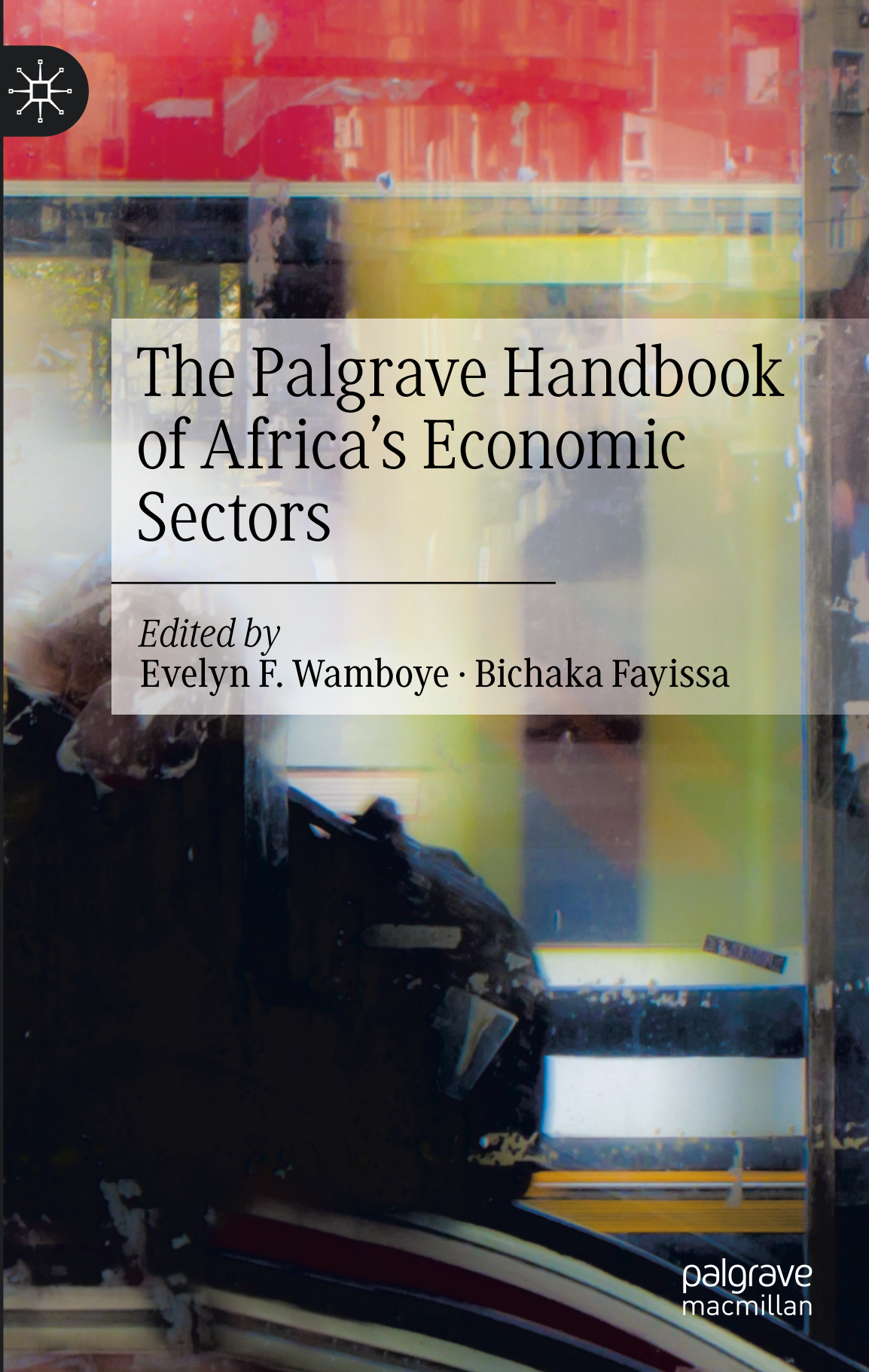

The Palgrave Handbook of Africa's Economic Sectors

Edited by
Evelyn F. Wamboye · Bichaka Fayissa

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Introduction

The Question of Africa's Economic Sectors and Development

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1 Introduction

Africa is a continent with enormous primary resources and development potential, and yet it is in a constant state of development flux. As demonstrated by the remarkable spurt of economic growth that started in the late 1990s, its development path has defied conventional economic theories, and the traditional paths taken by developed countries and emerging economies (such as China). Contrary to being industry-led, Africa's development is currently services sector–led, with the sector contributing about 50 percent of the output (see Figs. 1 and 2) and employing one-third of the labor force in sub-Saharan Africa (SSA) (see Fig. 3) and almost two-thirds in the Middle East and North Africa (MENA) region (see Fig. 4). This has left some economists and policy analysts wondering whether the observed growth is merely a mirage that will soon fade away, or if Africa is actually charting a new development model.

Undoubtedly, many (if not all) African countries recognize that the true path to sustained economic development is through industrialization, with the manufacturing subsector leading the way. In fact, the long-term development plans of many African countries have put industrialization at the

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heart of their development policies, while recognizing the unique role of the services sector. However, aggregate data over the last two decades show the manufacturing subsector, the cornerstone of industrialization, performing poorly both as a share of GDP (see Figs. 1 and 2) and growth rate (see Figs. 5 and 6), and its contribution to employment (see industry sector) is poor compared to both services and agriculture sectors (see Figs. 3 and 4).

In November 2017 in Cape Town, South Africa, Nobel Laureate Joseph Stiglitz remarked that "services, not manufacturing, will be the growth sector for Africa."[1] He also talked about the role of agricultural sector in Africa's industrialization.[2] But, such sweeping remarks on the importance of the services sector assume a monolithic continent and ignores the varying development plans of the countries in the region, and are reminders of the catastrophic failure of the structural adjustment programs in Africa and other developing regions (Thomson et al. 2017; Oppong 2014; Stein and Nissanke 1999).

Indeed, African countries are heterogenous and development theories that are most often based on the assumptions of conditions in the West do not offer much in explaining the complex realities in Africa and other developing regions. Most of the theories were formulated in conditions where technology was less sophisticated and the services sector minimally tradable. Certainly, African countries are poised to chart varying development paths with the services sector (especially education and infrastructure services) serving as a backbone to industrialization as evidenced in their development plans.

In light of the above perspectives, this handbook provides a reference resource to showcase insightful and nuanced perspectives on the twenty-first-century realities of Africa's economic sectors, contemporary opportunities impacting their competitiveness, and their contribution to sustainable economic growth and development of African countries. It also considers the potential benefits that the sectors [broadly defined as agriculture, industry, and services] could harness from the Continental Free Trade Area (*CFTA*) agreement that African countries signed in Rwanda on the 21st of March

[1] https://acetforafrica.org/highlights/services-not-manufacturing-will-be-growth-sector-for-africa-stiglitz-says/.

[2] Stiglitz comments on Africa's agricultural sector: "agriculture presents the easiest path to industrialization and economic transformation. Increasing productivity and output in a modern agricultural sector would, beyond improving food security and the balance of payments (through reduced food imports and increased exports) sustain agro-processing, the manufacturing of agricultural inputs, and a host of services upstream and downstream from farms, creating employment and boosting incomes across the economy." https://acetforafrica.org/highlights/services-not-manufacturing-will-be-growth-sector-for-africa-stiglitz-says/.

2018. Particularly, how CFTA could increase the efficiency and competitiveness of these sectors and enhance Africa's participation in the global value chain (GVC).

The twin goals and contribution of this handbook to the scholarship and research are to: (1) provide evidence-based holistic analyses of the past and current state of Africa's economic sectors, with a strong emphasis on tangible and specific policy recommendations for the purpose of enhancing future economic growth and sustainable development, and (2) assess the impact of the first ever Continental Free Trade Area in Africa (*CFTA*) and its implications for Africa's integration into the regional and global economies and competitiveness.

The Handbook also gives an in-depth analysis of the fundamental factors [such as infrastructure development, social media, globalization, institutions, policies, and human capital development] that have significant impacts on the sectors' actual and potential expansion and growth, and in turn, determine how these sectors contribute to sustainable economic growth and development in Africa, with differential effects across the continent. The handbook shies away from traditionally researched topics on Africa (such as resource curse, foreign aid, and foreign capital flows among others), and instead, focuses on new and refreshing topics that have much relevance on the current state of Africa's development trajectory; injecting novel ideas in literature and motivating the reader to gain new knowledge.

2 Africa's Economic Sectors and Sustainable Economic Growth and Development

Overview of the Sectors

For over 2 decades now, physical capital growth has been the primary driver of gross domestic product (GDP) growth in Africa; while the services sector has been the biggest contributor to its GDP (AfDB 2020),especially in SSA subregion (see Fig. 1). Sectoral shares in GDP vary across the sub-regions and individual countries; albeit the services sector being the biggest contributor, with its average value added as a percentage of GDP ranging between 48 and 50 percent during the 2000–2019 period in the MENA and SSA subregions, respectively (see Fig. 1). The second largest contributor to Africa's GDP in both MENA and SSA is the industrial sector followed by agricultural sector. Particularly, the value added of industry's sector output in MENA's

GDP, averaged about 45 percent in the last two decades, while in SSA, it averaged about 27 percent. Agricultural sector's share in GDP is relatively small compared to the other two sectors, especially in the MENA sub-region. For instance, while the average percentage share of the agriculture sector in MENA's GDP was only five percent that of SSA was roughly 16 percent during the aforementioned period (see Fig. 1).

At the country level, the importance of these sectors varies as well, but services sector is still the largest contributor to GDP in many of the countries (see Table 1 for selected countries). Also, in the three Africa's largest economies (Nigeria, South Africa, and Egypt) by GDP, the services sector employs more labor force compared to the other sectors, followed by agriculture (see selected countries in Table 1). What the data demonstrates is the heterogeneity across sub-regions and countries and both researchers and policymakers should take that into consideration.

Nevertheless, it is important to note that informal sector accounts for roughly 50–80 percent of GDP and 60–80 of employment and up to 90 percent of new jobs created (UN 2015; Benjamin et al. 2014; Grynberg 2013). Thus, the discussions on the sectoral shares of GDP and employment, in this handbook are based on the formal sector, which is as low as 20 percent in some countries.

Chapter Synopsis

Agricultural Sector

Agricultural sector is the backbone of many African economies, both in terms of providing material input for the industry and informal sectors and employment creation. As mentioned above, it employs more than 50 percent of SSA's labor force in the formal sector alone and contributes roughly 10–25 percent of GDP in Africa (see Fig. 7). The chapters in this section explore different dimensions of the agricultural sector from issues related to land acquisition (Chapter 4) to African cotton (Chapter 2) and agricultural credit guarantee schemes (Chapter 6) both from macro (Chapters 2 and 4), and micro (Chapters 3, 5, 6, 7, and 8) perspectives.

Chapters 2 and 4 take a macro perspective to evaluate the conundrums in the cotton sector and analyze FDI in land and agro-industry in Africa, respectively. For example, Chapter 2 provides a critical illustration of the cotton value chain, allowing for the key factors and frailties of Africa's cotton

subsector to emerge. It starts with a discussion of the evolution of cotton's industrial organization through reforms to the current pressing issues related to sustainability and climate change. It also examines the hurdles that hinder the subsector from flourishing. Chapter 4 on the other hand, investigates whether large-scale land acquisitions (LSLA) in Africa are associated with the heightened agro-industry investments and if the association has any impact on economic growth. Using network analysis to test the correlation between network of LSLA and agro-investments, the authors find a moderate and significant positive correlation between LSLA and agro-industry investments, and the correlation is driven mostly by key investor countries (USA, Saudi Arabia, and Great Britain), who systematically couple LSLA with agro-investments. Related studies have found a negative impact of LSLAs on local livelihoods (Hufe and Heuermann 2017).

Chapters 3, 5, 6, 7, and 8 provide a country-level analysis of various reforms of the agricultural sector for Senegal (Chapter 3), South Africa (Chapter 5), Nigeria (Chapters 6 and 8) and Tanzania (Chapter 7). In Chapter 3, *the authors* examine the reform efforts initiated in Senegal for the fisheries industry via massive investments in capacity, subsidies, and tax exemptions since the early 2000s, and their associated outcomes from a political economy perspective. They analyze the various dimensions of the reform with a focus on the small-scale/artisanal subsector and shed light on the constraints and shortcomings that continue to hamper the effectiveness of the reform. Chapter 5 unearths the factors driving the sluggish agricultural production and agro-processing and the accompanying job losses in South Africa and explore possible solutions. The chapter discusses two key themes: (a) the prevailing food value addition policies implemented in South Africa and the resulting impact on agro-food processing output, and (b) the challenges inhibiting South Africa's small-scale farming sector from achieving the food value addition objective. The author concludes that food value additions are mostly hampered by chronic under-funding of the sector, impacting vital support functions.

Chapter 6 uses historical lenses to discuss the Agricultural Credit Guarantee Scheme in Nigeria since 1977. The basic argument in this chapter is that lack of well-functioning agricultural programs is a major obstacle to achieving agricultural development in Nigeria. The study reveals that several credit schemes have been put in place to finance agricultural production; however, these schemes have not been able to provide adequate loans to farmers. Thus, the authors recommend that farmers in Nigeria should be granted opportunities to have co-operative societies to easily obtain funds without the usual stringent conditions.

In Chapter 7, the author examines the role of agricultural sector in Tanzania's industrialization and the challenges that hamper the sector from adequately contributing to the country's industrial sector. Finally, Chapter 8 discusses the economic potential of the oil palm tree (*Elaeisguineensis*) and its prospects as a global sustainable development project (Fig. 8).

Services Sector

Mobile technology has become a phenomenon in African countries and has spread faster than anyone could have imagined, and in turn, has re-invented the importance of the services sector in the African context. It has had a significant impact on all sectors of the economy, from banking to health, education, and agriculture; and formed the foundation of research and development in many African countries with e-platforms paving the way to innovation of products and services (see Fig. 9); and jumpstarting a wave of technology-driven industrial parks all over Africa, and business services in information technology-enabled service (ITES)-business process outsourcing (BPO). In fact, it is estimated that mobile technologies and services generated around $110 billion economic value in SSA alone, equivalent to 7.7 percent of GDP and is expected to rise to $142 billion (8.6 percent of GDP) in 2020 (AfDB 2019). In terms of employment creation, mobile technologies employed roughly 3.5 million people in SSA in 2016 alone (AfDB 2019). The COVID-19 pandemic has further shown the world that African countries are prepared to embrace new technologies to enable remote commerce and e-learning. These are just few of the many examples that demonstrate how the services sector is impacting the pace of change and development in Africa.

As mentioned before, African governments now recognize the important role of the services sector in their countries' long-term economic development plans. Foreign investors also see the future of the services sector in Africa and are now flooding to the continent with green field investments. In fact, among the top 10 areas that are benefiting from green field FDI in Africa are from the services sector, which included technology media and telecommunication, financial services, real estate, hospitality and construction, business services—including information technology enabled service (ITES)-business process outsourcing (BPO), transport and logistics, and electricity, gas and water (Fingar 2015; Lyttle 2016; World Investment Report 2017).

Finance and insurance: The banking subsector in Africa is doing relatively well compared to 30 years ago, but the high lending rates and wide interest spreads are potentially having a negative impact on small businesses and the real estate market (Shayanewako and Tsegaye 2018; Ndikumana 2016; Evans and Adjei 2014). Another subsector with a potentially large market in Africa is the insurance services, which is vital, not only to the healthcare industry, but also for hedging against indemnity (losses) associated with business risk. Healthy regulations in this subsector (as is in all sectors) are important to ensure fair practice and encourage competition**.**

Using panel data for 47 countries over the period 2000–2017, Chapter 12 evaluates the implications of inclusive development of the banking services in SSA. The authors show that banking services and corruption controls are citadels of inclusive development in Africa; however, the banking sector development and control of corruption do not produce positive synergies or effects on inclusive development. Complementing this view is Chapter 13, which explores the effects of financial development (as a source of credit to the private sector) on economic growth in the Economic Community of West African States (ECOWAS) and the benefits to individual member countries for belonging to a monetary union. Employing panel data analysis, they find that credit to the private sector has a positive impact on economic growth regardless of monetary union membership.

Education, skills, and training: Development plans of many Africa countries [such as South Africa, Tanzania, and Kenya] list education and human capital development in general as some of their priority areas. Most African countries (especially those in SSA) rank low on the human development index (HDI) that ranges between 0 (worst) and 1 (best). For example in the 2019 HDI report, only 6 countries (Tunisia, 0.74; Botswana, 0.735; Libya, 0.724; South Africa, 0.709; Egypt, 0.707; Gabon, 0.703) were ranked in the high development index category and only 12 (Morocco, Cabo Verde, Namibia, Ghana, Kenya, Equatorial Guinea, Zambia, Angola, Congo, Zimbabwe, Cameroon, and Comoros) were in the medium category, meaning that their index range between 0.697 and 0.554 (Human Development Report 2020). The remaining countries are in the low HDI category. Some countries like Kenya have instituted free primary education policy and many countries in Africa have increased the number of institutions of higher learning (including technical colleges and vocational schools). Kenya (with HDI of 0.601) has roughly 62 Universities and colleges and about 58 technical schools for a population of about 49 million people. On the other hand, Tanzania (with an index of 0.529) has about 31 universities, 29

vocational schools under the umbrella of vocational educational and training authority (VETA), and almost 900 training centers owned by government, private sector, and non-governmental organizations serving a population of 59 million people. Basically, these countries are doing a good job in terms of increasing the quantity of graduates, but the issue now is quality and how easily these prospects can be integrated into the job market upon graduation. Governments may now focus on assurance of learning to ensure quality (see, Chapter 17). Curriculum relevance should translate to market relevance. Questions such as—*(1) are the students being educated to solve problems in the domestic economy, or the rest of the world?, (2) are the students being exposed to current cutting-edge technologies on the market, or are they being taught technologies that were relevant in the 1950s, and (3) are these students being linked to the industry* via *internships?*—should guide curriculum design and quality control.

Institutions of higher learning within and across countries in the region should aim to develop areas of comparative advantage and the programs should also address domestic and regional needs to increase the employability of the new crop of graduates. For example, right now, Tanzania has only about 2190 medical doctors for a population of 59 million people. This translates to around 26,940 patients per doctor. Such numbers should signal to Tanzania that there is a dire need to train more doctors. The country could also conduct an internal assessment to understand what fields of medicine are of urgent need for the country.

Professional development and certification (and re-certification) of credentials are areas that are not so common in Africa. This refers to key professions such as nurses, doctors, engineers, accountants, and educators as well. There is very little incentive for these professions to be current in their fields. The importance of vocational training should also not be underestimated (see Chapter 9). Such training could help the informal sector, and as well, boost agriculture output in terms of good farming practices, how to develop a business plan, educating farmers on the importance of insurance, and how to access credit. Lastly, are the questions of affordability of college education, availability of relevant teaching and learning materials, and student–faculty ratio as addressed in Chapter 15. The overall importance of education in empowering vulnerable groups cannot also be underestimated as argued by the authors in Chapter 10.

Tourism: The need to enhance the potential of the tourism subsector goes without saying (see Chapter 11). For example, there is a need to diversify international tourist market sources without ignoring the domestic market, improve the infrastructure within country and in the region (this includes

reliable transportation system), and adopt people friendly immigration policies. Transportation cost is one of the determinants of tourism demand and, thus, tourists from neighboring countries should be promoted and encouraged. African countries with the tourism subsector prospect should develop travel packages that are attractive to tourists and market them to the target groups. They should also develop a business model that will help the sector, not only grow, but also thrive.

Other important subsectors addressed in this section are healthcare and social media marketing. In particular, Chapter 14 analyzes how Africa's public service infrastructure deficits impact healthcare subsector and corresponding macroeconomic implications when dealing with a pandemic such as the coronavirus in the continent. Chapter 16 on the other hand investigates the impact of social media marketing on performance of small- and medium-sized establishments in Tanzania. It adopts explorative research method and uses online focus group discussions conducted through Instagram, Facebook, and WhatsApp platforms to collect data on social media application and small- and medium-sized enterprises (SMEs) performance in Tanzania. The key take-away from Chapter 16 is that businesses engaging in social media marketing tend to perform well compared to those that do not. The chapter also analyzes the challenges facing these establishments in adapting digital marketing initiatives in Tanzania.

Industry Sector

The industrial sector is crucial in boosting a country's economic activities, increasing its value chain and labor productivity through new technologies, with real impact on economic development (AfDB 2019). It creates high-value formal sector employment with a potential to boost the informal sector through horizontal linkages. The tradable sector also immensely benefits from the industrial sector and in turn helps countries to integrate into the global value chain. Developed and emerging economies have been able to increase their national wealth through industrialization.

Africa has immense potential for high value-added industrialization that is augmented by its wealth of natural resources and an increasing consumer base (AfDB 2019). Existing data and anecdotal evidence lend credence to the above claim. For example, currently Africa has 5 of the 10 fastest-growing economies (Ethiopia—8.5 percent; Cote d' Ivoire—7.4 percent; Senegal—7 percent; Ghana—6.3 percent; Tanzania—6.4 percent) in the world with GDP growth rates of above 6 percent; and has the largest share of the world's

platinum, chromium, and diamonds, as well as bauxite, cobalt, gold, phosphate, and uranium deposits (Leke et al. 2010; AfDB 2019). Moreover, African Development Bank projects consumer spending to reach $1.4 trillion by the end of 2020 and increase to $2.1 trillion by 2025 and demand for food in urban areas to triple to $1 trillion in ten years (Signe 2018; AfDB 2019). Thus, the rich natural resource coupled with strong economic growth and consumer base, increasing regional economic integration through CFTA and diversification (especially in resource poor countries), high access to mobile technology and a young, entrepreneurial demographic, have the potential to attract diverse multinational enterprises and ensure that African countries, not only take advantage of the fourth industrial revolution, but also leapfrog it (AfDB 2019; AfDB 2018; Leke et al. 2010; AfDB 2020).

Chapters in this section explore different aspects of Africa's industrial sector. For example, Chapter 18 addresses questions on the link among the industrial sector, diversification, and intra-African trade. The continent's weak regional trade performance has been ascribed to factors ranging from limited supply capacities and multiple non-convertible national currencies to high trade barriers and infrastructural bottlenecks. The chapter examines the roles of product concentration and similarities in industrial structures across countries in explaining intra-African trade and finds that product concentration impedes intra-African trade while similarities in industrial structures between country pairs enhance it.

In the same vein, Chapter 20 evaluates the role of trade in the industrialization of African economies, but with a focus on *Aid-for-Trade* (*AfT*). The chapter shows that *AfT* can be instrumental in facilitating industrial development and building export capacities, thereby contributing to sustainable development in least developed African countries. Furthermore, Chapter 21 examines the effects of trade credit financing on firm growth using panel data for publicly listed firms in nineteen African countries for the period 1998–2016. They show that trade credit financing positively impacts firm growth.

Within the context of the globalization theme, Chapter 23 provides comparative analysis of major features of Chinese FDI in Africa [including its motivations, determinants, and position in the world], and its impact on African economies. The authors arrive at three major conclusions; (i) the Chinese investment has risen substantially in recent years, but remains small relative to the traditional investors from Europe and the USA, (ii) sectoral distribution and motivations of the Chinese FDI are similar to those from traditional investors (OECD member countries), and (iii) benefits of

China's FDI to Africa include investment in infrastructure, while its potential problems relate to the debt trap and lack of job creation.

Less developed economies generally industrialize through a regional pattern of knowledge and technology transfer. This sequence of structural transformation is often referred to as the "flying geese theory." Using Nigeria's shoe manufacturing industry as case study, Chapter 22 investigates claims identifying Chinese industrialists as "leading geese." An ethnographic survey of a private Chinese firm in Lagos and public Chinese partnership on technical vocational training in Aba support reasons to believe that skilled Nigerian shoemakers, rather than Chinese industrialists, are facilitating knowledge and technology transfer within the local economy via *imu-ahia*, an indigenous apprenticeship system that teaches an artisanal process to shoe cobbling in lieu of industrial method.

In Chapter 19, the authors focus on the gender dimension and the role of men in promoting gender equality and women's economic empowerment. Drawing on an action research that engaged men in supporting rural women in business in Uganda, the chapter examines the extent to which involving men in projects focused on increasing women's economic empowerment shifts attitudes and gender dynamics that inhibit women's success in business.

3 Cross-Sectoral Structures for Growth

Trade and the African Continental Free Trade Area

The trade sector is another key sector for Africa's growth and development. The CFTA that was signed on the 21st of March 2018 in Rwanda offers an opportunity to boost intra-Africa trade by approximately 52 percent by 2022. This calls for scrutiny because the agreement requires signatory countries to eliminate tariffs from approximately 90 percent of their commodities. Moreover, the CFTA calls for free movement of investment and persons, and the acceleration of the African customs unions and the Continental Customs Union.

The CFTA represents both a challenge and an opportunity to Africa in light of the Sustainable Development Goals (SDGs). The major challenge is overlapping membership in regional economic communities (RECs) and slowness of regional integration for continental harmonization. In particular, the concern is how the regulations of existing RECs will be harmonized with

those of the CFTA. On the other hand, some of the rewards include opportunities for economies of scale, enhanced competition, wider market access, and efficient allocation of resources. Unfortunately, there is very scant scholarship on the nexus between these "challenges and benefits" and various economic sectors (agriculture, service, and industry) in Africa. Consequently, chapters in this section attempt to address that gap.

Chapter 24 uncovers the effects of exporting manufactures, primary commodities, food, and agricultural products, as well as the impact of importing capital and semi-capital goods, on structural transformation in 21 sub-Saharan African countries that were covered in the inaugural African Transformation Report (ACET 2014). The authors find that the import of capital and semi-capital goods can be a good predictor of structural transformation while the concentration of exports in primary commodities and food and agricultural products predict weak structural transformation. Moreover, they find that higher shares of capital goods in total imports have greater positive influence in resource rich countries.

The remaining chapters in this section focus exclusively on the CFTA. For example, Chapter 25 evaluates the impact of the tax structure of CFTA on member countries' global competitiveness; and the success of the agreement within Central African Economic and Monetary Community (CEMAC) and the West African Economic and Monetary Union (WAEMU).

Chapter 26 assesses the potential challenges of the *CFTA* on Nigeria's textile industry. The authors find that while *CFTA* provides Nigeria an opportunity to gain access to Africa's market of 1.2 billion people, the country's textile might not benefit since it is already on the verge of total collapse. Evidence from two major textile firms (Sunflag and United Textile Companies) shows that the industry is struggling to survive due to the influx of cheap fabrics from China, smuggling of used clothes from neighboring states, infrastructural deficit such as power supply, and poor access to finance to procure new types of machinery. On the other hand, Chapter 27 evaluates the potential failures and successes of the trade liberalization agenda set by the *CFTA* by evaluating the motives and incentives of different actors including domestic businesses, multinational corporations, African and foreign governments, and the development community. The analysis in the chapter yield two key findings; (1) it is too early to have a clear picture of individual groups' and actors' interests as well as of the winners and losers, and (2)since governments are restricted by political circumstances, they are bound to deviate from the first-best, or textbook solutions.

Using the 2015 input–output tables for 47 African countries Chapter 28 studies the trade capacity of the food and beverage sector to gauge its trade potential in the CFTA. The chapter analyzes the real benefits of the sector within the context of environmental and import costs, and conducts simulation exercises to determine the effects of gradual and total removal of tariffs on the sector. Conversely, Chapter 29 uses Nigeria as a case study and looks at the trade and investment benefits of joining the *CFTA*. Specifically, the chapter explores the extent to which the *CFTA* can improve the efficiency of Nigeria's economy and how the capacity of domestic industries can be strengthened to compete favorably with rivals within CFTA.

Finally, using the gravity model, Chapter 30 assesses the impact of regional trade integration in the Common Market for Eastern and Southern Africa (*COMESA*), the Southern African Development Community (*SADC*) and the East African Economic Community (*EAEC*) on the exports of goods and services of member countries.

Infrastructure Development

Africa (especially SSA) has an infrastructure deficit. The Infrastructure Consortium for Africa (ICA) report estimates a deficit of about $130–170 billion for providing power, water and sanitation, roads, and information and communication technologies (ICT) (ICA 2018). Poor infrastructure has a negative impact on the cost of doing business, industrialization, and economic growth. It affects all aspects of the economy including human capital development, especially in the age of COVID-19 pandemic where e-learning and conducting business via online platforms is paramount. African governments are taking infrastructure investment very seriously. For example, by 2016, they had invested in a total of 286 infrastructure projects worth $324 billion (Deloitte 2016). They have also increased the road density (length of road per square kilometer) from 7.9 km in 2010 to 8.2 km in 2016; but this represents only 30 percent of Asia's density (AfDB 2016). Moreover, both traditional and new funding partners are now investing in Africa's infrastructure (AfDB 2016). However, one of the factors retarding industrialization on the continent is the insufficient stock of productive infrastructure in power, water, and transport.

The energy and water subsectors serve all other sectors. Reports on climate change effects show that Africa would be severely hit if nothing is done on

this front. One area, in particular, where Africa has vulnerability is agriculture. Much of Africa's agriculture relies on rainwater. Thus, portable **water** could reduce the dependency on rainwater and enhance irrigation technology. Water is also necessary for industrial production, the healthcare sector, and domestic use as well. Undoubtedly, the market for water in Africa is huge. On the other hand, energy is the lifeline of manufacturing and pretty much all other sectors (including health, education, and ICT). A 2016 AfDB report showed that energy costs are high in Africa compared to other developing regions. Also, electricity is scarce and unreliable. For example, the cost of energy in Kenya is $0.21 per kWh compared to only $0.06 in China and India (AfDB 2016). While African countries (in coordination with African Development Bank) have made a tremendous investment in this sector, more is needed to reduce the cost and increase distribution. Some alarming data show that between 2006 and 2016, 79 percent of firms in SSA experienced power outage (roughly 8.6 power outages a month) (AfDB 2016).

Chapter 33 examines the relationship between infrastructure development and sectoral growth in 29 SSA countries during the 2000–2014 period. Empirical evidence points to positive and significant impact of infrastructure development on both the industrial and services sectors' growth. Surprisingly, however, they do not find any relationship between infrastructure development and the agriculture sector growth. Conversely, Chapter 34 explores the impact of infrastructure development at the household level through the gender lenses. In addition to examining the unique effects of female labor force participation on sectoral value additions, the *chapter* investigates the role of domestic infrastructure in mediating the relationship between female labor force participation and sectoral growth. Utilizing panel data spanning from 1990 to 2017 for 33 countries in SSA, the authors find that while female labor force participation positively affects sectoral value additions, its effect is only significant for the service sector, which is further magnified by a well–developed infrastructure sector.

Using panel data, Chapter 31 investigates the effects of trade-induced technology progress (proxied by parts and components imports) on economic growth in SSA. The authors find that imported parts and components have some impact on economic growth; however, the impact of technology-intensive imports on economic growth is not clear. Results also reveal that the link between trade-induced technology progress and growth in the context of African countries is conditional on the level of economic development. In particular, the growth effects of trade-induced technology progress (as

measured by imports of parts and components) are greater in middle-income countries than in low-income African countries.

Global value chain (GVC) participation—which heavily relies on well-developed infrastructure—has been identified as one of the means by which developing countries can attain inclusive growth. African countries are now poised more than ever to actively participate in GVC. Many countries on the continent are now investing in ICT related infrastructure with public–private sector partnership, and have made tremendous efforts to attract ICTs related FDI, especially information technology-enabled services (ITES) such as business process outsourcing (BPO). Also, they are heavily investing in industrial parks, some of which are ITES focused, such as Kenya's Konza technocity. Moreover, the CFTA, if successful, provides a good opportunity for the continent to expand its GVC participation (Kihiko 2018). Chapter 32 investigates inclusive growth effect of SSA countries' participation in GVC and find that GVC participation drives inclusive growth through employment creation.

Governance

One of the seven aspirations in *Agenda 2063*, the African Union (AU) blueprint and master plan for transforming Africa into the global powerhouse of the future is governance. The third aspiration specifically reads "***An Africa of good governance, democracy, respect for human rights, justice and the rule of law***." *In other words, the member states agreed to build and promote an Africa with universal culture of good governance, democratic values, gender equality, and respect for human rights, justice, and the rule of law.* This includes strong and *capable institutions* and *development-oriented and visionary leadership in all spheres and at all levels*. Thus it is with no doubt that Africa as a unit recognizes the importance of good governance and strong institutions. In fact, studies have found a direct relationship between good governance and strong institutions and investment, economic development, and economic growth (Acemoglu et al. 2001; Acemoglu and Robinson 2008; Pereira and Teles 2011; Yildirim and Gokalp 2016).

The chapters in this section look at different aspects of governance and institutions in general and their implications in Africa. For example, employing System Generalized Method of Moments, Chapter 35 examines the interaction effects of sectoral value added and fiscal and monetary policies on income inequality in 43 sub-Saharan African countries during the 1996–2017 period. Their analysis leads them to conclude that to reduce

income inequality in Africa, policymakers should reduce taxes in the agricultural sector and compensate with an increase in taxes in the industrial sector. On the other hand Chapter 36 provides a review of the empirical studies on wage inequality in SSA and theoretical studies on market discrimination. It also provides descriptive analysis on disparities in the labor market and human development outcomes, which show significant gaps in employment and human development achievements with a declining trend over the past years.

Chapter 37 attempts to uncover two issues; (a) the impact of *Aid-for-Trade* (*AFT*) on trade costs borne by African countries, and (b) the role that infrastructure plays in mediating the effects, and the differential impacts of *AFT* from bilateral (*BLT*) and multilateral (*MLT*) sources using comprehensive bilateral trade cost data and a new index of infrastructure over the 2004–2011 period. The authors arrive at two key conclusions; (i) increased *AFT* disbursements to African economies (both at the aggregate level and across the sources) lead to significant reductions in the costs of trade in African countries, and (ii) the relative impact of *AFT* is typically more pronounced in recipients with improved infrastructure and the level of *AFT* disbursements received from bilateral, or multilateral sources, suggesting the need for targeting infrastructure investments for enhancing the effectiveness of *Aid-for-Trade*.

In the 1980s several African countries embarked on economic liberalization programs based on findings in empirical literature, which suggested that liberalization promoted economic growth; and in the early 1990s they complimented the economic liberalization programs with political liberalization. The programs yielded mixed results. Thus, Chapter 38 contributes to the non-ideological debate on the appropriate development model for African countries by investigating the role of key indicators (cost of doing business, foreign direct investment, and population) of market governance in driving rapid economic growth. The authors find that the total effects of the cost of doing business on economic growth are negative, unlike net foreign direct investment and population growth, which have positive effects.

In Chapter 39, the author argues that economists in developing countries should abandon the ideas enshrined in the Washington consensus, and resist teaching mainstream economic theory, because the idealized markets of mainstream economic theory differ greatly from real markets in ways that disadvantages those who are at the lower end of the global income distribution. The author asserts that real markets reduce the chances of those born into poverty to succeed in today's complex global economy. Thus the chapter

looks at the intrinsic imperfections that are often overlooked or trivialized by mainstream economists. For example, the costs associated with acquiring reliable information about market conditions, the myriad of problems associated with bounded rationality, and manipulation of utility function of market participants.

Chapter 40 addresses the relationship between GDP-focused growth, unpaid work, and gender with respect to sustainable economic growth in Africa; and highlights the opportunity to establish value for work independent of a market-based wage. While Chapter 41 uses panel data for 21 SSA countries for the 1984–2017 period to show that exchange rate volatility is directly harmful to tax revenue performance, and indirectly through trade openness. Last but not least, Chapter 42 adds to the literature on the relationship between trade and conflict by examining the impact of internal conflicts on trade structure. Two hypotheses are tested: (1) internal conflicts impede a shift to manufacturing (as measured by higher technology exports), and (2) internal conflicts reduce the willingness to send complex goods to countries experiencing conflict. The authors arrive at the conclusion that internal conflicts reduce exports and impede shifts to manufacturing in Africa.

4 Conclusion

This Handbook provides an in-depth analysis of the fundamental factors [such as infrastructure development, social media, globalization, institutions, policies, and human capital development] that have significant impacts on Africa's economic sectors' actual and potential expansion and growth, and in turn, determine how these sectors contribute to sustainable economic growth and development, with differential effects across the continent. The handbook shies away from traditionally researched topics on Africa (such as resource curse, foreign aid, and foreign capital flows among others), and instead, focuses on new and refreshing topics that have much relevance on the current state of Africa's development trajectory; injecting novel ideas in literature and motivating the reader to gain new knowledge. It is an excellent read for students in graduate school, policymakers, and researchers.

Appendices

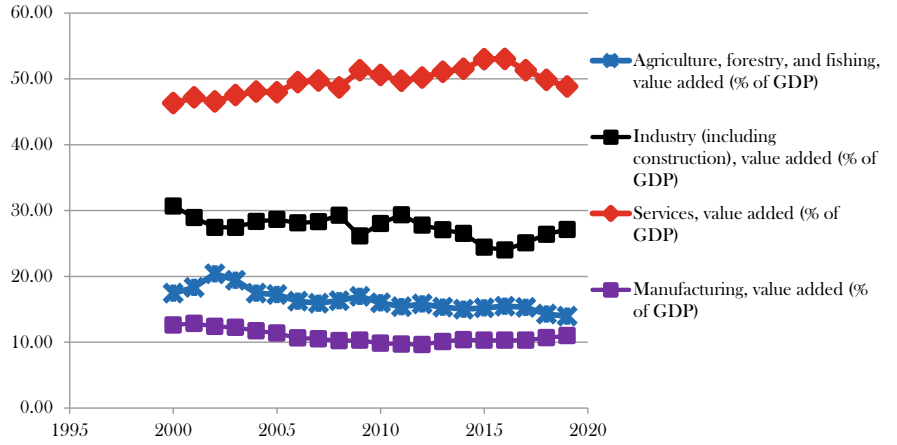

Fig. 1 Sectoral share in GDP, Middle East and sub-Saharan Africa region (*Source* Author's calculations based on World Development Indicators Online database [Downloaded on January 25, 2021])

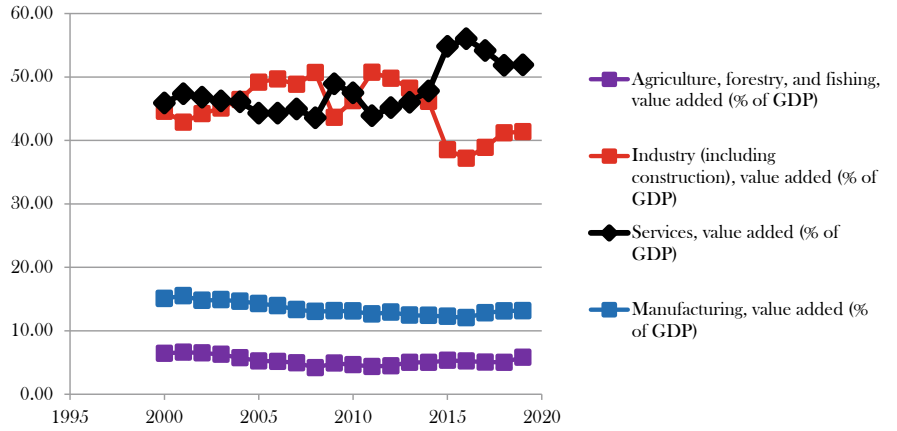

Fig. 2 Sectoral share in GDP, Middle East and North Africa region (*Source* Author's calculations based on World Development Indicators Online database [Downloaded on January 25, 2021])

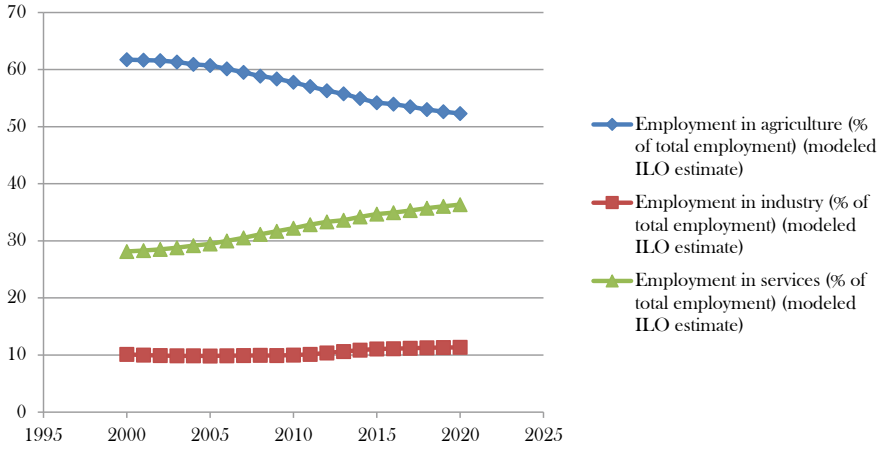

Fig. 3 Sectoral share in Employment, sub-Saharan Africa region (*Source* Author's calculations based on World Development Indicators Online database [Downloaded on January 25, 2021])

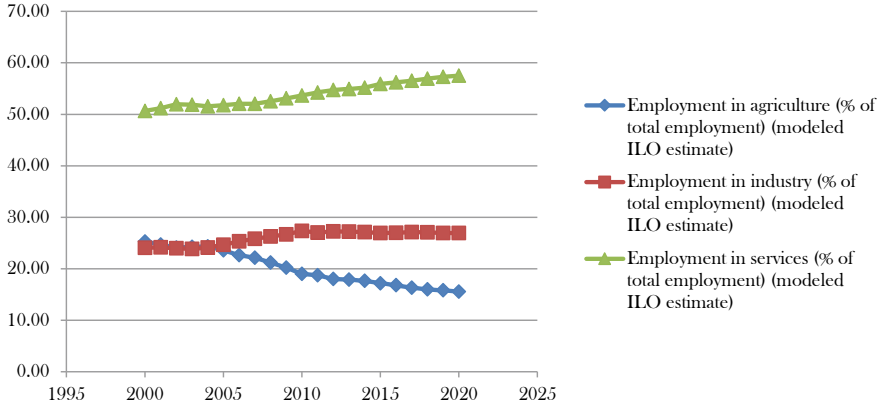

Fig. 4 Sectoral share in Employment, Middle East and North Africa region (*Source* Author's calculations based on World Development Indicators Online database [Downloaded on January 25, 2021])

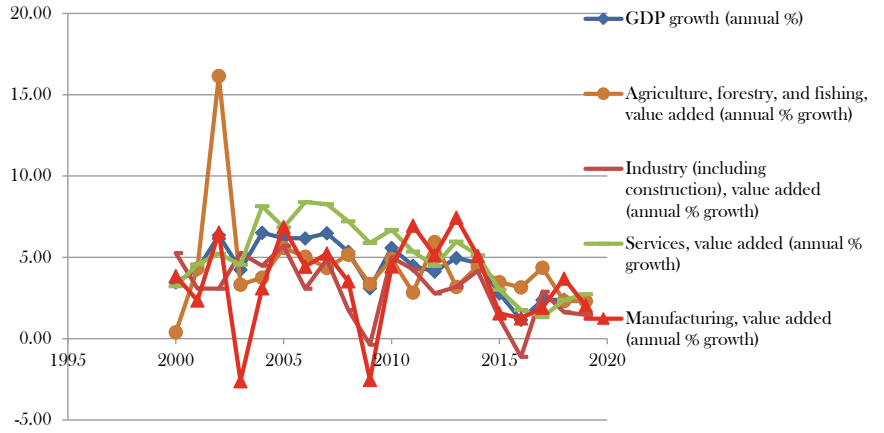

Fig. 5 Sectoral growth rates, Middle East and sub-Saharan Africa region (*Source* Author's calculations based on World Development Indicators Online database [Downloaded on January 25, 2021])

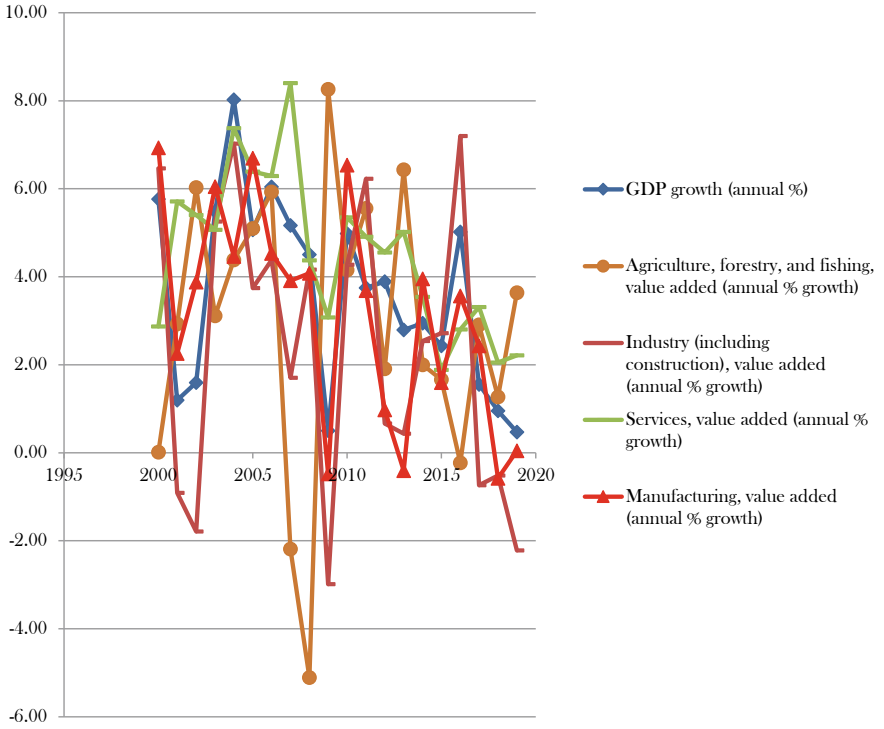

Fig. 6 Sectoral growth rates, Middle East and North Africa region (*Source* Author's calculations based on World Development Indicators Online database [Downloaded on January 25, 2021])

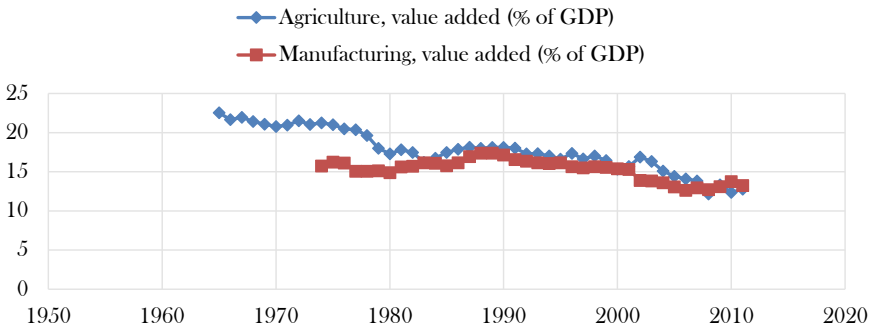

Fig. 7 Agriculture and manufacturing sectoral shares in GDP, Africa (*Source* Author's calculations based on African Development Indicators Online database [Downloaded on September 22, 2018]))

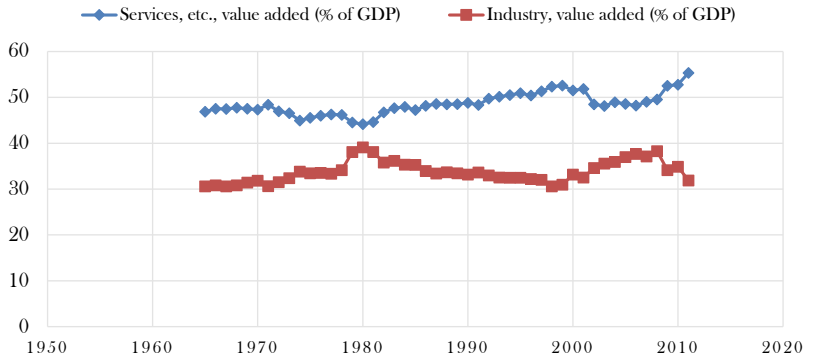

Fig. 8 Services and industry sectoral shares in GDP, Africa (*Source* Author's calculations based on African Development Indicators Online database [Downloaded on September 22, 2018])

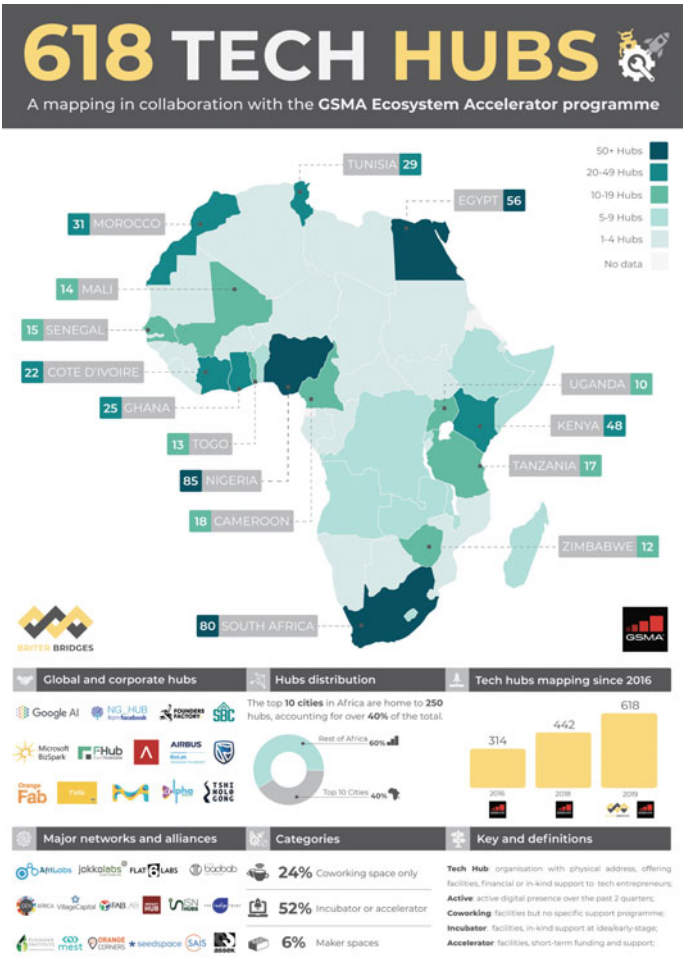

Fig. 9 Africa innovation hubs

Table 1 Average country-level sectoral output (% of GDP) and employment (% of Total Employment), Averaged over 2000–2019 Period

	Egypt	Ghana	Kenya	Morocco	Nigeria	South Africa	Tanzania
Agriculture, forestry, and fishing, value added (% of GDP)	13.01	27.25	26.98	12.57	24.28	2.51	24.25
Industry (including construction), value added (% of GDP)	35.17	26.02	17.33	25.89	25.43	27.20	22.33
Services, value added (% of GDP)	48.55	39.55	47.04	51.21	49.34	60.37	40.94
Employment in services (% of total employment) (modeled ILO estimate)	48.14	37.59	35.19	38.38	46.91	68.81	23.33
Employment in industry (% of total employment) (modeled ILO estimate)	23.48	15.62	7.27	20.91	11.50	24.96	5.56
Employment in agriculture (% of total employment) (modeled ILO estimate)	28.38	46.78	57.55	40.71	41.59	6.24	71.11
Manufacturing, value added (% of GDP)	16.55	9.07	10.32	16.13	9.70	14.01	8.37

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Agriculture Sector

The African Cotton Sector: Old and New Conundrums

Lorenza Alexandra Lorenzetti

1 Introduction

Cotton is a raw material from which a number of products are derived: lint for yarn; textiles; garments; sanitary and medical materials; seed cake for animal feeds and fertilizer; edible oil for cooking and soap stock; hulls for livestock feeds and poultry litter; linters for cotton swabs, paper, plastic and film manufacturing; and pharmaceutical products. It is produced in little less than 80 countries, while trade in raw cotton for lint involves about 110 countries and a 13.2 billion US$ in export value (UN COMTRADE 2017). The international market is highly competitive and dominated by major exporters (USA, Brazil and India) and importers (China, Vietnam and Bangladesh) and is projected to expand further as a consequence of global cotton consumption and production expansion from 2019 to 2024 (OECD 2019).

Africa has a comparative advantage in the production of cotton. The plant thrives in the African agro-climatic conditions and is grown from Morocco to South Africa (Fig. 1), although 75% of the continent's production comes from the West African region. At the country level, cotton contributes to national economic growth, employment (70% of the workforce in West Africa, ITC, UEMOA 2018) and trade earnings through exports of the

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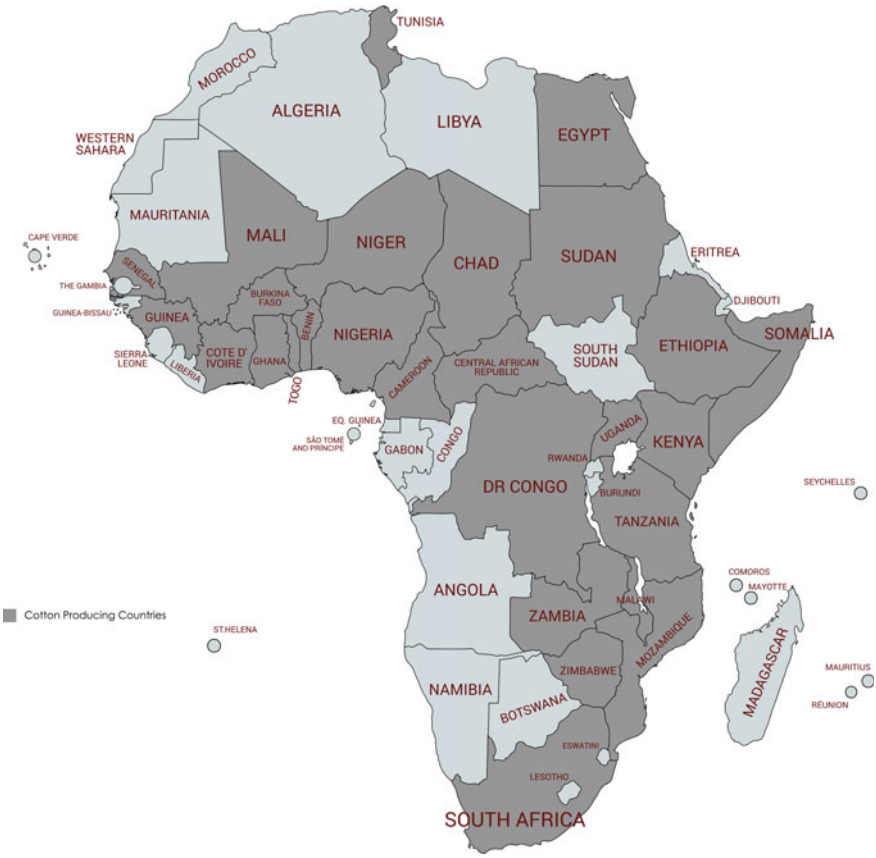

Fig. 1 Cotton-producing countries in Africa (2019) (*Source* USDA)

raw material, which provides access to foreign exchange. At the household level, cotton is an important cash crop enabling millions of farmers (15 million in the West African region alone, ITC UEMOA 2018) to exit subsistence farming, and the income generated from the crop contributes to rural household food security and cash for non-food purchases. Throughout the continent, it is produced by small-scale farmers (SSF) on small family farms with an average size of less than one hectare with relatively low levels of inputs and relatively inexpensive family labor compared to many other cotton-producing regions in the world. The International Cotton Advisory Committee (ICAC) rates Benin, Burkina Faso and Mali, where 75% of African production and shipments originates, as the three lowest cost cotton producers globally. Withstanding the continent's overall decline in global agricultural trade, Africa exports about 98% of its raw cotton, and the share of the cotton trade from Africa more than doubled from 1980 to 2005 keeping

more or less stable since (United States Department of Agriculture, USDA, data), awarding cotton the title of 'Africa's white gold'. With its recognized high-quality (top-quality cotton for Egyptian Extra Long Staple), Africa is the third global cotton exporter with 15% of global exports projected to continue growing at 2.6% p.a. in the coming decade (Cotton Outlook, USDA 2019).

The productivity and profitability of cotton production and processing are key determinants of growth and poverty alleviation across much of the continent (Brambilla and Porto 2011; Minot and Daniels 2005). Despite its economic importance, cotton is a controversial crop, which is at the centre of debates on globalization, structural adjustments, biotechnology, agricultural subsidies, poverty alleviation and sustainable development. In addition, the sector faces pivotal conundrums. Some are inherited from the past, such as the structural weaknesses that have become apparent since the 1980s and the missing final stage of the value chain, while other vulnerabilities have emerged more recently, such as sustainability, also in relation to climate change.

The rest of the chapter is organized in two parts. The first part (Sects. 2, 3, 4) provides a comprehensive and critical overview of the African cotton value chain allowing for the key factors and vulnerabilities of the sector to emerge. The second part tackles the past and present quandaries in the sector. Section Old Conundrums, but still Thriving illustrates the dynamics of the African cotton sector from an industrial organization perspective and the missing end of the value chain. Section "Emerging Conundrums" explains the emerging conundrums and suggests potential solutions, followed by concluding remarks (Tables 1, 2, and 3).

Table 1 Raw cotton world exports 2017

Continent	% World raw cotton exports	US $
North America	45	5.95B
Asia	19	2.56B
Africa	9.8	1.29B
South America	11	1.39B
Oceania	11	1.47B
Europe	4	529M

Source USDA (2018)

Table 2 Raw cotton exports in Africa by country 2017

Country	% of Africa raw cotton exports	US $
Burkina Faso	14	181M
Cameroon	14	180M
Benin	12	148M
Cote d'Ivoire	9.5	123M
Sudan	9.3	120M
Mali	9.3	120M
Egypt	7.0	89.6M
Togo	5.8	74.8M
South Sudan	4.7	60.1M
Zambia	2.7	34.7M
Tanzania	2.3	29.5M
Uganda	2.2	28.8M
Zimbabwe	1.6	20.8M
Chad	1.5	19M
Mozambique	1.2	15.7M
Senegal	0.94	12.1M
Nigeria	0.75	9.62M
Madagascar	0.37	4.76M
Guinea	0.30	3.88M
Malawi	0.27	3.5M
Ethiopia	0.27	3.41M
Central African Republic	0.23	2.9M
Ghana	0.21	2.69M
Kenya	0.038	486k
Sao Tome and Principe	0.023	301k
Tunisia	0.00027	3.47k

Source USDA (2018)

2 A Critical Overview of the African Cotton Value Chain

A cotton value chain can be generically considered a simple linear string of transformations of raw material into a final consumer product, typically with about five stages: production, processing, distribution, retail and consumption. In fact, cotton travels through a much more complex supply chain involving a number of interconnected stages, which include (origin of) farm inputs, farm technology, cultivation, harvesting, storage and processing. Processing entails the extraction of fibres, the primary processing of fibres for marketing, the secondary processing of fibres to yarn and then dyeing and more processing to convert the yarn into fabrics to produce clothes and garments. The value chain is usually divided into two separate value chains:

Table 3 Raw cotton production, area harvested and yield by country in Africa 2019

Country	Production (1000 480 lb Bales)	Area harvested (1000 HA)	Yield (KG/HA)
Benin	1450	675	468
Mali	1425	740	419
Burkina Faso	1200	725	360
Cote d'Ivoire	830	410	441
Sudan	600	200	653
Cameroon	565	250	492
Tanzania, United Rep. of	400	500	174
Egypt	350	100	762
Togo	265	185	312
Nigeria	235	210	190
South Africa	215	45	104
Zambia	210	130	352
Chad	200	220	198
Ethiopia	200	80	544
Zimbabwe	190	200	207
Uganda	125	75	363
Mozambique	115	125	200
Malawi	90	80	245
Senegal	35	23	331
Central African Rep.	32	32	218
Ghana	28	16	381
Kenya	25	30	181
Congo The Dem. Rep. of	15	30	109
Guinea	14	12	254
Tunisia	10	2	1089
Niger	9	5	392
Somalia	7	12	127
Morocco	1	1	218

Source USDA (2019)

the cotton crop value chain and the textile value chain. In addition, each step must be supported by institutional services, such as infrastructure, credit, transport, markets, grading, research and extension.

What follows next is a critical analysis of the African conventional cotton value chain, which allows for advantages and vulnerabilities of the sector to emerge.

Land Preparation

Land preparation is a labor-intensive activity rarely done with the aid of machinery in this part of the world. Cotton in Africa is generally produced by SSF, whose farms are typically two hectares. Conventional cotton is considered a particularly demanding crop that causes land exhaustion, possibly leading to soil degradation and eventually desertification. This has been experienced throughout the West and Central African region (WCA), for example, despite (or seemingly due to) the constant use of fertilizers (Hofonga 2018). Thus, especially in cotton cultivation areas, soil fertility must be accounted for. Extension services are necessary to educate producers on the correct use of fertilizers, successful crop rotation and other measures to avoid a decline in soil fertility, soil erosion and desertification.

Planting and Cultivation

Cotton is an input-intensive crop. In the planting stage, inputs include seeds, fertilizers, pesticides and labor. Of the total farming costs; pesticides comprise the largest share, and cotton is among the highest pesticide-consuming crops (Pesticide Action Network, PAN 2018). Inputs necessary for conventional cotton production are expensive for the African smallholder, and due to a lack of credit associations, they generally need to be purchased on a credit basis. Where this is offered, there is an implicit agreement that the SSF will sell their final harvest to the ginners who give out the credit. Such arrangement has remained the only efficient alternative that the small farms seem to have on the continent (Gray et al. 2016; Serra 2012; Poulton et al. 2008; Abudullahi and Ayele 2008). Input provision is often pointed out as the weak link in the value chain that makes a competitive cotton sector fail as a consequence of a coordination failure, which allows for SSF to side sell, preventing ginners from recovering the cost of input credit provision.

Particularly important is the quality of seed inputs. This is determined by variety (which should not be mixed), production, selection, timeliness of distribution and storing, all of which have consequences for productivity and fibre quality. Research plays a role not only in the development of seed variety but also in seed reproduction, which counteracts the distribution of 'second-hand' seeds (which entails poor quality and low germination). An example of poor lint quality onset (and a consequent discount on the market price) was recorded in 2006/2007 in Uganda, partly due to the breakdown in the seed-wave, which caused the sector to use 2002 (old) seeds (Cotton Development Organisation Uganda 2010; Baffes 2009). Research, including seed multiplication, remains mainly a public expenditure matter in Africa and private

sector participation in the research stage of the cotton chain is still trivial (Jensen et al. 2019; Lorenzetti 2013).

Harvesting

Cotton can be either harvested by hand or with the aid of specific machines. In Africa, cotton is still mainly hand-picked. This was once considered an advantage because it protects the quality of cotton and delivers cleaner cotton, making it a potential candidate for a premium price on international markets. However, hand-picking often entails the use of polypropylene (PP) bags, which contaminates cotton[1] and eventually affects textile quality.[2] On the other hand, although machine-picking is less accurate,[3] causes pollution,[4] is harsher on the flower than hand-picking, and results in an overall lower quality of lint; it is faster and produces more reliable results. Consequently, international merchants have been showing preference for the reliability of machine-picked cotton, which currently trades at a premium over hand-picked cotton. Indeed, contamination remains a major problem according to the International Textile Manufacturers Federation (ITMF) surveys due to the increasing demand for quality by end users and the consequent increase in premiums and discounts in the global cotton market. Contamination of cotton in Africa has been estimated to reduce premia by up to 20% (Estur and Knappe 2007). Hence, extension services should sensitize and train farmers to avoid contamination and should incentivize the use of cotton bags to ensure the consistency in quality sought by international merchants (Tschirley et al. 2010; Estur 2008; ITC).

Primary Market and Storing

Once collected, cotton is then sold either at the farm or at collection points where it is stored. This is the first possible quality classing stage. Next is storing, and although cotton is not particularly perishable, quality must be preserved through better storage devices compared to open air collecting points.

Transportation to the Ginner for Processing

In general, cotton is bulky to transport, and Africa has a competitive disadvantage. Neglected investments in basic infrastructures and a consequent underdeveloped transport network are partly responsible. In addition, freight

transport costs tend to be higher compared to Asia. They are up to four-five times higher in Francophone Africa, than in Pakistan or India on comparable roads (WB Logistic Performance Index 2018; Teravaninthorn and Raballand 2009). This is of particular concern for landlocked countries because transporting cotton to ports is costly, difficult and time-consuming.

Ginning

Raw cotton is transported to a gin to be processed to separate cotton fibres from seeds. The technology used for ginning can be either the saw-gin or the roller-gin. The saw-gin is faster with a higher ginning outturn ratio[5] and is less expensive to operate, but the roller-gin is more gentle and suitable for processing valuable long-staple cotton (such as African). This increases the quality and value of the cotton fibres[6] and earns a higher premium (Estur and Gergely 2010; Larsen 2003, 2008). In WCA, the saw-gin is most often used, but cotton producers increasingly invest in roller-gin installations rather than keeping the existing equipment operational (Estur and Gergely 2010). The maintenance of old equipment has actually been highlighted as the highest cost in the ginning stage, followed by the cost and supply of power, which is also a major problem in this and other stages of the value chain in Africa.

Ginning has been described as one of the weakest links in the value chain (UNIDO 2009) due to the need for renovation in terms of technology, management and integration to increase capacity utilization. Still, grand part of total ginning costs are variable costs (Estur and Gergely 2010), indicating that the profitability of the cotton ginning business can be enhanced by an increased capacity of operation to harness economies of scale.

Bailing

Once the cotton is ginned and separated into lint cotton, cotton oil seeds and planting seeds, the lint is bailed and packed to prepare it for the market. At this stage, contamination must also be counteracted. Most ginneries in Africa still use PP to pack cotton, which can affect the final quality of the lint, and investments are needed for cotton packing[7] to be used instead.

Cotton Lint Classing

The quality of cotton is achieved in almost every stage of the value chain, and the intrinsic (by variety) and induced (by production management and post-production handling) quality features together determine the *grade* of cotton. Cotton grading itself is significant in the quality performance of cotton: it plays a role in the information flow of the cotton value chain. Classing and grading provides producers with the necessary feedback on the quality of their harvest, which ideally acts as an incentive to implement all the necessary (labor-intensive) operations to further improve the quality of cotton. In Africa, this occurs when grading is implemented, especially at the primary market stage, a practice that has been hampered by the liberalization of the sector and postponed to the export port to the detriment of the information flow to producers.

Grade is determined after classification, which is the application of official standards and standardized procedures developed for measuring the physical attributes of raw cotton that affect the quality of the finished product and the processing efficiency. Grading from coarse to premium is a critical economic issue for the mills, and cotton fetches a higher or lower price over or below the world price based on its grade achievement. This can take place either through manual classification or instrumental classification (High Volume Instruments—HVI). International merchants have a preference for reliable and universally accepted methods of determination of cotton quality parameters; thus, also for HVI[8] equipment, which is a step toward standardized instrument testing for cotton. However, also HVI still lacks being recognized invariably in the international trade of cotton.[9]

In Africa, cotton is still mostly manually classed and graded. Manual grading is based on appearance and feel. A shortcoming is that there are limits on the number of quality factors that can be measured by human sight and feel. Moreover, it depends on human perceptions, making results somewhat subjective. Furthermore, methods are not harmonized, undermining reliability and precision of its outcomes. This type of grading hampers the right positioning of sub-Saharan Africa[10] (SSA) cotton in the international markets to the detriment of the price obtained by exporters and growers. Exceptions are Côte d'Ivoire, Mali, Togo and Senegal, where HVI systems have been installed, and HVI data can be provided. However, both manual and instrumental classing have shortcomings, and spinners still heavily rely on origin (of cotton) and country reputation for purchasing cotton (Estur 2008).

Another missing element in the marketing infrastructure for cotton in Africa is lack of a standard and quality label for African cotton. This would

make African[11] cotton quality recognizable in the world market and thus increase its market value. However, examples do exist, and official cotton standards have been put into practice. Egypt has a national cotton trademark guaranteed by DNA testing, the Tanzania Cotton Board established quality standards, Benin has cotton labels that differ per quality grade and other continental labels, such as 'Cotton Made in Africa' and the 'Better Cotton Initiative' are taking hold.

From the Ginner to the Spinner

Once cotton lint is graded, it is auctioned off to domestic spinners or (in grand part) international trading companies—in place of international spinners. The reference price is the Index A Cotlook price. Each producing country will achieve a different export pricing due to a number of issues ranging from differences in quality parameters (premia or discounts) to differences in geographic locations.[12] Additional pressures on exporting prices are linked to local currencies and their liaison to the Euro, which has in recent years been strong against the US dollar.

The first part of the value chain ends with the marketing of the raw cotton. The second part is the textile value chain, which is missing in most of the continent except for a few countries. Below is an analysis of how raw cotton prices are determined.

3 The Determination of the Price of Cotton

Cotton is in general priced in line with the Cotlook A Index pricing system, although there is a variety of pricing systems.[13] The Cotlook A Index is an index of the level of offering prices on the international market. The daily quotation[14] is an average of the cheapest five quotations from a selection of 16 upland cottons traded internationally. Premiums and discounts above or below the A Index are obtained in relation to various components.

Similar to other major commodities, global cotton prices have been under intense pressure. A number of factors are adduced to explain the instability and downward trend in prices. On the supply side, variations in global market prices are influenced by unpredictable fluctuations in production *in* and export *from* India, Pakistan and China. The three countries are major producers and contextually major consumers of cotton. China in particular[15] is the main 'swing' factor in the global cotton trade and has a very strong impact on cotton prices. Other advanced reasons are supportive government

policies enacted by few cotton-producing countries, which are considered to be a detriment to global cotton prices. The immediate effect of subsidies is to increase and to maintain otherwise unprofitable cotton production, mostly in industrialized countries, inducing excess supply and a consequent depressing effect on the global market price (Gray et al. 2016; Larsen 2008; Oxfam 2002). US, EU and Chinese subsidies are reported to depress global cotton prices by around 10–15% in the short-medium term (Alston et al. 2007; Goreux 2003), reducing returns to producers in other major exporting regions that do not benefit from such protective policies (Tschirley et al. 2010; Poulton et al. 2008; Boccanfuso and Savard 2006; Gillson et al. 2004). Further reasons are related to the price of man-made fibres, which have increased their share in the textile market to the detriment of cotton.

Instrumental Factors in the Determination of Cotton Prices

Quality features. Quality is expressed in grades and mills pay for good quality (bad quality) in the form of premiums (discounts) over (below) the Cotlook A Index. In general, cotton that is finer, longer and stronger than the global average but not as high quality as extra-fine, which fetches from 35 to 135% above the Cotlook A Index, achieves a 10–15% premium over the Cotlook A Index, while cotton that is classified as coarse cotton (cotton that is shorter, rougher and weaker than average) bears a discount of 3–10%.[16]

The market segment for upland cotton, which is growing fastest and is most profitable, is for higher grades and finer cottons (Estur 2008; ITC, Cotton Exporter's Guide). In addition to requiring longer, cleaner, whiter, brighter, stronger and finer fibre, this higher segment of the market is demanding additional properties required for the modern high-speed machinery. This said, staple length remains ceteris paribus the most requested property of the fibre. Africa has in general been able to follow the market demand trend for longer fibres.[17]

Origin reputation. Trust and reputation are influential in the cotton business, and the market rewards origins that have a strong record of delivering determined quality characteristics with consistency while respecting contract terms (for quantity and other). The significance of reputation is exacerbated by the way seed cotton is traditionally transported—in bulk—which does not allow for segregation of quality and makes free-riding possible among producers, particularly concerning contamination. Classing and grading stages at the primary market are critical in maintaining an incentive for producers to maintain levels of high quality. Cotton is generally sold based

on national type and not on description (types being defined by each country based on its own criteria).

The premiums and discounts attached to internationally traded cotton are known to stem in good part from the reputation of national origins as a means to curb the aleatoricism in quality testing.[18] This is particularly true for discounts, which are usually applied indiscriminately to all cotton originating from an area or a country considered to be curbed by contamination, often making perceptions more important than fact. In addition, the ITMF releases a detailed biannual survey on the level of contamination of cotton per producing country.

Additional issues. The way cotton is marketed and shipped influences the negotiated price. The spinning industry is especially concerned about consistency in shipments: homogeneous and reliable year-round shipments with consistent cotton characteristics, and standardized bales (same size and density) wrapped in cotton cloth are ceteris paribus preferred. The homogeneity of deliveries also depends on seed cotton grading and bale allotments. The majority of Africa uses manual classing, which causes homogeneity and consistency faults in terms of quality and packaging, but HVI adoption is increasing. SSA cotton (relative to that of North Africa and the rest of the world) bears an additional disadvantage: SSA shipments have longer transit times than those of the major competitors and are considered less reliable.

4 The Emerging Key Factor in the Cotton Value Chain

One factor specifically influences a number of salient issues in the cotton value chain: the quality of cotton. All cotton is not equal, and characteristics can vary considerably. Like most commodities, cotton is differentiated by quality parameters for the purpose of trade. The quality parameters by which cotton is differentiated and consequently determine its value, are set by the spinner and the textile manufacturer: the differences in quality affect the price that manufacturers are prepared to pay and hence the value that spinners can receive from cotton lint. In general, manufacturers are interested in the performance of cotton in the manufacturing of textiles: better fibre quality translates into better yarn quality as well as higher processing efficiency.

Withstanding the apparent descending trend in quality demand in the processing industries of other African 'success story' cash crops (i.e. in the coffee, cocoa and tea sectors), the spinning industry has been demanding

increased lint quality. The reasons are ascribed to the increasing market pressure being placed on the textile supply chain on the one hand and to the innovation in the spinning technology on the other hand (Tangboonritruthai et al. 2014; Tschirley et al. 2010; Estur 2008).

Increased competition in the textile industry results from the combined effect of cotton market saturation due to plentiful production (mainly from China and the USA) and from the growing pressure from man-made fibres in terms of quality and costs. Within the sector, cotton competes with various international growths consequent to spinners searching to attain particular blends of specific different national origins to obtain the desired yarn properties. This provides a scope for differentiation rather than standardization. Once reputation has suffered and customer spinners have changed their blends, it is difficult to regain the specific market segment. This results in rigidity in substitution, which makes quality and the related country's reputation entry barriers to the various spinning end-markets. In the fibre market, cotton strives to compete with new quality attributes that have assumed increasing importance in determining the advantages of artificial fibres (notably polyester).[19] The increasing quality and performance demands placed on the textile value chain has made chemical fibre performance a benchmark by which spinners judge cotton, requiring the same characteristics of cleanliness and homogeneity as offered by artificial fibres.

Another reason for quality demand for cotton is innovation in the spinning industry. Since the late 1970s, spinning machines have intensified the processing speed with a consequent 40% increase in productivity (Estur and Gergely 2010). This has resulted in an increase in minimum quality requirements for cotton, being that the characteristics of cotton lint determine its textile processing performance in terms of processing waste, yarn and fabric quality (Lorenzetti 2013). In addition, machine stoppages and spinning breaks—partly ascribed to yarn defects—have become increasingly costly, making the undesirable properties of cotton an additional burden on the determination of its price.[20]

Contrary to other cash crop sectors that have been undergoing liberalization in Africa, low quality is prejudicial to the survival of the sector (Lorenzetti 2014, 2017). Actually, depleted quality stems into an initial, short-term and direct negative impact on the premium—a lower price for producers and processors. In turn, this affects the quantity of production. Then, there is a second long-term impact on country reputation from which premiums and discounts are also partly derived, and this is considered by international merchants when deciding where to purchase cotton lint and at what price.

5 Conundrums: The Old and the Emerging

From the description of the African cotton value chain, some features emerge as prominent. These features are related to the old and new hurdles that affect the sector's survival and ability to thrive.

Old Conundrums, but Still Thriving

The foremost issue is the structural design of the sector. This has shown to invariably affect the key features of the sector, rendering the choice of the industrial design a pivotal decision (Lorenzetti 2017; Gray et al. 2016; Serra 2012). Another long-standing matter in question is that of the absence of the final part of the value chain, i.e. the textile industry, which would allow for the inclusion of the most profitable portion of the cotton value chain.

From Africa's 'White Gold'… to Troubled Waters

Africa's 'White Gold'—1960–1985

Cotton production was introduced in Africa by Anglophone and Francophone colonizers[21] in search of resources for their textile industry. At independence (1960s), the sector was organized as a state monopoly[22] throughout the continent. This resulted in a vertical integration of the sector, with parastatal companies providing factors that are to date considered critical to the sector.

The cotton state monopoly was characterized by a marketing board controlling and regulating all aspects of the cotton value chain from the provision of planting seeds to the marketing of cotton and its by-products. The marketing board provided the sector with a price announcement mechanism, input credit, research, extension and marketing. Below is a brief description of the distinguishing factors of the vertically integrated parastatal system.

Price announcement mechanism. In cotton sectors designed as monopolies, competition for the purchase of seed cotton was not allowed, and decisions about pricing were made at a central level. One firm had exclusive rights and an implicit obligation to purchase all seed cotton from farmers. Pan-territorial prices were fixed by governments or administrative bodies and were announced before planting time, allowing farmers to make production decisions. Once the parastatal monopolistic ginner announced the price at which it would purchase the seed cotton from the farmers, it bore the risk of possible

differences with the export (global) price. To address such differences, the price mechanism was linked to a stabilization fund,[23] the purpose of which was to support producer prices when the global price was low. The internal mechanism of the fund was simple: when the world market price was high, the fund was replenished by paying lower than global prices to producers and vice-versa.

Input credit, or contract farming. The parastatal ginner provided the farmers with the necessary inputs on credit, solving the input provision problem for SSF resulting from the failure of financial markets in Africa (Dillon and Barrett 2017; Fafchamps 2004). The farmers would pay for the inputs once they harvested their seed cotton and sold it to the monopolistic parastatal ginner.

Research & Development (R&D). In the cotton sector, research is related to seed variety and multiplication, soil fertility and pest management. In the 1980s, research programs were implemented in the public sector throughout the continent (ASTI Country Reports; Lorenzetti 2013), guaranteeing the necessary constant and sustained investments and the distribution of good quality area-specific seeds, which are conditional on the attainment of high-quality lint and yields. Extension services implemented by the parastatal ginners allowed for the necessary information flow between R&D and producers.

Marketing. The majority of African cotton is exported, and until reforms in the 1980s the marketing of cotton was managed by the parastatal company, which guaranteed year-round shipments and relatively consistent quality standards, gaining credibility[24] in the global market.

The structure of the cotton sector as described made it possible for Francophone Africa to increase its cotton production ten-fold from the 1960s to the 1990s (USDA data; Tschirley et al. 2009; Goreux 2003). The success within this period was due to the fact that the vertically integrated system was able to perform the highest degree of farmer coverage on input credit and extension provision and that it enabled stable repayment rates from farmers due to the impossibility of the latter to side sell (Delpeuch and Vandeplas 2013; Tschirley et al. 2009). Sustained investment in research and extension has also been of primary importance to the success of the sector as it benefited from agrochemical inputs and seed varieties adapted to local conditions to produce higher yields[25] and consistently top-quality cotton. In WCA, national monopolies are reported to have had a positive performance on value-added per capita: i.e. strong returns to a large number of farmers (Gray et al. 2016; Delpeuch and Vandeplas 2013; Goreux 2003). Moreover,

the pan-territorial and pan-seasonal prices guaranteed insulation of SSF from international market price volatility (Gouzaye et al. 2017).

The vertically integrated system made cotton one of Africa's success stories, hence the term Africa's 'white gold', with Francophone SSA alone accounting for more than two-thirds of Africa's cotton production. Furthermore, the flourishing of the cotton sector had positive spillover effects in other sectors, which benefited from public goods and services delivered by cotton parastatals as investments in transportation infrastructures and road maintenance (Delpeuch and Vandeplas 2013; Serra 2012; Tschirley et al. 2009).

From 'Success Story' to Troubled Waters and Reforms—1985 Onward

Toward the end of the 1980s, after considerable expansion of cotton companies (especially in WCA) and due to a number of factors, including declining global cotton prices and overvalued local currencies (in the case of WCA), African cotton companies began facing financial difficulties. Consequently, international donors and financial institutions[26] (IFI) began calling for a reform of the sector. The claimed objectives of reforms were farmer welfare, industry innovation, technical and economic efficiency and value addition.

The cotton parastatal companies were reported to be inefficient organizations with poor governance, high operating costs and opportunities for rent seeking and corruption (Tschirley et al. 2009; Baffes 2007), overall compromising the sector's international competitiveness and its contribution to the broader economy. Producer prices were not in line with global prices, and stabilization funds had a disappointing performance (Staritz et al. 2015; Tschirley et al. 2009; Akiyama et al. 2001). When world prices were high, producer prices were relatively low; on the other hand, when world prices were low, the price announcement mechanism caused parastatal ginners to pay relatively high prices, eventually contributing to the sector's financial crisis and jeopardizing national financial stability (Tschirley et al. 2009; Akiyama et al. 2001). The envisaged *nodi* implied a need to cut costs and to increase productivity, quality management and marketing, efficiency of research and extension to enhance pro-poor growth by maintaining returns to farmers (Tschirley et al. 2009).

In the subsequent decade, reforms were implemented in almost all African cotton-producing countries, although reform choices differed strongly across the continent. Reforms addressed abandoning state ownership and moving toward an involvement of the private sector and competition in input and output markets. If on the one hand reforms resulted in an increase in the share of producer price on the free on board (f.o.b.) export price and increased

efficiency in the processing industry (Gouzaye et al. 2017), on the other hand, they were considered to have fallen short of expectations because they caused a depletion of the sector in the long-term instead (Gray et al. 2016; Lorenzetti 2013, 2014; Tschirley et al. 2009; Fold and Larsen 2008). This has occurred in most East and South African (ESA) countries where reforms have been implemented more thoroughly (full review in Lorenzetti 2013).

A representative example of the undesirable effects of liberalization is Tanzania, which has returned to a centralized coordination, to rescue the sector from ruin (Lorenzetti 2017). Instead, at least initially, a successful example of liberalization in ESA was Zimbabwe (Larsen 2002), but after passing from a liberalized centralized system (zoning) to a more atomistic competitive system, the sector has also suffered.

The most accepted reason for the failure of reforms in the African cotton sector is market coordination failure and the consequent collapse of the input credit system (Tschirley et al. 2009; Poulton et al. 2004). In fact, liberalization has been shown to cause a more extended dismemberment of the cotton value chain. In particular, it affects the information flow to producers needed to incentivize careful production and post-production management, which both affect quality. In addition, increased competition causes quantity concerns to prevail on quality demand by ginners in an attempt to avoid overcapacity with a consequent detrimental effect on quality (Gray et al. 2016; Lorenzetti 2014; Poulton et al. 2008; Larsen 2003, 2008).

Post Liberalization Organizations

The present organization of the cotton sector in SSA varies considerably from West to East Africa, ranging from the early national monopoly system to competitive systems and concentrated systems, depending on whether reforms have been undertaken and to what extent. Tschirley et al. (2009) identified three macro classes of the cotton sector organization in SSA: a regulated, market-based and hybrid system. Monopolies are more easily found in WCA, where gins are still owned and operated by the public or at most by mixed companies. Instead, ESA implemented reforms more thoroughly (Gray et al. 2016; Delpeuch and Vandeplas 2013; Tschirley et al. 2009).

Regulated systems include national and local monopolies (zoning). Instead, market-based systems allow either for many buyers of seed cotton (i.e. competitive systems) or only a few (i.e. concentrated systems). Concentrated systems are related to duopolies or oligopolies with two or three ginners competing for the right to transact with producers both for services to producers and seed cotton prices or with a definite area of action. In such

organizations, the input credit system is generally maintained along with an extension advice service. Although the coverage of farmers is not as complete as that of national monopolies, consequences on yields as well as on quality have shown to be positive (Tschirley et al. 2009; Larsen 2002). This remains true until the sector design moves to atomistic competition and more ginners enter; such as in the case of Zambia (Brambilla and Porto 2011). However, although a 'one-size fits all' approach has proved inadequate for reforming the sector (Gray et al. 2016; Lorenzetti 2014, 2017; Fold and Larsen 2008), the discussion remains open.

The Missing End: The Textile Industry

Beyond the organization of the sector, a problem that has adversely affected the cotton sector in Africa since the 1960s is the inadequacy of the textile industry. This is the final part of the cotton value chain and where the majority of the added value is created. In fact, a textile industry did exist but was apparently depleted by liberalization (Fukunishi 2014; Traub-Merz 2006) and at present, few countries on the continent still have an active textile industry. Among these are South Africa, Mauritius, Lesotho, Kenya, Ethiopia, Morocco and Egypt. In general, the sector is hampered by a number of problems from sector-specific issues—the obsolescence and inadequacy of the machinery (which only allows for the manufacturing of low-quality products)—to more general concerns—electricity inefficiency, low qualification of workers, lack of investments, heavy bureaucracy and corruption. One peculiar example of the frailty of the African cotton value chain in relation to the textile industry is Egypt. The country is among the major African cotton producers, and its cotton is recognized as top-quality, but the textile industry is not suitable for processing domestic high-quality cotton. Thus, the extra-fine domestic cotton is exported, and the lower-quality cotton needed for the domestic textile industry must be imported.

A further issue affecting the textile industry is second-hand clothing (2HC) import, which undermines the domestic garment demand due to the low cost at which it is sold.[27] Some authors have established a causal relationship between the increase in imports of 2HC and the decline of the textile manufacturing and apparel industries across SSA (Frazer 2008; Baden and Barber 2005). Others consider the macro-economic changes in Africa rather than suggesting a single factor explanation and adduce the closure of African clothing factories in the 1980s and 1990s to the policies of economic liberalization (Traub-Merz 2006).

Opportunities in the Textile Industry

This said, the existing textile industry, albeit uncompetitive internationally, is the second-largest employer in West Africa after[28] agriculture and faces new non-trivial opportunities. Apparel production is especially labor-intensive with low start-up investments and easily transferable technology. Furthermore, the labor requirements can be easily met with low and semi-skilled workers, especially women. The opportunity for Africa lies in the expected diminishing Chinese share in the global textile market especially due to the increase in labor costs in the country. Although it is expected that this will positively affect primarily Bangladesh, Vietnam and India, these three countries together only cover one-third of China's present textile production. Moreover, over the next 20 years, SSA is projected to have the highest growth in working-age population globally.[29] Among potential African candidates for a thriving textile sector are Ethiopia and Kenya. The former displays very low labor costs and low electricity prices with a strong hydroelectric power capacity[30] and is a potential source of raw materials with land and a climate that is suitable for cotton cultivation.[31] Kenya has higher labor and electricity costs but displays superior productivity.

An additional opportunity comes from *within* the continent: with the newly instituted African Continental Free Trade Area (AfCFTA). The AfCFTA allows for the establishment of a vertically integrated mill (yarn to garment), which is more competitive than individual operations situated in different countries outside a Free Trade Area. The comparative advantage comes from 'time to market'. The AfCFTA enables garment producers to seek sourcing closer to home (e.g. in South Africa or Mauritius and Lesotho for denim): the shipping times (and costs) for fabric are considerably minor compared to the delivery time from China. However, much remains to be done, and intracontinental trade is still hampered by an inadequate transport infrastructure as confirmed by the score in the Logistics Performance Index[32] (LPI). This is particularly true for the road network[33] (LPI 2019; Teravaninthorn and Raballand 2009; Poulton et al. 2008), identified by domestic and international firms as a major barrier to trade.

Emerging Conundrums

In addition to the old impediments, new *nodi* arise also as a consequence of climate change. These affect the sustainability of the sector and endanger its survival in the long term. Indeed, research claims that intensive conventional cotton production leads to soil degradation, threatening sector production

and causing severe environmental and health problems. The following is an analysis of these emerging issues and of potential solutions.

The Sustainability Issue

The Negative Externalities of Conventional Cotton

Cotton is subject to a wide range of insect pests and diseases. The vulnerability of cotton to pests is exacerbated by the common agricultural practice of extensive monoculture,[34] which is also acknowledged to exhaust soil fertility. Pests affect the yields and quality of the crop and lead to the rationale for the intensive use of chemical pesticides and fertilizers. It has been estimated that approximately 20% of insecticides, 9% of agrochemical pesticides and 8% of chemical fertilizers globally are used for cotton (Williams and Mancini 2015).

Paradoxically, the intensive and continual use of chemicals does not lead to increased yields in the cotton crop, particularly in the long term. Instead, serious soil erosion and exhaustion are reported (Hofonga 2018; Vitale et al. 2011; Moseley and Gray 2008). Furthermore, pest populations are reported to increasingly develop resistance to the chemicals used (Hien et al. 2017; Gouzaye et al. 2017; Zhang et al. 2012). These issues become even more critical in view of the predicted increasing temperature (Vitale et al. 2011), desertification and consequent decrease in crop production on the continent (International Panel on Climate Change, IPCC 2019 Report). Although cotton in Africa is mostly rainfed and does not account for water consumption (except in Egypt and Sudan where cotton is irrigated), the chemical rundown, the applied nutrients, pesticides and herbicides also cause about 25% of the global water footprint (waterfootprint.org).

The intensive use of chemicals in cotton also raises health concerns. The World Health Organisation (WHO) has classified several of the chemicals used for cotton plant protection as highly hazardous. The misuse of such chemicals often has severe consequences for public health (Tovignan et al. 2001), which occurs whenever extension is not sufficiently implemented, as it often is in Africa. A survey by the Pesticide Action Network (PAN) (2015), reports a large percentage among conventional cotton farmers in developing countries experiencing acute pesticide poisoning. Remarkably, the ICAC (2012) recognizes that insecticides need to be eliminated from the cotton production system because they are dangerous to apply, have long-term consequences on the pest complex, and have deleterious effects on the environment. These increasingly manifested quandaries call for solutions, and

to date, two potential candidates have been identified. What follows is a brief introduction to both.

Potential Solutions

Bacillus Thuringiensis (Bt) Cotton

The objective of the adoption of Genetically Modified (GM) technologies is to enable a substantial decrease in chemical plant protection along with increased yields and health safety and in general more responsible environmental stewardship. The issue related to the adoption of biotech crops, among which is cotton, is controversial, and in the literature, both pros and cons are discussed (Fischer et al. 2015). On the one hand, it appears to be a 'desirable alternative' for developing countries (Pray et al. 2002, 2011). It is reported to be suitable and beneficial for all types of households, even the most resource poor SSF (Saravanan and Mohanasundaram 2016; Pray et al. 2011), and to provide a general gain in average yields, decreased production costs (Pray et al. 2011; Vitale et al. 2011) and eventually poverty alleviation (Subramanian and Aim 2010). On the other hand, critics highlight that the contribution of Bt cotton to poverty alleviation is evaluated focusing only on two indicators: yield and average profit gain. This is apparently reductive and overlooks that its adoption is not scale and class neutral[35] (Dowd-Uribe and Bingen 2011; Hofs et al. 2006) or that it comprises a higher risk[36] for farmers due to the high costs of GM seeds. In addition, Dowd-Uribe (2017, pp. 4, 9) remarked that only the first generation of Bt cotton performance is known and others report variability in yields and profit (Glover 2010), an erosion of benefits in time, along with increased pesticide use in response to time variant pest resistance and secondary pest emergence (Zhang et al. 2012; Liu et al. 2010; Wang et al. 2008).

In Africa, only Bt cotton, or *Bacillus thuringiensis* cotton, has been applied.[37] The first Bt cotton (Monsanto) was planted in South Africa[38] in 1997. Initially, a reduction in insecticide use and increased profits to farmers were reported. However, after only a few years, once the enabling institutional environment of easy access to credit for inputs and a guaranteed market disappeared,[39] most growers abandoned Bt cotton altogether. The showcase of Bt cotton adoption in Africa then became Burkina Faso.

The adoption of Bt cotton in Burkina Faso was more successful. Unlike South Africa, the country had a highly regulated vertically integrated cotton system, which ensured a reliable input credit system also appreciated by the company introducing Bt cotton (Monsanto). On Burkinabé demand, a

tailored Bt cotton variety was created (2008), and its adoption reached almost 70% of total cotton hectares, which remained consistent until 2015. The Bt cotton was successful in terms of crop yield performance, profit for the SSF and decline in pesticide use, which together outweighed the major Bt seed cost. Nevertheless, soon after, Burkina Faso began a complete phase-out of Bt cotton on behalf of the cotton companies. The inferior quality[40] of the lint and an inferior ginning out-turn (GOT) ratio in the GM cultivars were to blame. The former undermined the reputation of the country's cotton, cutting into its value on the international market. The latter had traditionally been high[41] as a result of decades of targeted breeding and careful hand-picking (Dowd-Uribe and Schnurr 2016), the Burkinabè cotton industry being traditionally keen on the reputation of its cotton, which is considered to be the best in the continent along with the rest of Francophone West African cotton (after Egyptian cotton). The lower quality of the fibre also complicated trading arrangements with other West African producers that aimed for a homogeneous product and a flexible sourcing mechanism from the region, to facilitate timely delivery.

Organic Cotton

Organic farming is based on a system intended to enhance the long-term fertility of soils, foregoing the use of agrochemicals, GM organisms or other synthetic compounds (Gomiero et al. 2011).

Organic cotton is grown without the use of any synthetic agrochemicals and in rotation[42] with other marketable crops and livestock[43] (organic intercropping). According to a strand in the literature, organic cotton can prevent the shortcomings of conventional cotton and also improve rural livelihoods. As such, it is advocated as an appropriate substitute for conventional cotton.

In comparison with conventional cotton, it is reported to reduce the impact on the environment across all considered categories by the Life Cycle Assessment (LCA), and its potential global warming impact is 46% lower (Shah et al. 2018). It is reported to enhance soil fertility, enable water use optimization (Gomiero et al. 2011; Funtanilla et al. 2009), reduce pest pressure and generally produce a higher yield of mixed crops per hectare (Forster et al. 2013; Gomiero et al. 2011; Lin 2011). In fact, lower yields, conversion time and consequent inferior economic performance are often reproached for organic agriculture in general (Seufert and Ramamurthy 2017). This is also reported for organic cotton but not consistently with respect to time[44] or agroecological context (Forster et al. 2013; Bachmann 2011; Funtanilla et al. 2009). Indeed, organic cotton is reported to have increasing yields in time

(ICAC cotton statistics, 1990–2002) and to outperform conventional cotton in conditions of biophysical stress (particularly drought), suggesting it has a comparative advantage in extreme soils (Gomiero et al. 2011; Funtanilla et al. 2009; Nemes 2009; Eyhorn 2007). After considering yields, costs and purchasing price, organic cotton is reported to be more profitable than conventional cotton (Forster et al. 2013; Bachmann 2011; Eyhorn et al. 2005, 2007; Funtanilla et al. 2009).

The independence from marketed inputs and consequent irrelevance of access to credit makes organic cotton particularly suitable for small/marginal farms and poor or even indebted farmers (Sodjinou et al. 2015; Bachmann 2011; Eyhorn et al. 2007; Dowd-Uribe 2007). Organic cotton is reported to be comparatively more labor-intensive, a convenient trait in developing countries where a young workforce is available (Sodjinou et al. 2015). It is also reported to enable women, who are usually marginalized and excluded from access to land and conventional cotton farming (due to high costs and discrimination from male extension agents), to hold a separate farm and to increase their economic independence (Sodjinou et al. 2015).

The organic cotton value chain apparently overcomes the coordination failure of atomistic competitive cotton systems without the need for a centralized system. This is partly because the majority of organic SSF is organized into farmer cooperatives (Sodjonou et al. 2015; Dowd-Uribe 2007), enabling a better information flow and extension services and a guaranteed market with better prices: organic cotton fetches a premium, per se, over the CotLook A Index. The pricing mechanisms that are reported to be effective for organic cotton are a direct negotiation between organic farmer leaders and the purchasing company or the price of conventional cotton plus a premium (Eyhorn et al. 2005). Better market access and prior contract agreements, which many African countries now enjoy, have shown to be critical factors (Ferrigno 2008).

Organic cotton production in Africa and consumption worldwide, have been increasing since the 1990s (ITC, The Organic Cotton Market). In Africa, pilot production began in South Africa, but Tanzania and Uganda later became Africa's largest producers of organic cotton (Ferrigno et al. 2005). Eight countries (Benin, Burkina Faso, Mali, Senegal, South Africa, Tanzania, Uganda, Zambia and Egypt) now lead the production of organic cotton on the continent.

6 Concluding Remarks

The economic attractiveness of the cotton sector in Africa is enhanced by the comparative advantage the continent has in the production of cotton and in the involvement of the rural poor. Thus, this chapter has highlighted the past and emerging criticalities of the sector from structural adjustments to sustainable development, which are envisaged as areas of action for policy-makers. The resolution of these conundrums is necessary for the survival of the sector and for it to fully reach its potential in terms of poverty alleviation and its contribution to environmental sustainability. This study has led to three policy implications.

I. *The design of the sector*. The fallacies of the cotton parastatal monopolies have driven to a reform of the sector, calling upon first best solutions to invoke efficiency, better economic performance and poverty alleviation through higher producer prices. However, where these solutions have been fully implemented, the outcomes have been a declining performance and burdensome loads for the small-scale farmers instead. The recognized cause is a coordination failure stemming from the market failures that still characterize the African context, reminding us that first best practices implicitly imply a highly sophisticated set of institutions (North 1990) and are, therefore, by definition non-contextual. It is thus more beneficial to recognize that the real world is a second-best environment as suggested by Rodrik (2008, pp. 5, 7, 12) and economic policies should be consistent with this. The policy implication here is that the African cotton sector should be contextualized and viewed in a more comprehensive way also considering its role as a rural development tool. Therefore, all in all, the best working alternative seems to be a regulatory concentrated design that might not be optimal from a theoretical point of view but would be better suited to the actual conditions in Africa.

II. *The missing part of the value chain, the textile industry*. The inclusion of the final part of the value chain would ensure that the most profitable part remains where the raw material is produced. The changes in the global supply of textile manufacturing consequent to China's new policies open new opportunities that Africa should not neglect. The existing textile industry in Africa needs investments in innovation as is already being done in Ethiopia, Kenya and Egypt, where new hubs are being established. In addition, to fully exploit the new possibilities of the AfCFTA and to be prepared to seize the change in global supply for textile manufacturing, investments are needed in logistic infrastructures to make them comparable to those in Asia.

III. *Sustainability*. Given that conventional cotton has a heavy cost in environmental terms and decreasing yields, there are two alternatives to be explored: Bt cotton and organic cotton. These are different—one could say opposite—options with different response times and design prerequisites. On the one hand, Bt cotton is successful in providing a short-term response: requiring no conversion time, securing pest control and delivering an immediate increase in production; however, it is questionable regarding the maintenance of quality and of pest control in the long term. Moreover, it requires a concentrated organization setting. On the other hand, organic cotton has more long-term advantages and has distinctive characteristics that are particularly suitable to the African SSF context. Therefore, it can be a successful development tool and an effective adaptation measure to the pressing climate issues, regardless of the sector design.

Notes

1. The contamination from PP is undetectable until the yarn is dyed. This entails heavy costs for the spinner.
2. As a consequence, some ginners have decided to distribute cotton-textile collecting bags to farmers, bearing a major cost.
3. Higher levels of vegetal matter leaf and twig fragments are left.
4. It requires a (chemically induced) defoliation stage prior to picking.
5. Profitability in the ginning stage is measured by the Ginning Outturn Ratio (GOT), i.e. the ratio of lint to seed cotton produced by the ginning process.
6. For this reason, Egypt, a major producer of Long Staple (LS) and Extra Long Staple (ELS) cotton, also uses roller-gin equipment.
7. This also happens to be the most expensive among packing materials.
8. Instrumental classification is implemented through High Volume Instruments (HVI), which were introduced in 1980 in the US. Since 1991, the entire US crop has been classed with HVI systems. HVI classification increased the number of quality factors that can be measured but still cannot perform leaf grade and extraneous matter tests. Another deficiency in instrumental classing is that in most cases, it tests samples, making the outcome not always exhaustive of the overall quality.
9. HVI testing needs to overcome problems related to the uniformity of its testing: test results have shown to be variable depending on the different laboratories they are carried out in. Nevertheless, every bale of cotton produced in the US is subjected to mandatory HVI testing.
10. Egyptian cotton is not included because it is acknowledged to be of superior quality.

11. Egypt should not be included as it is acknowledged to produce among the best cotton quality globally and is also protected by a trademark.
12. In particular, the amount of inland transport necessary to reach the nearest port, a warehouse or the designed spinner will be to the detriment of the price eventually negotiated. Coastal countries have significantly lower transport costs.
13. In the US, domestic cotton is priced against the NYMEX cotton contract.
14. Prices are expressed in US dollars (or cents) per lb, c.i.f. (cleared, insured and forwarded) for delivery at a Northern Europe/Far East port.
15. In particular its decisions regarding cotton stocks.
16. The benchmark for Upland cotton (the type of cotton mostly grown, except Egypt where is grown) is currently California San Joaquin Valley Acala, which is long (1.15 inch 1-1/8”), very strong (32–34 gpt) and has 4.2 micronaire followed by Australian SM 1-1/8”. These machine-picked cottons fetch premiums of about 10 and nine cents, respectively, over the Cotlook A Index.
17. As most African production now reaches the typical benchmark of 1-1/8”.
18. Cotton characteristics are only tested in samples, except for HVI testing which is more complete.
19. Man-made fibres have the advantage of being homogeneous, versatile, clean (e.g. all synthetic fibers within a given lot are identical and totally free of contamination) and stronger than natural fibres. They are easier to process and hence less costly to process. Due to these features and to the relatively lower prices, man-made fibres have gained a growing share in the as confirmed by the loss share of cotton to the advantage of chemical fibres. Contrarily, cotton is a natural product and varies widely in its fibre characteristics due to genetic, environmental and processing factors. This variability in the fibres impacts its processing performance, cost and quality.
20. Some 20–30% of weaving machine stops are attributed to yarn defects, and the repair of each end-break costs about 70 US cents.
21. In Mozambique, it was the Portuguese.
22. Actually, the organisation was a monopoly for seed cotton purchase and a monopoly for cotton input sale.
23. At least until 2004 (Tschirley et al. 2009).
24. Reliability of export quantities is important when dealing with international merchants.
25. Yields increased dramatically in most countries until the mid-1980s due to the intensified use of fertilizer (made possible through input credit), the development of animal traction and the development of new varieties with a higher yield potential as well as higher ginning outturn ratios.
26. As the World Bank and the International Monetary Fund.
27. Actually, the clothes are acquired for free by way of donations, and therefore the price at which they are sold does not include the cost of production but only that of transportation and sorting, which keeps the price very low.

28. Between sixty-five and seventy percent of Malian artisans, fifty percent of Burkinabe artisans and 30–40% of Ghanaian artisans operate in the traditional textile sector.
29. By 2035, the working-age population in the region is expected to be as large as China's today (UN).
30. And a separate grid under construction for developing industrial zones.
31. Barely 7 % is being used.
32. Africa scores in between 2.47 and 2.89 (1=low, 5=high).
33. Even when roads are reasonable, freight transport costs tend to be higher in Africa, such as in comparison to Asia. According to Poulton et al. (WB 2008), these are up to four-five times higher in Francophone, Africa, than in Pakistan or India on comparable roads.
34. Continuous monoculture, or monocropping, where the same species is grown year after year, can lead to a more rapid buildup of pests and diseases and then a rapid spread where a uniform crop is susceptible to a pathogen.
35. It benefits the richer farmers that can bear the cost and risk.
36. In comparison to conventional and even more to organic cotton.
37. A type of cotton, which has been genetically modified by the introduction of a bacterial gene that fights the most pernicious cotton pest.
38. In the Makhathini region.
39. The cotton company that provided the SSF with credit for the purchase of the expensive went bankrupt.
40. A decline in staple length.
41. A high ginning ratio is attractive to cotton companies because it increases the total amount of fibres that it can sell at a high value compared with the total harvest weight.
42. Cotton cultivation is not optimised by monoculture.
43. Due to the positive correlation between organic manure and cotton yields.
44. The shortcoming is reported to decrease over time.

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The Political Economy of Fisheries Reform in Senegal

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1 Introduction

This article analyzes the political economy of fisheries reform underway in Senegal, with a focus on the allocation and utilization of use rights and the establishment of a governance structure associated with these rights. Since independence in 1960, successive Senegalese governments have undertaken

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policies directed at expanding the fisheries industry. This effort has been supported by development partners—the African Development Bank, World Bank, Japan International Cooperation Agency (JICA), the French Development Agency, and the European Union (EU), among others. As an additional incentive for expansion, authorities have also offered, overtime, generous tax exemptions on purchases of fuel and fishing gear, which has led to increases in the size of the fleet and fisheries infrastructure. These developments, combined with the government's decision to grant other nations access to fishery resources through bilateral trade agreements, have contributed to the increase in fishing effort and catches. Hence, after years of ineffective regulation characterized by and an absence of a functioning governance structure for fisheries management, the sector became embroiled in an economic and environmental crisis. The quasi open access regime that characterizes Senegalese fisheries has created the conditions for overfishing, resource depletion, the erosion of ecosystems, excess capacity, and rent dissipation.

For a country like Senegal, this is a particularly alarming outcome because the fisheries sector is an important source of employment, and export revenue; and a big contributor to gross domestic product (GDP) as well as food security in the country. The fisheries sector accounted for approximately 2.7% of GDP and 21.9% of exports in 2015 (Ministère de l'environnement et du développement durable et Ministère de la Pêche et de l'Economie Maritime 2016). Moreover, fishing and associated downstream value chain linkages provided more than 630,000 jobs, i.e., about 17% of the active population in 2015 (Ministère de l'environnement et du développement durable et Ministère de la Pêche et de l'Economie Maritime 2016). And with regards to contributions to food security, the sector provides 70% of animal protein consumption in the country (World Bank 2015; Lancker et al. 2019).

Given this state of affairs, the government initiated a process of reforms since the end of the 1990s, in an attempt to address the economic and ecological crisis facing the fisheries sector. Assisted by development partners, the government embarked on a path that set out to create conditions for a robust and bottom-up regulatory system aimed at providing the right incentives to fishers to invest in the conservation of fisheries resources. To create such conditions required a strengthened and devolved governance structure that regulates access to the resource through some form of exclusionary access rights regime. It also required the active involvement of all stakeholders in the process of decision-making, elaboration, implementation, as well as evaluation of management plans.

The objective of this article is to provide critical analysis of the fisheries reform process in Senegal. The next section sheds some light on the development of Senegalese fisheries from a historical perspective. We subsequently analyze the government failure at regulating the sector as well as its causes, before examining the reforms undertaken to address this failure, focusing on the artisanal subsector—which is the largest sector by catches, and where regulatory failures are common and most challenging. Last, we offer some concluding remarks.

2 Development and Evolution of the Fisheries Sector

The fisheries sector in Senegal is comprised of two subsectors: the artisanal and the industrial fisheries. While there is no universally accepted definition that distinguishes artisanal and industrial fisheries, the 1998 Fisheries Act provides a distinction based on the type of technology used by the fishers. Artisanal fishers are those "*employing traditional undecked pirogues, using non-mechanized gear and only using ice and salt for the preservation of the catches*" (République du Sénégal 1998: Article 11). Therefore, any fishing activity that involves the use of a pirogue is considered artisanal. The artisanal subsector primarily concentrates on the supply of local markets with small pelagic species, while the industrial subsector is export-oriented and target high value fish such as the demersal species and tuna.

Since the colonial era, the State has aspired to modernize fishing activities in Senegal, following the model of the French industrial fisheries. This modernized sector, was thought to replace the artisanal subsector (often considered primitive, unproductive, and resistant to technological change) (Chauveau 1989; Chauveau and Samba 1990). While artisanal fishing units were typically structured around a core group that belonged to the same lineage; technological change together with rural migration to coastal areas has shifted labor recruitment to outside family circles. This contrasts with the past, as fishing was traditionally practiced by three communities; the Wolofs from Guet Ndar, the Lebous from the Cap Vert Peninsula and the Petite Côte, and the Niominka Serers from the Saloum Islands.

Despite the colonial authorities' interventions to modernize the artisanal subsector—building of fishing infrastructure, provision of subsidies, creation of cooperatives, and attempts to organize the marketing of the final products—the latter remained unscathed throughout the colonial period. Instead, it grew considerably due to demand from both local and export markets

though the export market was dominated by European firms. During the 1950s, it became clear to the colonial administration that the small-scale pirogue fishing would not disappear as expected. As a result, given the reliance of the industrial subsector on the catches of the artisanal fishers, the colonial administration, with the support of French industrialists launched a program of motorizing the pirogues in order to increase their yield such that by 1958, 14% of the pirogue fleet was motorized (Chauveau 1989; Chauveau and Samba 1990). Similar programs would prove even more successful in the following decades.

Since independence in 1960, successive governments have undertaken policies directed at expanding fishing activities within the national jurisdiction of Senegal. These policies have been supported by numerous development partners including the African Development Bank, the World Bank, the Japan International Cooperation Agency (JICA), the French Development Agency, and the European Union, among others. Expansionist policies, which included generous tax exemptions on purchases of fuel and fishing gear, as well as lax regulation were promoted between 1960 and 1970s. However, like the colonial administration, the government gave priority to the industrial subsector at the expense of artisanal subsector, although the latter remained a key player. Despite this relative neglect, the dynamism of the artisanal subsector began to attract policy makers' interest in the 1970s. To achieve the objective of modernization, a massive program of pirogues' motorization supported by Canadian cooperation was launched in 1972. Later, in 1973, with the technical and financial assistance of the Food and Agriculture Organization (FAO), a new fishing technique to catch small pelagic, the purse seine, was introduced (Chauveau and Samba 1990). These technology adoptions had considerable impacts on the future evolution of the sector. One of the consequences being that the pirogues became larger with more powerful engines. Other government initiatives, such as the introduction of tax exemptions on engines and pooled fuel prices, as well as the creation of fisher cooperatives and increased credit facilities for financing the purchasing of equipment, resulted in a 90% motorization rate for artisanal vessels by 1983 (Chaveau 1988). As a result, fishing fleets and fisheries infrastructure and overall fishing effort increased substantially in the 1980s (Chauveau and Samba 1990). Total catches have grown considerably, from 50,000 tons in 1965 to 502,000 tons in 2017 (Direction des Pêches Maritimes 2019). Notably, the artisanal subsector has been at the forefront of this expansion. The number of pirogues in the subsector increased from 4970 from 1982 to 19,009 in 2015 and continues to grow (Direction des Pêches Maritimes 2006; World Bank 2017). The artisanal fleet became highly

competitive to the point of overshadowing its industrial counterpart. For example, between 1990 and 2008, catches in the artisanal subsector gradually increased, but decreased by half in the industrial subsector (Ministère de l'Economie Maritime 2008: 17). By 2017, almost 80% of the total catches and 65% of the total value came from the artisanal subsector (Direction des Pêches Maritimes 2019). Thus, the artisanal subsector has substantially outperformed the industrial subsector, which has been hampered by its aging fleet (the average age is 30 years). Besides this increasing capacity in the artisanal subsector, the industrial subsector has faced stiff competition from distant-water fleets from the EU, and other nations, which have been granted access to Senegalese waters through bilateral trade agreements. These trade policies account for further increases in effort and catch.

These developments coupled with the absence of accurate stock assessments and well-functioning governance structures for fisheries management have led to the crisis of Senegal's fisheries sector. The crisis is characterized by overcapacity, overfishing, resource depletion, and resource rent dissipation. The latter stems from unsustainable catches and from the sub-optimal amounts of labor and capital being used to outcompete rival vessels in the race to fish. The existence of de facto open access fisheries creates perverse incentives that have resulted in the decrease in the entire sector's productivity. Kinadjian and Sy (2010) estimate that, if fish resources were used in a sustainable manner and excess capacity in the sector eliminated, resource rents in Senegal's fisheries sector could potentially reach € 200 million (or US $275 million)[1] annually, which in 2018 represented 7.6% of exports (World Integrated Trade Solution [WITS] 2018). The important role of the fishing sector across the Senegalese economy makes this of, particularly grave concern.

3 Primary Reason for the Crisis: Regulatory Failure

The Major Actors in Senegalese Fisheries

The 1998 Fisheries Act constitutes the legal framework regulating the fisheries sector. It stipulates that fish resources under Senegalese jurisdiction constitute a "*national heritage*." This implies that fish resources in the Senegalese Exclusive Economic Zone (EEZ) belong to the Senegalese People as a whole, but, the State as the custodian of those resources has the obligation to manage them sustainably for food security and income generation for current and future generations. To perform its regulatory role and manage

the country's fisheries, the State relies on several agencies namely, the Directorate of Marine Fisheries, the Center for Planning, and the Directorate for Protection and Surveillance of Fisheries. Together, these agencies are responsible for the design and implementation of State policies with respect to marine resources. They provide key strategic orientations by setting the legal, sectoral and macroeconomic framework for policies. They are also responsible for undertaking impact assessment of macroeconomic policies in the fisheries sector, preparing the sector's public investment budgets, and publishing economic information and statistics. Further, they are to ensure the protection and surveillance of the EEZ and compliance with fishing regulations. Lastly, the fisheries sector also benefits from the scientific support of the Center for Oceanographic Research of Dakar-Thiaroye (CRODT), which is responsible for monitoring fisheries and fish stocks.

What is noticeable here is that while there has been a slow process of decentralization by which a number of prerogatives regarding natural resource management have been devolved to local governments, competence in fisheries management has not been adequately transferred by the State administration. As a result, fisheries policies are typically formulated and implemented based on a top-down approach where the directives emanating from the central administration in Dakar are brought down to the stakeholders with little or no consultation. This means that fishing communities are often alienated from the State because of a lack of consultation regarding decisions that directly affect their livelihood. This poses a question of legitimacy of State policies, which could render them ineffective.

In addition to State agencies, the sector also comprises of professional organizations, such as the National Collective of Senegal's Artisanal Fishers, the National Federation of Economic Interest Groups of Senegal's Fisheries, and the National Interprofessional Council of Senegal's Artisanal Fishers. The creation of these organizations reflected the willingness of fishermen to better defend their interests before the State. However, the relationship between the State and these organizations has been rather complex. Often in the past, the State has been intrusive and fostered clientelist relationships with some organizations.[2] Since the end of the 1980s, the artisanal subsector has witnessed the creation of numerous rival professional organizations that are primarily concerned with defending the corporatist interests of their members and in helping them pool resources to finance investment projects. Since less than 10% of fishermen are members of such organizations, the question of their representativeness remains a major issue. Therefore, while the creation of these organizations does much to democratize the participation

in the fisheries management policies, they have been unable to coordinate and cooperate effectively.

The general inability of the artisanal subsector organizations to act collectively to defend their common interests contrasts with the effectiveness of the industrial subsector major organizations. The Association of Senegalese Vessel Owners and Industrial Fisheries or Groupement des Armateurs et Industriels de la Pêche au Senegal (GAIPES) is the most prominent professional organization in the industrial subsector. Over the years, GAIPES has turned into a trusted partner of government agencies. Members of the GAIPES pride themselves to be long-term investors in the sector. Due to their influence, they have been able to limit entry to curb the "race to fish."

Because of the artisanal organizations' general inability to coordinate coherently and to formulate a vision regarding the long-term management of fisheries resources, they are typically not regarded as strategic partners unlike their counterparts in the industrial fisheries. Consequently, they have been sidelined and bypassed by both government administration and donors. As a result, they have made minimal contributions to current reforms. Their absence, however, has dire consequences as far as the success of sustainable resource management policies in the sector is concerned. Indeed, in order for the reforms to have a long-lasting success beyond the duration of most projects and the temporary support of the donors, there is a real need for strong, credible, and representative professional organizations that represent the interests of all stakeholders.

Weak Institutional Arrangements and Policies

The fundamental cause of the collapse of fisheries in Sénégal and elsewhere is arguably the inadequacy of the prevailing property regime (namely open access, be it regulated or unregulated) that characterizes many fisheries and the perverse incentives it creates (Anderson and Libecap 2010; Munro 2010; and Costello et al. 2008). While access to the industrial subsector in Senegal is controlled through licensing, thus making it a regulated form of limited access, the artisanal sector, which accounts for 80% of catches as of 2017 (Direction des Pêches Maritimes 2019), operates in a "quasi" unregulated open access environment. An open access fishery has three essential characteristics. Firstly, the fishery resource is exploited by a large number of independent vessels such that no single actor can influence the total output and the market price. Secondly, entry and exit to and from the sector is free. Lastly, there is no property right or use right to the resource in its natural habitat. This has several implications. Most importantly, in the absence of

an enforceable right to the in situ resource, no one party has an incentive to *invest* in the resource by leaving it at sea for future growth. This is because any vessel is allowed to catch the fish for immediate economic returns, even at the expense of sustainable rent extraction for society as a whole. Consequently, this leads to a "tragedy of the commons" driven by the "race to fish".

Just like the "no barriers to entry and exit" condition in competitive markets ensures the dissipation of any economic rent, the investment in increased effort in an environment devoid of exclusive access rights ensures an identical outcome. Due to their scarcity, natural resources typically generate an economic return to the resource itself, a scarcity or resource rent above the return needed to cover intermediate input costs, labor costs, and the opportunity cost of capital.[3] However, in the absence of limited access, the existence of scarcity induces greater investment in capital and effort, thus offsetting the natural productivity of the resource. This results in overexploitation and translates into lower return on effort. The downward trend in the average catch per trip by the pirogues since the early 1990s reflects the rent dissipation taking place in the artisanal subsector. Although total catches in this subsector have increased due to increasing volumes of fish captured in the waters of neighboring countries, the return to effort as measured by the catch per trip has decreased by more than 30% over a period of 20 years (Ministère de l'Economie Maritime 2008).

Furthermore, despite the rent dissipation, the government's continued subsidy policy to the sector, which averages to $17.3 million annually (Ministère de l'Economie Maritime 2008) has exacerbated the crisis further and accounts for the dramatic increase in the levels of effort. However, simply removing the subsidies is socially, economically, and politically difficult because they play an important socioeconomic and sociopolitical role. In any event, the main challenge presented by the current regulatory system is its inability to effectively regulate access to the subsector that represents 80% of all catches in the fisheries industry. Indeed, the 1998 Fisheries Act does not address the controversial issue of access to the resource by the artisanal fleet. While Article 15 of the Fisheries Act (République du Sénégal 1998) stipulates that

> *any construction, purchase, processing or conversion of an industrial Senegalese fishing vessel must be subject to prior authorization of the Minister of Marine Fisheries. This decision will be conditioned by the availability of the resource stock.*

Paragraph 2 of the same article states that it is "*applicable to artisanal fishing boats under the conditions decreed by the Minister of Fisheries,"* such a decree for regulating access has never been promulgated (Seck 2004). With relatively

low entry costs, anyone willing and able to engage in small-scale fishing can become a fisher with no control from the authorities. This absence of regulation results in increased fishing effort and ultimately erodes resource rents and threatens the future survival of numerous species. This policy failure challenges the Senegalese State to undertake corrective measures that would reverse the current trend. It also poses a challenge to all fisheries stakeholders to seek an alternative approach to resource management, one that would create wealth from the fish resources in a sustainable manner.

The Failure of the Regulatory System

Since independence, the expansionist policy of modernization and development of Senegalese fisheries has come at a high cost. Some species, once abundant, are now severely overexploited and face possible commercial extinction. The cause is to be found in the self-defeating incentives of fishers to compete in an open access environment until resource rents are dissipated. Despite imposing limited entry rules and limits on the use of inputs, the regulation has been unable to curtail these perverse incentives. Moreover, the top-down approach to regulating the sector has failed because of its inability to address the underlying causes of the socially costly and wasteful "race to fish." By failing to engage communities in the management of the resource, the fisheries authorities, through their top-down approach, face a problem of trust and legitimacy across local fishing communities. Consequently, even environmentally and economically sound policy interventions generate low levels of compliance, which, coupled with poor monitoring and enforcement, render policy interventions ineffective at reversing the trend.

Another factor that is contributing to the regulatory failure is political interference. Politicians, at times, take discretionary measures that violate both the spirit and letter of the law or subvert procedures designed to limit access for political and/or financial gain (e.g. the illegal allocation of authorizations to fish to Russian trawlers in 2010). Another form of political interference relates to the enforcement of sanctions for non-compliance. Often, the intervention of politicians or high-level officials is sufficient to lift sanctions. This practice generates a moral hazard problem because offenders will continue violating the law so long as they have powerful backers. A major weakness of the current system is that it lends itself easily to political manipulation. As such, there should be an effort to minimize unwarranted political interference as much as possible. The impacts of such discretionary, political interventions are far-reaching because instead of the regulatory process creating expectations of certainty and trust regarding the management of

fisheries policy among participants, the opposite occurs. This subsequently may discourage the fishers to comply with the law, which in turn, has serious consequences on the sustainability of fisheries resources.

4 Fisheries Reform in Senegal

The Principles of the Reform

In the late 1990s and the early 2000s, the realization of the shift from fish abundance to systemic depletion of the stock instilled a sense of urgency and a willingness to reform the management of fisheries in order to prevent an irreversible damage. The Senegalese authorities, with the support of financial and technical partners, embarked on the development and implementation of co-management initiatives that sought the active involvement of a diverse pool of stakeholders (including fishers and fishing communities) in the decision-making process. The goal of these reforms was to provide effective fisheries management and gain legitimacy by actively involving the stakeholders even in the monitoring and enforcement of rules governing resources. This approach marked a considerable departure from the conventional practice of centralized, top-down management of fisheries by national government agencies. Despite these goals, the fisheries administration retained a major role in initiating the reform because of the belief that local fishing communities were unable to steer the reform successfully due to their poor organization and lack of resources.

Notable in the reform process is the consultation that took place in 2004, during which key reform principles were defined. These included developing public policies that placed the fisherman at the heart of the reform, giving priority to tighter control over access to the resource, and disinvesting in excess fishing capacity. These steps would be necessary to generate greater wealth from the fisheries' resources. Consequently, after a wide consultation process spanning a number of years, several important documents that articulate the strategic orientations of the State regarding the reform of fisheries management were formulated. The Sectoral Policy Letter, published in 2007–2008, is arguably the most prominent. Another notable document is the Strategy of Accelerated Growth, which views fisheries reform as a potential driver of economic growth and a key component in the poverty reduction strategy. In essence, the reform revolves around the development of fisheries management plans[4] and the devolution of management responsibilities to the producers themselves and local communities through concession contracts

with the State. For such a decentralized concession system to be functional, all parties involved in co-management must understand and appreciate each other's rights and duties. However, making all stakeholders understand that fishing is primarily an *economic activity* that is lucrative and sustainable so long as resource rents are appropriated by producers and not dissipated (Ba et al. 2017), has proved to be a challenge—both within local communities, and within the State administration where most managers have a natural science, not an economics or management training. Although all stakeholders understand the necessity and urgency for a reform, at times, distrust and suspicion about the State's possible hidden agenda remain as a result of past State-society relations. Consequently, there has been resistance from all stakeholders.

Understandably, any reform that aims to address the ecological and economic challenges in the sector, must be grounded in the rights to access the resource in order to block or adjust the perverse incentives that are inherent in the prevailing open access regime. As such, a consensus has been reached regarding the establishment of State concessions that allocate use rights to fishers as an incentive mechanism to end resource overexploitation. Concessions are described as "*fair and transparent mechanisms that facilitate the transfer of responsibilities through a contract between the State and holders of a use right. This contract is enforceable against all parties involved- fishermen, institutions involved in the management and the State*" (Direction des Pêches Maritimes 2009). The concession system would rely on three criteria: (1) the principle of territorialization, (2) capacity restriction in order to control effort in a more effective manner, and (3) quotas on catches. However, the efficacy of concessions would depend on the particular subsector. For instance, quotas on catches held by fishers or groups of fishers can be an effective instrument for the industrial fisheries, while territorialization can be effective for the artisanal subsector when well defined groups of fishers who share common fishing zones are identified. Again, the rationale here is that by getting the economics and the incentives right, fisheries reform has the potential to play a critical role in the country's strategy for enhancing economic growth.

What follows is a discussion of some of the major reform programs initiated in the artisanal subsector, as well as the challenges therein.

Reform Process and Governance in the Artisanal Fisheries

The reform process undertaken by the fisheries authorities in the artisanal subsector has two components. The first component is to facilitate the emergence of local organizational structures, namely, Councils of Local Artisanal Fisheries (CLPA), which are to become the institutional instruments for carrying out reform in the artisanal subsector. The objective is to create a platform where stakeholders and their pre-existing social arrangements that were previously marginalized by the authorities under the centralized institutional arrangement, can participate as collectives in the co-management of fisheries. The second component of the governance reform is to develop local or national initiatives that foster capacity control and co-management. Examples of such reforms include the registration of pirogues under the *Programme National d'Immatriculation (PNI),* the artisanal fishing permit system, and the GIRMaC program.

Local Institution Building: CLPAs

Pursuant to Article 12 of the 1998 Fisheries Act, 22 CLPAs were created by ministerial decree in 2008. The CLPA is both a key institutional innovation in the management of artisanal fisheries and a cornerstone of the reform process in this subsector. The typical CLPA is structured according to colleges of stakeholders grouped by profession ranging from fishers, traders, to fish processors and carpenters. Other stakeholders include local leaders, the fisheries administration, and a representative of the executive. The main goal of a CLPA is to ensure the economic wellbeing of its members while achieving sustainable resource management of the fisheries stock. In addition, the CLPA is expected to become an active partner in the governance of resources by elaborating management plans and conservation measures that contribute to sustainability, participating in the co-monitoring and surveillance of local fishing activities, providing advice regarding the award of fishing permits, and contributing to local conflict resolution. Therefore, the CLPA is envisioned as the organ of local governance where co-management initiatives are elaborated, discussed, validated, and implemented with the involvement of all relevant stakeholders.

However, while the CLPAs were designed to be inclusive organizations that involve all key stakeholders in the management of resources and foster bottom-up sustainability, this did not take place in practice from the onset. In fact, when the first CLPAs were created, the local pre-existing institutions

were by-passed as they were perceived as representing narrow vested interests as well as lacking representation and legitimacy to voice the concerns of the fishing communities. For this reason, CLPAs are at times perceived as an arm of the State, created by ministerial decree and chaired by a representative of the executive, with members of local communities merely seen as rubber-stamping participants in initiatives driven by the administrative authorities.

Out of the 22 CLPAs originally established, only a few operate effectively (Tine et al. 2018). Most have become dysfunctional and have failed to perform their intended roles due to a lack of financial, material, and organizational resources. These problems must be resolved for the CLPAs to have any meaningful role in co-managing artisanal fisheries.

Local and National Institution Building: GIRMaC/ GDRH Programs

Launched in 2005, GIRMaC (*Gestion Intégrée des Resources Marines et Cotières)* is an integrated program funded by the World Bank through a US $10 million International Development Association (IDA) credit and a US $3.85 million Global Environment Facility (GEF) grant. It was designed to promote sustainable fisheries management through the support of local communities in the management of coastal demersal fisheries and marine resources, as well as the protection of ecosystems, including the improvement of habitat and preservation of key species through the creation of five marine protected areas (World Bank 2015). The program aimed at promoting a local co-management system based on a participatory approach and active community involvement organized around a local fisheries committee in order to establish a system of fisheries management planning at local and national levels (World Bank 2015). The program selected four pilot sites—Ouakam, Ngaparou, Foundjoune, and Betenty based primarily on the local communities' demonstrated willingness to engage in sustainable management in areas where fish resources face a real threat of depletion. A Local Fisheries Committee (CLP) was created in each site. The composition of CLPs is similar to that of the CLPAs in that the CLP includes a variety of stakeholders such as active and retired fishers, pirogue owners, fish traders, and fish processors. But, while the CLPAs are created as an organ through which the State, together with local stakeholders give embodiment to co-management, the CLP is a private association created by GIRMaC. As such, CLPs are simply village-level associations and are institutionally subordinate to the CLPA. The main objectives of the CLPs are the resolution

of conflicts over fishery resources, the restoration and sustainable management of fish resources by restricting fishing effort or allowable catches, the protection of marine breeding grounds, and the generation of income from the sale and processing of fish products (World Bank 2015). To achieve these goals, GIRMaC was tasked to implement two major activities: (1) the revision of the 1998 Fisheries Act; and (2) the elaboration of fisheries management plans for two critical species, coastal shrimps and cymbium, relying on co-management.

The overall outcome of the program was mixed. First, the efforts to promote negotiation, conflict resolution, and consensus building forums among stakeholders with respect to the co-management of fisheries resulted in mixed results. Secondly, the proposed revision of the 1998 Fisheries Act was criticized for its inadequacy. Meanwhile, the development of national management plans for the coastal shrimp and cymbium suffered setbacks and could not be completed under the program.

The GIRMaC project was subsequently extended to eight new sites under the aegis of the GDRH program (*Gestion Durable des Resources Halieutiques or* Sustainable Management of Fish Resources). The GDRH aimed at consolidating and expanding co-management in the fisheries sector pilot program by replicating the GIRMaC, providing additional implementation support, and deepening the impact and geographical coverage beyond the individual sites by preparing consolidated management plans across a number of co-management sites in a given area (World Bank 2015). Beyond the ecological sustainability dimension, the GIRMaC program's approach to co-management is also concerned with economic viability, that is, ensuring a sustained income stream for fishers and fishing communities.

Pirogue Registration and the Permit System

In order to implement successful reform in the artisanal fisheries, certain prerequisites must be met. Firstly, a precise audit of the resource stock in each fisheries management unit by species and spatial distribution must be carried out. The role of the CRODT in assessing the stock is crucial in this regard. Secondly, the assessment of the size of the fleet of pirogues through the national program of pirogues registration (Programme National d'Immatriculation, PNI), initiated in 2006, is to be completed. Thirdly, pirogue registration must be combined with the introduction of the artisanal fishing permit system, which grants access rights. Finally, a moratorium on new pirogue construction must be imposed in order to control fishing effort and capitalization in the subsector. Achieving these initiatives would

go a long way in addressing the problem of overfishing of declining resource stock and rents dissipation in subsector. However, the implementation of these initiatives has been slow, arduous, and fraught with setbacks and disappointments. For instance, the completion of the national program of pirogues registration took no less than 10 years. By December 2015, 19,009 pirogues were officially registered (Direction des Pêches Maritimes 2015) and digitally captured in a new pirogues database. However, the inability of the administration to impose a moratorium on the construction of new pirogues during those 10 years despite tremendous effort, resulted in a 50% increase in the pirogues fleet since the CRODT's 2005 estimation of 12,619 pirogues when the reform was initiated (CRODT and ISRA 2006). The moratorium came eventually into force in January 2015 following numerous nationwide awareness campaigns in 2014–2015.

Once the pirogues are registered, it is necessary to introduce a permit system that grants the right to access the fisheries resource. The implementation of an artisanal fishing permit system, however, has been underwhelming. It was introduced in 2005 following a long process of consultation and discussion with major stakeholders under the aegis of Directorate of Maritime Fisheries. The process led to the creation of three categories of permits: The A Category which costs nearly US$10 for standing fishermen, the B Category which costs nearly US$30 for small pirogues of up to 13 meters, and the C Category which costs nearly US$ 50 for large pirogues exceeding 13 meters. It is worth noting that even 15 years after its introduction and numerous awareness campaigns, the level of compliance remains low; nearly 60% of pirogues are still without fishing permits according to the latest estimates by the Department of Maritime Fisheries. More importantly, one may question the ability of such instrument to effectively regulate access to fisheries. In fact, the rules for granting the artisanal fishing permits are extremely lax, for they are not conditioned on the type of gear used, the species targeted or the fishing location. Overall, access to fisheries has remained unrestrictive despite the introduction of fishing permits. Nevertheless, there have been ongoing discussions to establish a new fishing permit that will address some of these issues (Direction des Pêches Maritimes 2015).

Recently, major milestones have been achieved such as the completion and enactment of a new Fisheries Act (République du Sénégal 2015) and the implementing decree (République du Sénégal 2016). This is an important achievement because it provides a revised legal framework that governs the reform effort. The most notable aspects of the new Act are the codification of fisheries co-management, the strengthening of fisheries management plans, the promotion of marine protected areas and the stricter penalties

against illegal, unreported, and unregulated (IUU) fishing, as well as participatory monitoring and surveillance. In addition, the long process of physical and digital registration of the artisanal fleet was completed in 2015 with an official estimate of 19,009 pirogues as mentioned earlier. There has been progress regarding the use of TURFs as the territorial basis for access restriction among artisanal fishers. Finally, half a dozen management plans have been completed: the coastal shrimps and cymbium management plans which started under the GIRMaC program were eventually completed under the PRAO-SN project.[5] Similarly, the deep see shrimps, octopus, and sardinella management plans were developed recently.

Shortcomings and Challenges of Artisanal Reform

The reform in the artisanal subsector suffers from various shortcomings. The first, and probably most significant shortcoming is the coordination failure. The process of reform has been characterized by numerous compartmented initiatives that are aimed at individual strategies to foster co-management. Many of these projects rely on the technical and financial assistance of Senegal's development partners such as the World Bank, the Japanese Development Agency (JICA), USAID, as well as NGOs like the World Wildlife Fund (WWF) or Environment Development Action (ENDA), among others. However, despite the intrinsic value of these projects, the lack of coordination among them has created confusion and frustration among some key stakeholders. Each project has its own objectives, time horizon, approach, as well as interest. Overall, there is little regard as to how they all fit together. Instead, there seems to be little coherence in so far as these initiatives contribute to the bigger picture. The fundamental problem here lies with the authorities' inability to define a long term and coherent operational co-management strategy that all donor projects must contribute toward and meet. Without such a strategy, the confusion from coordination failure will likely persist, and this will undermine the prospects for success.

Secondly, the fisheries administration (national or local) seems unable to truly embrace a bottom-up participatory process despite the co-management narrative. The creation of concessions as a primary instrument to re-shape fishers' access rights and incentives requires the establishment of a host institution that is independent, representative of grass root fishers and has the capability of managing fisheries. Since fisheries management will likely be based on territorial access rights, using pre-existing local arrangements that have developed organically would be natural and would economize on costly institutional engineering. In this regard, the creation of CLPAs in their

current form, by perpetuating the administrative authorities' preeminence in fisheries management, seems inconsistent with the aim of a localized, bottom-up reform of the subsector. Additionally, one may question the sustainability of the organizations and initiatives (e.g. the CLPs) developed by the ever-ubiquitous development partners upon project completion.

Yet, examples of successful self-organized fishing communities that bring about sustainable management exist in Senegal. The self-regulation of effort and catches in Kayar, a fishing village located 60 kilometers north of Dakar, is probably the most well-known example. In the early 1990s, the Joint Committee of Kayar-Guet Ndar was established with the support of local, traditional, and religious leaders to put an end to the violent conflict between local fishermen from Kayar and migrant fishermen from Guet Ndar. The source of the conflict was the competition for access to fish resources between the two communities (Platteau and Gaspart 2002). Because of their long tradition of migration, Guet Ndar fishermen consider the sea as an open access resource, while local fishers have a restrictive view of the access to the adjacent waters, which they consider as their own. The fishers' communities of Kayar engaged in further collective action by rationing the supply of pelagics in order to support producer prices. Thus, a regulation limiting the number of daily trips to one for any specific board involved in purse seine fishing was introduced in 1992. Furthermore, in the wake of the FCFA currency devaluation in 1994, line fishers of Kayar adopted an effort-limitation regulation by setting a cap on the number of boxes of fish a boat could land, a maximum of three boxes per pirogue. This move was probably a reaction to fish traders' practice of offering low prices in a context of rising input costs. It effectively set a limit on the amount of catches. The Committee further elaborated and implemented regulations on the size of the catches, the fishing periods, the fishing gear, and the methods allowed. It also supported the marketing of the fish products by actively negotiating with fish traders, and this eventually resulted in the stabilization of the selling price of fish. This form of regulation has been hailed as a success since both the concern for improved livelihood for the community and sustainable fishing practices were addressed. Importantly, unlike the recent co-management initiatives developed by the CLPAs or CLPs, the management initiatives carried out in Kayar, emanated directly from the fishermen themselves. And, the rules and regulations governing fisheries management were formulated and enforced without government and its development partners.

5 Conclusion

This article sheds some light on the economic and political dimensions of the crisis of the fisheries sector in Senegal. We sought to explain, why the current ecologically and economically unsustainable mode of appropriation has persisted, despite the implementation of ambitious reform programs. We have focused on the political economy of reform in the artisanal sector because this is the most exigent and challenging subsector in Senegal. In this article, we have argued that the cause of the fisheries crisis lies in the expansionist policies undertaken by the state authorities and their inability to regulate access both in the artisanal and industrial subsectors. Over the years these policies have led to declining fish stocks and rent dissipation as a result of overcapacity and overfishing. Given past failures to instill sustainable resource management, there was unanimity among stakeholders that fisheries co-management is the only viable solution because the inclusive nature of this approach creates legitimacy and a sense of ownership that are essential for sustainable stewardship. However, the structural reform of the sector that all stakeholders have been calling for, had been elusive until recent progress; for instance, the enactment of the new 2015 Fisheries Act, and the adoption of several key management plans (for coastal shrimps, deep see shrimps, cymbium, octopus and sardinella management plans). This recent progress in building a regulatory framework is notable and welcome after years of a seemingly stalled process. However, the next step, probably the most challenging, is to implement this new institutional framework to shape a new and sustainable behavior from all the stakeholders.

Despite the co-management narrative, a major challenge of the reform in the artisanal subsector has been to identify and engage with representative producer organizations at the grass-root level that is capable of managing fisheries sustainably. Relative to the industrial subsector, this task is arduous because of the vast heterogeneity and lack of coordination among stakeholders. Yet, the reform underway requires well-functioning professional organizations that engage with the authorities and the development partners in a credible manner. The fact that no such organizations exist, presents the CLPAs with the opportunity to be the legitimate candidate representing producers and communities. Therefore, turning the CLPAs into autonomous and functional organizations will be critical for the ultimate success of the reform.

Notes

1. Similar to the World Bank (2015), we have used the 2009 exchange rate of FCFA 467.98 per US dollar.
2. In the 1970s, the State facilitated the creation of numerous fisher cooperatives which served as a means to control the artisanal subsector through co-optation (Ndiaye 2004). Many cooperatives were led by village leaders, community leaders or notables who had close ties with the ruling party. By controlling access to fishing inputs and credit facilities, these cooperatives contributed to the consolidation of the ruling party's power at the local level through an effective political patronage system. It was not uncommon for cooperative officials to distribute the Socialist Party's membership cards among the fishing communities (Ndiaye 2004).
3. The rent is measured as the difference between the landed value of fish and the full economic costs of bringing a catch to port, including normal return.
4. These management plans constitute a set of measures aimed at conservation and optimization of the rent generate by the scarcity of the resources. They specify the technical and financial needs required for the implementation of the measures. The actual implementation of management plans is subject to government approval.
5. PRAO-Sénégal is a World Bank funded program aimed at strengthening governance capabilities and sustainable management of fisheries namely through the development of management plans.

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Are Large-Scale Land Acquisitions in Africa Pro-development? A Network Analysis of FDI in Land and Agro-industry

Nadia Cuffaro, Laura Prota, and Raffaele Bertini

1 Introduction

Africa is changing for the best. It is urbanizing at a very high pace and making notable progress in the areas of income per capita, trade liberalization, human capital development, and doing-business indicators (African Development Bank 2018). Sub-Saharan Africa (SSA) is experiencing structural transformation away from agriculture, with falling agricultural share in GDP and employment (Barrett et al. 2017).

However, families in rural Africa still rely essentially on agriculture, as virtually all rural households have an on-farm activity (92% on average across countries) and derive about two-thirds of their income from on-farm agriculture (Davis et al. 2017). Furthermore, rural households in Africa are less engaged in wage employment, both on and off the farm (even after

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controlling for the level of development), resulting in a smaller share of nonfarm wage income in total income (8%) than in other developing regions (Christiaensen 2017).

Farm incomes per capita depend on per capita land and farm output per hectare. Although rural population density in Africa is still relatively low on average, there are wide variations across SSA, where both high and low-density countries face the challenge of rapid rural population growth more than other areas of the developing world (United Nations 2014). SSA is the only region of the world that is forecasted to have positive rates of growth of the rural population to 2050 (United Nations 2014; Heady and Jayne 2014).

In this context, Africa has been targeted more than any other region of the world by large-scale land acquisitions (LSLA) through foreign direct investments (FDI) but also domestic acquisitions. The wave of FDI, the majority of which has been for agricultural use, has led to fears of "land grabbings".[1] This concern was motivated by several reasons, the most important being that the deals involve at least one crucial asset, land (and also water), usually on a very large scale and predominantly in the context of complex and often unclear structures of property rights.

LSLA and agro-industry investments in Africa are the topics of this chapter. We depart from the focus of most of the "land grabbing literature," which has concentrated on property rights and the risk of dispossession of vulnerable users, to examine whether LSLA may have had a growth impact in the agricultural sector of targeted countries. We first review the literature and general data on the possible transmission channels between LSLA and growth in agriculture. Then, we apply network analysis to analyze the matrixes of land and agro-industry[2] investments to:

- Test whether LSLAs and FDI in food beverages and tobacco (FTB) are positively correlated. If so, we can conclude that if an investor country is buying land in a specific target country in Africa, it will more likely invest also in the agro-industry. This hypothesis, if confirmed, would suggest that land acquisitions could have a developmental impact on the target countries.
- Identify the countries that couple land acquisitions with productive investments.
- Investigate whether there is a process of concentration of investments in specific African countries, by which a few target countries are benefiting more than others from the renewed flows of resources in the continent.

We use two main data sources on investments: Land Matrix,[3] and FDI Markets. The first provides up-to-date information (starting with the year 2000) on large-scale land acquisitions, domestic, and FDI, including the size of contracts (larger than 200 ha, mostly leases). The second provides up-to-date information on greenfield foreign direct investment projects since 2003. Both sources are "private" research projects whose data differ and are more up-to-date than those provided by UNCTAD and OECD. Although the FDI Markets dataset tracks investment in food, beverages, and tobacco (FTB), hence includes primary agricultural production, the latter is a tiny share of the value of FTB.

Hence in this chapter, the FDI Markets dataset is defined as "agro-industry", FDI investments or simply FDI. Land acquisitions reported in the Land Matrix dataset are defined, instead, as large-scale land acquisitions (LSLA).

Policy implications are described in the conclusions.

2 Large-Scale Land Acquisitions and Growth: A Review

Land Balances and LSLA

Land balances worldwide show that a large share of the remaining land suitable for agriculture not already in use (net balance) (Fisher et al. 2011),[4] is concentrated in Africa, and particularly, Sub-Saharan region. Although estimates of area for cropland expansion are very sensitive to the definition of "potentially available" land, there has been basically consensus that in Africa, arable land is relatively abundant (Alexandratos and Bruinsma 2012; Chamberlin et al. 2014; Fischer G. et al. 2011).

Accordingly, the idea of a vast extensive margin for agriculture and egalitarian farm structures has traditionally shaped the development discourse on Africa. The recent revival of the debate on land intensification and the wave of large-scale land acquisitions in the aftermath of the 2007–2008 commodity price boom has however refocused attention on land in Africa and contributed to reshaping the perspective on agrarian structures in the continent (Chamberlin and Headey 2014; Cipollina et al. 2018; Deininger and Byerlee 2011; Jayne et al. 2014).

The available data (Alexandratos and Bruinsma 2012; Fisher et al. 2011; FaoStat; United Nations 2014) show that there is a high degree of heterogeneity among countries in Africa in terms of net land availability and

population pressure on land: (i) The net balances and the largest areas of forests are concentrated in some countries while in others, e.g., Egypt, most land suitable for agriculture is already in use; (ii) The ratio of cultivated to suitable land ranges from 0,9 in Egypt and Rwanda to less than 0.1% in seven countries; (iii) The amount of suitable land per rural inhabitant varies considerably, and about one-third of countries have less than one hectare of land suitable for agriculture for rural inhabitant, largely as a result of demographic trends.

In a synthesis of a debate on the topic of land pressure and farming systems in the region, Jane et al. (2014) emphasized that Africa's surplus land is concentrated within relatively few countries, while many others are land constrained and experiencing declining farm sizes. The authors point out that rapid population growth is taking place amidst declining land endowments in high-density African countries, which are already typified by severe rural poverty.

In this context, Africa has been targeted more than any other region of the world (Fig. 1) by the large scale land acquisitions reported in the last two decades, through FDI but also domestic investments. Figure 1 shows the shares of LSLA (in terms of the number of deals and land acquired in contracts concluded) by world region: Africa accounts for about 40% of deals and land acquired through FDI (international and mixed investments) as reported in Land Matrix across the world.

LSLA distribute unevenly across the African continent. The data on land investments as reported in Land Matrix shows that the highest activity, in

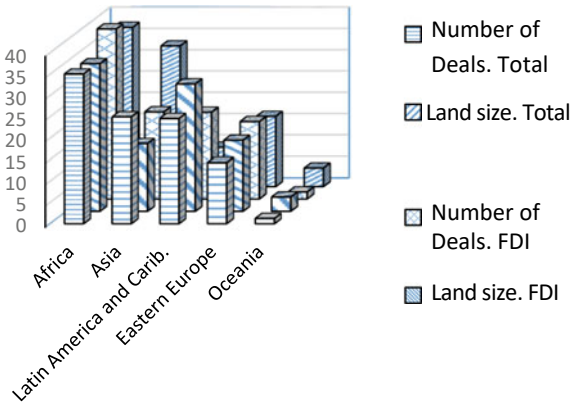

Fig. 1 Shares of total land acquisitions by world region (2020) (*Source* Land Matrix)

terms of the number of deals reported, is in Eastern Africa, followed by Western Africa (Fig. 2a), while the size of land acquired is largest in central followed by Eastern and Western Africa (Fig. 2b).

Figure 3 shows the shares of total deals and total land acquired in Africa by country. In terms of the number of deals, the largest targets are two countries in Eastern Africa: Mozambique, and Ethiopia. The largest areas of land have been acquired in the Democratic Republic of Congo, South Sudan, Mozambique, Congo, and Liberia.

To relate land investments to the size of countries we computed what we refer to as an index of investment (as in Conigliani et al. 2018), namely, the ratio between the overall actual size (ha) of domestic and international and mixed deals (FDI) in a country (concluded, documented by official sources of information, and reported in the Land Matrix dataset), and total agricultural land of the country.

Figure 4 plots the number of international and mixed deals (FDI) by country against the investment index by country. Outliers in this space are countries with many deals and a relatively low investment index (Mozambique and Ethiopia) and countries with the opposite feature, high investment index, and few deals (Liberia and Sierra Leone). In this second group there may have been a limited functioning of land markets, and distinct investors' strategy, with only a few acquisitions of very large size. Therefore, these countries experienced a non-negligible land rush from a relatively limited number of very big investors, which gained control over a substantial portion of territory, with potentially large political, economic, and social consequences.

As mentioned before, the post-2007–2008 wave of land investments, mostly for agricultural use, has been generally discussed in the framework of property rights and the risk of dispossession of vulnerable users. A case studies literature, the so-called "land grabbing" debate (Anseeuw et al. 2012a; Cotula et al. 2009; Cuffaro et al. 2013; FAO 2009; GTZ 2009; Oxfam 2011), has

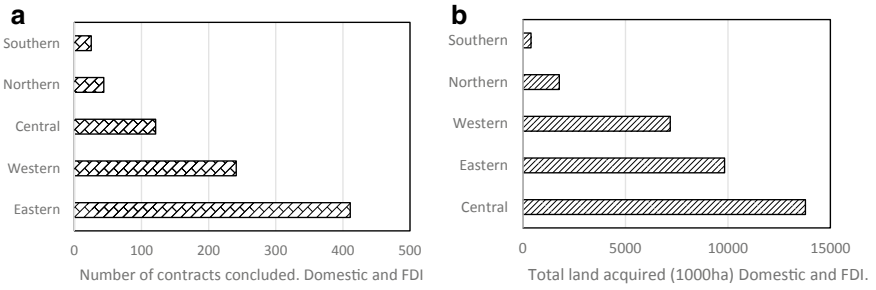

Fig. 2 Africa. Land acquisitions by region (2019) (*Source* Land Matrix)

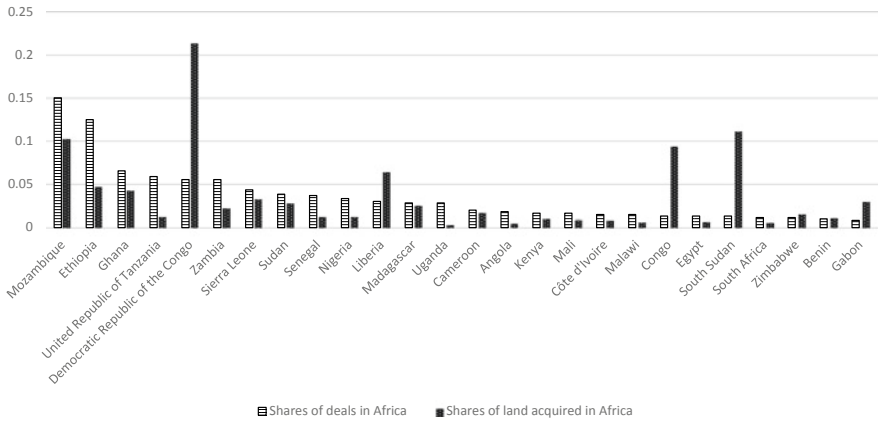

Fig. 3 Africa. Shares of total deal numbers and of land acquired by country (2019) (*Source* Land Matrix)

Fig. 4 Land acquisitions: international investment index vs. number of deals (2019) (*Source* Authors' elaboration Based on Land Matrix and Faostat)

concentrated essentially on deals by international investors targeting developing countries and on the concern that investments are often taking place in contexts where many people have only insecure land rights. Quantitative studies have been comparatively few and have analyzed the determinants of foreigners' land acquisitions in Africa (Deininger and Byerlee 2011; Arezki et al. 2015; Conigliani et al. 2018; Giovannetti and Ticci 2016).

From a different perspective, one may examine the possible links between large-scale acquisitions and growth in agriculture.

LSLA and Growth

In the 1980s and early 1990s case studies across locations in SSA partially formalized and tested a general model of the evolution of farming systems originating in the work of Boserup (1965) and Ruthenberg (1980) (the so-called BR theory or framework), which predicts intensification driven by population growth and market access.[5] An example is Heady and Jane (2014), who, albeit admitting severe data and methodological constraints, conducted cross-country tests of the strength of responses of various land intensification variables (namely, value added, yields, fertilizers use, livestock, and non-land capital per ha) to falling land-labor ratios in Africa and Asia.[6] They found that high population density countries in Africa have largely intensified by increasing cropping intensity, i.e, the ratio of area harvested to cropland (which accounts for half of the growth in total crop output per hectare). However, there was no response of yields to land constraints over the short run and no growth of modern inputs such as fertilizers or irrigation. Intensification hence occurred along an unsustainable path, given the implied mining of nutrients.

A recent World Bank project addresses the issue of data limitation under the Living Standards Measurement Study–Integrated Surveys on Agriculture (LSMS-ISA) Initiative,[7] and researchers using these data have reconsidered some of the key issues of land intensification.

Sheahan and Barrett (2017) find that fertilizer and agro-chemical use in Africa is more widespread than it is often acknowledged, but the incidence of mechanization and irrigation remains quite small. Binswanger and Savastano's (2017) descriptive results show that, consistent with the BR predictions, fallow areas have virtually disappeared under increasing population pressure and market access. However, they also find that, with few exceptions, the proportion of households using chemical fertilizers is too low to maintain or restore the soil nutrients under permanent agriculture. Furthermore, pressure from population growth and market access did not trigger significant irrigation investments.

Land intensification is also dependent on the system of property rights in land, which are notoriously complex in SSA (Cuffaro 2002; Deininger et al. 2011),[8] the traditional view being that factor markets are either missing or imperfectly functioning in the region. Dillon and Barrett (2017), using a range of recent data including LSMS-ISA, show that in the surveyed area

rural factor markets exist (for example, cross-country averages show that, 29.4% of agricultural households rent/borrow land, 38.9% hire labor and 23.7% take out a loan), albeit functioning poorly, as there is a significant link between labor input and household size across all countries. Deininger et al. (2017) analyze land governance constraints to intensification and land market operation and find that differences in land endowments and productivity create the potential for land markets to equalize endowments and contribute to higher levels of productivity; furthermore land rental markets improve equity by promoting land access to those with limited land endowments.

In summary, panel data from the LSMA-ISA household surveys available so far have produced interesting research results; however formal testing of the Boserup-Ruthenberg hypothesis has to wait until data of greater length are available, essentially because changes in farming systems are quite slow (Binswanger and Savastano 2017).

What follows next is a brief review of the literature on the possible transmission channels between LSLA and growth in agriculture, which will lead to the definition of our empirical research focus and approach.

Transmission Channels Between LSLA and Agriculture Growth

There are three possible main transmission channels through which large-scale land investments impact growth in agriculture. First, investors may seek intensification and/or may impact growth through the extensive margin; second, the acquisitions activity may be positively associated with the functioning of land markets, which in turn positively impacts growth; and, third, large farms may capture the advantages of scale-biased participation to modern value chains in agriculture.

On the first channel, the "land grabbing" literature has suggested that recent LSLA have targeted land abundant low productivity countries where land prices are presumably low, and that acquisitions mostly did not result in intensification. The main reasons quoted are two. First, there has been a variety of observed outcomes, including a large incidence of failed projects—often linked to property rights conflicts. Second, because of the much-debated idea that international acquisitions may have been partly driven by motives other than actual production on the part "new" investors, i.e., "financial" and State "political" actors[9] (Anseeuw et al. 2012a; Cotula et al. 2009; FAO 2009; GTZ 2009; Oxfam 2011). Specifically, Arezki et al. (2015) found that the difference between the potential and actual yield on land already cultivated (yield gap), which can be regarded as a predictor of

the ability to quickly increase production through investment, had no consistent impact on acquisitions, while the availability of suitable but uncultivated land for expansion was a key driver of land demand.

Hence, based on the consensus that emerged in the LSLA debate so far, one should observe a negative correlation between average value added per hectare (land productivity) and the share of land acquired in each country; and no correlation between acquisitions and land productivity growth. Indeed, Fig. 5 shows a weak negative correlation between the average productivity of the land by country and the international investment index (after excluding Liberia, which shows an exceptionally high index). Figure 6 shows

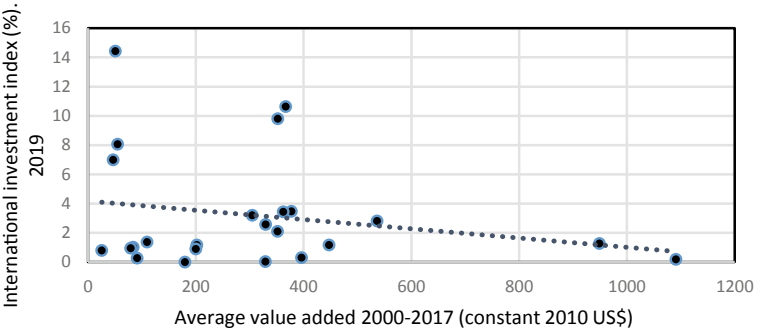

Fig. 5 Africa. Land productivity and international land acquisitions (investment index)[10] (*Sources* Land Matrix and Regional Strategic Analysts and Knowledge Support System [ReSAKSS])

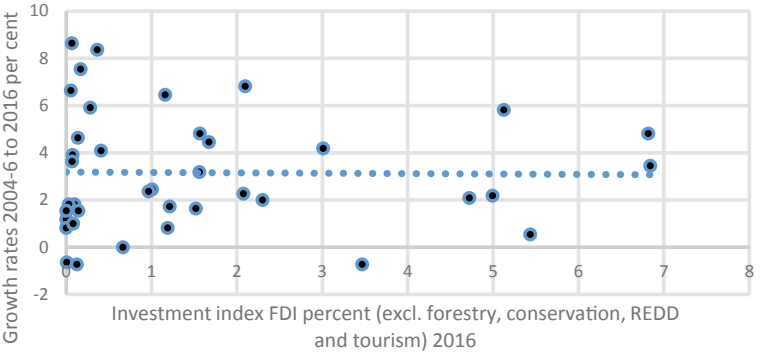

Fig. 6 Africa. International land acquisitions and growth of value added per hectare (*Note* International Investment Index excluding forestry conservation, REDD and tourism. *Sources* Land Matrix and ReSAKSS)

an extremely weak negative correlation between investments and land intensification. These associations seem in line with the idea of resource-seeking investments with no impact on land intensification.

As for the second channel of transmission, the literature suggests that the degree of operation of land markets is positively associated with growth (Besley and Ghatak 2010; Deininger et al. 2017; Chamberlin and Ricker-Gilbert 2016). Indeed, the only significant correlation, positive, in the available data emerges in the relationship between the number of international acquisitions and growth rates of agriculture (Fig. 7), albeit with much dispersion, which may be related to the positive nexus between the existence and functioning of land markets and growth.

Land markets in Africa have been underdeveloped for historical reasons, also linked to the modalities of transition from colonialism to independence (Alden Wiley 2011; Cuffaro 2002). However, there is evidence that these markets are growing with growing population pressure on land, as it should be expected based on the Boserup model and of worldwide empirical evidence (Boserup 1965; Cuffaro 2002). For example, Deininger et al. (2017) analyze evidence on land markets from six Sub-Saharan African countries.[11] They observe that inheritance or grant by traditional authorities or the extended family remains the main way for accessing land and that levels of formal or informal documentation of land ownership remain low throughout—except for Ethiopia. However, their study suggests that land markets are more active and have the potential to contribute to structural transformation more than it has been commonly assumed in the literature on land rights in Africa.

The operation of land markets is in general expected to be positively correlated to land and labor productivity. This is because markets may transfer land to its best and most productive use, and eventually facilitate access to credit markets by using land as collateral. By helping farmers reach economies

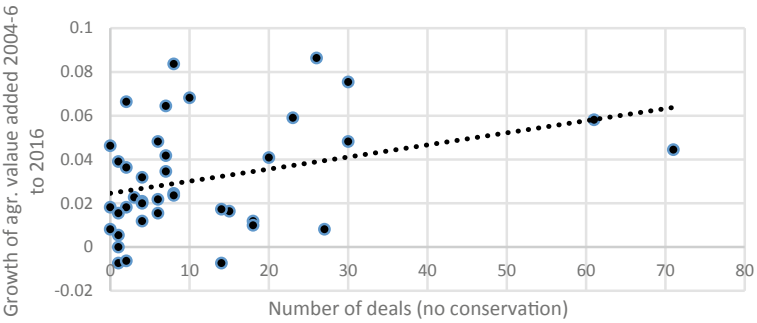

Fig. 7 Africa. Number of international deals and growth rates of agr. value added (2004/6 to 2016) (*Sources* Land Matrix and ReSAKSS)

of scale, efficient land sale, and rental markets can increase farm productivity, raise the incomes of farmers with limited land, and even facilitate the transition to off-farm activities (Deininger et al. 2014).

This leads our discussion to the issue of the scale of farming, which is relevant in the context of large acquisitions, as LSLA are likely to increase the scale of farming. The long-lasting debate on farm size and productivity has provided much empirical evidence on an inverse relationship (IR) (see Rada and Fuglie 2019 for a recent review of this literature) mostly based on data from Asia and Latin America, but it is also confirmed by representative survey data for some countries in Africa (Carletto et al. 2013). If that holds, LSLA possibly resulting in large-scale corporate farming, may not contribute to growth.

The traditional challenges to IR—the most prominent being that land of high quality may be more densely populated because of higher yields, resulting in smaller farms, i.e., farm size endogenously reflects land quality—has been debated with mixed results. However, recent large-scale land acquisitions, which are the topic of this chapter, and other developments such as the emergence of mega-farms in middle-income countries, suggest that new technologies and institutional arrangements may be giving rise to significant farm economies of size, and are new challenges to old IR assumptions (Collier and Dercon 2014; Deininger and Byerlee 2012; Rada and Fuglie 2019). For instance, Foster and Rosenweig (2017) point out that, given the global pattern of farm productivity across developing and developed countries, the relationship between farm productivity and scale is U-shaped, and hold that the existence of labor-market transaction costs can explain why the smallest farms are most efficient, slightly larger farms least efficient and larger farms as efficient as the smallest farms.

Modern value chains in agriculture have been characterized by augmented quality standards of downstream entities (supermarkets and export firms) with procurement systems relying on specialized wholesalers and contract farming. Scale-biased participation tends to arise from scale-variant grower capacity to meet requisite standards, or from scale-invariant contract-related transaction costs, that attenuate the advantages of smallholders (Barrett et al. 2012; Rada and Fuglie 2019; Henderson and Isaak 2017). This is confirmed also by empirical evidence on Africa (e.g., Maertens and Swinnen 2009).

Could large farms capture the advantages of scale-biased participation in modern value chains in agriculture? If that were the case, we should also see a positive correlation between the pattern of land acquisitions and investments in up and downstream activities in agriculture.

The possibility of coexistence between LSLA and agro-industrial investments is particularly appealing. One could expect LSLA to be coupled with downward-linked investments to facilitate the processing, storage, and transportation of agricultural and wood products. This point is also interesting under an economic policy perspective, since the availability of land and the presence of the right mix of country characteristics might facilitate the upgrading of a country's economic system along the global value chains (GVC).

In the next section, we apply network analysis: (i) to test whether LSLA and FDI in food beverages, and tobacco (FTB) are positively correlated. If so, we can conclude that if an investor country is buying land in a specific target country in Africa, it will be more likely also to invest in agro-industry; (ii) to identify which countries have the approach of coupling land acquisitions with manufacturing investments; and (iii) finally, we also want to investigate whether there is a process of concentration of productive investments in specific African countries, by which a few target countries are attracting FDI in agro-industry.

3 The Network of Foreign Acquisitions in Africa: Land and Manufacturing

Network Data

Africa has attracted most of the foreign land acquisitions taking place in the last 20 years. Focusing on the implications of LSLA and their possible linkages with manufacturing and services industries (particularly, focusing on whether they pave the way for more complex and higher value-added forms of investments) is crucial to understanding the possible future scenarios for development. A way to examine such a correlation is to analyze land acquisitions and agro-industry investments as two networks linking African countries to the rest of the world. In the following, the same data used in the previous sections will be analyzed using social network analysis. Table 1 shows

Table 1 Network statistics for the LSLA (2000–2019) and FDI (FTB) (2003–2019) flows

Network statistics	FDI network	LSLA network
# of countries	84	84
# of ties	166	93
Density	0.02	0.013
Average degree	3.95	2.14

the main characteristics for the two networks analyzed: the LSLA showing exchanges of land titles larger than 200 hectares between 2000 and 2019; and the network of FDI Market reporting capital flows in the Food, Beverages, and Tobacco industry (FTB) from the year 2003 to 2019. Overall, there are 85 countries worldwide involved either in LSLAs or FDI in agro-industry, while only 46 countries are present in both networks.

In Fig. 8 LSLA data are presented as a network where a source country "buys land from" a target country in Africa. For example, if the USA buys land from Mozambique (MOZ), in the network an arrow will go from the USA to MOZ. In the figure, the node's size is proportional to in-degree. In social network analysis, the in-degree of a node indicates the sum of all incoming ties a node has (Wasserman and Faust 1994, p. 100). For example, in Fig. 8 Senegal (SEN upper right side of the graph) has in-degree equal to five because there are five incoming ties from other countries to Senegal. In this network ties represent land acquisitions, thus an in-degree equal to five indicates that a total of five land deals were concluded between Senegal and international investors. Of course, in the graph, we can also see precisely which countries acquired land from Senegal. Similarly, Mozambique (MOZ), at the center of the graph in Fig. 8, is particularly large because it has the highest in-degree in the network equal to 11.

Furthermore, the number of hectares acquired in each transaction is depicted in the graph using different line weights. The largest single land

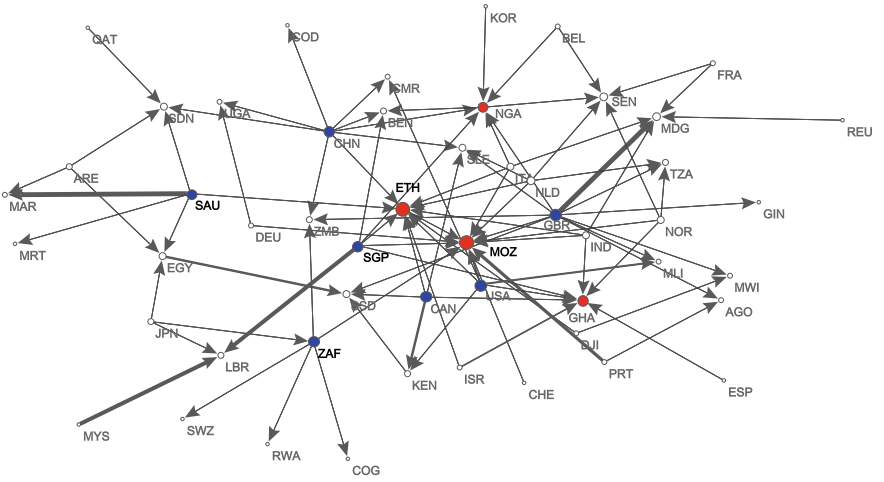

Fig. 8 Large Scale Land Acquisitions (LSLA) network in Africa (*Note* Nodes represent countries; ties represent Large Scale Land Acquisitions. Most central receiver countries are highlighted in red color. Most influential investor countries are highlighted in blue color. *Source* Authors' elaboration based on Land Matrix data)

acquisition recorded in the data occurred between Morocco (MAR) and Saudi Arabia (SAU) for 700,000 hectares.

The network shows that Mozambique (MOZ), Ethiopia (ETH), Ghana (GHA), and Nigeria (NGA) signed the highest number of deals (high in-degree); the largest land sales occurred, instead, in Morocco (MAR), Madagascar (MDG), Liberia (LBR), and Mozambique (MOZ) (tie weights). The buyers involved in these large land acquisitions are (1) ex-colonial powers such as Great Britain (GBR) and Portugal (PRT); (2) Asian tigers such as Singapore (SGP) and Malaysia (MYS) whose strategy was to concentrate their acquisitions mostly in Liberia; and (3) Saudi Arabia (SAU) who bought land primarily in Morocco (MAR).

Figure 9 shows the configuration of the FDI in the food, beverage, and tobacco network in Africa. Similarly, to the LSLAs network, in the FDI network in Fig. 8, nodes represent countries and ties report that a source country "Invested capital in" a recipient country. For example, if Saudi Arabia (SAU) invested capital in the agro-industry sector of Egypt (EGY lower left corner of the graph), an arrow will link SAU to EGY in the network. Ties' width is proportional to the amount of capital invested (Millions). The nodes' size is proportional to in-degree. Therefore, this network in-degree provides

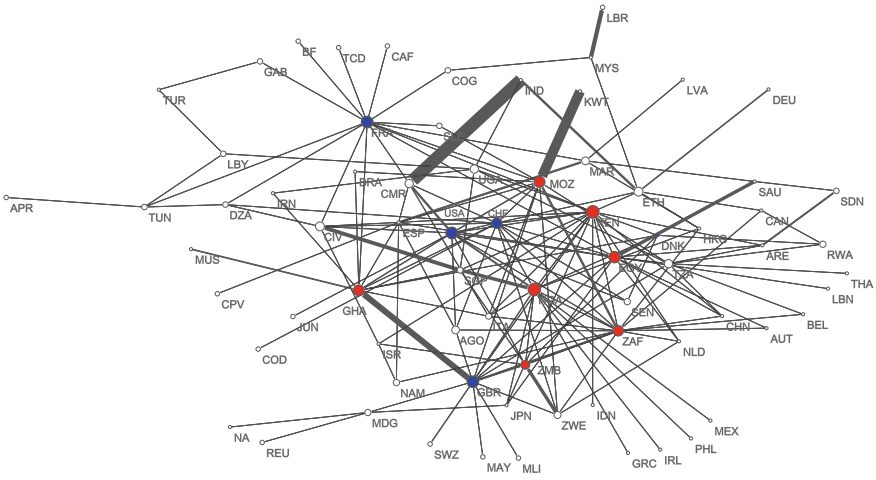

Fig. 9 The network of Foreign Direct Investment (FDI) in the Food, Beverages, and Tobacco industry in Africa (*Note* Nodes represent countries, ties represent Foreign investments in the Food, Beverages, and Tobacco industry (FBT). Most central receiver countries are highlighted in red color and include Nigeria (NGA), Kenya (KEN), Egypt (EGY), Mozambique (MOZ), Ghana (GHA), and South Africa (ZAF). Most influential investor countries are highlighted in blue color and include the USA, Switzerland (CHE), Spain (ESP), France (FRA), and Great Britain (GBR). *Source* Authors' elaboration based on FDI Markets data)

an indication of the capacity of African countries to attract FDI: the higher the in-degree of a country, the higher is the number of countries that decided to invest in it.

The FDI network is denser (0.02 versus 0.01 in the LSLA network) and more articulated than the LSLA network.[12] The largest recipients of FDI in the food, beverage, and tobacco in Africa include, for example, Nigeria (NGA), Kenya (KEN), Egypt (EGY), Mozambique (MOZ), Ghana (GHA), and South Africa (ZAF). France (FRA), Great Britain (GBR), United States (USA), Switzerland (CHE), and Spain (ESP) are the more prominent countries, having invested in more than 10 countries with their companies.

It is also interesting to note that Kuwait (KWT), India (IND), Great Britain (GBR), and Malaysia (MYS) have realized the largest investments in the network. In particular, Malaysia has a unique relationship with Liberia, indicating its willingness not only to buy land but also to make productive investments.

Are LSLAs Correlated to FDI Flows?

As mentioned in the introduction, one of the main questions addressed in this study is whether LSLAs in Africa are correlated with productive FDI in Food, Beverages, and Tobacco. To test this hypothesis, we use a QAP (Quadratic Assignment Procedure) correlation test, which compares the observed correlation between the LSLA and FBT networks against the probability of finding the same correlation by chance in two random graphs with the same characteristics. In practice, this test counts the number of times randomly permuted graphs present the same statistics as those observed in the LSLAs and FDI networks. Thus, similar to the classical significance tests, the higher the *p*-value, the higher the probability to obtain the same correlation by chance on random graphs.

Table 2 reports the results of the QAP correlation test for the LSLAs and FDI networks. In the LSLAs ties' strength is proportional to hectares acquired (Ha); for FDI ties' strength is proportional to the capital invested (Millions).

Table 2 QAP correlation test results for LSLA (200–2019) and FDI networks (2000–2019)

	Observed value	Significance level	Average	Std dev	Minimum	Maximum	# Ob
Pearson correlation	0.1388	0.0043***	0.0001	0.0236	−0.0135	0.6580	49,989

Column 1 reports the observed value of the Pearson correlation coefficient measured on the two networks: in this case, the Pearson correlation coefficient is 0.1388 indicating a moderate positive correlation between the LSLA and the FDI networks. Column 3 reports the average correlation obtained on about 50,000 randomly permuted graphs with the same characteristics of those observed in the empirical networks. The value of this average random correlation is extremely low and equal to 0.001% (column 3, Table 2). Furthermore, the results are highly significant at the 0.01 confidence level (indicated by three asterisks in Table 2, Column 2) meaning that the percentage of random permuted graphs showing the same value or higher of the Pearson coefficient observed in our empirical networks (which is 0.1388) is less than 1 or only 0.43% (column 2, Table 2). Hence, of the 50,000 random permutations, just about 200 networks over 50,000 produced a Pearson coefficient equal or higher to that observed in the empirical data of 0.1388. We can conclude that the observed correlation between the LSLA and the FDI network is not obtained by chance and is highly significant. Thus, the patterns of land acquisitions and productive investments in agriculture is the outcome of a substantive, non-random process. Land acquisitions increase the likelihood of productive FDI by 13% (Pearson correlation coefficient: column 1, Table 2). Similarly, productive investments in agriculture from a foreign country also increase the likelihood of increased land acquisitions by 13%. The correlation, unfortunately, does not provide information about the direction of the relation; however, it suggests that the two processes are related.

To have a clearer visualization of how the two networks overlap, we display only the nodes that are involved in land acquisitions and FDI investments in Fig. 10 (i.e., countries that have bought land at least in one African country and have invested in agro-industry projects in at least one African country). For instance, Great Britain (GBR), the United States (USA), Saudi Arabia (SAU) The Emirates (ARE) have indeed coupled FDIs in the food, beverage, and tobacco industry with LSLAs. By contrast, big players such as France (FRA), Germany (DEU), and China (CHN) do not appear in the graph as they never combined FDIs with land acquisitions.

Mozambique, Ethiopia, Ghana, and Nigeria are the countries that more often attract investments in both land and agro-industry. The special relationship between Liberia and Malaysia that we have observed in the previous sections, is also presented here with a bold solid line coupling of land and FDIs.

The quantitative literature on the determinants of LSLAs has mostly pointed to a resource-seeking motive (Deininger and Byerlee 2011; Arezki

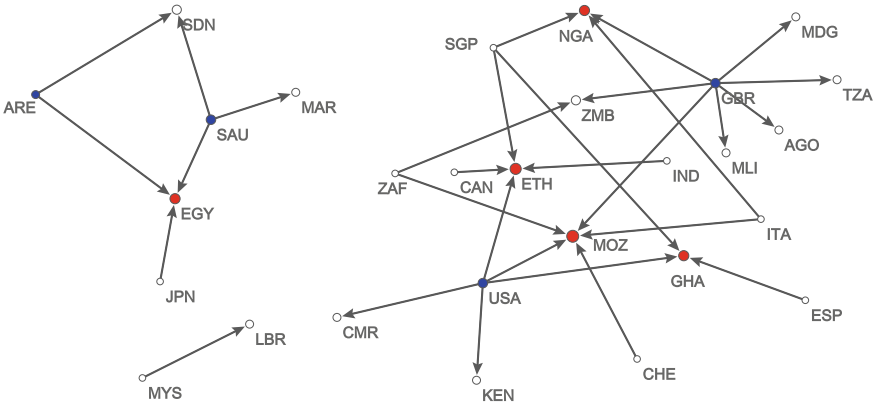

Fig. 10 Multiplex ties in the LSLA and FDI market networks (*Note* Nodes represent countries, ties are present when both land acquisitions and FDI occur together. *Source* Authors' elaboration based on the Land Matrix and FDI market data)

et al. 2015; Conigliani et al. 2018; Giovannetti and Ticci 2016). A recent study by Arezki et al. (2018) holds that LSLAs are more likely motivated by re-exports to investor countries, i.e., they are functional to integrated food chains driven by investors' food security. Our analysis adds to this literature by suggesting that investors' strategies are indeed diversified and may also be coupled with agro-industry investments.

In the section that follows, a community detection algorithm is used to explore in more detail the characteristics of each network and to understand whether a higher correlation exists between groups of countries investing in specific regions of Africa.

Exploring the Regional Patterns of LSLA and FDI in Africa Through Community Detection

Structural Patterns in the Network of LSLAs

The network of LSLAs in Africa is analyzed using a community detection algorithm[13] (Blondel et al. 2008) to identify groups of countries with similar patterns of land sales. The algorithm aims at clustering countries into groups that are more densely related to one another. In Fig. 11 the results of the community detection analysis are presented. The network analyzed is the same as in Fig. 8, however, in this visualization nodes belonging to the same community are closer. Moreover, we ordered countries in each community

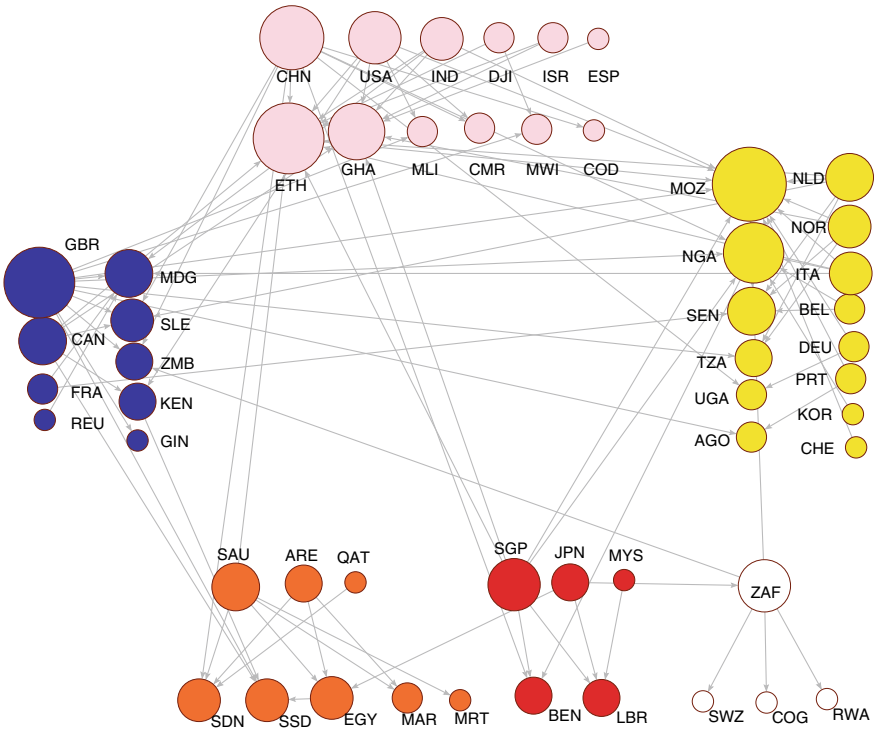

Fig. 11 Louvain Communities in the LSLAs network (2000–2019) (*Note* Nodes represent countries and ties represent LSLAs. Nodes' colors indicate Louvain communities of countries. *Source* Authors' elaboration based on the Land Matrix)

by network degree centrality so that nodes with a higher number of connections are at the top and those with fewer ties are at the bottom of each group. Furthermore, we created two columns for each community, one with all land buyers and the other with land sellers. Nodes' color indicates communities, thus if two countries have the same color, it means they belong to the same community insofar as they buy land from a similar set of African countries. Node size is proportional to nodal degree measuring the number of contracts each country has concluded.

It is possible to see from the graph that investments in large land acquisitions in Africa follow a very clear geographical pattern: each community includes buyers from the same world region. Community 1, colored in yellow, includes many investors from Europe such as Italy (IT), the Netherlands (NDL), Belgium (BEL), Norway (NOR), Portugal (PRT), and Germany (DEU). This European group mostly acquires land from Mozambique (MOZ), Nigeria (NGS), Senegal (SEN).

Community 2, colored in blue on the left side of the graph, includes France and Great Britain which are the most influential ex-colonial powers in the continent. Madagascar (MDG), Sierra Leone (SLE), and Zimbabwe (ZIM) are the African countries that are the most targeted in this group. It is important to recall here that Great Britain and France have, however, very different investment strategies. The former has a tendency to couple land acquisitions with productive investments in the Food, Beverages, and Tobacco industry; while the latter, which mostly invest in Madagascar, uses a decoupling strategy.

Community 3, colored in pink, includes all new investors interested in Africa such as the USA, China (CHN), and India (IND). These new powers are investing mostly in Ethiopia (ETH), Ghana (GHA), and Mali (MLI). Among these foreign investors, only the USA tends to join FDI and LSLAs.

Community 4, colored in orange, mostly includes investors from the Middle East such as The Emirates (ARE), Saudi Arabia (SAU), Qatar (QAT). From the African side, in this group, we find Sudan (SDN), South Sudan (SSD), and Egypt (EGY).

Furthermore, community 5, colored in red, includes land buyers from Asia. In particular, we can find in this community; Singapore (SGP), Japan (JPN), and Malaysia (MYS). It is interesting to notice that Asian investors concentrate specifically on Liberia (LBR) and Benin (BEN), except for Singapore whose land acquisitions span across Ghana and Ethiopia (GHA an ETH, pink community) Mozambique and Nigeria (MOZ and NGA, Yellow community).

Finally, South Africa (ZAF) dominates community six colored in white. Land acquired by South Africa comes from Rwanda (RWA), Congo (COG), and Swaziland (SWZ). The countries in this sixtieth community have all exclusive ties with South Africa.

Overall, it is possible to notice that the three communities on the top (Yellow, Pink, and Blue) are quite well integrated because there are many ties linking countries across communities. In particular, the most central African countries in these three groups are targets of land acquisitions from investors in the other groups. Overall, land acquisitions concentrate mostly in Mozambique, Madagascar, Ethiopia, and Ghana.

By contrast, the communities at the bottom of the graph (white, orange, and red) are relatively narrow, with few crosscutting ties to one another. The extreme case being South Africa (ZAF), which represents an exclusive partner for Congo, Rwanda, and Swaziland. South Africa is thus the only country that is buying land in central Africa.

In conclusion, the community detection algorithm highlighted a new geography of land acquisitions in Africa, with six distinct communities each representing a distinct world region: formal colonial empires such as Great Britain and France; other European countries, new global economies such as China, India, USA, and Israel; the Middle East, Asia and, finally South Africa.

In the next section, the same algorithm for community detection is used to partition the FDI matrix and to understand to what extent this geography of land acquisition holds when capital is considered.

Structural Patterns in FDI Networks in Africa

What follows is a discussion of the geographical distribution of FDI in Food, Beverages, and Tobacco (hereafter referred to as the agro-industry). As for the LSLA network, Louvain community detection algorithm has been used to partition the FDI network into groups of densely connected countries. The ties in this network indicate that a country "invested capital in" another country measured in millions of dollars.

Figure 12 shows the result of the analysis. The network presented in Fig. 12 is the same network presented in Fig. 9, however, in this visualization nodes'

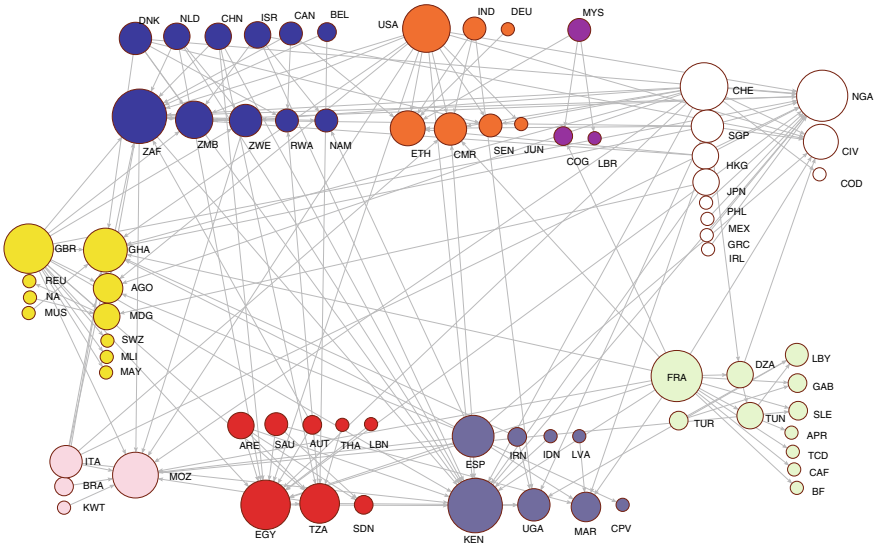

Fig. 12 Louvain Communities in the FDI network (2003–2019) (*Note* Nodes represent countries and ties represent FDI. Nodes' colors indicate Louvain communities of countries. *Source* Authors' elaboration based on the FDI Markets data)

color indicates Louvain communities. Furthermore, nodes belonging to the same communities are closer to each other. Finally, node size is proportional to the degree measuring the number of investments done and received by each country. As for the LSLAs network, also, in this case, nodes were rearranged to differentiate investors from target countries.

The communities identified in the FDI network are very different from those characterizing the LSLA network. The eight communities identified in the FDI network do not follow a clear geographical pattern as those identified in the LSLA network. By contrast, in the FDI network communities involve investors coming from a variety of different geographical areas.

It is interesting to notice that most communities in this network are dominated by the presence of a few prominent target countries. These African countries are the most attractive for FDIs in the Food, Beverages, and Tobacco sector as the large nodes representing South Africa (Blue), Ethiopia, and Cameroon (Orange), Nigeria (White), Kenya, and Uganda (Dark Blue); Egypt (Red); Mozambique and Ghana (Yellow). These prominent countries not only attract investments from the foreign countries within their community, but also from investors clustered in other communities, showing a generalized tendency to attract FDI from all investors in the network. This is probably because business conditions are overall better in these countries. From the investor point of view, Great Britain, France, the USA, and Switzerland are the four major players in this network, spreading their ties across most communities.

These results suggest that there exists a core of countries that are the most active in sending and receiving FDI in Africa. To identify these core actors, we use the K-core algorithm (Batagelj and Zaversnik 2003). The network in Fig. 13 presents the result of a K-core analysis of the FDI network. In the graph, central actors in the core are highlighted in black. This cohesive group of actors includes not only the most central actors but also the ones that have a higher number of links among themselves. In this group, we can find South Africa, Egypt, Kenya, Cameroon, Mozambique, Zimbabwe, Ghana, Nigeria as well as Great Britain, France, USA, Italy, and Switzerland.

On the opposite extreme, on the outskirt of the networks is the periphery where we find the countries with fewer connections (grey). The countries in the periphery are those that completely depend on a single investor. This is, for instance, the case of Mali (MLI), Malawi (MAY), and Swaziland (SWZ), Liberia (LBR), or South Sudan (SDN). In this periphery, we also find investor countries that are concentrating their resources only in one or a few African countries. For instance, this is the case of Germany (DEU), Turkey (TUR), and Thailand (THA).

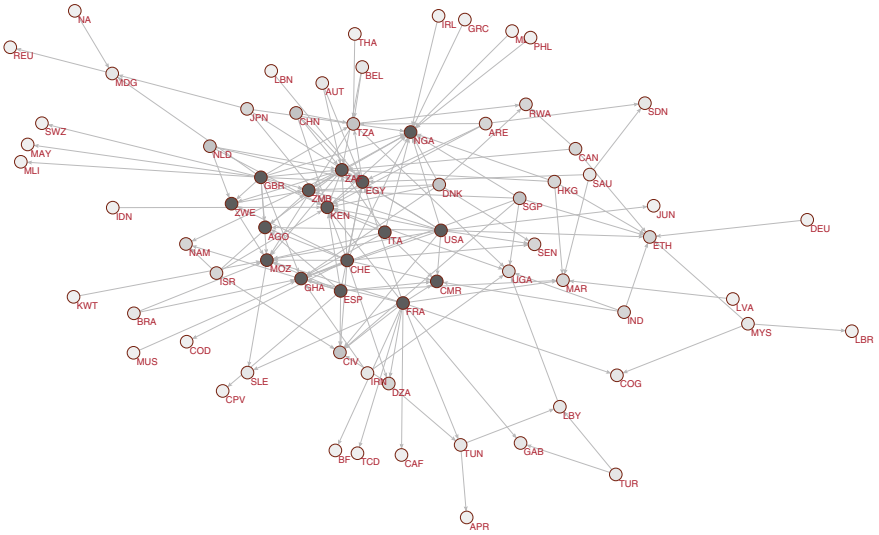

Fig. 13 K-core groups in the FDI network (2003–2019) (*Note* Nodes represent countries and ties represent FDI. Color intensity indicates core actors in the network. *Source* Authors' elaboration based on the FDI Markets data)

In between the core and the periphery, there is a semi-periphery (grey). Here we find China, Denmark, Switzerland, which are investing in Cote D'Ivoire (CIV) and Tanzania (TZA). India, Japan and Israle that are investing in east-central Africa including Ethiopia, Uganda and Rwanda.

4 Conclusions

In this chapter, we use social network analysis to examine large-scale land acquisitions (LSLA) in Africa and FDI in the Food, Beverages, and Tobacco industry (FDI) to understand to what extent they are correlated and what impact they have on growth.

We first review the geographic pattern of land investments across the continent and the transmission channels between LSLA and growth. There are three possible main transmission channels between LSLA and growth in agriculture: investors may seek intensification or may use the extensive margin; the acquisitions activity may be positively associated with the functioning of land markets, which in turn positively impacts growth; large farms may capture the advantages of scale-biased participation to modern value chains in

agriculture. The possibility that foreign acquisitions of land could be associated with FDI in agro-industry emerges from our discussion as an innovative research question.

We apply network analysis to examine foreign direct investments in land and the agri-food industry (Food, Beverages, and Tobacco) to test whether they are correlated; which investor countries do couple land acquisitions with agro-industry investments; whether there is a process of concentration of FDI flows in specific target African countries.

Results show that there exists a moderate and significant positive correlation overall between the pattern of land acquisitions and investments in the Food, Beverages, and Tobacco industry. This correlation has been overlooked in the "land grabbing" debate.

However, we also found that investor countries do have different strategies. Only a few countries systematically associate investments in the FDI industry with LSLA in Africa, namely, the USA, Saudi Arabia, and Great Britain. The centrality of these countries increases the overall correlation between the two networks. Most other countries, by contrast, adopt a decoupling strategy because their productive FDI in agro-industry does not occur in the same African countries where they made LSLA. This is, for instance, the case of countries such as France and China, that never associate FDI and LSLA investments. France and China are also very central actors in both the networks analyzed, and this explains why the correlation between the two matrixes is very weak.

Looking at receiving countries, only a few countries in Africa can attract both agro-industrial investments and LSLA, namely, Mozambique, Ethiopia, Ghana, and Nigeria. For other countries, the ability to attract FDI or LSLA varies greatly. A specific algorithm to identify the most central and interconnected countries (the k-cores analysis) showed that the agro-industry network has a core-periphery structure where a set of central target countries receive FDI by most investors, while peripheral countries only depend from one or two investor countries.

For land markets, our analysis identified a distinct geography of acquisitions in Africa through a "community detection algorithm" that identifies groups of countries with similar patterns of acquisitions. A six groups partition in our analysis captures deep-seated influences on Africa such as those exerted by France and Great Britain. It also identifies new players such as the USA, China, and India; other European countries; East Asian countries (Japan, Malaysia, and Singapore); the Middle East led by Saudi Arabia; and finally a group dominated by South Africa mostly investing in central African states.

Agro-industry capital flows in Africa follow a different pattern that is unrelated to that leading to land acquisitions. At the core of the FDI network, we find more dynamic African countries such as South Africa, Egypt, Kenya, Cameroon, Mozambique, Zimbabwe, Ghana, Nigeria. At the periphery, there are countries whose development mostly depends on one or a few specific investors. This is for instance the case of Liberia or South Sudan.

Although there are positive links between land acquisitions and agro-industrial investments, the factors that make a country attractive for land investments are not necessarily the same that determine the ability to attract manufacturing food processing. Indeed, African countries have a considerable advantage in attracting land investments but many of them may lack the conditions for effectively attracting investments for the subsequent productive phases.

Agriculture in Africa has not been sufficiently linked to agro-industries, and increasing private sector investment in this sector is a development objective (FAO-UNIDO 2010; UNDP 2018). International demand for "land" is increasing and governments in Africa are often involved in the negotiations of large scale land acquisitions (Cotula 2020). Therefore, we believe that a useful policy indication for the land acquisitions debate is that governments could require from investors effective coupling strategies between land and manufacturing investments, and on their part, they should have credible policies for enabling such strategies.

Notes

1. The phenomenon of LSLAs emerged mainly since the 2007–2008 commodity price boom through media reports; since timely and reliable data on investment in agriculture and land were not available and hard to find for several reasons. First, investments that do not go through multinational enterprises (MNEs) are difficult to trace, and in the case of agriculture, there are many new non-MNEs actors, often private equity or State-owned funds, sometimes specifically established for investing in land acquisitions (UNCTAD 2009). Second, a recent trend, such as land grabbing, may not be reflected in FDI data for a substantial length of time because a transaction appears in FDI data only when it has been fully paid (UNCTAD 2009). Other limitations include deals not being reported if host governments see them as politically sensitive and existing reports and databases having very different coverage.
2. Throughout this chapter we use the term agro-industry for industrial processing activities linked to the manufacturing of food products, beverages, and tobacco (FAO-UNIDO 2015).

3. International Land Coalition in partnership with several research centers (CDE, CIRAC, GIZ, GIGA) has published Land Matrix (Anseeuw et al. 2012b and http://landportal.info/landmatrix). Land Matrix includes deals (purchase, lease, or concession), at a different stage of negotiation (intended, concluded, failed); transnational and domestic, initiated since the year 2000, and covering an area of 200 hectares or more.
4. The regional data for land availability are evaluated at the world level in the Global Agro-Ecological Zones (GAEZ) project (Fischer et al. 2011). This assessment provides estimates of six suitability classes condensed into three: prime land, good land, and marginal and not suitable land. "Suitable land" is the sum of "prime" and "good" land. "Gross balance" is suitable land minus cultivated. "Net balance" is suitable land minus cultivated, forest, built, and protected. The idea of "land availability" refers to the notion of net-balance.
5. In Boserup, growing pressure on land implies increased use of labor with associated diminishing returns until, eventually, a new, superior technique is introduced. Yields per acre increase, but output per hour worked may decline or stagnate. Boserup's horizon is very broad, describing a sequence in which land-use systems and techniques evolve in response to increasing population pressure (Cuffaro 1997, 2002).
6. The authors regress the first difference of the log of various intensification variables against the log of the first difference of agricultural population density, separately for Asian and African samples.
7. The Living Standards Measurement Study–Integrated Surveys on Agriculture (LSMS-ISA) Initiative http://surveys.worldbank.org/lsms/integrated-surveys-agriculture-ISA collects households surveys panel data (over the period 2008–2020) through, nationally representative surveys in eight African countries, representing 45% of Sub-Saharan Africa's (SSA) population.
8. The Land Governance Assessment Framework compares countries' land situation in five areas (land rights recognition, land use planning, management and taxation, expropriation, public provision of land information, and conflict resolution) against global good practice via an ordinal ranking of some 80 dimensions that draws on input by local experts and stakeholders (Deininger et al. 2011).
9. Agribusiness has accounted the largest share of investors in land acquisitions but governments, sovereign wealth funds (SWFs) and private sector finance have been increasingly involved. For example, international pension funds have been expanding and diversifying their portfolios to include more developing world agriculture exposure.
10. Data of the Regional Strategic Analysts and Knowledge Support System (ReSAAKS) are compiled for tracking implementation of the Comprehensive Africa Agriculture Development Programme (CAADP).
11. Data from LSMS-ISA surveys in Ethiopia, Malawi, Niger, Nigeria, Tanzania, and Uganda.

12. Network density is equal to the number of lines present in the observed graph divided by the maximum possible lines the graph could have if fully connected. Formally, density = 2L/g(g − 1) were L is the number of lines observed and g is the number of nodes in the graph.
13. Louvain community embedded in Pajek software for network analysis. To optimize results, the Louvain algorithm was run on the network with no isolate nodes and a resolution parameter of 0.5 and 10,000 repetitions.
14. The phenomenon of LSLAs emerged mainly since the 2007–2008 commodity price boom through media reports. since timely and reliable data on investment in agriculture and land were not available and hard to find for several reasons. First, investments that do not go through multinational enterprises (MNEs) are difficult to trace, and in the case of agriculture, there are many new non-MNEs actors, often private equity or State-owned funds, sometimes specifically established for investing in the land (UNCTAD 2009). Second, a recent trend, such as land grabbing, may not be reflected in FDI data for a substantial length of time because a transaction appears in FDI data only when it has been fully paid (UNCTAD 2009). Other limitations include deals not being reported if host governments see them as politically sensitive and existing reports and databases having very different coverage.

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The Contribution of the Small-Scale Agricultural Sector into South Africa's Food Value Addition Agenda

Adrino Mazenda, Ajuruchukwu Obi, and Tyanai Masiya

1 Introduction

A central theme in contemporary agricultural development discourse, particularly in the context of agricultural transformation and restructuring is food value addition. Essentially, *value addition* refers to "the full range of activities required to bring a product or service from conception through the different phases of production, delivery to final customers, and final disposal after utilization" (Sturgeon 2001: 12). The value chain concept has become one of the strategic tools, that farmers or firms adopt to gain competitive advantage, conveying the notion of a value chain as the full range of activities required to bring a product or service from conception, through the

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different phases of production involving a combination of physical transformation and the input of various producer services, delivery to final customers and final disposal after use (Porter 1985; Kaplinsky 2006). Much of the recent perspectives of the value chain have grown out of the seminal work of Porter (1985) that was anchored on the theory of the firm as a collection of activities that are performed to design, produce, market, deliver and support its product (Porter 1985). This implies that the value chain inter-links and coordinates separate activities and alternatives to add value to agriculture output (OECD 2016). According to Yusuf and Trondsen (2014: 78), value addition in the food industry transforms production chains vertically to increase production. Moreover, it helps to improve production technologies and food security (Montalbano et al. 2015: 3–15).

The concept of value addition emanates from the *Global Value Chain (GVC)* principle, which relates value addition to the commodity sector among various multi-national companies (MNC). The view is held that value addition serves somewhat to rally firms, and other players in a wider framework that entails multifarious processes that originate from production through marketing and terminate in consumption (Inomata 2018: 15–16). To facilitate these processes, it is recognized that information availability, access to resources, and various factors are indispensable (Inomata 2018: 16). GVCs create employment opportunities in all economic sectors; a condition necessary for economic growth. In addition, GVCs facilitate improvements in communication technology, decreases distribution costs, and coordinates value chain actors (Inomata 2018: 18).

South Africa's agricultural sector has for a long time been dominated by a large-scale commercial sub-sector whose performance compares favorably with the best in the world and contrasts sharply with those of the small-scale sub-sector whose methods remain traditional at best. In no area than food value addition does this dichotomy manifest more glaringly. Available data suggest that the large-scale sub-sector accounts for approximately three-quarters of total grain, oilseed, and meat production (Wilkinson et al. 2016: 728; Hall and Cousins 2017: 1–20). What this means is that the small-scale sub-sector is naturally disadvantaged by its meager share of gross output. At the same time, the scale of production has a strong racial character in South Africa, with the large-scale commercial sub-sector being almost entirely white-owned, while the black population dominates the small-scale farming sub-sector. As the existing structure of the economy does not allow much occupational flexibility for the black population outside the agricultural sector, smallholder farming is widely practiced especially in the former Homeland areas of the country (Lowder et al. 2014: 2–4).

Under such a scenario, the policy focus ideally revolves around improving the efficiency of existing production systems, of which value addition is a major component. Prospects for diversification in horticulture, animal production, and aquaculture are also recognized and are often actively pursued. But efforts in South Africa to fast-track these processes and integrate the black farmers into the nation's agricultural economy are being hampered by a plethora of constraints, not least of which are financial, competitive and risk management challenges, infrastructure challenges, low credit lines, and environmental conditions; making it difficult for these farmers to fully commercialize and enhance their profitability (Joshi and Kumar 2012: 4; Kevin et al. 2015: 616–623). Nonetheless, wherever circumstances have permitted, the application of value addition approaches in the agriculture sector has created opportunities for agricultural innovation, enterprise development, and employment creation, which are critical contributing factors for food and nutrition security as well as enhanced income and livelihoods (World Bank 2017).

In the light of the foregoing, the South Africa Government has taken steps to incorporate food-value addition into its agriculture and food security policy (see Britz and Venter 2016; DAFF 2014a). For example, the government has committed substantial financial resources toward supporting smallholder farmers through various initiatives on food value addition (see Chen et al. 2015: 616–640; Drimie 2016: 1–15; Cavral 2017: 1–39; McKay 2018: 74–91; Minten et al. 2017: 42–49). But, these measures have not yet been subjected to any systematic evaluative process to ascertain the extent to which they have been successful or whether there is a need to adjust the policies to better serve the needs of the population. At the same time, available official statistics on processed foods do not provide enough basis for judgment as to how effective the food security programs have been.

Against this background, this chapter responds to two principal questions, namely:

- How do the South Africa food value addition policies encourage food value addition in the small-scale agriculture sector?
- What are the challenges inhibiting South Africa's small-scale agriculture sector from contributing toward the food value addition agenda?

The chapter adopts a qualitative desktop research approach, to examine South Africa's policies on food value addition and go on to identify the key challenges faced by South Africa's small-scale agricultural sector in its quest to implement food value addition. Authoritative scholarly sources,

policy documents, and legislations were reviewed. The policy shortcomings and challenges faced by smallholder farmers in the food and fisheries sectors were specifically targeted. The chapter expands on previous studies that have attempted to explore food value addition from individual crops, notably McKay (2018), Liefert and Liefert (2012), Pavithra et al. (2018), Machado et al. (2018), Kumar and Sharma (2016), Kevin et al. (2015), Chen et al. (2015). None of the studies has analyzed food value addition from the perspective of the smallholder farming system, which has been virtually overshadowed by the large-scale commercial farming sub-sector in South Africa. To that extent, this chapter makes an important contribution to both policy dialog and the academic literature on the South African small-scale agricultural sector in the context of the food value addition.

The rest of the chapter is structured as follows: after the introduction the chapter conceptualizes food value addition drawing on existing literature. This is followed by a review of South Africa's food value-added policies. Following are the challenges faced by South Africa's small-scale agricultural sector toward food value addition. The chapter concludes with recommendations and conclusions toward successful food value addition from South Africa's small-scale agriculture sector.

2 Conceptualizing Food Value Addition

This section provides both theoretical and empirical analysis of the contribution of small-scale holder farmers to food value addition. The theoretical analysis is based on the GVC framework, the Supply chain management theory, Social network theory, and the Competitive advantage theory, which capture critical components of food value addition applicable in the agriculture small holding sector. The GVC framework captures the role of small-scale producers in the food value chain, by mapping the geographical dispersion and organizational linkages with other actors. It highlights the governance structure by identifying leading firms capable of incorporating smallholder farmers into the agri-food chain processes. Figure 1 provides the Agri-sector GVC framework as discussed by Lee et al. (2012).

The GVC framework comprises four components, namely; bilateral oligopolies, traditional markets, production-driven, and buyer-driven chains. Production-driven chains include foreign direct investment, capital-intensive production practices, and technological progress. The aim of the production chains is to improve the product quality and coordinate other value chain steps. In the production-driven chains, food manufacturers play an important

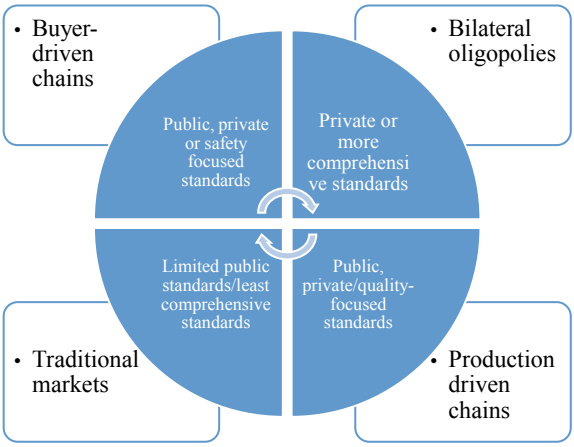

Fig. 1 Global Value Chain framework (*Source* Lee et al. 2012)

role in supplying and processing commodities (Gereffi et al. 2005: 96–97; Lee et al. 2012). Buyer-driven chains comprise wholesalers and brand name merchandisers, who play the central role in shaping labor-intensive agriculture production networks (Lee et al. 2012). In this phase, the wholesalers and brand name merchandisers play the intermediary role of collecting products from the farmers to the consumer. Consumers can be local or international buyers. The buyer-driven chains are necessary as they guarantee farmers' incomes as well as quality products for the local and international markets.

Bilateral oligopolies exist where there are few buyers and sellers of a given agricultural commodity in a market. The buyers' and sellers' activities are interdependent. As such, any countervailing power to constrain the market has implications for output or price. The severity depends on the price elasticity of the commodity (Lee et al. 2012).

The traditional market is composed of small producers and retailers, with less demand and supply coordination. In this setup, traditional and local traders buy primarily from smallholder farmers and sell to consumers and traditional retailers in local markets. Brand names are not important to the pricing of goods, and standards are limited. Moreover, there is hardly any value addition, and quantities are meant for primary consumption (Lee et al. 2012). Typical examples of traditional markets are street vendors and roadside stalls. These traditional markets increase access to affordable and nutritious foods. Micronutrient intake is one of the critical components of food security. The transformation of the agro-food industry has significantly changed the role of smallholder firms and improved the quality of food (OECD 2016). In that regard, food value addition enables the integration of small growers

into the global food market. It enhances diversification, value creation, food security, and employment (Yusuf and Trondsen 2014: 80).

Complementary to the GVC framework is the Supply chain management theory, the Social network theory, and the Competitive advantage theory. The Supply chain management theory emphasizes logistic planning and optimization of inventories across the supply chain system. It highlights the need to transform agricultural raw materials into products, which satisfy the needs of customers (Yusuf and Trondsen 2014: 79; Bowersox and Closs 1996: 64–65). The Social network theory argues for a sound horizontal, vertical, and business-support relationship between companies and organizations supplying inputs and services. It posits that, for an effective social relationship, there is a need for trust and sound inter-company and organizational relations. Social relations are necessary for enhancing the social capital of a company. They necessitate knowledge transfer and technical and financial support among social partners (Neilson 2008: 1609; Coleman 1990: 14). The Competitive Advantage Theory emphasizes the need for farmers or producers to invest in profitable ventures to remain competitive in the market. Moreover, farmers and stakeholders should venture into value addition to increase income. This is done through the identification of efficient transformation systems from the producer to the market (Porter 1985; Lopez-Gonzalez 2016: 91).

Studies on small-scale agriculture food value addition in Africa speak to different components of the above discussed theories, the competitive advantage theory. Machado et al. (2018: 201–209) identified consumption patterns as the main determinants of food value addition. A purchase pattern characterized by traditional retailers, such as street stalls, vendors, and local butcheries, is analogous with a smaller consumption of ultra-processed food. Supply chain intermediaries are necessary to increase the profitability of these traditional retailers. Moreover, food value chain governance and investment promotion are necessary in the creation of successful food value chain systems (Machado et al. 2018: 201–209). In another contention, growth and development of agricultural value chains in fresh fruits and vegetables is regarded as a powerful mechanism for food security and nutrition compared to traditional crops (Kumar and Sharma 2016: 3–5). Consequently, the value chain in the staple food sector is highly constricted. Farmers in Africa still have limited knowledge of value addition and are not positioned to realize the full benefits of value chain systems (Pavithra et al. 2018: 2740).

The value chain in the poultry and livestock industry is highly underdeveloped in Africa. Challenges include a lack of supply chain intermediaries,

technological progress, and unfair trading practices (Ncube et al. 2017). Similarly, the value addition on oil-based food products—oilseeds, edible oil, and processed oils is mostly successful (Jahari et al. 2018). However, Jahari et al. (2018) further state that restrictions on the development of the fisheries sector point to high logistics costs, which reduce profitability. More so, climate change, lack of knowledge of innovative production methods, value addition, and marketing strategies have been identified as additional constraints (Britz and Venter 2016: 22–23). Finally, commercial banks' and other financial institutions' support for agriculture value chains (inputs, technology, and services) is limited in comparison to internal financing. The restrictive measures on tripartite agreements among farmers, banks, and intermediary firms hinder farmers' access to financial support (Kevin et al. 2015: 616–624). It is imperative to note that international finances have penetrated the local food market. This has changed the production patterns, land ownership, and governance in the food sector. In Africa, these changes have threatened smallholder independence as they become absorbed into the value chain activities of international organizations (McKay 2018).

3 Food Value Addition and Agro-processing in South Africa

While the benefits of food value addition have long been recognized and the government has actively promoted agro-processing at the national and provincial levels in South Africa, the participation of smallholder farmers in agro-processing has been limited, at best. Research by Mmbengwa et al. (2019) reveal that participation in agro-processing remains insignificant, being as low as 19% in Gauteng Province of the country. The Agro-processing Strategy paper prepared by the Department of Agriculture, Forestry and Fisheries (DAFF) (2014b), proposed four broad typologies of participants in the agro-value system as: artisanal, semi-artisanal, semi-industrial, and industrial. In addition to information on the production technologies employed by the entities and their target markets, Table 1 shows the approximate proportions of these different categories based on data generated by Statistics South Africa.

According to Table 1, both semi-artisanal and semi-industrial categories of the participants, which represent weak attempts at value addition, add up to a mere 15%. Likely, lower degrees of participation in the more rural provinces of the country.

The evidence also suggests that lower levels of agro-processing investment are associated with lower and less sophisticated technologies employed

Table 1 Estimated share of total agro-processing activity, production technology and market type

Category	% Share	Production technology	Market type
Artisanal	81	Traditional	Subsistence, local, targeted
Semi-artisanal	9	Low-tech	Local
Semi-industrial	6	Semi-mechanized	National, sub-regional
Industrial	3	Highly mechanized	All Markets—national, regional, external

Source Based on review of DAFF (2014b)

and more narrow markets. In an analysis of African Leafy Vegetable (ALV) value chains in the Limpopo Province, Senyolo et al. (2018) took note of the considerable post-harvest losses experienced by smallholder producers because of their more frequent use of informal market channels and low capitalization.

4 South Africa Policies on Food Value Addition

The Government of South Africa has recognized the importance of the food value chain as a necessary mechanism to reduce food insecurity, improve economic growth and enhance a country's competitiveness in the global market (DAFF 2012: 1–3; Inomata 2018: 18). In elaborating a broad strategy to more directly address agro-processing goals, DAFF (2012) argued that immense benefits accrue by way of backward and forward linkages which lead to substantial stimulation of productive capacity that culminate in job creation and expansion of incomes along the food value chains. For successful food value chains, South Africa needs to engage in strategic alliances and trade in agricultural commodities and processed foods (OECD 2017; Food Industry 2015). The success of these alliances and trade call for policies that promote the intense implementation of food value chains, trade, and global governance.

The Constitution of the Republic of South Africa (1996), Sections 27.1b and 28.1b, stipulates that every individual has a right to food. The Constitution mandates the government to take appropriate legislative measures, using existing resources, to uphold this right. Since 1996, various policies were formulated within the constitutional mandate. Focus was on improving the competitiveness of agriculture, marketing, and the participation of disadvantaged smallholder farmers (Drimie 2016; Hendriks 2014: 1–24). The

2012 National Development Plan (NDP) became the overarching government development agenda. The plan emphasized food security, with access as a key priority in marginalized rural communities. The New Growth Path (NGP) of 2013 expanded on the basic food access focus of the NDP and incorporated the nutrition component of food security in the national development agenda (Hendriks and Olivier 2015). Notable strategies in the NGP include The Roadmap for Nutrition in South Africa (2013–2017) (2013); Integrated Growth and Development Policy for Agriculture, Forestry and Fisheries (2012); and the Agricultural Policy Action Plan (APAP 2013). These strategies seek to enhance the sustainable use of agricultural natural resources, food security, and governance. Moreover, they facilitate equitable growth and employment in the agricultural sector, consistent with the NDP.

The National Policy on Food and Nutrition Security (NPFS) gained momentum between 2014 and 2015 (DAFF 2014b). The policy goals include increasing food production and distribution and supporting community-based and small-scale production. In so doing, the policy emphasizes better nutritional education, increased agricultural investment in rural areas, improved efficiency of food storage and distribution networks, access to inputs, farmer-inclusive public–private partnerships, marketing, and food security risk management.

The National Aquaculture Policy Framework (NAPF) of 2013, and the National Inland Fisheries Policy Framework (revised in 2018), governs the South African fisheries sector (Aquaculture) comprises mostly of the coastline and the inland fishing systems. Prominent is the NAPF, which is a comprehensive sector development plan, under the National Aquaculture Strategy and Action Plan. The plan has clear NDP objectives of alleviating poverty, unemployment, and inequality through enhanced food security. This is achieved through investment incentives and grants offered through the Aquaculture Development Enhanced Program, housed in the Department of Trade and Industry (Britz and Venter 2016: 22). The aquaculture policy success is aided by increased demand for environmentally sustainable fisheries. This has created a competitive advantage for aquaculture products and was made possible through the World Wildlife Fund's South African Sustainable Seafood Initiative (SASSI) of 2014. SASSI worked with producers to improve harvesting methods, and with retailers to alter consumer behavior on sustainable fish species (Britz and Venter 2016: 24). Through these initiatives, the aquaculture sector is expected to reach about US$210-million on an annual basis from 2019, adding more than 14,000 jobs in the fisheries value chain (Britz and Venter 2016: 28).

The policies discussed in this section relate to existing challenges of equity and equality for which parallel measures for redress have been instituted and are currently operational. The extent to which they contribute to the promotion of food value addition imperatives at the national level remains marginal. Moreover, the smallholder agricultural and aquaculture sectors are not well established, with lobbying for land reform still in contention for the former. The next section discusses the challenges experienced by South Africa's smallholder farmers in food value addition.

5 Food Value Addition Challenges in South Africa

Value chain addition has generally been influenced by a number of factors categorized in the literature as: drivers, barriers, enablers, and regulators (Fig. 2).

The constraints operate at two levels, namely the primary production level where smallholders face constraints at the farm level, limiting both quality and quantity of output with practical implications for agro-processing participation. The other level at which the constraints operate are much higher up at the sectoral, macro level.

This section focuses on the barriers, or challenges, whose effects often constrain the full realization of value addition goals. According to von Loeper

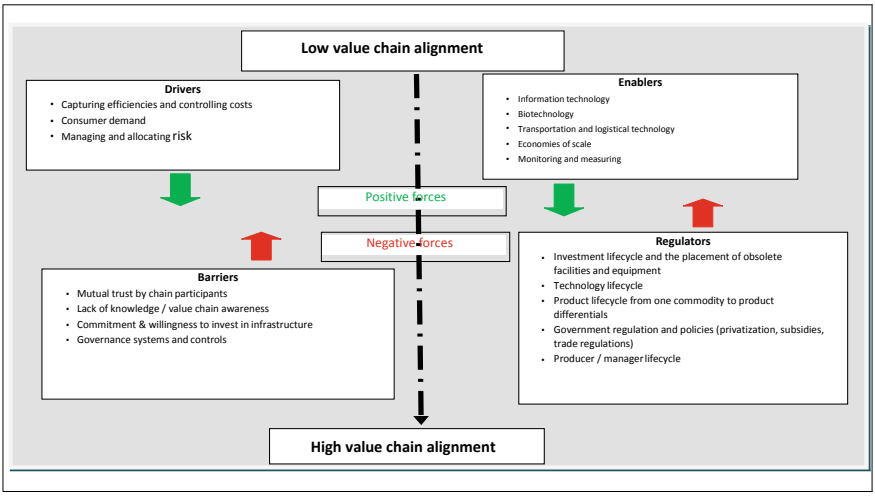

Fig. 2 Forces that affect the alignment of agricultural value chains (*Source* Authors tabulation)

et al. (2016), while barriers and regulators such as lack of trust and willingness to slow down or reverse the movement. The South African agriculture system is regarded as viable, due to the contribution of the commercial sector, which is involved in feeding the nation. However, population increase as well as demand from other African nations, especially the Southern African Development Community (SADC), have severe consequences on food security, as South Africa cannot meet food demand. Due to this trajectory demand for food, the threat of land reform without compensation, as well as little support from the government for commercial value addition activities, the total production of agro-processed food and fisheries from commercial farmers continue to dwindle in the country (von Loeper et al. 2016).

Over the past decade, more specific assessments of the factors constraining and limiting participation in agro-processing have been carried out as part of systematic academic research or policy work to better target interventions in South Africa. Thindisa (2014) has identified the following as key constraints to the participation of smallholders in agro-processing activities in South Africa:

- Lack of access to finance
- Lack of appropriate agro-processing technology
- Lack of technical and entrepreneurial skills
- High post-harvest losses
- Inadequate access to processing infrastructure
- Bottlenecks in the supply of raw materials.

To the foregoing list, Khoza et al. (2019) have added the lack of access to agro-processing related training and information and past exclusion of the black population from participation in the agricultural economy as a factor in the limited experience in both primary farming and agro-processing observed within the black African community in South Africa. These points are poignant in a rather curious way. An anonymous reviewer of an article submitted recently to an international journal had queried the claim of "zero years of experience" recorded for middle-aged to old household heads in a rural South African household. As unbelievable as that might sound for a rural, agrarian society, nothing can be more symptomatic of the more enduring legacies of Apartheid than such an anomalous situation. In almost all African societies, participation in agriculture represents a rite of passage and platform for the socialization and grooming of children for induction into the world of work. In such a society, for an adult to report inexperience in farming tantamount to having not been born in that society. Khoza et al.

(2019) also highlights the importance of access to infrastructure which was also noted by Christian et al. (2019) in relation to the effect on primary agriculture, rather than agro-processing, but is nonetheless significant in the view of their close links.

With respect to the constraints that operate at the sectoral level, the Agriculture Policy Action Plan (APAP) 2015–2019 provides very helpful insights into the nature of the challenges faced by the Agriculture-Forestry-Fisheries (AFF) complex which have been administratively consolidated within the Department of Agriculture, Forestry and Fisheries (DAFF) as has been noted previously. According to the APAP (DAFF 2014b), the complex confronts the following crucial challenges:

- Rising input costs
- Uneven international trade environment
- Lack of developmental infrastructure in the key areas of rails, harbor, and electricity
- A rapidly evolving policy environment, and
- Slow and tentative pace of transformation in the Agriculture, Forestry and Fisheries sectors as a whole.

According to the APAP, Government's broad goals were to support smallholder farmers in a manner that would translate into increased food value added output (DAFF 2014b). Paradoxically, while the sectors' contribution to the GDP registered a healthy growth of 29%, they experienced job losses in the order of 30–40% (DAFF 2014b). This rather curious situation provides strong corroboration of the Lewis model in the South African context where improving agricultural performance ultimately turns the terms of trade against agriculture because of the pattern of investment in the sector. According to the APAP 2015–2019, at the same time as agriculture was making the above-cited contribution to GDP growth, its share of national budget allocation was in decline, reportedly from 1.7% in the first half of the 2000's to possibly 1.6% in the period from 2019. This could mean that profits generated by agricultural labor in the manner conceptualized by Arthur Lewis, was not being re-invested in agriculture, effectively turning the terms of trade against agriculture. Lewis envisaged two problems that can rise from the foregoing situation: one is that, as the agricultural profits are invested in non-agricultural sector, possibly in capital-intensive technology, agricultural employment will decline. The other problem is that the net

transfer of resources out of agriculture leads to sluggish growth in the agricultural sector over time. Thus, initial agricultural growth generates conditions that lead to agricultural decline. These have happened in South Africa.

The foregoing situation can also be explained by the well-known Cochrane's Technology Treadmill in Agriculture (Cochrane 1958; Levins and Cochrane 1996). The phenomenal progress made by South African agriculture in the early years of the National Party ascendancy has been well documented. As the white settlers of South Africa dug in, there were deliberate efforts to expand their spheres of influence and capacitate them to give them a competitive advantage over black farmers, beginning with the enactment of the Cooperative Societies Act of 1922 (Obi 2019). Through soft loans delivered by the reconstituted Land Bank and easy access to information on new technology and markets, the white farmers enjoyed reduced production costs which enabled them to expand their scale of production and experience a period of unparalleled prosperity. But the dismantling of the Apartheid era privileges that accompanied the establishment of democratic rule since 1994 has resulted in declining productivity and profitability and consequently reduced the labor share of whatever agricultural growth had taken place as the APAP report shows.

Several the challenges mentioned in the APAP report can be linked to the foregoing circumstances of declining productivity and profitability and declining budget share of agriculture in recent years. For instance, the removal of the heavy subsidization had led to a reduction in the size and scope of the extension services. As a result, field extension agents are poorly informed about farmers' markets and are no longer able to offer that level of support to farmers. Without timely information on new technology and markets and removal of protection against price fluctuations, farming became less profitable than before, leading to declining employment in the sector. The reduction in the scope of the extension services also affected farmer's knowledge about food quality and standards required by customers and this also had adverse consequences for the competitiveness of the sector. Within the sector itself, there are natural dichotomies between large-scale farmers (invariably white) and black smallholder farmers in terms of their knowledge of food quality standards and their relative ability to meet and comply with the specifications of the customers, including supermarkets that are demanding much stricter conditions that for smallholder farmers find too stringent. This has limited smallholder capacity, as they cannot access market opportunities offered in the agro-food chain (Nordas and Rouzet 2015: 4–8; Bavier 2018). Therefore, compliance with procurement requirements remains a fundamental obstacle to linking smallholders to markets.

Another element that the APAP document has highlighted is the reduced budget on R&D for agriculture, which is of course not unrelated to the overall decline in the sector's budget share. As a result, the smallholder farmers, then the large-scale farmers, lack the necessary access to technological innovation required to boost agricultural productivity. The lack of technological innovation means increased production and operational costs with adverse consequences for profitability. This discourages value addition in the food value sectors, again for smallholder farmers than for commercial farmers (OECD 2015; Britz and Venter 2016: 23–24).

Another area of concern that arises from the reduced budget for agriculture is the lack of specific training to develop the knowledge and skills to implement food value addition processes (OECD 2015; Britz 2015: 623). Indeed, this should be understood in the context of the prevalence of poverty, limited access to information, lack of capacity to absorb potential shocks and farming being the primary source of livelihoods. Knowledge, skills, and experience are very crucial to enterprise survival and success. Government can support entry into and growth of competitive smallholder agro-processors in the local and global agriculture value chains.

Finally, there is the issue of food trade policy misalignment with partner countries in various trading blocs. Where this occurs, the effect is the incapacitation of the food value addition process since it is difficult to correctly anticipate the supply and demand relationships. One of the negative outcomes of trade policy misalignment is dumping of food products which effectively destroys the domestic food value chain. Furthermore, imports negatively impact the employment of local labor in much the same way that they reduce farmer's income.

6 Conclusions and Recommendations

A key concern is why there is inadequate food value addition by smallholder farmers in South Africa despite official policy on overall agricultural transformation and agro-processing. To address the question, the chapter conceptualized food value chain in general, critically examined South Africa's policies on food value chain and agro-processing and reviewed research and policy work to identify the challenges the country faced in increasing food value-added output. A major finding of the chapter is that the problems currently faced by the agricultural and agro-processing activities in South Africa are being hampered by budget cuts which have resulted in several vital support functions being de-emphasized. The routes through which the

funding constraints might have affected these sectors seemed to have followed processes foreseen by two major developmental theories, namely the Lewis two-sector model and Cochrane's Technology Treadmill. Without question, the South African government needs to re-think its funding policy for agriculture and agro-processing to prioritize programs that enhance farmers' access to information about technology and markets, as well as improve the knowledge and skills of farmers to undertake agro-processing and understand and comply with food quality standards in line with customer preferences.

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Agricultural Credit Guarantee Scheme Fund in Historical Context: Evidence from Nigeria

Muhammed Sani Dangusau

1 Introduction

The Central Bank of Nigeria (CBN) in line with its developmental functions has initiated and implemented several agricultural credit policies and programs. This is because the agricultural sector is important to the Nigerian economy in resolving the economic crisis hindering economic growth and development in the country. It is for this reason that Nigeria has, since pre-colonial period, engaged in agricultural production of different kinds of products such as rice, cocoa, beans, cassava, palm trees, and groundnut (Ali 2012: 5). In fact, during the pre-colonial era, food production featured prominently in agricultural production of the country, and there was self-sufficiency in food supply. The potential of agriculture to propel Nigeria's economic development was also recognized by the colonial government when policies were enacted to encourage agricultural production. Though the colonial government encouraged the production of cash crops, food crops production was discouraged. Therefore, the colonial impact on Nigeria was profound in the agriculture.

The post-independence literature (from 1960) focused on the importance of agriculture as a bedrock for development. It centered on the need for

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financing agricultural programs. This was because agriculture in the context of the economy was tied to the industrial sector that is essential for generating broad-based growth necessary for development (Uche 2011: 12). Danbaban and Sani (2016: 70) asserts that during the 1970s, efforts aimed at boosting agriculture failed due to the government's failure to strengthen public finances despite the oil boom. In other words, the discovery of oil in 1956 at Oloiboiri was a major milestone in the economic development of Nigeria (Panter-Brick 1978: 150) as there was a considerable shift of emphasis from agriculture to oil. Following this, Nigeria witnessed an era of decay and decline in agricultural production as the role of agriculture in Nigeria's economic development was diminished (Alimi 2005: 15). During this time, the Federal Government of Nigeria (FGN) embarked on, and implemented several agricultural policies and programs, but all efforts to finance agricultural production came with limited success. Hence, there was clear evidence that Nigeria was in dire need of agricultural credit facilities that would boost the agricultural sector. The Agricultural Credit Guarantee Scheme Fund (henceforth—ACGSF) is an agricultural program established by the Central Bank of Nigeria in 1977 to encourage the flow of farm credit to rural farmers in order to enhance agricultural development.

The aim of this chapter, therefore, is to examine the role of Nigeria's ACGSF in redressing the paucity of funds in the agricultural sector that has led to poor agricultural productivity in the country. ACGSF which is one of the oldest credit facilities in Nigeria had 60% of its funding from the national government, and the remaining 40% sourced from the Central Bank of Nigeria, which also manages the ACGSF. After becoming operational in 1978, the ACGSF quickly became a major player in Nigerian agricultural finance because of its favorable terms and conditions in granting loans to banks: 75% coverage of the principal in case of default plus reimbursement of interest up to a level matching the interest income from non-due loans. However, the settling of claims filed by banks had decreased due to a drop in the number of banks participating in the ACGSF.

After this introduction, the rest of the chapter is organized as follows; the next section provides a review of related literature, followed by a discussion of agricultural development policies in Nigeria. Historical overview of ACGSF comes next, then the scope of ACGSF, structure and operations of ACGSF, loans and limits of liability of ACGSF in respect of guarantees, role of ACGSF in Nigeria, challenges of ACGSF, effects of ACGSF on the Nigerian economy while conclusion and policy recommendations forms the last part of the chapter.

2 Literature Review

Credit is the backbone for any business and more so for agriculture, which has traditionally been a non-monetary activity for remote rural farmers (Sarkin Dori 2016: 66). Credit is the trust which allows the lender to provide money to the borrower (Obilor 2013: 87). It is a facility extended from the lender to the borrower and is repayable at maturity, which may range from a few days to several years; but for a credit transaction to be completed, the borrower must provide some evidence of debt obligation (Salami and Aramowo 2013: 6–8). For agricultural credit, it refers to loans granted to borrowers for the purpose of production, storage, processing, and marketing of farm products, which may be categorized as livestock production or food and cash crop production credits, depending on the purpose for which the credit will be used (Gyong et al. 2016: 113).

A guarantee fund has been used over the years in many developing countries as a way to increase the flow of funds into targeted sectors and groups. Different guarantee systems and schemes in developing countries such as Asia and India have Credit Guarantee Fund Trust for micro and small enterprises. For instance, the Small Industries Development Bank of India used to make lending more attractive by sharing or absorbing the risks associated with lending (Zander et al. 2013: 113). Such systems can also increase the guarantee fund available to an enterprise beyond its own collateral limits, because the guarantee is a form of loan collateral. The guarantor can assume the additional role of loan assessor and monitor, which can improve the quality of the loans made. However, guarantee funds have a cost, which is paid through the fees charged and/or subsidized by the government or a donor.

Emphasizing on the relevance of agricultural credits in developing countries, World Bank (2019) opined that agricultural finance and agricultural insurance are strategically important for eradicating extreme poverty and boosting shared prosperity. According to World Bank, there are an estimated 500 million smallholder farming households representing 2.5 billion people in developing countries who rely on small and medium enterprises to access better technologies in order to boost agricultural productivity.

Access to finances is critical for the growth of the agriculture sector and to enable a shift from subsistence to commercial production. In developing countries where agriculture is a source of livelihood for 86% of rural people, access to finance for investment in the agriculture sector is scarce, even for large investors (Ruete 2015: 1). That is why the same author shows that less than 1% of commercial lending is reserved for the agricultural sector. This underscores the reason financial institutions are reluctant to accept the

risks prevalent in the sector such as droughts, floods, pests, and diseases, or the transaction costs of covering large geographical distances. Consequently, although governments are now making efforts to attract investment in the agricultural sector, lack of understanding of the financial risks and opportunities in the sector deprives it of the much needed funds to boost production, processing, and marketing.

Several studies have made attempts to evaluate the impact of agricultural credits on economic growth and development in different regions. For example, Hong and Hanson (2016: 3) posit that in Africa smallholder farmers farm less than 2 acres and yet produce 70% of the total food consumed. The study found that an improvement in smallholder productivity has an effect on food security and poverty reduction, not to mention the benefits for the rural economy. In Africa, providing farmers with access to credit is essential to unlocking long-term sustainable gains in farmer productivity, incomes and as a tool aimed at reducing poverty. The above scenario clearly demonstrates that without financing, small-scale farmers cannot afford the relatively high upfront costs of quality seeds and fertilizer. Farmers in Africa are increasing their modern inputs on agricultural development because they observed that government subsidies to farmers to buy fertilizer were common before the Structural Adjustment Programs in some Sub-Saharan African countries like Tanzania, Malawi, Cameroon, Ghana, and Nigeria where they had a subsidy scheme through the banking sector. The central banks supplied credit through the commercial banks. But since lending is risky because recovery rates are low, there is an enormous gap between the demand for agricultural financing and the supply provided by the banks (Adjognon et al. 2017: 93).

In Africa, different policies have been implemented that enhance farmers' access to credit facilities, because access to credit facilities has the interest to boost agricultural productivity. Agricultural credit in Africa can be obtained for agricultural purposes from formal and informal sources. The informal type of agricultural credit refers to credit from moneylenders, friends, relatives, and the like. In the formal setting, commercial banks and other specialized agencies are charged with the responsibility of providing credit to farmers. Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) is a typical example of a specialized bank established for the purpose of advancing agricultural credit. Land Bank (LB) is also a statutory body with a mandate by the South African Government to support the development of the agricultural sector in the country.

The constraints of accessing credits are often cited as the main reason why farmers fail to adopt modern agricultural technologies in Africa. According

to Pindiriri (2018: 48), increased incomes and access to credit in areas like Northern Ethiopia and Mozambique increase farmer's probability to adopt modern technologies. Agricultural equipment is quite expensive to most smallholder farmers, and in this regard, access to credit becomes crucial in technology adoption and in the decision-making process on whether to adopt a given technology or not. Insufficient savings by smallholder farmers prevent them from investing in modern agricultural technologies; hence, availability and access to credit may close this gap.

The demand for agricultural finance in Africa by a diverse group of agricultural households and farmers could be categorized differently, using various aspects such as size of landholdings, and access to markets. Despite the diverse financial needs of farmers, both informal and formal financial institutions in Africa often fail to supply ample and suitable financial services, especially for agricultural production and agribusiness development. In Africa, more than 50% of the population is engaged in agricultural activities, yet less than 1% of banking credit goes to this sector. Among various segments in the sector, smallholder farmers are considered among the most difficult clientele to serve in a financially sustainable manner due to various risks and costs involved, including, occasional natural disasters such as drought, flood, and epidemics of crop diseases or seasonal and lumpy financial requirements (Varangis et al. 2017: 67–68).

The linkage between rural financial market and agricultural development in Nigeria has been established by (Shobande et al. 2018: 242) where they emphasize the need for agricultural policies to be made for the purpose of making credit available to farmer in order to stimulate agricultural growth. Some of the agricultural bodies established for the purpose of making credits available to the farmer included the following bodies: the ACGSF, Small and Medium Enterprises Investment Scheme (SMEIS), Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB), People Bank (PB), and Macro-finance bank (MFB). The efforts to boost agricultural production by the policies of the above-mentioned bodies are well documented. However, some of them lacked good execution and monitoring frameworks. For instance, the ACGSF which was meant to support agricultural activities was poorly managed by the Central Bank of Nigeria as efforts to minimize risk exposures on agricultural credit sent wrong signal to the lending banks.

Insufficient agricultural credit has been identified as a major constraint to modernizing agricultural production in Nigeria. The desire for credit before the advent of formal credit institutions necessitated the evolution of the informal credit system in rural areas of Nigeria (Obeta 1992: 173). However, the unsatisfactory performance of the informal sources has led to series of

efforts by the Federal Government of Nigeria to ensure the availability of institutional credits. These efforts include the establishment of agricultural credit schemes in the country. For example Nigerian Agricultural and Co-operative Bank (NACB) established in 1973, Rural Banking Scheme (RBS), and the ACGSF both started in 1977.

3 Agricultural Development Policies in Nigeria

The agriculture sector plays an important role in the development of government policies geared toward food security. The agriculture's contribution to Nigeria's Gross Domestic Product (GDP) measured in naira in 2016 and the first quarter of 2017 (see Table 1) accounts for a significant contribution to GDP. In 2018 and 2019, the sector contributed about 25.7 and 27.4% to GDP (World Bank 2019). This is because the importance of agriculture to the economy of Nigeria like other countries is measured as the value added of the GDP. Chukwuma (2018: 148) illustrated the importance of agricultural development, stating that it can promote the economic development of underdeveloped countries in many ways. First, by increasing the supply of food for domestic consumption and provides employment for the industrial sector. Second, by providing raw materials for industries, and finally, by increasing the supply of income and providing the foreign exchange earned by agricultural imports. Agriculture is the bedrock upon which the development of rural and urban communities depends as the produce of agriculture is much greater than that of any other manufacture (Smith 2007: 349). The agriculture sector is the bedrock of the Nigerian farmers as it propels them to produce enough food crops to feed the population, and generating foreign exchange reserves from exported crops in financing government expenditure.

The place of the agricultural sector in Nigeria's economy has remained critical over the years despite some setbacks. For example, the thirty months civil war coupled with rising fortunes from the petroleum sector in the early 1970s witnessed a dramatic decline in agricultural development. This led to a food crisis where demand for food rose while supply stayed low, causing a rise in food prices, and increased imports of food and raw materials for local industries. However, on the other hand, the crisis prompted the government to launch different agricultural policies and programs aimed at revamping agriculture in Nigeria. Yet the desire to boost food production has been met with stiff challenges and one of those challenges, being lack of credit facilities.

Table 1 Trends of agriculture contribution to Nigeria's GDP in Naira in 2016 and 2017

Agriculture	GDP (=N = Million) 2016					2017
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Total	1st Qtr
Crop	3,583,980.7	4,017,083.56	5,801,028.13	5,480,989.64	18,883,081.50	3,969,515.26
Livestock	464,969.11	437,827.87	433,401.39	539,584.99	1,875,783.36	487,870.92
Forestry	53,486.95	59,790.68	54,677.39	68,299.96	236,254.98	58,244.18
Fishery	165,454.83	115,157.00	109,355.82	138,425.01	528,392.66	170,591.17

Source CBN Statistical Bulletin (2017)

4 Historical Overview of ACGSF

As stated above, the need to enhance agriculture development in Nigeria led to the emergence of ACGSF. According to CBN (2003: 2), ACGSF was established by the Federal Military Government (FMG) under the ACGSF Decree 1977 (Decree No. 20) for the purpose of providing guarantees to loans meant for agricultural purposes (Nwosu 2010: 87). Initially, it was suggested that the ACGSF should not cover only agriculture but also small-scale enterprises in general. However, Nigeria's Federal Government rejected the idea because such will deny funds to the agriculture sector in favor of other smaller industries which secure credit more than agriculture. The ACGSF now came to effect on April 3, 1978. The loans guaranteed by ACGSF were those linked to establishment or management of plantations for the production of rubber, oil palm, cocoa, coffee, tea, in addition to animal husbandry and farm machinery as well as for the production of cereal crops, tubers, cotton, and beans, among others (Central Bank of Nigeria 1990: 2–3). In 1988, loans were extended to incorporate fish production, processing, and marketing. The ACGSF provided a 75% guarantee cover for the lending banks on outstanding loan balance in event of default (Okon and Nkang 2009: 133). Thus the mandate of ACGSF was to strengthen further the institutional arrangement already provided by the Federal Government to support agricultural production.

5 Scope of ACGSF

The Federal Government of Nigeria established ACGSF in order to motivate the Commercial Banks to increase credit allocated to agriculture. The agricultural purposes in respect of which credit can be guaranteed by the ACGSF are those connected with:

(a) Establishment and/or management of plantation for the production of rubber, oil palm, cocoa, cotton, coffee, tea, and similar crops;
(b) Cultivation or production of food crops and grains such as cereals, tubers, beans, groundnuts, shea nuts, beniseed, vegetables, pineapples, bananas, and plantains;
(c) Animal husbandry that covers poultry, piggery, rabbitry, snail farming, cattle rearing, fish farming, etc.
(d) Processing in general where it is integrated with at least 50% of farm output e.g., cassava to garri, oil palm to palm oil and kernel, groundnut to groundnut oil, etc. (Olaitan 2006: 4).

However, the 2019 ACGSF amendment act witnessed two additions to the above activities which included:

(e) Production of farm machinery, implements, and equipments for production, processing, storage, and transportation and;
(f) Any purpose connected with the activities within the agricultural value chain.

6 Structure and Operations of ACGSF

The operations of ACGSF are controlled by the Central Bank of Nigeria in addition to stipulating the guiding rules for eligibility of farmers' access to funds. ACGSF is managed by the ACGSF Board. The Board, in accordance with section 2 of Decree No 20 of 1977 is made up of the Chairman, Secretary, and six members. While the Federal Government of Nigeria appoints four members to the board, the other two are the Directors of Agriculture, Finance Department, and Domestic Operations, both of the Central Bank of Nigeria. To operate the ACGSF, the CBN opened Agricultural Finance Offices (now Development Finance Offices) in its branch offices in the states of the federation. Through the branch offices, the CBN handles the day-to-day operations of ACGSF. The Board meets at least twice in a year, where the chairman of the board presides such meetings. The quorum of such meeting consists of at least four members, one of which must be appointed by the CBN. For easy administration, ACGSF was divided into four zones: Bauchi, Enugu, Ibadan, and Kano.

7 Loans and Limits of Liability of ACGSF in Respect of Guarantees

The ACGSF initially has a capital base of 100 million naira subscribed to by the Federal Government of Nigeria (60%) and Central Bank of Nigeria (40%), but was increased to 1 billion naira on 8th December 1999, 3 billion in 2000, and later to 4 billion in 2006 (CBN 2007). In 2020, the Federal Government of Nigeria has raised the capital to 50 billion naira (ACGSF Amendment Act 2019). The Commercial Banks are empowered to lend from their own funds at a statutory rate of 6% to individual farmers, and 4% to cooperative societies. However, ACGSF guarantees relief and concession of up to 75% of losses resulting from lending with a maximum ceiling of 50,000 naira for individual farmers and 1,000,000.00 million naira for the

cooperative society (Donald 1984: 94). According to Zakaree (2014: 1278), ACGSF at its inception provided a loan of maximum 100,000.00 naira for individual farmers and 1,000,000.00 naira for cooperatives and corporate bodies, though such loans required collateral. However, loans below 5000 naira do not need collateral. At present, the maximum for non-collateralized loans is now 100,000 naira while the maximum for collateralized loan granted to individuals and cooperative societies is now 50 million naira (ACGSF, Amendment Act 2019). This has prepared most financial institutions to be interested in granting loans for agricultural purposes. In order to improve lending, ACGSF initiated the Self Help Group Linkage Banking, the Trust Fund Model, and the Interest Drawback.

8 Role of ACGSF in Nigeria

The role of credit as a source of agricultural financing in Nigeria has attracted a lot of interest from scholars. Agricultural financing plays an important role in enhancing agricultural development. Mbutor et al. (2013: 2) pointed out that in agriculture, finance remains the bedrock for mechanization which involves the purchase of machinery, the training to use machinery, the transportation of equipment, agricultural produce, as well as its marketing. The justification for the establishment of ACGSF was to curb the unpredictability and risky nature of agricultural production. The mandates of ACGSF were designed to further strengthen the importance of agriculture to our national economy, to provide additional incentives to further enhance the development of agriculture in order to ensure there was self-sufficiency in food supply and the increasing demand by lending institutions for appropriate risk aversion measures. That is why financial institutions have served to increase the productive capacity of the agricultural sector through the lending program. This in turn has stimulated total agricultural production for both domestic consumption and export.

From the operation of ACGSF in April 1978 to the end of that year, a total of 341 agricultural loans amounting to 11.3 million naira had been granted by the ACGSF (Zakaree 2014: 1276). There has also been a constant progressive increase in the number of loans such that by the end of 1982, a total of 4762 projects involving the sum of 143.2 million naira had been guaranteed by ACGSF to facilitate agricultural production (Ihegboro 2014: 34).

ACGSF has been a major source of channeling credit from the commercial banks to the agricultural sector since credits had been described as catalyst in improving the performance of the agricultural sector (see Fig. 1). In the 1980s, many cooperative societies had secured loans for their members. For example, at that period, loans were secured by a cooperative society through the United Bank for Africa (UBA) and Bank of the North (BON) to the Governments of Plateau and Bauchi states, respectively. ACGSF has the capability to improve agricultural production and to positively channel the potential of small and medium enterprises for the attainment of rapid sustainable development (Olaitan 2006: 2). The total number of loans guaranteed and disbursed by the ACGSF for agricultural production shows that from the inception of ACGSF to December 1983, funds amounted to 179.5 million naira, covered 6095 projects. In the distribution of the loans, for instance, Kaduna State got loans amounting to 13.8 million naira, Bauchi got 8.15 million naira, Ondo's share was 5.365 million naira while Rivers and Imo states got 9.3414 million naira and 8.5987 million naira, respectively (Donald 1986: 16–17). The loans were noticed to have progressed to the extent that by the year 2006, the total number of 453,748 loans valued at 11.28 billion naira were guaranteed which translates to an average of 16,205 loans valued at 402.86 million naira per annum (Central Bank of Nigeria 2006). According to the Central Bank of Nigeria, in the year 2005, the available funds channeled to agriculture, forestry and fishery grew from 261,559 billion naira in 2004 to 262,006 billion naira in 2005 (Central Bank of Nigeria 2005). According to the Central Bank of Nigeria (2020), the ACGSF has guaranteed a total of 539.8 million naira to 3161 farmers as of February 2020. The amount guaranteed represented an increase of 63.3 and 47.3% in the preceding month and the corresponding period of 2019, respectively. The same source further showed that food crops obtained the largest share

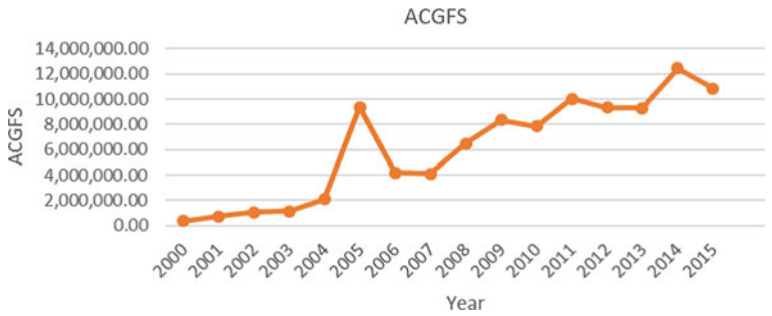

Fig. 1 Trends of Agricultural Credit Guarantee Scheme from 2000–2015 in Naira (*Source* CBN Statistical Bulletin 2016)

of 184.9 million naira (55.2%) guaranteed to 1314 beneficiaries, followed by livestock 60.2 million naira (18.0%) guaranteed to 219 beneficiaries. Furthermore, fisheries and mixed crops got loans in the sum of 21.8 million naira (6.5%) and 15.3 million naira 4.6% guaranteed to 77 and 226 beneficiaries, respectively.

In a related development, the interest drawback program was established not only to further encourage farmers' repayment of loans, reduce payment default and provide free funds for use but to also offer a rebate of 40% on the amount paid as interest on the loan by the farmers (Obasi 2015: 61). In sum, the record of ACGSF has thus far been encouraging. An institutional framework for the achievement of rapid sustainable growth and financial empowerment of the farmers in order to ensure productivity and good market for their product is established.

9 Challenges of ACGSF

Despite the progress made by ACGSF in Nigeria, it is still relatively underdeveloped and there are challenges that must be addressed in order to have a more robust economy. Some of the challenges are highlighted below.

Increasing Incidences of Loan Repayment Defaults The high rate of loan repayment by ACGSF is incredibly stumpy. Many farmers after receiving guaranteed loans have deliberately and persistently refused to pay. The reasons adduced to this might be natural disaster, poor farm management, low product prices, the inability of farmers to assess loan requirements properly leading to farmers' receipt of inadequate or excessive loans as well as loan diversion to other uses (Nwosu 2010: 88). Therefore the incidence of loan repayment default is a colossal failure since it obstructs the chain of money circulation, thereby becoming a stumbling block to the realization of ACGSF objectives (Donald 1984: 17).

Bank Related Problems The banks involved in ACGSF do not cooperate fully in giving out loans to the majority of Nigerian farmers. Due to the high cost of processing loans in relation to the actual loans and the high default rate of the farmers, many of the participating banks prefer to pay penalty than to risk lending their monies to the development of agriculture. The banks also fault the farmers for submitting incomplete application forms. In some cases, where loans are approved, it arrives too late for it to fulfill the purpose for which it was intended (Nwosu 2010: 88). Therefore ACGSF has suffered bureaucratic and administrative bottlenecks. For instance, the processing of applications and claims has been slow to the extent that at the

end of the year 2005, there was an accumulated backlog of 4064 unprocessed claims (Eze et al. 2010: 6). The end result of this is that most of the participating banks become reluctant to grant loans due to the inherent risks and uncertainties with agricultural development in Nigeria. In addition, financial institutions require huge collateral from farmers before giving out any loans, but small-scale farmers have nothing worth to offer as collateral to secure bank loans (Efobi and Osabuohien 2011: 21). The adverse implication of this is that banks have been a stumbling block toward providing credit facilities for financing agricultural development.

False Claims by Farmers ACGSF which was meant to provide loans to boost agricultural production had been used as an umbrella for many false farmers to claim monies. According to Odidi (2014: 8), false farmers hide under the canopy of ACGSF to borrow money but divert loans to other uses that is non-agricultural. In some cases, private money lenders hide under the umbrella of ACGSF to collect huge sums of money at concessional interest rates and loan such funds to farmers at higher interest rates.

High Population of Nigerian Farmers The continuous increase in the population of farmers in Nigeria is a challenge that has continued to affect the performance of the ACGSF. According to Isoirhovoja (2017: 109), Nigerian farmers, who constitute almost 70% of the country's population, have had their population in the country rapidly increasing over the years. Thus, the implication of this is that the number of loans guaranteed under the ACGSF is more or less static and this will mean that over time, increasing number of farmers will not match the loan guaranteed under the ACGSF. In other words, the amount of money set for the farmers will be inadequate to finance the needs of all the farmers. Hence, the farmers will not be active all the time of the year.

Government Policies and Programs The policies and programs of the Federal Government of Nigeria have adversely affected the performance of ACGSF. The delay in claims' settlement which must show a gap of two years between when a claim form is filled and the settlement is a disincentive to the lender who may probably have to wait for up to two years to obtain guarantee debt from the ACGSF. This lack of encouragement affects the banks due to their form of operations which relies on short-term funds (Nwonyi 1999: 45). Similarly, the Structural Adjustment Program of the mid-1980s is undoubtedly one of the most radical programs of the government. Yahaya (1988: 35) argues that under the program, the private sector divests its efforts as the main propellant of economic growth and positioned itself as a key operator in Nigeria's banking sector. Akinyele et al. (2000: 60) had complimented this view by asserting that the Structural Adjustment Program had enabled

the government to privatize, thus making the agricultural sector compete unfairly with the less strategic sectors. The effective adoption of this policy has adversely affected credit disbursement as the criteria for determining who deserves bank credit which was also determined by the private sector.

Devaluation of the Naira Related to the above is the government policy of naira devaluation. Inflation, which is a consequence of naira devaluation, has been a great challenge for the ACGSF because it brings about constant review of all monies borrowed. The implication of this is that the rate of growth in demand for loans will outweigh the amount of share and paid up capital. This will in turn result in lack of adequate funds for loans to meet the demand of the applicants.

Outbreak of Livestock Diseases Another challenge that is facing ACGSF is the outbreak of diseases, particularly in the livestock industry. These diseases have been a threat to ACGSF and the quarantine measures to control them have dampened the enthusiasm of the farmers to make recourse to short-term borrowing to fund production. Farmers were discouraged by the consequential decline in the demand for certain livestock items. Poultry production was equally dampened by the invasion of Quella birds in Kebbi, Sokoto, Zamfara, Jigawa, Bauchi, Gombe, Yobe states as well as temporary adverse ecological problems in certain Southern and Northern states.

10 Effects of ACGSF on the Nigerian Economy

The role of ACGSF as shown above revealed that ACGSF through its various policies had increased the flow of funds to Nigeria's agricultural sector. The effect of ACGSF on Nigeria and Nigerians has shown an unprecedented increase in agricultural growth and development particularly in the rural areas. The credit facilities had expanded the farmers' skills through the adaptation of new and improved farming inputs. In addition, many Nigerian farmers were able to acquire new improved farming seeds, quality fertilizer, adequate pesticides, and modern farming machines such as tractors and threshers, thereby boosting agricultural development (Sarkin Dori 2016: 66). ACGSF had also made positive contributions directly to the farmers, as it was free from embezzlement and diversion of funds. In addition, the continuous flow of credit to the Nigerian farmers had accelerated farmers' income and input on agricultural production (Dori 2016: 71). From all indications, the total average farm income generated by the beneficiaries of the ACGSF is larger than that generated by non-beneficiaries. The reason for the higher income might be because of the leverage that is associated with borrowing

which constitutes a major form of both agricultural financing as well as agricultural policies in Nigeria. Increased sources of funds should translate into higher demand for goods produced by other sectors of the economy in order to boost consumption expenditure and, ultimately, the national income of Nigeria (Eze et al. 2010: 15).

The increased income of farmers also led to increased agricultural output which in turn increased consumption and enhanced the development of rural markets. Based on these parameters, it can be concluded that the improved income and output of farmers is a function of the creation of ACGSF which enhances the farmers' capacity to invest in agricultural production. The multiplier effect of this approach to agricultural financing is therefore felt in the general development and enhancement of rural agriculture. As observed by Gyong et al. (2016: 115), increased agricultural output consequently led to an increase in agricultural exports, thereby providing direct impact on economic growth.

Equally important to emphasize is the fact that under the Trust Fund Model, oil companies, the states and local governments as well as non-governmental organizations are to deposit funds in trust with the leading commercial banks to augment the savings of the farmers. This factor aided the banks to assist the small- and medium-scale farmers. For instance, under the Trust Fund Model, many states in Nigeria such as Jigawa, Kogi, Plateau, Ebonyi, and Edo among others have assisted their farmers in securing loans for the production of cotton and sugarcane (Ojiegbe and Dumechi 2015: 62). In another instance, under the Trust Fund Model, four stakeholders: Total Oil Company and the Governments of Ondo, Nassarawa and Katina states collectively injected the sum of 308 million naira to the farmers which has facilitated agricultural development in the areas (Central Bank of Nigeria 2004). That is why Orok and Ayim (2017: 1104) observed that the impact of ACGSF has played crucial role in agricultural development through its positive impact on crop and livestock in the Nigerian economy (see Figs. 2 and 3). Hence, it had propelled an increase in Nigeria's Gross Domestic Product.

11 Conclusion and Policy Recommendations

This chapter has surveyed the literature on ACGSF in Nigeria. It is clear that from the preceding discussions that ACGSF has the potential to positively influencing agricultural development in Nigeria. However, delay in processing applications, incidences of loan repayment defaults despite the

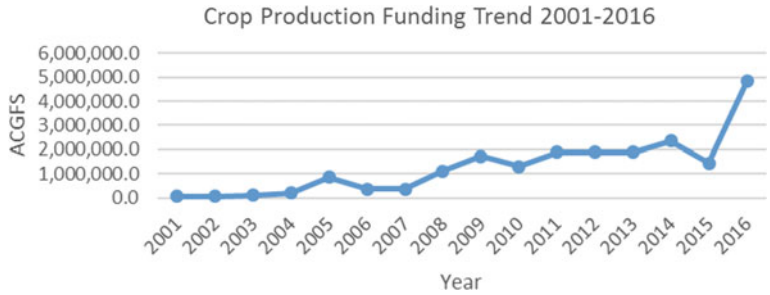

Fig. 2 Trends of ACGS in crop production from 2001–2016 in Naira (*Source* CBN Statistical Bulletin 2016)

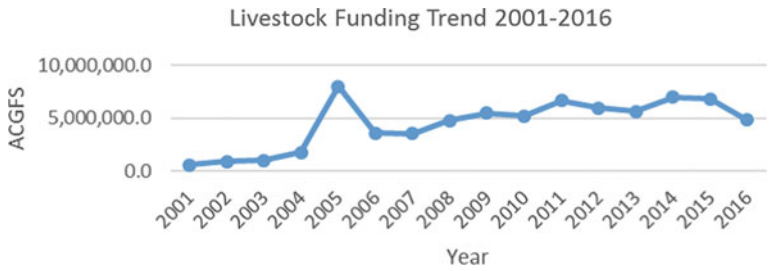

Fig. 3 Trends of ACGSF in the livestock sector, 2001–2016 in Naira (*Source* CBN Statistical Bulletin 2016)

control measures, high population of Nigerian farmers and outbreak of livestock diseases were some of the issues identified as hampering the success of ACGSF.

Looking ahead, we see important three drivers for economic growth that will impact the speed of ACGSF in Nigeria. First, the Federal Government of Nigeria should ensure that the collateral security should always be favorable to the farmers in order to encourage them to borrow funds or as a way of ensuring efficient agricultural production, farmers can also form cooperative societies so that they can easily obtain funds at a lower cost without the usual stringent conditions. With this, the farmers would be more focused on agricultural productivity which will ensure food security in Nigeria. Second, it is also necessary to encourage the commercial banks to make efforts in providing agricultural loans at the appropriate time to farmers who meet the conditions. The late disbursement of such loans to farmers leads to its diversion which has been recognized to be a major cause of poor loan repayment. The utilization of monies by the farmers should also be observed in order to prevent their diversion. In respect to the collateral securities that may be offered to the banks before a loan is guaranteed, there is the need

for the Federal Government of Nigeria to review the idea of a farmer using a certificate of occupancy. This is necessary because most rural farmers do not possess the legal certificates on their lands, probably due to illiteracy or ignorance which makes the farmers think that land certificates are not important. To this end, the federal government should carefully screen the farmers before a loan is guaranteed. This apart, the collateral security should always be favorable to the farmers in order to encourage them to borrow funds. Where loans are available to the farmers, enabling environment should be created for the loans to be recovered. For instance, an independent legal unit can be established under the ACGSF to prosecute loan repayment defaulters. These commitments will be important toward ensuring the long-term sustainability of ACGSF.

Third, incidence of loan default posses' major challenge if prompt payment of loans are not encouraged. Looking ahead, the lending commercial banks should plan to visit the farmers on their respective farms. This will make sure that the loans guaranteed are invested for the purposes the loans are given, and diversion of funds will also be prevented. As for the Central Bank of Nigeria, efforts should be directed toward ensuring that the lending institutions do not charge high-interest rates in order to encourage greater participation of large number of farmers to the ACGSF, thereby ensuring that lending banks' claims are settled promptly.

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Toward Industrialization in Tanzania: What Is the Role of the Agricultural Sector?

Honest Prosper Ngowi

1 Introduction

As is the case with many other countries, Tanzania has introduced several initiates aiming at economic development of the country. Among other things, it attempted to industrialize few years after the 1961 independence. Whereas several achievements have been recorded in this space, the country is yet to attain high level of industrialization. However, industrialization is still among the top priorities of the country and a focus of the 5th phase government that came to power in 2015. As a basically agrarian economy, the agriculture sector has huge potential and actual roles to play in the country's industrialization efforts. This work discusses the roles that the agricultural sector can play in industrialization efforts in Tanzania.

The industrialization literature in general is very broad. It covers themes such as geography of industrialization (Hayter and Patchell 2016), capitalism, industrialization and development (Corbridge 1986), Africa's industrialization debate (Nzau 2010), industrialization as driver of sustainable economic growth in Africa (Opoku and Yan 2018), trade, technology and the role of the state in industrial development for Africa (Sampath 2014), and

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industrialization and economic transformation in Africa (Ajakaiye and Page 2012).

The literature on industrialization in Tanzania is rich. It includes the works of Msami and Wangwe (2017) on industrial development in Tanzania; Rweyemamu (1973) on underdevelopment and industrialization in Tanzania; Skarstein and Wangwe (1986) on some critical issues in industrial development in Tanzania; Szirmai and Lapperre (2001) on the industrial experience in Tanzania; UNIDO (2004) on Tanzania Review of Industrial and Trade Performance; Macro-economy Commodities; Industrial Subsectors; Export Processing Zones; among others. The authors have covered various aspects of Tanzania's industrialization since its 1961 political independence from Britain.

The literature relating to industrialization and agriculture includes that of Boehlje (1996) on industrialization of agriculture, Coffey (1993) on implications for farm supply cooperatives of the industrialization of agriculture and Melton (1987) on proto-industrialization, serf agriculture and agrarian social structure. The key message is that there is very close relationship between agriculture and industrialization. The relationship is one explained in the inter-sectoral linkages and inter-sectoral dependencies theoretical frameworks as can be seen in Leontief's input–output models. There is paucity of literature on the roles of agriculture in Tanzania. This piece contributes to bridging the gap.

2 Unpacking Industrialization

At the core of succeeding in Tanzania's industrialization move lies understanding of what industrialization means and entails Pass et al. (2000) describe the term industrialization to imply the extensive development of organized economic activity for the purpose of manufacture. It is characterized by transformation of a primarily agrarian economy into a more specialized, capital—as opposed to labor-intensive economy. Industrialization took the form of Industrial Revolution in Western Europe and North America in the eighteenth and nineteenth centuries.

Elsewhere in the economic and business literature (see Bishop 2009), industrialization is described as the process in which a country transforms itself from a basically agricultural society into one based on manufacturing of goods and services. Whereas manual labor is more often than not replaced by mechanized and automated high-tech-mass production, craftsmen are replaced by assembly lines. Industrialization is associated with the growth and development of large urban centers and suburbs.

There are many potential advantages embedded within industrial economy. These include but are not limited to potentials for direct and indirect jobs and therefore income creation and improved standards of living. Industrialization also poses potentials for foreign exchange earnings through exports and foreign exchange saving through import substitution. It can also generate government revenues from related taxes and nontax revenues. It stands to develop other sectors of the economy through inter-sectoral linkages via both backward and forward linkages that can trigger development of many other sectors through providing them with markets as well as supplying these sectors with factor inputs both intermediate and finished.

3 Theoretical Framework

This work is guided by the Leontief model of input–output or inter-sectoral linkages theoretical framework. The input–output model represents flow of money in an economy, primarily through the connection between industries. It shows the extent to which different industries are buying and selling goods and services to one another in a particular geographic region. The model has been derived and modified from the Leontief model where industries are producing different products such that the input equals the output. In this chapter, the agricultural sector is seen as highly linked to the industrial sector through backward linkages in the factor market and forward linkages in the output markets. Similarly, the industrial sector is linked to the agricultural sector in similar backward and forward linkages.

4 Industrialization in Tanzania

The industrialization move in Tanzania by the fifth phase government that came to power at the end of 2015 is not a new one. There have been several industrialization efforts since independence. Detailed descriptions of industrialization efforts in Tanzania have been documented widely. These include but are not limited to the works of Kim (1966).[1] According to Kim (ibid.), at independence in 1961, Tanzania had a very low level of industrialization. It was the least industrialized of the three East African Common Market partners. Its development strategy placed emphasis on agricultural development. Industrial production was oriented toward agro-processing and light manufacturing without internal linkages to domestic raw materials.

Kim (ibid.) further informs that Tanzania's first comprehensive industrialization effort began with the First Five Year Plan in 1964. While continuing with an emphasis on the agricultural sector, the Plan called for an ambitious industrialization program that was to rely on private foreign and domestic investments for expansion of import substitution industries (ISI). Incentive schemes included tax holidays, accelerated depreciations, tax rebates, guarantees for repatriation of capital and tariff protection.

With the adoption of the Arusha Declaration in 1967, the Government set a new course in industrialization strategy consistent with Tanzanian socialism and self-reliance (*Ujamaa*). The Declaration stipulated two principles that must be adopted in the future industrial plan. Firstly, the future strategy should not be significantly dependent on foreign investment; and secondly, private ownership of industry must gradually be substituted by state ownership in the form of parastatal corporations. The Arusha Declaration did not stipulate any action plans.

In the context of what it takes to industrialize, the nationalization of industries that came with the Arusha Declaration was bad economics. This is due to inadequate preparations in terms of having, among others, competent management of these industries.

It was in the Second Five Year Plan which began in 1969 that the industrialization strategy was spelled out in detail. While calling for continuous process of transferring the means of production to the state, industries included, the plan prescribed a restructuring of industry, placing priorities on the production of simple import-substitution manufactures, intermediate and capital goods, and agro-industry based products for export. The extent to which these industries could produce competitively for domestic market and export just after the 1967 nationalization is doubtful. This is due to inadequate expertise and experience in managing such industries. Also, emphasis was placed on the promotion of labor-intensive, small-scale firms and the decentralization of industry, where this was considered economically appropriate. Issues with labor-intensive industrialization include availability of qualified industrial labor needed to produce competitively just after the nationalization.

The progress in industrial restructuring in subsequent years was very slow. In 1974, the government laid down for the Third Five Year Plan more drastic measures for structural changes in the direction of self-reliance. Efforts for industrialization would be aimed at the processing of agricultural products and import substitution of basic industries. Agro-processing industrialization falls natural for Tanzania given the abundance of agricultural raw materials in this basically agrarian economy. These industries were meant to promote

Tanzania's capacity to be self-reliant in industrial production as well as fulfill the basic needs of human life for the majority of Tanzanians. For the latter category, the industries would include those producing such necessities as food, shelter and clothing. Self-reliance in the context of industrial restructuring was to be interpreted as an economic independence. Given the diverse needs of industrial goods and capacity for a single country like Tanzania to produce them, it is very challenging for a country to be self-sufficient.

Tanzanian industry depends heavily on intermediate and capital goods imports. This is due to inadequate capacity to produce them domestically. The industries producing these goods were considered not only as the cornerstone of the country's industrial structure upon which other branches of industry could be developed, but also as exerting important linkage effects in generating economy-wide employment. The strategy thus sought development of this branch of industry through import substitution.

Importation of industrial capital goods necessarily calls for huge demand for foreign currencies to pay for these imports. This in turn calls for adequate foreign currency earning mainly through exports of goods and services. Arguably this was not easy for Tanzania just after the 1967 Arusha Declaration as there was no adequate foundation for strong exporting economy. Alternative to foreign currencies earnings through exports would be borrowing which leads to swelling of national debt and dependence on aid which can have attached conditions.

From the late 1970s, Tanzania began to be affected by a series of economic malaises of external origins. First, the war with Uganda in 1979; the second global oil crisis and the fall in world price of coffee, which has been Tanzania's main export product. Tanzania had to put on hold further implementation of its industrialization strategy, as the government sought adjustment by cutting imports and per capita expenditure by 50%. There were virtually no expansionary capital budget increases. Without such expansion, it was not possible to increase importation of the highly needed industrial capital goods.

The recurrent budgets had to be drastically reduced as a response to the hard economic realities on the ground. With the rapid increase in external debt and arrears, and largely in response to increased pressures from the International Monetary Fund (IMF), the government decided to reverse the earlier strategy of overprotecting industry, and instituted new measures to support agriculture by increasing agricultural producer prices by 30–35% in 1983/84. At the same time, it gave the economy a more export-oriented structure. Export incentives included devaluations of the Shilling, the scheme for export retention and, most importantly, that for own funds imports. Export orientation strategy is good economics in the context of increasing a country's

foreign currency earnings that can be used to finance importations including importation of industrial capital goods in the context of this work.

In the mid-1980, there were major and far-reaching reforms in the management of the economy. These included major liberalizations and privatization of the economy. Almost all sectors of the economy including the industrial sector were liberalized and privatized. Among other things, the former state-owned enterprises (SOEs) were privatized. Over time there have been various efforts to industrialize including statements in the Tanzania Development Vision 2025 and Sustainable Industries Development Strategy (SIDP) 1996–2020. It is seen therefore that the industrialization move in Tanzania by the 5th Phase Government that came to power at the end of 2015 is not a new one.

5 The Fifth Phase Government's Industrialization Move

Debates and plans on Tanzania's fifth phase government economic future revolve around the axis of industrialization. This is the main economic project for the fifth phase government. This industrialization move is packed in various documents. They range from the ruling party's (*Chama Cha Mapinduzi*) 2015 election manifesto to President Magufuli's maiden speech in the Parliament on 20th November 2016 and the Second Five Years Development Plan that saw the light of the day in July 2016 after coming to end of its predecessor on the same date. In order to put all the debates on this move in the right perspectives, there is a need to unpack the whole industrialization move including but not limited to what it is all about, why it is important and which are the guiding documents that one needs to make reference to.

6 Prospects of the Fifth Phase Government Industrialization Move

The fifth phase government move on industrialization has been captured in various documents. These include but are not limited to the ruling party's 2015 election manifesto; President Magufuli's maiden speech in the Parliament on 20th November 2015; in the second Five Years Development Plan (FYDP II) (2016/17–2021/22), annual plan 2016/17 and the 2016/17 national budget and budget for the Ministry responsible for industries inter

alia. The government has several prospects in its new industrialization move as partly captured in its various documents outlined in what follows.

Industrialization in CCM Manifesto

What the fifth phase government has been attempting to implement in the bid to industrialize the country is derived from the ruling party's 2015 election manifesto. The word industrialization is mentioned over 70 times in the CCM manifesto. Among other things, the manifesto aims to accomplish and implement Sustainable Industrial Development Programme (SIDP) Phase Three covering the time period 2010–2020. It also aims to attain industrial sector contribution in Tanzania Development Vision 2025. The manifesto aims at increasing industrial sector Gross Domestic Product (GDP) contribution from 9.9% in 2013 to 15% in 2020 and to have 40% of employment in the country coming from industrial sector by 2020. It is important to conduct objective evaluation to assess the extent to which these goals have been reached by 2020. This (evaluation) is beyond the scope of this work.

The manifesto also talks about mobilizing the private sector to invest in middle and large industries as well as protecting them against foreign industries. Whereas protectionisms may be a good argument for infant domestic industries that cannot withstand competition, it can be a raw deal to consumers by way of reducing their consumption menu. Furthermore, protecting inefficient industries that are not likely to grow is bad economics. As if the above were not enough, protectionism in the globalized world of the World Trade Organization and possibilities of retaliations need to be re-thought.

Industrialization in President's Speech

In President Magufuli's speech in the Parliament on 20th November 2015, the word industrialization appears about 35 times covering five out of 48 pages or 10.4% of the volume of his speech. On page 20 of the speech, the President acknowledges that he deliberately dwelt on the matter in length. The speech (page 19) insisted on the type of industries that the fifth phase government is aiming at. These are mass employment-creating industries, industries for domestic mass consumption goods and industries for export goods. Each of these will be interogated separately in coming articles given the weight of each in gold.

Industrialization in the FYDP

The Second Five Years Development Plan (FYDP) that was unveiled in the Parliament in the last week of April 2016 is focusing on industrialization. Its theme is 'Nurturing Industrialization for Economic Transformation and Human Development'. The FYDP has been implemented annually through annual plans funded by annual budgets. These annual budgets on the other hand have been guided by annual budget guidelines. One therefore needs to understand the FYDP, the annual plans, annual budget guidelines and their corresponding annual budgets to unpack and analyze the extent to which the planned industrialization move will be unfolding.

7 The Role of Agricultural Sector in Industrialization

The industrial revolution and development in Europe benefitted substantially from the agricultural sector. The revolution was preceded by agricultural revolution. The agricultural sector is among the several complementary sectors for industrialization. According to URT (1996: 25),[2] industrial development will be seriously hampered if complementary sectors (such as agriculture) do not perform well. According to Shigehisa (1996), agriculture played transformative role in transforming the Japanese economy from a stagnant agrarian society to a modern industrial one.

The agricultural sector has key roles to play in Tanzania's fifth phase government's industrialization move. These roles are outlined in what follows in line with the three major kinds of industries that the fifth phase government has been aiming to develop.

Agriculture Role for Employment—Creating Industries

The government's desire has been to have 40% of employment in Tanzania coming from the industrial sector by the year 2020. For Tanzania to attain the mass employment-creating industrialization, then it has to opt for labor-intensive industrialization if the jobs are to be coming directly from industries. Labour-intensive production techniques employ more labor than capital and therefore create more jobs.

However, there are several downsides of labour-intensive production and by extension labor-intensive industrialization. These include limited ability to

enjoy economies of scale through large scale production, less speed in production, less efficiency and at times less quality and standardization of products. For this type of industrialization, employment can only be mainly created along with industrial value chain nodes through backward and forward integration. It calls for strong inter-sectoral linkages and holistic approach to industrialization. All sectors related to the industrial sector including agriculture need to be adequately developed.

A review of the industrialization goals in this new move shows among other things that the fifth phase government aims at having industries that will create mass employment for Tanzanians. This should be very well understood and a good goal partly given the unfortunate state of affairs of high unemployment especially among youth. Unemployment is among the key social, political and economic challenges. The new industrialization move aims at having a whole 40% of Tanzanian labor force employment coming from the industrial sector. This is a good goal but must be understood in the correct context and therefore strategies toward this must be correct as well.

Unpacking Job-Creating Industries

That industries will create jobs, is not a contested territory. The issue is on the number of jobs to be created directly and indirectly. Implication of the wished 'mass-employment' creating industries is that these industries have to be labor intensive. There are the ones that make use of more labor and human muscles than capital. These are industries that are not automated, computerized and highly high-tech. This will be the case if by 'mass employment' creating industries one means direct jobs from industries.

Reality on the Ground

In modern-day industrialization, one is likely to see and embrace more capital-intensive than labor-intensive industrialization process. Involved here are highly mechanized, computerized and high-tech-driven industries. These present a more transformative industrialization than their labour-intensive counterparts. They augur well with modern-day industrialization in which state of the art, high tech, capital intensive, mechanization and automation are key words. These are industries with bigger competitive edge than labor-intensive ones. They are better suited for mass production and therefore enjoyment of economies of scale by captains and titans of the industry whose bottom line is profit. These types of industries are more likely to produce

higher quality and standardized goods and services and at a bigger speed than labor-intensive ones.

Capital Displaces Labor

On employment creation, however, capital intensive industries will not create as many direct industrial jobs as will their labor intensive counterparts. This is because, in capital intensive production technique, capital in the shapes of machines displaces labor. What could be done by a dozen of labor is done by just one person who presses machines buttons on and off as required. Therefore capital intensive industries will not create direct mass industrial employment. There is therefore a need for all stakeholders in the new industrialization move to understand this reality on the ground correctly in order to manage expectations and avoid unnecessary surprises when the true employment colors are seen.

Potentials for Indirect Jobs

The uncomfortable truth that capital-intensive industries will not create mass direct industrial jobs should not be the end of mass employment creation through industries goal. Ceteris paribus (all other things being equal), employment through industrialization can be created along the long and many industrial value chain nodes. Through the backward forward integration in the context of inter-sectoral linkages and the associated multiplier effects, many indirect jobs can be created. These will be jobs created by the sectors that supply factor inputs of all kinds to the industrial sector through backward integration as well as those that save as markets for the same through forward integrations. This calls for strong inter-sectoral linkages and holistic approach in the new industrialization move.

All sectors touched by and touching the new industrialization move should be optimally developed to absorb and support what comes from the move. When sectors such as agriculture, fishery, livestock, infrastructure, financial services, education and much more are optimally developed to support the industrial sector, then mass employment can see the light of the day. Short of that the mass jobs creation goal through industrialization will remain a wishful thinking.

Agriculture Roles in Industries for Mass Consumption

The fifth phase government aimed at having industries that would produce goods for mass consumption. They include industrial goods from agro-processing such as food and related items; textile; footwear etc. Among other things, these industries do make use of locally available raw materials. The agricultural sector therefore has the role of providing the needed quantity and quality of raw materials for agro-processing industries. These raw materials are expected to come from various agricultural subsectors as partly outlined below.

Crops Sub-sector

The sub-sector is expected to provide various raw materials for agro-processing industries. The raw materials include various kinds of grains (maize, rice, wheat, etc.); seeds (sunflower, groundnuts, sesame, cotton, coconut, etc.), grass (including lemongrass, grass for pellets etc. Others include cashew nuts.

Livestock Sub-sector

The livestock sub-sector of the agricultural sector plays an important role in providing raw materials to the industries that process these raw materials. The raw materials include but are not limited to milk (for processing by example Tanga Fresh, Asas and Shambani Enterprise industries); hides and skin for leather industries that manufacture among others bags, footwear, belts, wallets (for example Shah Industries in Moshi, horns for key holders and decorations (ornaments like ear rings); bones and blood for animal feed, etc.

Fishery Sub-sector

The fishery sub-sector provides raw materials for fish processing industries. They include factories in Mwanza (for example Vic Fish) and Mafia Island (for example Tanpesca). The sub-sector also provides raw materials for leather-processing industry (including a factory at SIDO Estate in Mwanza). Sutton and Olomi (2012) provide a list of leading firms in agro-processing in Tanzania as presented in Table 1.

Table 1 Selected firms that process agricultural raw materials in Tanzania

Crops types	Major agro-processing firms	Remarks
Coffee and tea	Tanzania Instant Coffee Company Ltd, Afri Tea and Coffee Blenders (1963) Ltd, Unilever Tea Tanzania Limited, Tanzania Tea Packers Limited	All these and other firms make use of raw materials from the agricultural sector
Oilseeds and edible oils	Murzah Oil Mills Limited, Mount Meru Millers Limited, Vegetable Oil Industries Ltd, BIDCO Oil and Soap Limited	All these and other firms make use of raw materials from the agricultural sector
Food processing	Vicfish Tanga Fresh Limited, Azania Wheat Flour Coast Millers Ltd	There are many micro and small food processing firms that make use of raw materials from the agricultural sector in Tanzania
Beverages	Tanzania Breweries Limited Banana Investment Limited,	All these and other firms make use of raw materials from the agricultural sector
Tobacco	Alliance One Tobacco Tanzania Ltd Tanzania Cigarette Company Ltd	All these and other firms make use of raw materials from the agricultural sector
Sugar	Kilombero Sugar Company limited Tanganyika Planting Company Kagera Sugar. Mtibwa Sugar	All these and other firms make use of raw materials from the agricultural sector
Cotton	Badugu Ginning Company Limited Olam Tanzania Limited Birchand Oil Mills Ltd	All these and other firms make use of raw materials from the agricultural sector
Textiles	Tanzania–China Textile Friendship Mills Karibu Textile Mills	All these and other firms make use of raw materials from the agricultural sector
Hides, skins and leather	Ace Leather Tanzania Limited	All these and other firms make use of raw materials from the agricultural sector

Source Modified by the author from Sutton and Olomi (2012)

Agriculture Roles for Industries for Export

As is the case with other types of industries, the agricultural sector plays the role of providing raw materials for the industries that produce for export. It also can be among sources of finance for the industrial sector based on incomes and savings from the agricultural sector that can be invested in industrial projects. It also provides food for workers working in exporting industries.

Agriculture Cross-Cutting Roles

Apart from the above, the agricultural sector plays other vital cross-cutting roles in all types of industries. These include but are not limited to the following:

Agriculture as Market for Industrial Sector

In the context of inter-sectoral linkages (forward and backward linkages) and input–output relations, the agricultural sector is part of important market for industrial goods both intermediate and final. Agriculture provides markets for such industrial outputs as machinery and equipment as well as fertilizers, pesticides, insecticides, packaging materials, etc. Therefore the agricultural sector is a potential and actual market for the industrial sector which in turn is a key factor for industrial development.

Agriculture as Source of Food for Those in the Industrial Sector

As is the case for all other sectors of the economy, the labor force in the industrial sector needs food. It is the agricultural sector that provides the food in this context. This is a very important role because industrialization is normally accompanied by rapid urbanization which in turn increases demand for food. Agriculture, therefore, is very important in industrialization due to its role in providing food to industrial workers.

Agriculture as Source of Capital for Industrial Development

The agricultural sector both at micro and macro-level plays important role in providing capital needed for direct and indirect development for the industrial sector. They include both direct and indirect tax and non-tax revenues

from agriculture for the central and local governments' various industrialization interventions. The interventions include developing business and investment climate needed for industrialization. The sector can also be important for providing capital for industrialization at household and individual levels. This is normally in form of surplus capital from agriculture that can be invested in various types and sizes of industries.

Agriculture as Support of Other Important Sectors for Industrialization

Under the input–output relations and inter-sectoral linkages and dependencies concepts, the agricultural sector is of indirect importance to industrialization through supporting other sectors that are important for industrialization along the industrial value chain and its nodes. These other sectors include education, financial/banking sector, transport and other sectors. Agriculture provides among other things, food and revenues for these other sectors thereby supporting the industrial sector indirectly.

Agriculture as Source of Labor Force for Industrial Sector

Conceptually, at some stage of agricultural development, the sector is supposed to release some excess labor for the industrial sector. This can take place for example when agriculture gets mechanized and capital intensive. Since capital displaces labor, the displaced labor can potentially be absorbed in various nodes of long industrial value chain. Agricultural sector therefore can play the role of becoming a source of labor force for the industrial sector. For this to happen, however, the released agricultural labour force must have what it takes to be absorbed in the industrial sector. The key issue is having skills. Arguably, labor force released from agriculture may struggle to be absorbed in the industrial sector especially if it is a highly capital intensive industrial setting that demands few and highly competent labor force. Labor force laid redundant in the agricultural sector is not likely to have the needed high skills for the industrial sector.

8 Role of Agriculture in Industrialization: Selected Challenges

Tanzania's fifth phase government's industrialization move in general and the role of agriculture in that process in particular stands to encounter a number of challenges. Among the general challenges to industrialization include inadequate resources both financial and non-financial. Other general challenges are those related to investment/business climate.

Various studies and reports have produced a wide range of issues that constitute challenging and constraining business climate in general and in specific countries, sectors and sub-sectors in particular. When the business climate issues are short of the needed level they are seen as challenging and constraining. They constitute unfriendly, none-conducive, unattractive and none-optimal business climate. They imply a deficit in the desired business environment. Such deficits need to be bridged through various interventions. They constitute issues of concern to business stakeholders.

Among the key issue of concern in the various World Bank's Doing Business Reports include the easiness of doing business in a given country as measured quantitatively and qualitatively by various indicators. These indicators include but are not limited to starting a business. Among the variables that are scrutinized in this category include the level of decentralization of business registration, needs for various inspections such as those done by health, town and land officers as a pre-requisite for a business license and business start-up costs. Another variable of interest is that of dealing with construction permits. Issues that are scrutinized include the easiness of the process of getting a construction permit and the price of obtaining a building permit.

Doing Business reports also look at the easiness of getting electricity including the cost of getting hooked to this important factor of production. The reports also look at the business environment in the context of registering property. Among the measures in this variable include the time it takes for registration of a property and involved costs. Getting credit is yet another important component of business environment. It looks at the easiness of getting credit for various business purposes including starting and expanding businesses. Another important indicator of business environment is protection of investors. Variables in this indicator include disclosure index, director liability index, and ease of shareholders suits index and strength of investor protection index.

Payment of various kinds of taxes to the government constitutes indicators of business environment as well. Inter alia, one looks at the number of taxes,

tax rates, predictability of fiscal regime, time it takes to pay taxes as well as availability of one-stop center for tax payment purposes. The trading across borders indicator of business environment includes streamlining trading in a number of ways including Pre-Arrival Declaration (PAD) system and electronic submission of customs declarations and other measures that reduce time and documentation needed to import goods and services. Other important indicators of business environment are the easiness of businesses to enforce contracts and resolving insolvency. The World Bank (2016)[3] (as is the case for other World Bank's Doing Business Reports) addresses similar business environment issues as those outlined above with different ranking of different countries over time.

At the country level with Tanzania as an example, issues constituting challenging business climate/environment have been documented in various works. The main one is arguably the Business Leaders' Perception on Doing Business in Tanzania produced by the Business Environment Strengthening for Tanzania (BEST—AC). Among the indicators for business environment[4] include easiness of doing business in the country as measured by availability of quantity and quality of a number of variables. Specific variables of consideration include telecommunication, security, skilled labor, employment law, environmental law, enforcing contracts, licensing and regulations, roads, ports and airports, ease of registering land, water, macroeconomic policy, access to finance, tax administration, level of taxation, corruption and power. Issues similar to the above have been covered in Ngowi (2015).[5] Figure 1

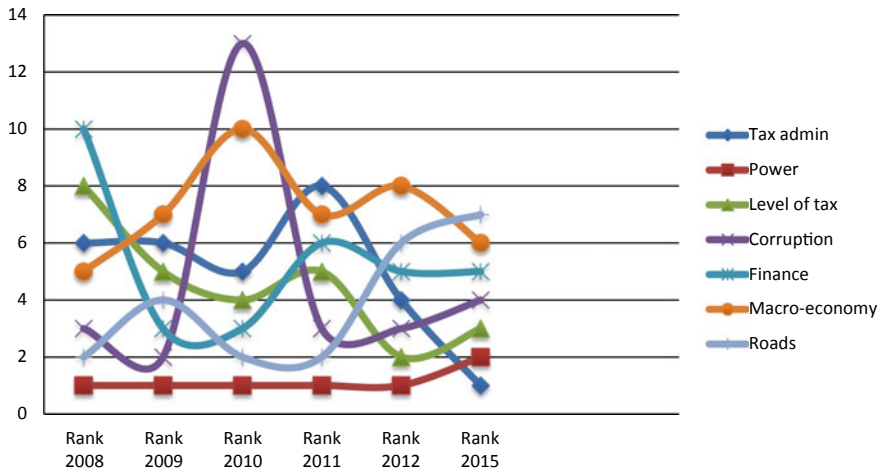

Fig. 1 Factors making business difficult in rank order 2015 (*Source* TPSF. Business Leaders' Perception of the Investment Climate in Tanzania—2015)

from Tanzania Private Sector Foundation (TPSF 2015) shows factors that make business difficult in Tanzania.

9 Challenges Related to Agricultural Sector

It has been documented above that the agricultural sector has a noble role to play in Tanzania's new move on industrialization. On top of the general challenges to industrialization outlined above, there are a number of agriculture-specific challenges that are likely to be encountered along the industrialization process. These challenges are closely related and intertwined.

The challenges include low budgetary allocation in the agricultural sector. Among other things, the Maputo Agreement of the African Union heads of states that each African country should set aside at least 10% of its annual budget for agriculture has not been implemented in Tanzania.

Other challenges facing the agricultural sector in Tanzania include small farm sizes leading to inabilities to enjoy economies of scale; low productivity caused by inter alia poor farming practices; low quality and quantity of agricultural outputs needed for industrialization; inadequate steady supply agricultural outputs (for example fruits and vegetables for agro-processing) partly due to seasonality; low growth rate of the sector (less than 4% for a number of years); low mechanization; inadequate access to finance due to both supply and demand-side constraints and issues; low commercialization; rain-dependence; post-harvest losses; inadequate agricultural infrastructure including roads, markets, irrigation system, etc.

Unless these and other challenges are properly addressed by both the public and private sector including the academia, agriculture will not be able to play its rightful noble role in Tanzania's new industrialization drive. This is because of the dependence of the industrial sector on the agricultural sector. Under the concept of co-movement of sectors, if the agricultural sector fails to deliver due to the outlined challenges among others, the industrial sector will fail to deliver as well.

10 Conclusions

Based on the discussions in this chapter, it is clear that the agricultural sector is of great importance in the desired industrialization move by the fifth phase government of Tanzania. Its importance is seen in the context of inter-sectoral linkages theoretical framework. Among other things, there is input–output relationship between the agricultural and industrial sectors. In this context and framework, the agricultural sector has the potential to provide industrial raw materials for agro-processing industries which are among the types of industries that envisages to have. It provides food for the industrial and related labor force. This is very important in industrialization in general and industrialization that aims at creating mass employment as that of Tanzania's fifth phase government.

The agricultural sector provides market for some industrial outputs both intermediate and final and can be among sources of finance for industrial development at micro and macro-levels. The latter will happen when there is saving from agricultural activities that can be invested in industrial sector. Therefore, there are very high expectations from the agricultural sector if the new industrialization move is to succeed. However, there are a number of challenges that need to be addressed to avoid the agricultural sector becoming the missing link and constrain in the industrialization move. These challenges have been highlighted in the chapter and should be solved for agriculture to play its expected role in Tanzania's new industrialization drive.

11 Recommendations and Ways Forward

A number of recommendations are outlined in what follows in the context of the central issues raised in this chapter.

For the desired industrialization to be attained in Tanzania, there is a need for very conducive, friendly and supportive investment and business climate across the sectors in general and in the agricultural sector in particular in the context of this work. The conducive investment/business climate variables include but are not limited to issues related to infrastructure both hard and soft and especially rural agriculture infrastructure in its very broad sense. This includes roads, irrigation infrastructure, rainwater harvesting infrastructure, markets, storage facilities and other agriculture-supporting infrastructure. Other variables include utilities especially electricity for agro-process and agro-storage facilities such as refrigerators and cold room; water for irrigation, agro-processing and household use; appropriate quantity and quality of

skills and talents among the labor force in general and for agriculture and related activities in particular; good fiscal regime including relatively low tax and fees rates and fewer number of the same, predictability, easy tax returns, participatory taxation, re-investing tax and fees as well as crop cess revenue in the sector among others.

There is a need to learn from earlier industrialization moves in Tanzania and elsewhere in general and the role played (or not played) by the agricultural sector. The key issue is to learn what works, what does not work, why and what should be done differently in the new industrialization drive in the context of this chapter.

The Government (both local and central) has to allocate fairly large amounts of financial and none-financial resources to the agricultural sector including funds for research and development (R&D). This will contribute to inter alia reducing and ultimately ending the challenges faced by the sector. The results will be high productivity, reduced post-harvest losses and rapid growth of the sector. Since Tanzania is a signatory to the Malabo Agreement that requires all African countries to allocate at least 10% of their total national budgets in agriculture, the country should honour this commitment.

Key stakeholders in the agricultural sector should address the various challenges that the sector faces that can constrain the industrialization process. The stakeholders include the government, private sector, development partners, Civil Society Organizations (CSOs), the media, academia among others.

There is a need for all stakeholders to recognize the role of the sector in its broad sense in industrialization and give it the correct and deserved weight.

It is important to note that agricultural development—as is the case with industrial and other sectors development—is a cross-cutting issue that needs balanced development of many other sectors in the context of inter-sectoral linkages.

Higher learning institutions (HLIs) in general should demonstrate (more) intellectual leadership in agricultural development in general and as related to industrialization in particular. This should be seen in their training, research and dissemination agenda including well-articulated university–industry linkages as well as commercialization of agricultural and related research findings

All HLIs and universities in particular should provide intellectual leadership by way of research, training, consultancy, service to the community (outreach), interrogating and advise on industrialization in general and the role of agriculture in the industrialization process in particular. For this to happen, however, both financial and none-financial resources are needed adequately. These have to be mobilized by the government, the institutions

themselves and other stakeholders such as the private sector and development partners

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An Analysis of the Importance of Oil Palm Tree in Central and Southern Nigeria

Fidelis Achoba

1 Introduction

The oil palm tree is one of the major crops that significantly contributed to Nigeria's economy before the country's civil war of 1967 to 1970 (NIFOR 2003). Between 1948 and 1964, Nigeria was a leading producer of palm oil in the world (NIFOR 2003). As a result, Malaysia and Indonesia came to Nigeria to acquire oil palm seedlings, and this has helped to boost their economies. However, the Nigerian civil war, and more significantly, the discovery of crude oil, which diverted the country's economic attention, adversely affected the oil palm industry. While oil palm production was relegated to the background in Nigeria, Malaysia, Indonesia, and Columbia took the lead (NIFOR & FDA 2005). Even with the tireless effort of the Nigeria Institute for Oil Palm Research (NIFOR), Nigeria is only now the fourth-largest producer of palm oil and palm kernel after the aforementioned three countries. It is against this backdrop that the chapter seeks to identify ways by which the oil palm tree and the by-products can be revitalized for sustainable economic growth in Nigeria.

The oil palm tree is commonly found in sub-Saharan Africa, especially in the southern and the middle belt of Nigeria which has a temperate climate

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and good soil condition, for its production. It grows tall, erect, sturdy, beautiful, and majestic. Its leaves, also called fronds are spread at its head, beneath which it produces the palm fruits on bunches all year round. Its stem is hard and sometimes rough from fallen fronds. Although the oil palm tree has fibrous roots, and no deep taproots, it stands immovably strong in the ground. In modern days, farming of oil palm has been modernized; planters space the trees to avoid or limit soil acidity, and by so doing, intercropping becomes very important as the well-spaced plantation pattern lets the plants in between to naturally treat the soil. A space of 8–9 meters between the palm trees could be used for planting lower crops such as melon, cassava, cowpea, and groundnut within the first five years of the oil palm tree. Intercropping also helps to prevent soil erosion as well as to curb weeds. However, intercropping should be done without stretching the limited soil resources (NIFOR & FDA 2005: 25). After five years, the palm fronds spread like cover crops, hence there would be no need for further intercropping at this stage.

It is noteworthy that in 2014, as seen in the Tribune Newspaper, the Federal Government of Nigeria, through Dr. Akinwumi Adesina, who was Minister of Agriculture and Rural Development at that time, has indicated that it is not relenting its efforts in boosting the palm tree sector sustenance. Thus, he further asserted as follows:

> So far we have distributed to all the States in the South-West of the country, a total of 2.6 million of sprouted nuts of palm oil seedlings, which represent 28% of all the sprouted nuts administered across the country. Oyo State has received 351,000 sprouted nuts of palm oil seedlings; Ogun State has received 600,000; Ondo 574,000; Ekiti 219,000; and Osun 312,000. (*The Nigerian Tribune* Newspaper, Tuesday, 18 November 2014)

Nonetheless, this proposition is not enough for the South West part of Nigeria whose soil is very rich for oil palm production, just like South East, South–South, and Central Nigeria compared to the rival countries mentioned above. So the government at all levels in Nigeria should intensify effort at boosting the economy of the country through oil palm production as an alternative source to the petroleum economy.

2 Importance of Oil Palm Trees

The oil palm tree is a multipurpose plant. Some native adages in Nigeria use it as a metaphor to refer to a self-sufficient and independent person. The Encyclopedia Britannica (2020) rates the African palm the most important in

the world, as a prime source for vegetable oil, fat, coir for mats and ropes, and the endocarp as fuel and to make charcoal, cups, bottles, trinkets, a beverage from the liquid endosperm, cattle feed, coconut milk, sugar, alcohol vinegar, and furniture making. In pre- and post-colonial Nigeria, the oil palm tree was a major cash crop, which served the European industries as raw materials for industrial and domestic use such as the production of soap and detergent, and lubricant. Other export crops that developed in that era were cotton, groundnut, rubber, cocoa, among others (Alison 1946: 12). As a result of its demand, which was necessitated by its value in the European industrial revolution, the oil palm tree was cultivated in large quantities. It is, therefore, reasonable to argue that the cultivation of oil palm tree, which grows both in the wild and domesticated in Southern and Central Nigeria, is indigenous to the people.

3 Mulch and Subsidiary Crops

Palm fronds are used as mulch for grain seedlings planted on ridges. This protects crops from the direct excessive heat of the sun. Mulching of pre-nursery and main nursery seedlings with suitable materials is very important for the conservation of soil moisture. In other words, they are important for soil protection. Partially shredded decomposed oil palm bunch refuse serves as the best mulching material (Alison 1946: 12).

Also, in a well-spaced oil palm plantation, subsidiary crops different from cover crops can be planted in between the palm trees in the initial stages of the plant. These crops include coco-yam, tobacco, pumpkins, pepper, and so on. The required labor in this subsidiary farming is light. Thus, it provides women the opportunity to do subsidiary farming, and in turn, raising their income and boosting the markets where the proceeds are sold. Thus, income is derived from both the oil palm tree and the subsidiary crops.

4 Social-Cultural Lifestyle and Empowerment

The oil palm tree contributes greatly to the social life of the Nigerian people. The sap tapped from the tree is called palm wine, and it is served on several social and cultural occasions. For example, it is served in a marriage engagement ceremony, burial ceremony, and other festivals and cultural occasions. The influence of palm wine consumption also extended to colleges and universities. For instance, the Palm Wine Club is also known as *Kegites Club*

was formed by a limited number of undergraduates in some Nigerian tertiary institutions to promote and celebrate African culture and enjoy some camaraderie. The *Kegites Club* is believed to have been founded in 1963 at the University of Ife (now Obafemi Awolowo University) (Kola Adeniyi 2018). Through its network of contacts, its members who have attained prominence have been able to empower one another economically. In the same vein, its network also enhances intermarriages among various ethnic groups. This also facilitates intergroup economic relations which is a key instrument of peaceful interdependent coexistence (Kola Adeniyi 2018).

5 Effect on Climate and Socio-economic Well-Being

The oil palm tree, which forms the major component of forests in Southern Nigeria, mitigates climate change for healthy living and sustainable economic growth. For instance, when people interfere with the forest, such interference hardly interrupts the oil palm trees because of the importance attached to the trees. The interference is observed only in palm wine and felling the fronds for brooms. The main tree remains untouched as part of the forest which mitigates climate change, because deforestation can lead to environmental degradation, destroying flora and fauna and endangering the life of mankind.

The place of oil palm in Nigeria's economy and socio-economic life is also significant. The oil palm tree as an indigenous crop that grows virtually everywhere in central and southern Nigeria is both individually and collectively owned by the community, and nobody is prohibited from assessing them at any point in time. In Igboland and Igalaland, for instance, to cut down a palm tree without any genuine reason constitutes a serious offense that would incur the wrath of the community. Besides, the oil palm is widely regarded as a major economic tree because of its products, ranging from brooms, palm oil, pomade, healing balm, soap, cooking fuel, building and roofing materials. As a result of this deep-rooted attachment of the people to the tree and its products, the people of southern Nigeria have great value for it. They devote their time and energy to its cultivation because of its numerous prospects, especially the products gotten from it.

The production of palm oil in precolonial Nigeria was in the hands of the native farmers who gathered the fruits from the wild palms and extracted the oil from the fresh pericarp through manual processes. There were two forms of manual extraction of palm oil. The first form was much less laborious and produced hard oil (International Institute of Agriculture, Rome 1939: 329),

while the second was much more strenuous, producing semi-soft or soft oil. In the production of hard oil, the fruit was first heaped and later allowed to soften by fermentation. It was then pounded, and very hot water was added to the fruit, enhancing the extraction of oil. The liquid was again heated to separate the oil from the pulp. For the process involved in the extraction of the soft oil, the fresh fruits were boiled in water and the resulting mash was then pounded and the nuts separated. The liquid was then heated to separate the oil from the pulp and oil on the surface was skimmed (Tobback 1944: 3). The oil obtained was heated further to remove the moisture and thus purify it for consumption. Another way of extracting oil was by boiling the palm fruits until the pericarp softened. They were then turned into a mortar and trodden vigorously using one's foot until the flesh begins to separate from the nuts. Today, however, a pestle is used to pound the fruits in a wooden mortar to separate the flesh from the nuts. This is removed and strained to produce an emulsion, which together with the liquid in the mortar is then boiled and allowed to settle before the oil rises to the surface and is skimmed off. Then the remaining fiber is boiled again for further purification.

Shedding more light on this, Ford and Scott observed that,

> The wild palm faces ready for harvesting were frequently scattered in the forest, at some distance from the places of abode. Its gathering involves much waste of time. It was transferred manually to the village for extracting the oil. The inner nuts of the palm fruits are crushed between stones by women and children to extract the kernel; the incomes from the sale of the palm-kernels were only recognized as the women's prerequisites. (Ford and Scott 1946)

Contributing to this, Allison asserted that:

> The whole household shared the palm oil collection and preparation. The young men climb the palms using a sting supporting them from their back. The men of the compound then cut up the palm bunch so that the fruits fall out. The women boil the fruit and pound it in a long mortar to separate oil and kernels and waste fiber. The kernels were then dried in the can. (Allison 1946: 38)

It is worthy of note that women played a significant role in the palm oil processing industry. It was the exclusive preserve of the women to boil, refine, process, package, and sell off the finished product. While major agents from the cities competed with them in town markets, palm oil trading was in the hands of women at the village market level. The reason for women's domination of the industry is not farfetched. First, women occupy about 70% of the

processing activities in the agricultural value chain. Second, palm oil formed an indispensable commodity and ingredient in the daily meal of every household, and since women preoccupied with the preparation of household meals, ensuring an adequate supply of palm oil for the household also became their prerogative.

6 Source of Food and Fuel

As an indispensable household item, palm oil was put into different uses. As a result of its rich and nutritional contents and value, it was and is still used as a sauce for eating yams, potatoes, cocoyams, and other edible tubers. It is also used in the preparation of different local soups and dishes such as *banga, egusi, ewedu*, and *okra*. It is also used for frying and preservation of other food items like fish, meat, yam, and sweet potato. The use of palm trees extends even to its trunk. Palm trees that are neither used for furniture nor firewood are allowed to decay. The decayed trunk produces very nutritious edible maggots that serve as alternatives to fish or meat protein. Maggot farming is another lucrative industry that yields good income and provides economic sustenance for its farmers. Another important aspect of the decayed oil palm tree trunk is that it attracts the growth of mushroom vegetable which is rich in proteins. It is used for cooking soup and also cooked with other grains like corn, beans, cowpea, among others. It is sold in various markets in Central and Southern Nigeria (Unanimous Oral data collected in Igala land, October 9, 2018). The kernel nut can either be eaten alone as snacks or used to garnish cassava flakes popularly called "garri" in place of groundnuts or coconuts. Before the discovery of petroleum, palm oil served as fuel for local lamps to give light at night.

The oil was poured into an earthen pot with a wick made of cotton wool fixed into it. The wick is lit through fire flame and this provided light for domestic use. This made the people also to engage in cotton farming as a subsidiary industry for wick making (Abah 2019). The trunk of the palm tree itself can also be split and used as firewood. Before the advent of the stoves, gas cookers, and electric cookers as we have today, people relied heavily on firewood. Even with the coming of these cooking tools, the place of firewood cannot be removed as people still rely on it when cooking for large events like weddings, burials, and village meetings. The wood fire is also preferred when using the oven for frying garri. The chaffs that are gotten during the production of palm oil are kept under the sun and allowed to dry up properly

and the dried chaff is thereafter used for cooking as an alternative to firewood. In addition to this, the shells of the palm kernel can also be used in place of firewood.

7 Soap and Cream Production

Palm oil has been a major ingredient used in the soap making industry. The process of native soap making is simple. First, the palm fruits are extracted from the bunch, and the empty bunch is dried and burnt. The ash is then properly mixed with the palm kernel oil and water. This mixture is boiled until it is solidified. The end product is a soap for domestic use. It is rich in alkaline and naturally so good that it is preferred by the natives to contemporary products (Ocheja 2019). Apart from bathing, it is also used for washing clothes, plates, and furniture. Soap making is an industry that native women engage in which augments the local economy. Thus, in the value chain, the chaff from the oil palm bunch becomes useful. Also, the native oil palm soap is medicinal in another way as it removes skin infections like eczema and different kinds of rashes.

Another domestic product from the palm tree is pomade. To make pomade from palm produce, the fruit shells are broken to get the kernels. The palm kernels are put in a wide pan or special clay pot and set on fire for some time. The kernels produce a black liquid which is allowed to cool and is then poured into bottles. Oil palm pomade smells good and it is soothing on the skin. This local pomade, made from oil palm, like the oil palm soap, is also very medicinal and comes in handy in many ways for the cure of different ailments. One of such ailments is convulsion (Ocheja 2019).

Palm kernel oil popularly called black kernel oil which is useful in local African societies is another product made from palm trees. The palm kernel oil is derived from palm kernel, which is a by-product gotten during the production of palm oil, after breaking the shell. It is the heating of it in a clay pot with moderate fire that brings out the oil from the kernel. In the production of the palm kernel oil, the palm kernels are smashed to separate the nuts from the shell. The nuts are poured into a clean dry pot without water and then put on fire to extract palm kernel oil. The process of heating and extracting the palm kernel oil could last for about an hour or more depending on the intensity of the heat beneath the pot. Palm kernel oil is also one of the ingredients used in the manufacturing of the local black soap. The production of this black soap involves heating the kernel oil in a clean dry pot on the fire; thereafter, burnt palm fronds ashes are poured on the hot oil and

properly mixed with some potash powder by stirring it until it gets cold. The result of this process produces black soap. The black soap is very useful in the home. Before the coming of modern soaps, newborn babies and even adults had their baths with this local soap. The black soap is arguably better on the skin of newborn babies than modern soaps. The production of this soap is a form of occupation and source of income as the producers sell them in large and small quantities to buyers. Apart from the production of black soap, the palm kernel oil itself was used as a body and hair cream for both adults and babies before the coming of the modern creams.

8 Palm Tree Wine

Although much has been said about the value of the palm tree in this chapter, another value of the tree is contained in the palm wine tapped from the tree, which is both socio-economic and medicinal. Palm wine, which is whitish in color and has a sweet taste, is a special type of traditional and local drink gotten from the trunk of the palm tree, used in entertaining guests. It needs no special process of preparation as it is ready for consumption as soon as it is tapped from the palm tree. It is worthy of mention that once the wine is tapped from the oil palm tree, that tree would cease to bear fruits. For this reason, the natives are careful to harvest the palm fruits long enough before converting the tree into wine tapping. The wine could be tapped by using a climbing rope or by felling the tree.

Freshly tapped palm wine is less in alcohol content but fermentation increases its alcoholic content. Before the use of modern bottles, palm wine was presented in kegs made from gourds. To this day, kegs of palm wine are presented by a groom during traditional marriages in central and southern Nigeria. It is medicinal as the yeast content in it can aid clear vision (Pharm. Ada Ugonma, February 6, 2019).

Palm wine and sugar form the basic ingredients for the distillation of gin. The internal fermentation of palm wine produces about 5.2% alcohol by volume. When the distiller boils off 50% of the mash each time and then redistills the distillate, the alcohol strength increases. By the end of the third distillation, there will be half a pint of spirit comparable in strength to the imported brands (Olofun Abu, March 8, 2019). Treating the distilled alcohol with burnt sugar produces a spirit similar in bouquet and appearance to whisky while adding tobacco juice makes it brandy colored. The bark of a cinnamon tree, nutmeg, and cloves adds their distinct flavor (Olofu Abu, March 8, 2019). The use of palm wine initially restricted the distilling area

to the southern raffia palm and oil palm belts. However, within a few years, there were new alternative ingredients like banana, cashew, bitter and sweet cassava, coconut, guinea corn, maize, pineapple, potatoes, and yam. With some of these available in the north, the distilling business has spread to that region (Olofun Abu, March 8, 2019).

There has been a recent development in palm wine production. The production of plastic bottles has contributed to the growth of the palm tree industry. Investing in palm wine is cheap and very easy. The production process begins by getting the needed amount of palm wine from palm wine tappers. After getting the wine, the sugar level of the wine must be properly checked. The palm sap is filtered and brought to the production room. The palm sap is further filtered in the production room to further remove dirt. The sap is then poured into a clean pasteurizer and then the pasteurizer is switched on to check the temperature until it reaches 90 °C (Olofun Abu, March 8, 2019). The hot sap is poured into properly washed plastic bottles and cocked immediately. Thereafter, it is put in cold water to cool after which it is removed from the water, labeled, and packaged for sale. This has become a very lucrative business in most parts of Nigeria.

9 Production of Pharmaceutical Drugs and Spiritual Potency

The significance of oil palm for the sustenance of the economic development of Africa cannot be overemphasized. Alcohol, a by-product of the oil palm tree, is used for medical purposes (NAE RIVPROF 20/15, 1931). Ethanol which is derived from oil palm is an important chemical in the manufacturing of some drugs: Cough Syrups like Bennylin—5%, Coltrex expectorant—4.7%, Norahistrine—3.5%; Vitamins: Geritonic—20%, Chemiron—20%, Orheptal—20%; Mouth Wash: Listerine—26%, Listermint—12%; Anesthetic/Pain Reliever: Tylenol Liquid and drops—7%; and Mentholated Spirit—over 50% (Adah Okorie and Ekundayo Moses 2019). Alcohol as its by-product is also used for the production of hand sanitizers against infectious diseases. Apart from its food value, the palm tree has proven to be useful in medicine for human health. For instance, it is a good source of Vitamin A, which is very good for the eyes. It is also taken for constipation to soften the belly and aid digestion. This raw material for pharmaceutical industries can also generate employment for the teeming youths in Nigeria raising the per-capita income, thereby enhancing the revenue base of the country.

In traditional African societies, palm kernel oil has proven its medicinal efficacy in many ways. For instance, it softens the stool for easy excretion. It serves as an antidote neutralizing different types of poison. It is believed to dispel evil forces when one rubs the kernel oil on one's body. This view about the potency of the kernel oil to dispel evil is a peculiar feature of the African, or specifically Nigerian, the worldview of palm kernel oil. For example, it is believed that convulsion in children is an attack of evil spirits. To cure convulsion, a mixture of palm oil, palm kernel pomade, special herbs, and other ingredients are pounded together and thoroughly mixed. This mixture is used to massage the convulsing child and it is also applied to the ears, eyes, nose, and anus for maximum effect (Abutu 2018). It also serves as a healing balm for other ailments such as swollen parts of the body and skin irritations.

Fronds from the palm are also important in the performance of certain rituals among the people of southern Nigeria. For example, when a dead person is being conveyed for burial, their spirit is believed to be hovering around which may prevent the corpse bearers from moving especially when the spirit is angry. Palm fronds together with other materials are used to appease the spirit of the dead. This is done by reciting incantations and then touching the corpse with the palm fronds or by tying the palm fronds in front of the vehicle or on whatever that is carrying the corpse. The Esan people of southern Nigeria as well as other ethnic groups in the middle belt also believe in the same mystical powers of the palm fronds. The Igala people believe that palm fronds can put the spirit of the dead in check. The tender frond that is usually in the middle of the palm tree regarded as the king of all fronds is also used for this purpose (Ose and Oboh 2016).

Furthermore, the newest palm fronds kept in particular places are believed to prevent evil spirits from operating. The palm frond can also be used to protect a person's valuable items especially when it is kept outside the house. For instance, farmers could keep their cultivated lands protected by fencing the farm perimeter with palm fronds. People also use these palm fronds to demarcate their newly purchased land from other nearby lands to avoid any form of encroachment leading to a dispute. From the foregoing, palm fronds can be seen to be morally, traditionally, socially, spiritually, domestically, and economically useful.

10 Automobile Industry

The palm tree is very useful in the automobile and transport industry. An interim report on the development of asbestos-free automotive brake pads using Palm Kernel Shell (PKS) as frictional filler material was presented (Olufemi Adebola Koya 2010: 5). This was with a view of exploiting the characteristics of the PKS, which is largely deposited as waste from palm oil production, in to replace asbestos which is seen to be carcinogenic (Olufemi Adebola Koya 2010: 5). Two sets of brake pads with identical ingredients using either PKS or asbestos as a base material were produced following standard procedures employed by commercial manufacturers. The physical thermal, mechanical, and tribological properties of the palm kernel shell-based brake pads were evaluated and compared with the values for the asbestos-based brake pads. The Standard Organization of Nigeria observed that the properties of palm kernel shell-based brake pads were better than those of asbestos-based brake pads in terms of lower specific gravity, lower percentage swelling when wet, higher heat resistance, heat dissipation, and co-efficient of friction. It also exhibited a lower wear rate (Olufemi Adebola Koya 2010: 5).

Aside from the enhancement of the road transportation system through the production of brake pads, palm kernels also contribute to the development of waterways. A lot of revenue is also generated in the course of transporting the bulky products via River Anambra and River Niger as well as other river tributaries in the Niger Delta to Burutu, Warri, Port Harcourt, and other port cites for onward transportation to Europe. This transport network encourages international trade, international relations, facilitates markets, and develops per-capita income, thereby boosting the economy of the country. Transportation of palm kernels through the waterways results in the development of a water transportation system through the dredging and clearing of hazardous plants on waterways. This indirectly creates labor and employment and also economic gain.

11 Religio-economic Importance

Palm oil plays important role in religious and cultural rites among the native people of central and southern Nigerian peoples, making the palm also economically viable. Before the coming of Christianity and Islamic religions, the people of southern Nigeria were worshipping idols, gods carved out of

trees and stones. These trees and stones were used as symbols or representations of their gods. The carved wood sandstones were considered sacred and sacrifices were offered to these idols. One of the materials used as palm oil which was poured out on these woods and stones to appease the gods (Ichekwene 2019). Palm oil was also an important item for certain sacrifices at road junctions. In addition to other items such as pieces of white or red cloths, rice, beans, guinea corn, corn, and palm oil. The coming of Christianity and the Islamic religion has not eradicated the spiritual use of palm oil because the traditionalists who still believe in the gods of their ancestors still perform these rituals and sacrifices. Palm oil also formed part of the articles for major traditional ceremonies, festivals, initiation rites, and oath-taking. Its potency to deliver desired results was never in doubt and this has been sustained over time.

12 Temporary Shelter for Events

Palm fronds are used for making temporary shelters during important occasions, ceremonies, festivals, or any other event that requires people to be under a shade to be shielded from the tropical sun. From time past to date, the Igalas, Efiks, Ijaws, Igbos, and Yorubas use palm fronds to construct shades or huts within their compounds to serve as resting or relaxation points during the day. Shades are also constructed on their farmlands to provide them with a place to rest at intervals on the farm.

13 Craft

The peeling from the bark of palm frond stalk is used for making hats, bags, fish traps, toothpicks, and baskets. Basket making is an occupation practiced across southern and north-central Nigeria because of the enormous availability of palm trees. The baskets produced are of different shapes and sizes and they are used for various purposes. Market women rely heavily on baskets to carry their goods to the market. The big baskets are used by farmers during harvest to convey their produce home. There are also baskets for carrying poultry and rabbits. Baskets of medium and small sizes are used as decorations in residential houses, hotels, and other important commercial places. The bark of palm frond is also used for the production of a local tray for hawking and selling of goods in shops.

In the ancient Igala, Yoruba, Benin, Igbo, and Ibibio societies, the people extensively participated in these crafts. Ukpabi (1971) observed that many of the cottage industries in Nsukka division have a close affinity with the industries in the Igala division. The baskets made in Nsukka have the same shape as those made in Igala land. It would appear that while Igala historically influenced Nsukka in basket weaving, Awka, as the home of iron-working, introduced blacksmithing to the Igalas, aiding the mass production of cutlasses of varying shapes and sizes which in turn aided the production of more baskets. Riverine and swampy communities of Africa where oil palm trees naturally abound also engaged in the production of baskets used for transportation of agricultural produce from farm to home and thereafter to and fro market. The merit of the palm frond basket is that it is anti-rust and it is well ventilated for conveying perishable goods such as tomatoes, garden eggs, mangoes, cucumber, and other vegetables.

Hats of different sizes are also made from palm fronds. The hats are used either for fashion or by farmers, market women, and hawkers to protect themselves from the direct heat of the sun.

Palm fronds are also used to produce brooms which are very important for domestic use. Broom making is an economic activity engaged in by both men and women. Brooms are sometimes sold or given out as gifts alongside sponges, another economic activity of peoples of southern and central Nigeria. In a community such as Olowa-Elika, the clan or families known for broom-making also specialize in the crafting of baskets made out of palm fronds. These craftsmen also double as marketers of the product and usually occupy a particular area of the market square during market days as it is with every other product (Alhaji Okutepa 2019). This implies that the activity of the middlemen was limited except when products were needed in large quantities by those outside the community where transportation cost was involved. Brooms are of two types, one is made for sweeping and taking off cobwebs from the walls of houses, while the other type, usually in small sizes, is meant for stirring okra, beans, and *ewedu* soups. Okra is a delicious soup made from okra vegetable; beans soup is made from beans grains while *ewedu* is a Yoruba word for a special vegetable soup similar to okra. Ewedu is known as jute leaf in the English language. Therefore, brooms also serve as a ladle for cooking meals. It is important to say that brooms were exchanged for other goods and services during the period of a trade by barter. In the present day, brooms are now sold for money and still being exchanged for other goods in some local markets in various parts of Nigeria.

Besides, brooms used for cleaning are also used for winnowing during crop harvest. They are used to clear the chaff or dirt from the main grains such

as rice, millet, guinea corn, and beans. In most parts of southern Nigeria, brooms are not just meant for cleaning the environment; they are also used to sweep away bad luck (Ose and Oboh 2016). Also, when demonstrating the strength of unity, elders and parents use brooms to teach vital lessons. They simply ask the young ones with individualistic tendencies to bring a bunch of brooms and then ask them to break the bunch. Once unable to do so, they are asked to pick out a stick and attempt the same thing which easily breaks at once. The intended lesson is unity and strength in togetherness.

The broom has another great significance in African society. To the Esan people of southern Nigeria, it is associated with a lot of beliefs with spiritual implications. Like the Igala people, Esan people believe that the broom is beyond an instrument of hygiene but also of high spiritual significance. For instance, it is taboo to beat a child with a broom no matter the offense of the child, and the anger of the other person. If anyone beats a child with a broom, they have to perform some sacrifices to appease the gods of the land. Again, the Esan people believe that if a person flogs another with a broom, they imply that that person is either a witch or a slave. Superstitiously, the Esan people pray not to be like the broom that only serves utilitarian purposes, after which it is abandoned or kept in an unclean corner. In war times, a child is handed a bunch of brooms to be taking out the sticks as long as the war lingered. Each removal of a broomstick signals the death of the enemy (Ose and Oboh 2016).

14 Hunting Game

In hunting, strong palm fronds are used to fence an area in the wild believed to have animals. The fence is narrowly opened at a point where there is a trap set for the animals on their tracks. To make the fence firmly stuck in the ground, it is supported by a bamboo tree. Any animal passing through the narrow opening triggers off the trap and the animal is caught. The game caught is a source of protein and income for the family; sometimes they are sent to one's in-laws or a notable figure in the community as a gift. In riverine areas, palm fronds are also used for catching fish, prawns, and crayfish. A small canoe is properly lined with whole palm fronds and then capsized in the shallow part of the river where the trapper can firmly stand when he comes to inspect it. The capsized canoe with the fronds is left for about three or four days during which fishes swim in and make its comfort their home where at night they come to sleep. The trapper comes early in the morning and carefully lifts the canoe, tilts it to empty some of the water before removing

the palm fronds, leaving the catch of fishes, prawns, and crayfish. Palm fronds are also used to construct mini dams and fences in rivers, lakes, and ponds for fishing. The palm frond, therefore, serves as an economic booster to the fishing industry.

15 Conclusion

A careful analysis of the usefulness of palm trees in southern and central Nigeria, in particular, and Africa in general reveals that the tree is very useful. The exposition in this chapter has laid bare the innumerable benefits of the palm tree in the economic, social, religious, and domestic lives of many Nigerians in the southern and central areas. Nigeria is the fourth-largest producer of palm oil and palm kernel in the world, after Indonesia, Malaysia, and Columbia. In fact, given the right framework of economic policy and political will, the potential of the oil palm tree would have been exponential. In Africa, Nigeria has contributed immensely to the oil palm subsector of the agricultural sector. The importance of palm trees cuts across so many other aspects of life. For instance, the oil palm tree is the most efficient and highest yielder per unit area of all plantation crops. It is the first choice crop for any country to meet shortfalls. Countries should endeavor to carry out researches that can lead to an improvement in the planting of this useful tree. Among the many other significant values of the tree, also provides environmental protection. Environmentalists have often stressed the importance of planting trees to save the environment from environmental hazards. The cultivation of oil palm trees taken seriously would be helpful in this regard. The Nigeria Institute for Oil Palm Research (NIFOR) should play a leading role in research and provision of improved seedlings to farmers across the nation for private cultivation of the oil palm trees since the sustainable economic future lies largely in improving the agricultural sector for enhanced food security which would in turn help to achieve the planned economic diversification drive of the Nigerian government.

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Services Sector

Entrepreneurial Literacy as a Pathway to Economic Empowerment of Rural Women in Uganda

Susan Namirembe Kavuma, Florence Kyoheirwe Muhanguzi, George Bogere, and Kiran Cunningham

1 Introduction

Across the world, the commitment for gender equality and women's economic empowerment, as reaffirmed in the United Nations Sustainable Development Goals, remains an important goal for many countries in Sub-Saharan Africa because of the realization of its potential impact on economic development and poverty alleviation. Empowering women economically is acknowledged as central to the realization of women's rights and achievement of broader development goals such as economic growth and poverty reduction (United Nations (UN) Women 2015), which the World Bank (2012) referred to as "smart economics." Growing evidence associates enhanced women's economic opportunities to better outcomes for families, societies,

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and countries (UN Women 2012; World Bank 2014). According to Golla et al. (2011), women's economic empowerment entails the ability of women to succeed and advance economically with the power to make and act on economic decisions. They suggest that women's economic empowerment exists at the intersection of two interrelated components: economic advancement; and power and agency.

While power and agency relates to the ability to make and act on decisions regarding the distribution and control of resources and proceeds from business ventures, economic advancement centers on access to productive resources required to participate in the market economy. Scholars posit that women's economic empowerment can be achieved through equal access to and control over critical economic resources and opportunities, and the elimination of structural gender inequalities in the labor market. Golla et al. (2011) argue that interventions to economically empower women can be implemented at the individual or group level. This requires taking a multidimensional approach by empowering women socially through building their capacity for agency; and economically by enhancing their access to productive resources.

Women entrepreneurship is increasingly becoming a popular strategy for women's economic empowerment and is recognized as a potential contributor to poverty reduction and sustainable development in developing nations (Van Praag and Versloot 2007; Naude 2011; World Bank 2014; Okeke-Uzodike 2019). Female entrepreneurs play a prominent role in the economies of developing countries, accounting for more than one-third of all firms in Africa (Sida 2015). There is increasing acknowledgment that women entrepreneurs contribute significantly to inclusive and sustainable industrial growth in developing economies (Vossenberg 2013). However, the majority of these women operate micro or small enterprises in the informal sector and are almost invisible in large and medium enterprises (Spring 2009; Sida 2015; Okeke-Uzodike 2019).

Despite the contribution of women entrepreneurs to countries' economies with more women starting businesses, women tend to engage in less profitable business sectors and struggle to expand and succeed (Global Entrepreneurship Monitor 2011; World Bank 2012; Karlan et al. 2014). Studies indicate that women experience multiple obstacles that limit their capacity to take advantage of business opportunities and grow their businesses. The barriers range from limited participation in business associations, limited choice of business sector, to discriminatory social norms and practices around women's economic autonomy and work outside the home and property ownership and inheritance. Other barriers include lack of collateral to

access credit, the burden of domestic chores; limited capital for investment, and lack of information (World Bank 2011, 2012; UNIDO 2012).

Lack of or limited education and skills training limit women's participation in more productive and remunerative work (Eskola and Lavinia 2010). In Sub-Saharan Africa, 57% of women are literate compared to 72% of the men (United Nations Educational Scientific and Cultural Organization (UNESCO) Institute of Statistics [UIS] 2018). The majority of these women live in rural areas. In Uganda, while the literacy rates have improved over the years women continue to lag behind the men—68% of the women are literate compared to 77% of the men and illiteracy is higher in the rural areas than the urban areas (Uganda Bureau of Statistics 2016). Secondary education which is key for skills development particularly vocational training remains limited to the majority of the young women especially those from the rural areas. The gross enrollment rate at the secondary level shows that only 25.2% of the girls enroll in secondary school (Ministry of Education and Sports 2017).

Illiteracy is generally believed to lock up women's potential as entrepreneurs thus relegate them to the informal sector (Nmadu 2011; Kitching and Woldie 2004). Evidence shows that in Sub-Saharan Africa lack of lifelong education and training opportunities is a major challenge for women entrepreneurs to develop their entrepreneurship key competence and business skills (Botha et al. 2007). Early liberal feminists postulated that education opens up women's economic opportunities (Tong 1989). Lack of sufficient education and training for women not only limits women to the informal sector, but it is also an impediment to the success of the micro-enterprises operated by women (Nmadu 2011; Nyowe 2011; Botha et al. 2007). There is growing evidence that lack of education (mentorship, management skills, and training) impacts heavily on women entrepreneurs (Organisation for Economic Cooperation and Development (OECD) 2013). Education and training therefore have a positive impact on women's entrepreneurship performance as it broadens their outlook and enables them to perform their entrepreneurial role better (Nmadu 2011).

Growing evidence shows that the majority of the women in Sub-Saharian Africa start business enterprises with limited entrepreneurial skills (Irene 2017; Karlan et al. 2014; Nyowe 2011; Okeke-Uzodike 2019; UNIDO 2007) and limited understanding of the complexities of business practices and management (Irene 2017). The women lack skills related to compiling business plans; conducting market research; identifying business and market opportunities; networking; risk management and taxation issues,

producing financial statements; and keeping records (Botha et al. 2007; Ahmad et al. 2010). Morris (2014) attributes this phenomenon to Africa's education system that does not train students in practical thinking and creative problem-solving needed to build and manage businesses successfully (Morris 2014).

Development of entrepreneurship literacy is increasingly gaining a great deal of attention in research. While several studies emphasize the significant negative impact of social-cultural attitudes and practices concerning women's work and access to productive resources on women's participation in economic ventures such as business (Akinbami and Aransiola 2016), increasing businesswomen's entrepreneurial literacy[1] is an area of intervention that can have immediate positive impacts on women's economic empowerment. Botha et al. (2007) and Karlan et al. (2014) note that lack of managerial skills is a major hindrance to the expansion of small and medium business enterprises of women in developing countries.

Researchers from Nigeria (Nmadu 2011) to Bangladesh (Parvin et al. 2012) and South Africa (Botha et al. 2007) have found that developing women's entrepreneurial knowledge and skills not only helps them to scale-up and formalize their small businesses but is effective as an anti-poverty strategy. As Nmadu (2011, 96) states, "as important as basic literacy is and is said to reduce poverty, entrepreneurship literacy is what helps women entrepreneurs scale up their businesses enough to move out of poverty and become active participants in their economies." While not a substitute for interventions designed to reduce social-cultural barriers affecting women's control over income and productive resources (Carter 2000; Cala's et al. 2009; Corus and Ozanne 2011), working with women to build their entrepreneurial prowess can increase their economic empowerment by increasing their confidence as businesswomen (Carter 2000; Botha et al. 2007; Nmadu 2011; Parvin et al. 2012; UNIDO 2014). Carter (2000) argues that widening access to business training and advice encourages large numbers of women into entrepreneurship. Botha et al. (2007) indicate that education provides women entrepreneurs with the skills, contacts (networks), and opportunities that are vital for success in business. In an intervention study in South Africa, Botha et al. (2007) report how entrepreneurship training provided women with new skills and knowledge to run businesses; increased confidence and improved their business performance indicators, including turnover, productivity, and profit, and encouraged starting of multiple businesses. McKenzie and Woodruff (2014), in their evaluation a study conducted in Vietnam, Tanzania, India, Mexico, and Sri-Lanka argue that although business training programs have the potential of changing business practices, there is minimal

evidence that they can lead to increased returns in the longer term. However, evidence from a study conducted in Peru, indicates that all the women who attended the training reported increases in sales and ability to make innovation in the long run (Valdivia 2014).

This paper stems from an action research project designed to enhance the entrepreneurial literacy of rural women in business in Uganda. The project is one component of a three-country collaborative initiative titled "Supporting Opportunities for Rural Women in Business in East and Southern Africa" that involved Uganda, Zimbabwe, and Kenya. The paper seeks to articulate the potential of building rural women's entrepreneurial literacy in advancing their economic status. The paper articulates the nature of Uganda's rural women's businesses and the challenges that continue to constrain them from becoming innovative entrepreneurs to take advantage of the opportunities available for business development. Further, the paper provides a case for supporting women in business by building their entrepreneurial capacities through training and mentoring in business skills and practices. It also draws lessons to inform future programming to support rural women entrepreneurship development. Below is a brief description of research methods that generated the data for this paper.

2 Methodology

The paper draws from an action research project implemented in three countries: Zimbabwe, Uganda, and Kenya. The two-year project implemented from 2016 to 2018 aimed at building the entrepreneurial capacity of rural women by supporting them to overcome economic barriers that hinder them from taking advantage of business opportunities. In Uganda, the study was conducted in three districts, selected to ensure geographic and economic breadth. Soroti, representing the eastern region, has the lowest poverty rates among the three districts. It is followed by Mukono, representing the central region, and Mbarara, representing the western region. According to the 2016/2017 Uganda National Household Survey (UNHS), the population living below the poverty line is 42.7% in the eastern region, 22.7% in the central region, and 19.1% in the western region (Uganda Bureau of Statistics 2018). Two subcounties were selected in each district as focal areas. The research design incorporated a comprehensive baseline study. The findings of the baseline survey informed the design and implementation of an intervention on enhancing the entrepreneurial literacy of rural women in business, after which an endline survey was conducted to ascertain the outcomes of the

intervention. This article will largely focus on documenting the outcomes of the intervention on enhancing women's entrepreneurial literacy.

The Baseline Study

During the baseline phase, data was obtained using a mixed methods approach comprising of quantitative and qualitative research approaches, and informed by a comprehensive review of documents relevant to gender and business entrepreneurship in Africa especially Uganda. Quantitative data was collected using a semi-structured questionnaire, administered to a total of 151 businesswomen (51 in Mukono, 50 in Mbarara, and 50 in Soroti). These women were purposively selected using lists of women with business enterprises in the villages compiled with the help of Community Development Officers at the district and subdistrict levels. In selecting the women for the survey, care was taken to ensure that respondents represented women who were involved in value-addition production processes, in male-dominated business activities, in female-dominated business activities, and in trade.

The qualitative data were obtained through key informant interviews and focus group discussions (FGDs). Six gender-specific FGDs—three with women and three with men—were conducted in each of the three districts. The FGD participants were also purposively selected using the same criteria as above to include women engaged in a range of business activities (men and women dominated enterprises, production, and trade); the men's FGDs were comprised of men whose wives were businesswomen, though they were not necessarily the husbands of the women in the women's FGDs. The total number of FGDs were 18 (nine for women and nine for men) with a total of 167 participants in all of the FGDs combined (82 women; 85 men). The key informant interviews were conducted with representatives of government institutions, district local governments, civil society organizations, and private institutions known to support and promote women business entrepreneurship. In total 23 key informant interviews were conducted—10 at national level and 13 at district level.[2] These individuals were identified and selected through a comprehensive stakeholder mapping exercise conducted in each district.

The Intervention

In accordance with the action research design of the project, the findings from the baseline survey informed the nature of the intervention to support women's entrepreneurial activities and further women's economic empowerment. From the baseline survey three clear areas of need emerged in the findings namely: increased entrepreneurial literacy, product development through value addition, and a more supportive household context. Thus, an intervention was designed with several components. First, training was held in each of the three districts for the businesswomen who participated in the baseline survey. The two-day trainings were participatory, interactive, and linked to the participants' personal business experiences and exposure. The training also covered key aspects of business skills such as business and market plan development and implementation, records and bookkeeping, and value-addition processes. The first session of the training, which focused on the importance of women's economic empowerment, also included the spouses of the women. Fifty-six (56) men (29 Mukono, 24 Soroti, and 3 Mbarara) attended the meeting. Their involvement was important to helping them understand the project, the importance of women's economic empowerment to their household's well-being, and support to their wives' efforts to improve and grow their businesses.

During the training, each of the women was given a customized Farm Business Record Keeping Book, and trained in how to use it to enhance their record-keeping and business planning skills. At the end of the two days, 20 women were selected from each district for mentoring and coaching. The women were purposively selected based on their level of commitment during the training with a leaning on women involved in agricultural production and representation of the subcounties in the sample. Before the conclusion of the training, the 20 selected entrepreneurs, with the support of the mentors and the project team, developed simple business and marketing plans, set goals and objectives, and outlined a three-month mentoring and coaching action plan aimed at facilitating the mentors to adequately prepare for mentoring sessions.

The mentoring program was designed, supported by two mentors in each of the three target districts. In each case, these were the District Production Officers and the District Commercial Officers, who are the local government officials in charge of working with farmers, traders, and business people in the district. Since mentoring is already a part of their docket of responsibilities, integrating them into the project would enhance their capacity to do the work they have been mandated to do, ensure the sustainability

of the mentoring relationship, and help the women entrepreneurs establish connections with the mechanisms of government designed to serve them. The mentors were sensitized to the nature of the project, trained in the mentoring techniques expected of them, and provided a mentoring manual tailored to the intervention.

Mentorship was the central component of the intervention. Each mentor was assigned 10 mentees, and expected to meet with each of their mentees once every month for three months. After the first mentoring sessions, which focused on fine-tuning their work plans and working through record-keeping challenges, each woman was given UGX 200,000 (roughly US$53[3]) to invest in their business as they saw fit. Subsequent mentoring sessions were tailored to each woman's needs and activities, but continued to focus on helping them sharpen their record-keeping, expand their markets, and add value to their production activities. During the course of the mentoring process, two peer-learning meetings were held in each district where the women being mentored could share what they were doing and learn from each other.

The Endline Study

The post-intervention—or endline—study adopted a qualitative approach using in-depth interviews (IDIs) and FGDS for the women who participated in the mentoring program, their spouses, and Key Informant Interviews (KIIs) with mentors. Due to resource constraints, in each of the study districts 10 women and five men (spouses) were randomly selected (using the lottery method) to participate in the in-depth interviews. The remaining 10 women participated in the FGD meetings. All the mentors in the study districts participated in the key informant interviews guided by a Key informant interview guide. Overall, 45 interviews (of these 15 were men), six KIIs (five men), and three FGDs (29[4] women) were conducted.

Data Management and Analysis

The quantitative data from the baseline survey was coded and analyzed using the Statistical computer Package for Social Sciences (SPSS). For the baseline and endline qualitative data, all the IDIs, FGDs, and most of the KIIs were voice recorded with consent from the study participants, and subsequently transcribed. The transcripts were coded and analyzed using the Atlas.ti software package. Key ethical considerations included obtaining clearance from

the Uganda National Council for Science and Technology and the respective districts prior to commencement of data collection; ensuring participants' consent, confidentiality, and privacy; and adhering to the principles of doing no harm. Where verbatim quotes/voices are used, actual names are omitted, instead we make reference to the tool, sex, and study district.

The paper presents findings from both the baseline and endline study, tracking changes in entrepreneurial ability that contributes to the economic empowerment of women. First, we present the profile of rural women in business and economic barriers related to entrepreneurial literacy and later document the findings from the endline interviews on the impact of the intervention on women's business knowledge and skills, especially in terms of record-keeping and the development of work plans.

3 Profile of Study Participants

The majority (55%) of the 151 women surveyed during the baseline phase of the project were between 31 and 50 years, 28% were aged above 50 while 17% were aged between 16 and 30 years. Forty-nine percent had some primary education, followed by 44% with post-primary education, while 6% had no education. Over half of the women (55%) were married or cohabiting, nearly a quarter of them (24%) were widowed, 12% were either divorced or separated, and only 9% were single. In terms of household size, most (70%) had between four and nine members, with the average household size being four. The profile of the women in the FGDs was similar to those surveyed, though a higher proportion was single (20%) and only one was widowed.

Just over half of the women (51%) reported agricultural activities as the main source of the income, followed by own-account work (47%) and salaried work (2%). Own-account work refers mainly to enterprises run solely by the entrepreneur, though sometimes these enterprises employ a few workers on a temporary basis. Among the agricultural activities, about two-thirds of the women reported participation in crop farming, while the remaining third said they were involved in animal husbandry. The findings showed that non-salaried work was the dominant source of income for women in our sample, suggesting that women were doing business as a main source of livelihood.

With regard to economic enterprises, women were engaged in multiple enterprises with having two main economic activities for their enterprises. The most prevalent economic activity mentioned was agriculture (33%),

which includes crop and animal husbandry, aquaculture, and apiary. This was followed by trade (31%) in merchandise, produce, and livestock, followed by processing (15%) including brewing and charcoal burning. Services such as hairdressing, hotels and restaurants, mining, and brick making were lumped together as "others" and accounted for 21% of the responses on main economic activities of enterprises. There were however differences in the study sites with Mbarara women (47%) mainly involved in agricultural activities, while women in Soroti were mostly (45%) involved in trade. Most Women in Mukono (35%) were also involved in agricultural-related enterprises. This pattern is not surprising, since there is more agricultural production in western and central Uganda where Mbarara and Mukono district, respectively, lie than in eastern Uganda that includes Soroti district. Western Uganda is known to receive more rainfall and has more arable land than the eastern region, which is likely to encourage more agricultural production in Mbarara than Soroti.

During the baseline study, women reported several challenges that hinder them from taking advantage of business opportunities such as; limited use of appropriate business practices due to perceptions on the relevancy of business practices such as record-keeping to small businesses; lack of capacity to take on these practices; and potential household tensions associated with record-keeping. The notion that these practices are not for small businesses was very prevalent in the FGD data from men and women across the study sites. A businesswoman from Mukono stated, "*We do not keep records because there is nothing to write, the little money we get is spent immediately to meet household expenses.*" Similarly, a woman from Soroti said, "*Ours is still a very small business, it is people with big businesses in towns who keep records.*" Another woman from Mbarara echoed, "*Record keeping is found on big farms that are interested in tracking inputs and outputs for purposes of gauging profit. With a small business it is easy to determine whether it is profitable or not even without records.*"

On lack of capacity to undertake business practices, the majority of the interviewed women (61%) did not have any prior training at the start of their business. More women in Mbarara (38%) and Soroti (39%) than in Mukono (23%) had not attended any training. About two-thirds of the women said they had not accessed business development services (BDS) including training in bookkeeping, financial management, business plan, marketing plan, and production process improvement. The remaining third of the women who accessed BDS reported that it was mostly provided by private companies, and most of the beneficiaries of these services did not pay for the acquired BDS.

The women in the FGDs expressed lack of knowledge and skills in a number of areas including bookkeeping, records management, financial literacy and management, marketing of products, entrepreneurship, business management, drawing business plans, profitable use of credit from the savings groups, and identification of viable businesses/business opportunities, as illustrated in the following excerpt from women in Soroti:

> *For us we started without any knowledge as life became difficult without a source of income. We pray that one time a chance for such support and training arises. We just learnt from friends. We lack knowledge and skills of establishing, running and sustaining successful businesses. We need training in basic business skills like book keeping, records management, financial management, how to start and successfully run a business among others.*

Women in Mbarara observed that they lack the basic skills of doing business. "*Keeping business records and marketing depends on ones' level of education*," explained a woman from Mbarara. Another woman in the same FGD agreed, saying that, "*Most of the women in business are neither educated nor trained on how to keep records or write a business plan.*" A woman in Soroti emphatically said, "*For me I do not even know how to read and write how can I keep records?*".

While participants discussed impediments to record-keeping, the benefits of engaging in sound business practices were also resoundingly acknowledged. As a woman in Soroti said, "*It is good to keep records of the inputs bought so that one can know whether they made profit after selling.*" The importance of keeping records in order to know whether or not one is making profits was started by a woman in a Mukono FGD as well: "*The situation in which we operate teaches us to keep records. At times you may think you are making profits yet you are making losses so you have to write somewhere.*" Limited knowledge and skills in business is a barrier to improving productivity and accessing markets.

4 Entrepreneurship Literacy and Women's Economic Empowerment

As noted earlier, women's entrepreneurial capacity was built by training, mentoring them in basic business skills as well as providing a platform for peer learning. The training was highly interactive with several exercises and study materials with illustrations appropriate for adult learning. During the training the women were required to develop a business and/or marketing

plan, for which the research team provided the necessary support to facilitate the implementation of the plans. Immediately after conducting the district trainings, we implemented a mentorship program with the aim of ensuring that the trained women apply the acquired knowledge and skills. Each woman was visited by a mentor three times during the mentorship period to ascertain the level of application of the acquired knowledge and to offer advice on both the technical and business aspects of the business. During the endline study, we sought to ascertain changes in business practices attributed to the training, mentorship, and peer-learning events undertaken by the women.

The women reported significant changes in record-keeping, development of work plans, and value-addition processes. With reference to record-keeping, several women confessed that they only started recording business transactions after participating in the training, which improved their knowledge of their businesses regarding the level of production and sales as reported by one of the women in the Mbarara district:

> *I was not keeping records. Keeping records is very important because now I know that my pig delivered so many piglets and the number I sold, as well as, that the income I got from the sale of the piglets is this much.*

The training in record-keeping had far-reaching consequences of enabling the women to know the level of profitability and planning for the business. One woman in Soroti attested to this:

> *Through the training, I have learnt how to keep record of my activities, I do record all my expenses like how much I have spent on pruning, weeding, pesticides, transport, how much have I sold today, what are the profits and many other things so I can now know whether I am making losses or profits out of my business and at the end of the month I balance my books to see how I have fared in profit making , what is the way forward, what needs to be improved and I don't just waste money buying what was not in the plan.*

Besides record-keeping, the women learnt how to develop a work plan and the general idea of business planning. With regard to developing a work plan, the women learnt to schedule the day's activities and a woman in Mukono had this to say:

> *During the training I learnt that every day I must be with a programme. For example, if I wake up at 5.00 a.m. I start with watering the plants, at 10.00 a.m. I do the weeding and at 3.00 p.m. I plant. This helps me to know that before each day starts I have to know the activities I will do on the day. I also learnt time*

management, for example if I am targeting at selling products in December then I must plant as early as May.

Other women testified that they had been able to improve planning and budgeting, one of the women respondents in Soroti said that:

The programme has given me knowledge and skills for planning and budgeting because before I was just mixing up all the money, no recording, no accountability at all. I can now also save some good amount of money with my VSLA like 10,000 shillings every meeting.

The mentorship program was very beneficial to the women because it provided an opportunity to clarify concepts that had not been understood during the training, particularly the practical aspects of recording business transactions in the record book and developing a work plan. Two voices attested to this:

The mentor supported me because the day he came, he found out that my books were not properly filled like the way they had taught us, so he helped me by telling me how to fill them.

The mentor advised me on how to write the work plan, he advised me to schedule time for every activity, like weeding, you have to write when you expect to weed, when to spray and prune, each activity has its own cost and he told me when I am about to harvest I should start looking for market before harvesting it because if you harvest and put the oranges in the house it can easily rot like in case the buyers delay to come, it can be a great loss.

The mentors offered technical and business advice to the women beyond the scope of the topics covered during the training, particularly the agricultural and production officers on the team who were knowledgeable in farming and veterinary services. This kind of expertise enabled the women to improve their farming practices and gain skills in obtaining better planting materials and animal breeds, practice good methods of disease control, and improve the hygiene of their business premises.

The mentor helped me so much. I was lucky that I was mentored by a veterinary doctor. He knew what to do with the chicken. When he came home, he found some chicken were not okay. He advised me to deworm and immunize them. Now, I rarely have sick chickens on my farm.

The mentors provided business advice including providing market information, encouraging the women to diversify their income sources and save a

proportion of the money earned. The advice addressed key constraints that women in agriculture normally face such as limited access to markets and unstable incomes as a result of the riskiness of agricultural economic activities. Therefore, the women appreciated this advice and said:

> *Our mentor was not bad, he was selfless, he visited us and inspected our books and advised us to save money. I got some of my fellow women and we started saving in boxes. So ACODE gave us a lot of knowledge.*
>
> *My mentor advised me that, I should always maintain good hygiene and customer care like talking to the customers politely and negotiating well with them and it is helping me, I always get many sales because of being nice to the customers.*

The peer-learning events provided a platform for women to network and gain ideas that would enhance their business skills. They were also a source of inspiration to viewing farming as a viable business venture and also to consider diversifying income sources. During the peer-learning events, the women were able to get contacts for women with whom they had mutual interest in the kind of businesses they were undertaking and follow-up with personal visits at their respective homes. The women shared their experiences on good business practices related to record-keeping, value addition, price information, weather patterns, and built their social capital.

5 Discussion

The findings from this study show that enhancing women's entrepreneurial literacy is an important strategy to enable women to engage in viable and sustainable business enterprises. All the women appreciated the importance of engaging in key business practices, for example record-keeping to enhance business performance and growth. While they initially were concerned about production and profitability of their products and marketing, after the training and mentoring, women realized that certain business practices were crucial, in order to increase productivity and profitability.

Record-keeping and management were the most popular among the areas targeted for improvement and taken up because of the perceived potential to improve business performance. Through record-keeping, women (and men) noted that they were able to track progress and spot weaknesses in their business operations which would facilitate devising means of improving performance. Evidence from other studies (Mckenzie and Woodruff 2015) shows that improved business practices such as record-keeping, stock control,

and marketing enhance business productivity. Those who were not able to use the record books provided; bought other types of books to keep their records.

The mentorship program further helped women to improve on their entrepreneurship skills and business planning. While most of the women had not yet embarked on developing business plans, a number had work plans—a listing of the activities to be done within the respective timelines. Scholars such as Frese and Gielnik (2014) and Campos et al. (2017) acknowledge the importance of providing managerial skills but also emphasize the need for developing personal initiative skills in order to have a sustained impact on business performance.

Sida (2015) also stresses the importance of supporting business training, start-up and growing business services, and mentorship for women linked to micro-finance, particularly training designed to the needs of women. Activities such as training and providing business support services, or even sustainable energy solutions to women entrepreneurs can significantly increase the profits of their businesses, help to provide decent work, and improve women's standing within their families and communities (UNIDO, 2014). Developing one's entrepreneurial mindset yields sustainable improvements and encourages one to be innovative and differentiate one's business from others, anticipate problems better, overcome setbacks, and foster better planning for opportunities and long-term preparation (Campos et al. 2017).

The mentorship exercise offered space to further clarify the business concepts and practically demonstrate the application of the skills taught. While the mentors were initially expected to focus on business skills and practices, they offered other support that related to individual concerns and challenges associated with the performance of the business particularly advising women on proper farming methods, customer care, and quality improvement. Mentoring enabled women to get hands-on experience from the mentors. The practical experience was very helpful especially for the semi-literate women who had difficulties in reading and writing. It also made women accountable and committed to applying the acquired knowledge and skills in their business enterprises. The intervention positively influenced women's saving culture and investment with many being able to save and reinvest in their businesses, though their savings remain minimal. While there were limited opportunities for supporting women in business with many women depending on financial support from their Village Savings Loan Schemes, some were optimistic that the knowledge they acquired on records keeping and management and business planning would help them to access support from other institutions.

The peer-learning sessions, fora for sharing experiences and exchange of knowledge increased women's social capital. Social capital is mentioned in other studies as an important resource for women entrepreneurs (Campos and Gassier 2017). They argue that providing women opportunities to expand their networks enables them to secure information and support not only to engage in more profitable businesses but also could encourage them to engage in nontraditional activities (Campos and Gassier 2017). Women appreciated the new ideas and practices that they learnt from their colleagues—the businesswomen. It also became an avenue for marketing their products and a source of inspiration to many women on the program.

The findings show that education makes a difference in uptake of business practices. Being educated and having resources facilitates the application of the acquired knowledge and skills. Women who had low levels of education (poor reading and writing skills) had difficulties in conceptualization of most of the business practices and their application, especially developing business and marketing plans. They also found it difficult to use the record book that was given to them. This is in agreement with Golla et al.'s (2011) proposition that education is an important resource for women's economic empowerment. Studies conducted in South Africa have also found that education contributed to better business performance (Brijlal et al. 2013; Radipere and Dhliwayo 2014). In addition to enabling women to apply good business tactics, education enhances women's decision-making. Findings show that women who are more educated were more likely to have full control over economic decisions than those with low education.

Domestic expenditure remains a big challenge in addition to the positive contributions of the interventions. While women's ability to save and reinvest had improved. Many women including those who were able to save decried the burden of household expenditures that eats into the savings and hence little money is reinvested back in the business. In this case, business growth is marginal. Women's time poverty remains a challenge to balance family and business tasks. Similar constraints relating to high expenditure on domestic welfare and time poverty were reported in other studies conducted in Africa (Fafchamps et al. 2014; Campos and Gassier 2017). Time limitations impacted on the mentoring sessions as there was limited time to answer questions and conduct demonstrations. It is clear that mentoring required time to realize significant impact, particularly for the semi-literate women (and men) to fully grasp the relatively new business practices. Further, with the low levels of education of some women who had difficulties in reading and writing, the ability to fully comprehend and implement the business practices was not possible in such a short time. Mentors faced difficulties

in explaining the business concepts. The lessons from the women emphasize the importance of training to acquire knowledge—as "knowledge is wealth," record-keeping in enhancing business performance, networking to increase social capital—facilitate the exchange of knowledge, and the aiming for high-quality standards.

The findings clearly illustrate that women's participation in business enterprises has a potential for enhancing women's economic autonomy and household welfare/standard of living. Provision of training and mentorship is an important strategy for enhancing their business potential to increase productivity and performance. Accordingly, engaging in business is a gateway to the economic independence of women, as many women testified. Training and mentoring have a potential for improving women's business performance and empowering women economically. Mentoring offers a hands-on/practical support to the women particularly the semi-literate ones who have difficulties in comprehending some of the technical aspects of running a business enterprise.

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Notes

1. Entrepreneurial literacy is defined as the "possession of skills for analysis, interpretation and understanding of one's self and others, the social and business environment to make informed decisions about enterprises and persons that relate either directly or indirectly with such enterprises" (Nmadu 2011, 96).
2. 5 in Mbarara 4 in Mukono and 4 in Soroti districts.
3. Bank of Uganda Exchange rate as of August 15, 2018—USD$1 = UGX3750.
4. One of the women shifted to another district and did not participate in the mentoring program.

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The Impact of Education on Household Decision-Making Among Women in Sierra Leone

Colin Cannonier and Monica Galloway Burke

1 Introduction

Household decision-making—how people with differing preferences living in multiperson households make decisions—is a component of economic development as it impacts the welfare of the household and community. In research related to its influence, three models have been used that recognize the impact of household members' behaviors and preferences on household decisions—unitary (Becker 1991; Himmelweit et al. 2013; Lundberg and Pollak 1994; Samuelson 1956), bargaining (Grossbard 2011; Konrad and Lommerud 1995; Lommerud 1997; Lundberg and Pollak 1993, 1994; McElroy and Horney 1981; Manser and Brown 1980), and collective

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(Browning et al. 2006; Chiappori 1992; Vermeulen 2002). A key insight that these models offer is that specific factors (e.g., cultural dynamics related to gender, educational levels, traditions, etc.) can affect the bargaining power within the household and therefore, have a significant impact on outcomes in household decision-making. For instance, bargaining power in households within developing countries can look different as culture and individuals' perceptions about gender roles and social norms as well as educational levels and income can impact the decision-making process in households.

The focus of this study is Sierra Leone, a small country located on the West African coast. In this country, women and girls have historically faced discrimination and inequality as the society is male-dominated. As it is elsewhere in many African countries, women in Sierra Leone are traditionally less involved at all levels of decision-making, such as within the community, political parties, and professional associations (Jan and Akhtar 2008); including household decision-making. There is a belief among many Sierra Leoneans that education can be the key factor if women and girls are to become more fully involved in decision-making and resource mobilization at all levels. However, the government's failure to comply with international recommendations to provide education and training for women can be attributed to a lack of participation of women in decision-making (Holland and Sandiu 2012). Sierra Leone also ranks among the lowest countries in the world in female literacy and education as well as access to various resources (King and Hill 1993). Considering women in Sierra Leone have limited access to decision-making processes and lower levels of educational attainment, it is pertinent to analyze whether education can empower women in Sierra Leone to take a more active and balanced role in the household decision-making process.

Education can influence women's decision-making through several channels. It facilitates increased learning, which helps women to better understand their rights regarding issues consistent with their family responsibilities. Importantly, an increase in more years of schooling implies the acquisition of more investment resources, which increases the "threat point" for leaving a spousal relationship or partnership, thereby increasing bargaining power (de Brauw et al. 2014). Evidence on the effect of education on women's decision-making in the household is mixed. For example, Samarakoon and Parinduri (2015) show that education has no effect on women's autonomy when it comes to asset ownership or community participation in Indonesia, although many of these women appear to have some say in decisions related to household expenditures (i.e., food eaten at home, routine purchases, and large expensive purchases) and children (i.e., clothes, education, and health).

In this study, we use an instrumental variables (IV) estimation strategy to evaluate the impact of education on women's autonomy in household decision-making. Our approach, which closely follows that of Cannonier and Mocan (2018), exploits variation in schooling, generated by a plausibly exogenous free and compulsory primary education reform that was implemented in Sierra Leone in 2001. The identification strategy relies on differences in the program (i.e., the amount of funding allocated for primary education) between districts as well as variation in exposure to the program across different age cohorts. More specifically, we focus on two groups of individuals: those who were born between 1989 and 1998 and were eligible to receive free primary education and those who were older (born between 1983 and 1988) and did not benefit from the program. We show that the policy, which varied in its intensity within districts, increased access to primary education in the country. Ordinary Least Squares (OLS) regressions were also employed, along with reduced-form regressions, which revealed that eligible individuals—those exposed to additional education resources—are likely to gain more autonomy regarding making decisions on matters pertaining to the household.

The data are drawn from the 2008 and 2013 Sierra Leone Demographic and Health Surveys (SLDHS). We find that married women's decision-making power increases with education, especially regarding having the final say in making decisions related to their own health, large household purchases, and how their husband's earnings are used. The results are qualitatively similar in both the reduced-form and IV regressions. Indeed, the extent to which an increase in education for women translates to greater bargaining power relative to her husband's is an important empirical question that is outside the scope of this study. In fact, we find some support that as years of schooling increase for a husband, married women are less likely to indicate having a final say in making household decisions.

The remainder of the paper proceeds as follows. We provide some background to the relationship between education and household decision-making as well as a review of the literature. This is followed by a description of the data; a discussion of the empirical strategy; and presentation of the results. A potential mechanism explaining the results is followed by the conclusion.

2 Background

Women's Education and Household Decision-Making

In considering women's development, well-being, and statuses in household decision-making, an increase in women's education could increase women's bargaining power and role within household decision-making. Increased bargaining power and participation of women in household decision-making are significant as they influence various dynamics. Empirical studies have shown that decisions and bargaining power in a household impact outcomes such as child's health, education, nutrition, fertility decisions, and expenditures for different goods and services, depending on whether its income is controlled by the husband or the wife (Duflo 2003; Phipps and Burton 1998; OlaOlorun and Hindin 2014; Schultz 1990). Furthermore, household decisions influenced by a woman's bargaining power can impact household production including household chores, agricultural work, and wage work (Doss 2011).

Although the level of female education is low in the poorest countries and the gender gap is also larger in these countries (King and Hill 1993), it should be noted that there are still market and nonmarket returns to female education and the family decision-making process is a first step toward determining those returns to female education (Schultz 1993). Hill and King (1995) noted that increasing levels of education improve women's productivity in the home and education passes on social benefits beyond the individual family ranging from fostering economic growth, to extending the average life expectancy in the population, to improving the functioning of political processes. Therefore, the amount of education women receive is a significant factor in determining economic growth and quality of life in families in developing countries. In due course, the return to education is higher in developing countries (Psacharopoulos 1994; Schultz 2002). For example, Himmelweit et al. (2013) suggested that in some developing countries, recognition of intrahousehold distributional effects such as an increase in children's consumption, nutrition, and well-being, have been important in directing family benefits. Increases in a woman's education can also improve the chances of employment and consequently, a woman's increased education and participation in the labor force have been found to be positively related to women's increased participation in decision-making in the household (Acharya et al. 2010; Furuta and Salway 2006).

Education is also a key instrument in empowering women in the household because it helps them gain a better understanding of their rights and

responsibilities and it can raise their confidence regarding their possibilities, especially in less developed countries (Acharya 2008). Empowering women, which could improve their economic and social status as well as enhance their decision-making power within the household, is considered to be related to economic development and household welfare (Boateng et al. 2014; Deere and Doss 2006; Deere et al. 2013; Johnson et al. 2016). In this context, a woman's educational level has several positive benefits in the household decision-making process in relation to household economic activities.

Review of Literature

Various empirical studies have been conducted related to women, the bargaining process within households, and education. Studies have also occurred in different settings on the relationship between women's education and household decision-making. For example, in Mexico, Oropesa (1997) used multivariate analysis with data from a 1992 national survey of Mexican women and reported that educational attainment increased the likelihood of wives having an equal say in decisions and their satisfaction with their influence in household decisions. Boateng and colleagues (2014), using data drawn from the 2008 Ghana Demographic and Health Survey with an analytic sample of 1876 married women aged 15–49, evaluated women's empowerment in Ghana in the light of the Millennium Development Goal 3. Using binary logistic regression in determining the factors that influence women empowerment, the relationship between wealth and women's involvement in household decision-making was examined. They found married women with tertiary education have greater autonomy on all measures of household decision-making than those who have only primary and secondary level education. Sinha (2012) conducted analyses of unitary and collective models related to households' labor supply decision-making in rural India and proposed that a wife's bargaining power increased if she has a higher proportion of wage income and years of education. The proportion of a number of years of education of woman to the years of education for both spouses can provide the woman with some intrahousehold decision-making advantage. Hou and Ma (2013) used data from the Pakistan Social and Living Standards Measurement Survey to examine the influence of household decision-making on women's uptake of maternal health services in which regression analysis showed that women who are older, have more education and are employed have greater decision-making power in their households. They found that education level and employment status were significant determinants of women's decision-making power. Analyzing data collected

from married women in rural Bangladesh, Chanda et al. (2012) similarly concluded that women's say in decisions regarding household purchases increased with education, especially related to socioeconomic, familial, and level of purchasing decisions. Also conducting a study in South Asia, Sai Sujatha and Brahmananda Reddy (2009) associated women's education in Andhra Pradesh (India) with greater autonomy in their decision-making, particularly, women's access to money and their freedom to decide how to spend it (i.e., having and using a bank or savings account) were positively related to the level of education attained.

Studies have also found significance in women's education in joint decision-making of households. Conducting a study in Taiwan, Xu and Lai (2002) showed the positive effects of a wife's education on the likelihood of her making decisions alone or jointly with her husband on household expenses and estate purchases. Likewise, with representative samples from 31 countries using data drawn from the 2002 International Social Survey Program, Treas and Tai (2012) concluded that, in relation to major purchases, better educated wives were more likely to make decisions jointly with their husbands. More recently, Albert and Escardíbul (2017), applying the multinomial probit models to the Spanish Living Conditions Survey of 2010, investigated the function that investment in the education of both women and men served to empower wives which results in more balanced household decisions on matters related to consumption and financial management. The authors found that when controlling for demographic, family, and labor market characteristics, the level of education of both the husband and wife had a positive effect in terms of a more egalitarian decision-making process in relation to three areas of expenditure: daily shopping, expensive purchases of consumer durables, and significant expenditure on children. However, only women's education showed a positive effect on borrowing money and no effect of education is observed regarding the use of savings.

One empirical study added the element of ethnicity in examining women's role in household decision-making and found women's level of education to be a factor. Yusof (2015) examined ethnic differences in financial household decision-making of married men and women and differences across three ethnic groups in Chinese, Malay, and Indian households in Malaysia. Using data from a random survey of households, Yusof (2015) found that for women, the level of education contributes significantly in giving them more control over household finances and decision-making.

3 Data

Overview

We use data from the two available waves—2008 and 2013—of the Sierra Leone Demographic and Health Survey (SLDHS) which were carried out by Statistics Sierra Leone in collaboration with the Ministry of Health and Sanitation from April 2008 to June 2008 and from June 2013 to September 2013, respectively. Funding and other support for both waves of the SLDHS was received from the Sierra Leone Government, the Department for International Development (DFID), the United States Agency for International Development (USAID), the World Bank, the World Health Organization (WHO), World Food Programme (WFP), and the United Nations High Commissioner for Refugees (UNHCR). This nationally representative sample consisted of over 20,000 households for both waves (7758 in 2008 and 13,006 in 2013), covering all 14 districts in four regions.[1] The randomized sampling frame was designed from the 2004 Sierra Leone Population and Housing Census.[2]

Our analysis is based on females who were aged between 15 and 49 during the two years the surveys were conducted. We focus on the married females in the sample. Using reported information on birth dates and age, we identify the individuals according to two main groups. One group, the treated group, comprises individuals who were born between 1989 (September) and 1998 and were exposed to a free and compulsory primary education (FPE) policy that was implemented in 2001.[3] The second group includes those born between 1983 and 1988 and because of their age in 2001, were beyond the primary school age during the implementation of this policy. We intentionally exclude the group of individuals who ranged in age from 12 to 14 years in 2001 because even though their age was outside of the primary school age range, most of them were nevertheless allowed to attend primary school. Our final sample consists of 5772 married females with 2003 of them being exposed to policy and the remaining 3769 not considered eligible for the free and compulsory primary education. The individuals, which form the estimation sample, were between 15 and 30 years at the time of the survey.[4]

The main independent variable is years of schooling for each married female. A key mandate of the policy was to make primary education free and compulsory, thus impacting those individuals born in 1989 and thereafter. Average years of schooling for the married women exposed to the policy is 3.7 compared to 1.7 for those born in 1988 and before. Figures 1 and 2 display the average years of schooling for the cohort affected by the FPE policy and

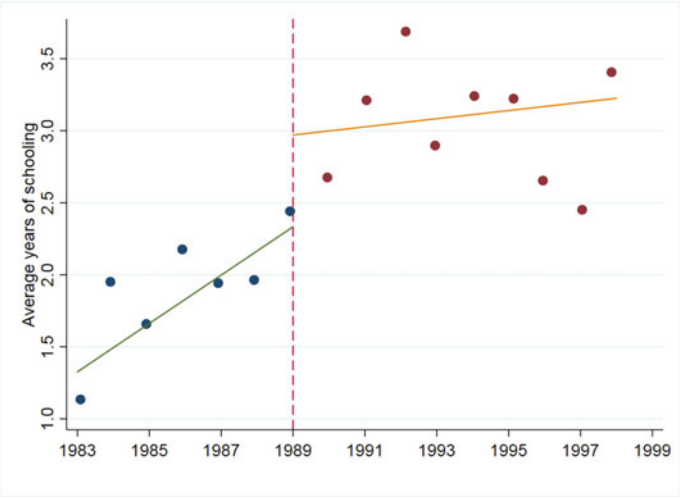

Fig. 1 Average years of schooling by cohort

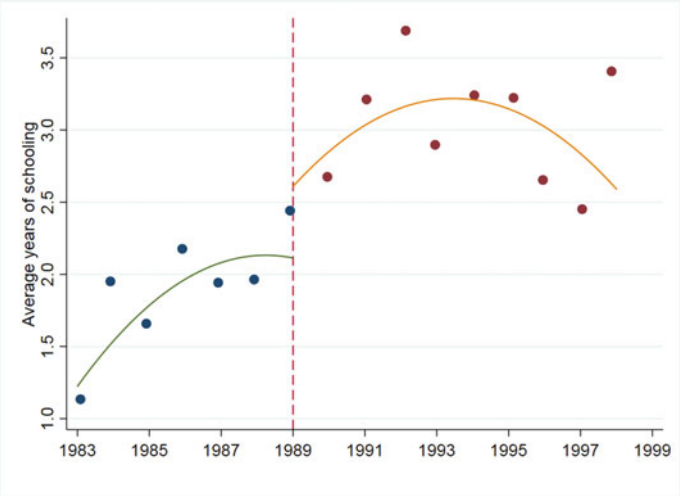

Fig. 2 Average years of schooling by cohort (second degree polynomial)

those who were not. As shown in both figures, compared to the control group of married females born from 1983 to 1998, the average years of schooling jumps by at least 0.5 for those born in 1989 and thereafter. These figures provide illustrative evidence of the possible impact of the policy in increasing average years of schooling.

Household Decision Variables

Both waves of the SLDHS collected information on women's participation in the following household decisions—her own health care; making large household purchases; visits to family or relatives; and control over earnings—to assess women's decision-making autonomy. Specifically, we consider an individual's response to the following as measures of the extent of a woman's power to make household decisions: (1) *Who usually makes decisions about health care for yourself?* (2) *Who usually makes decisions about making major household purchases*? (3) *Who usually makes decisions about visits to your family or relatives*? (4) *Who usually decides what to do with the money the husband earns*? The response was coded using a five-point scale with 1 = respondent alone, 2 = respondent and husband/partner jointly, 4 = husband/partner alone, 6 = someone else, and 7 = husband/partner has no earnings.

Based on these responses, we compute indicators to measure the prevalence and the extent of women's contribution in making household decisions. For each of these questions, we create a dichotomous variable indicating whether the woman has the final say in making the decision. We also create an index, which is the percentage of times the respondent indicates having final say in making decisions to all four questions.

We show the summary statistics for the outcome variables (Table 1) and covariates (Table 2) for the final sample by those exposed to the FPE (i.e., those who were born from 1989 to 1998) or the *unexposed* group of women who were born from 1983 to 1988. Column 2 displays the means (and standard deviations) of the full sample, followed by the same information for the "control" group (column 3) and the "treatment" group (column 4).

The age range of the married sample of females is 15–30 and the age distributions are shown in Fig. 3. It is important to note that married females constitute a relatively small fraction of the sample. In the sensitivity analyses, we show that our results are largely unaffected when only married females, age 18 and over, are considered.

In terms of the outcome variables, the proportion of married women who indicate having either a final say in various decisions appears to be higher in most cases for the control group relative to the cohorts who were exposed to the FPE policy. On average, the percentage of married women likely to indicate having a final say in decision-making in the household is 6.7% for those born from 1983 to 1988 and 6.2% for those females born after 1989 and after. These differences were statistically insignificant.

Table 1 Summary statistics of outcomes: 2008 and 2013 SLDHS sample (individual level data)—married females

Variable	Variable definition	Mean (Std. Dev) Full sample	Mean (Std. Dev) Control group (born 1983–1988)	Mean (Std. Dev) Treated group (born 1989–1998)	*p*-value Difference in treatment and control
	(1)	(2)	(3)	(4)	(5)
Own health (final say)	Equals one if respondent has the final say in deciding own health, zero otherwise	0.062 (0.241)	0.065 (0.246)	0.057 (0.232)	0.236
Major purchases (final say)	Equals one if respondent has the final say in making large purchases, zero otherwise	0.055 (0.229)	0.059 (0.235)	0.049 (0.216)	0.116
Family visits (final say)	Equals one if respondent has the final say about visits to family and relatives, zero otherwise	0.089 (0.285)	0.091 (0.288)	0.085 (0.280)	0.441
Partner's earning (final say)	Equals one if respondent has the final say in deciding how partner's earnings will be used, zero otherwise	0.051	0.048	0.056	0.178

Variable	Variable definition	Mean (Std. Dev) Full sample	Mean (Std. Dev) Control group (born 1983–1988)	Mean (Std. Dev) Treated group (born 1989–1998)	*p*-value Difference in treatment and control
	(1)	(2)	(3)	(4)	(5)
		(0.220)	(0.214)	(0.231)	
Index of overall decision (final say)	The proportion of times the responded has the final say in household decisions	0.065 (0.186)	0.066 (0.187)	0.062 (0.186)	0.445
Observations		6019	4016	2003	

Note Standard deviations in parentheses below the mean. The treated group comprises those who were born from 1989 (September–December) to 1998 and the control group are those born from 1983 to 1989 (January–August). Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS)

Table 2 Summary statistics of covariates: 2008 and 2013 SLDHS sample (individual-level data)—married females

Variable	Variable definition	Mean (Std. Dev) Full sample	Mean (Std. Dev) Control group (born 1983–1988)	Mean (Std. Dev) Treated group (born 1989–1998)	*p*-value Difference in treatment and control
	(1)	(2)	(3)	(4)	(5)
Schooling	Years of schooling completed	2.182 (3.636)	1.741 (3.429)	3.065 (3.873)	0.000
Schooling—husband	Years of schooling completed for husband	3.446 (4.858)	3.169 (4.775)	4.001 (4.975)	0.000
Fully literate	Equals one if respondent is able to read all of the sentence, zero otherwise	0.168	0.126	0.251	0.000
Partially-fully literate	Equals one if respondent is able to read all of the sentence or some parts of the sentence, zero otherwise	0.208	0.161	0.303	0.000

Variable	Variable definition	Mean (Std. Dev) Full sample	Mean (Std. Dev) Control group (born 1983–1988)	Mean (Std. Dev) Treated group (born 1989–1998)	*p*-value Difference in treatment and control
	(1)	(2)	(3)	(4)	(5)
Age	Age in years	24.028 (3.940)	26.064 (2.940)	19.946 (2.083)	0.000
Employed	Equals one if currently working, zero otherwise	0.726	0.754	0.668	0.000
Radio	Equals one if respondent's household has a radio, zero otherwise	0.609	0.604	0.620	0.231
Fridge	Equals one if respondent's household has a fridge, zero otherwise	0.037	0.042	0.026	0.002
TV	Equals one if respondent's household has a television, zero otherwise	0.099	0.104	0.089	0.063
Urban	Equals one if resides in an urban area, zero otherwise	0.305	0.313	0.291	0.078
Religion					
Christian	Equals one if belong to Christian religion, zero otherwise	0.171	0.171	0.172	0.928

(continued)

Table 2 (continued)

Variable	Variable definition	Mean (Std. Dev) Full sample	Mean (Std. Dev) Control group (born 1983–1988)	Mean (Std. Dev) Treated group (born 1989–1998)	*p*-value Difference in treatment and control
	(1)	(2)	(3)	(4)	(5)
Islam	Equals one if belong to Islam, zero otherwise	0.824	0.823	0.824	0.919
Other religion	Equals one if belong to another religion, zero otherwise	0.005	0.006	0.004	0.319
Ethnicity					
Temne	Equals one if belong to Temne ethnic group, zero otherwise	0.268	0.243	0.318	0.000
Mende	Equals one if belong to Mende ethnic group, zero otherwise	0.283	0.277	0.295	0.152
Other ethnicity	Equals one if belong to another ethnic group, zero otherwise	0.449	0.480	0.387	0.000
Wealth					
Wealth 1 (poorest)	Percentage of respondents within the first wealth quintile	0.230	0.228	0.235	0.584

Variable	Variable definition	Mean (Std. Dev) Full sample	Mean (Std. Dev) Control group (born 1983–1988)	Mean (Std. Dev) Treated group (born 1989–1998)	*p*-value Difference in treatment and control
	(1)	(2)	(3)	(4)	(5)
Wealth 2 (poorer)	Percentage of respondents within the second wealth quintile	0.203	0.204	0.202	0.821
Wealth 3 (middle)	Percentage of respondents within the third wealth quintile	0.197	0.191	0.208	0.124
Wealth 4 (richer)	Percentage of respondents within the fourth wealth quintile	0.214	0.212	0.219	0.532
Wealth 5 (richest)	Percentage of respondents within the fifth wealth quintile	0.155	0.164	0.137	0.005
Observations		6019	4016	2003	
Education resources (R)	Funding for primary education in the district in millions of Sierra Leon Leones ($N = 14$)	Mean = 1.598 Std = 0.561			

Notes Standard deviations in parentheses below the mean. The treated group comprises those who were born from 1989 (September–December) to 1998 and the control group are those born from 1983 to 1989 (January–August). Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS)

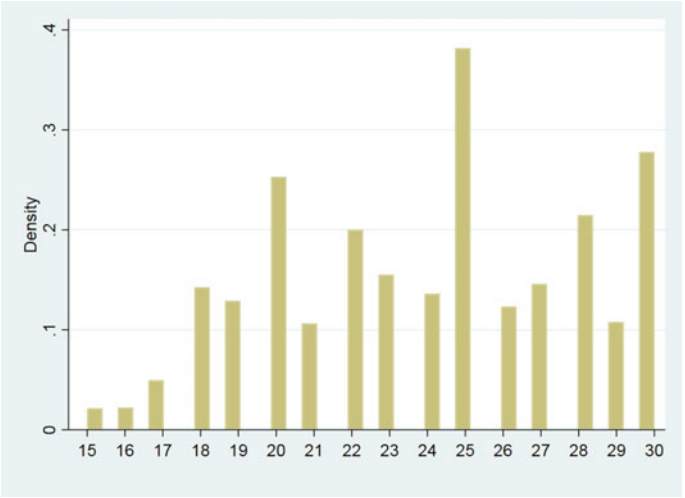

Fig. 3 Married female age distribution (*Source* 2008 and 2013 waves of the Sierra Leone Demographic and Health Survey [SLDHS])

Covariates

For the remaining control variables, we find no significant differences in the two groups of married women when it comes to living in a house with a radio, their religion (whether Christian or Islam), and wealth (except for the richest quintile). On the other hand, the control group of married women is more likely to live in households containing a fridge or a television and to reside in an urban setting. Acknowledging that Temne and Mende are the two largest ethnic groups in Sierra Leone, a higher proportion of the treatment group identify as being from Mende while a similar proportion of both the control and treated groups are associated with Mende. In terms of wealth, married women exposed to free primary education are more likely to be in the richest quintile relative to their less educated female counterparts.

District-Level Information

We also use district-level information, which is primarily based on education funding. Specifically, funding received by each district is based on a formula which multiplied the total government spending on FPE by the share of primary schools in each district. Because information on the amount of primary education funding allocated to each district was not available, we impute the amounts being spent on the FPE program by using data

from several sources, mainly the Government of Sierra Leone Budget and Statement of Economic and Financial Policies for the financial years 2004 and 2013. These budgeted funds amounted to 14 billion Le (approximately US$5.2 million) and 23.9 billion Le (approximately US$5.5 million at prevailing exchange rates), respectively. To determine the share of funding in each district, the number of primary schools in each district was divided by the number of primary schools in the country.[5] Data on the number of primary schools come from the Statistical Digest 2005/2006 and 2007–2013 editions.

4 Empirical Strategy

Our goal is to determine whether there is a causal effect of education on a variety of outcomes related to the extent of married women's decision-making in the household. Given that we have observational data within a quasi-experiment setting, it is important to consider the role that unobservable variables can potentially play in biasing our estimates. In a truly natural experiment, we would randomly assign (expose) individuals to the free primary education and subsequently measure the extent of their decision powers. We are, however, forced to rely on alternative methods to undertake this analysis. Ordinary Least Squares (OLS) estimation strategy leads to biased estimates of the effect of education, triggered by the FPE policy. Such biases may arise from the omission of key variables influencing factors related to education and household decision outcomes in addition to model misspecification or even fundamental (and unobservable) group differences, which may be the true drivers of the variation in the outcomes rather than the effect of education. With these considerations in mind, we use a rich set of covariates, year of birth, and district fixed effects within an instrumental variable (IV) framework to uncover any possible causal impact of education on women decision-making.

We investigate the extent to which education has an impact on the various outcomes related to women's household decision with the following model:

$$Y_{ijt} = \beta_0 + \beta_1 S_{ijt} + \mathbf{X}_i \mathbf{B} + I_{2013} + \kappa_j + \tau_t + \varepsilon_{ijt}, \quad (1)$$

where i is the index for individual, the j indicates the district, and t is the year of birth. The variable Y_{ijt} denotes one of several related household decision outcomes described above; S_{ijt} is the years of schooling of the individual i living in district j and born in time period t; and $\boldsymbol{X}_i$ is a vector

of covariates that includes religion, ethnic background, an employment indicator, residence in an urban area, whether the respondent lives in a household containing a radio, fridge, television and, lastly, a set of wealth indicators. To capture time-invariant unobservables across districts, the equation includes a set of district fixed effects κ_j. Year of birth fixed effects τ_t and a standard white noise error term ε_{ijt} complete the model. As explained in the data section, we use two cross-sectional waves (2008 and 2013) of the SLDHS; therefore, we include a year dummy, I_{2013}, to account for the survey year fixed effects. The main parameter of interest, β_1, describes the average relationship between education and our household decision outcomes. Due to the potential endogeneity in this relationship between schooling and the outcomes analyzed in the paper, OLS method may yield biased estimates. We therefore turn to IV estimation.

The IV method allows us to estimate the average causal impact, β_1, by using instruments for years of schooling. Validity of the instruments relies on the following main assumptions: (1) the instruments must be highly correlated with S_{ijt}, but (2) related to the outcome only through their effect on S_{ijt}, and (3) the instruments are uncorrelated with the error term, ε_{ijt}. We use a similar approach as Cannonier and Mocan (2018) in using an external instrument that is based on exposure to the free primary education policy and the intensity of the program. This instrumental variable strategy is depicted by Eq. (2):

$$S_{ijt} = a_0 + a_1\left(FPECohort_i * R_j\right) + \mathbf{X}_i\Omega + I_{2013} + \kappa_j + \tau_t + \omega_{ijt}. \tag{2}$$

where *FPECohort* is the binary indicator that equals one if the cohort of the respondent was exposed to the policy and thus, born anytime from 1989 (September) to 1998. Otherwise, the variable takes the value of zero. Exposure to the FPE is based on whether the individual was of primary school age since the introduction of program. The intensity of the program is based on the amount of district-level primary education resource inputs measured in millions of current Sierra Leon Leones (Le) and denoted by R_j. We interacted with the two variables to form an instrument.

We test the underlying assumptions as follows: in the case of the first assumption (i.e., the instrument must be highly correlated with the endogenous regressor), we use weak identification tests to examine the strength of the instrument. The second assumption is justified because the distribution of these funds—set aside specifically for primary education purposes—was unrelated to any observable individual characteristics. With respect to the third assumption, it is possible that districts with a more generous receipt

of funding resources differ from those with smaller amounts of educational resources because of differences in leadership styles of district leaders. In addition, funding for education may be tied to other public goods. While this is a more difficult assumption to substantiate, Cannonier and Mocan (2018) found no evidence of significant correlation between funding and leadership attributes nor was there any significant relationship between education and access to various public sector services. Nonetheless, as a way of mitigating this potential problem, we include district dummies in all of our models.

Further, we include reduced-form regressions, which provide estimates of the net effect of the policy reform, and thus further enabling us to account for possible confounding effects. The reduced-form equation below is obtained by inserting Eq. (2) into Eq. (1):

$$Y_{ijt} = \pi_0 + \pi_1\left(FPECohort_i * R_j\right) + \mathbf{X}_i\Pi + I_{2013} + \kappa_j + \tau_t + \mathbf{e}_{ijt}, \tag{3}$$

where the parameter π_1 measures the net effect of the reform and thus, will allow us to obtain estimates of the *intention-to-treat*.

5 Results

Instrumental Variables (IV) Regressions of the Impact of Education

Table 3 presents estimates of the IV regression for the impact of education on married women's decision-making power to have a final say regarding household-related activities. Estimated coefficients are obtained from models as depicted by Eq. (1) while standard errors are clustered by treatment status and district. All regressions are weighted by the sample weight from the SLDHS. We report the Kleibergen-Paap (First-stage) statistic—an extension of the Wald test—for weak identification or instrument relevance. This is a more powerful test that offers greater reliability in making inferences within a setting where a potentially weak instrument exists (Baum et al. 2007). In all cases, F-statistic is above the critical value (10% maximal test size), indicating a rejection of a weak instrument. Further, the first-stage F-statistics far exceed 10, which is the Staiger-Stock standard rule of thumb for a sufficiently strong instrument.[6] The Kleibergen-Paap LM test is a Lagrange Multiplier test for under-identification which is comfortably rejected throughout the main results. The estimates show that in almost all of the cases, schooling has

Table 3 The impact of education on household decision making: instrumental variables regressions—married females

Variables	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say - Index of overall decision making
Schooling	0.062*	0.079**	0.029	0.081*	0.063**
	(0.035)	(0.037)	(0.031)	(0.042)	(0.028)
Christian	−0.047	−0.062*	−0.037	−.045	−0.048*
	(0.030)	(0.035)	(0.028)	(0.044)	(0.029)
Temne	−0.031	−0.025	−0.018	−0.035	−0.027
	(0.027)	(0.024)	(0.020)	(0.032)	(0.021)
Mende	−0.016	−0.033	0.008	−0.060**	−0.025
	(0.026)	(0.035)	(0.024)	(0.030)	(0.022)
Urban	−0.060**	−0.079**	−0.019	−0.090***	−0.062***
	(0.030)	(0.033)	(0.033)	(0.033)	(0.024)
Employed	0.037**	0.029**	0.033**	0.047**	0.036***
	(0.016)	(0.013)	(0.015)	(0.024)	(0.014)
Radio	−0.044***	−0.044***	−0.037***	−0.025*	−0.038***
	(0.014)	(0.015)	(0.014)	(0.014)	(0.012)
Fridge	−0.092*	−0.114*	−0.068	−0.113**	−0.097**
	(0.051)	(0.058)	(0.055)	(0.057)	(0.042)
TV	−0.083*	−0.113**	−0.042	−0.087	−0.081*
	(0.045)	(0.056)	(0.044)	(0.064)	(0.046)
Wealth 1	−0.002	0.005	−0.007	0.020	0.004
	(0.021)	(0.023)	(0.013)	(0.029)	(0.018)
Wealth 2	0.002	0.003	−0.004	0.001	0.001
	(0.016)	(0.018)	(0.016)	(0.013)	(0.013)
Wealth 4	−0.040	−0.049**	−0.028	−0.047	−0.041*
	(0.031)	(0.024)	(0.024)	(0.033)	(0.023)
Wealth 5	−0.129	−0.143**	−0.056	−0.170*	−0.125**
	(0.079)	(0.071)	(0.055)	(0.092)	(0.057)
District fixed effects	Yes	Yes	Yes	Yes	Yes
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes
Survey year fixed effects	Yes	Yes	Yes	Yes	Yes
Kleibergen-Paap (First-stage) Wald F-stat	21.804	21.804	21.804	21.804	21.804

(continued)

Table 3 (continued)

Variables	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say - Index of overall decision making
Kleibergen-Paap LM stat	9.937	9.937	9.937	9.937	9.937
Kleibergen-Paap LM *p*-value	0.002	0.002	0.002	0.002	0.002
Observations	6019	6019	6019	6019	6019

Notes Wald F-statistic is the Kleibergen–Paap test for weak identification. LM statistic is the Kleibergen-Paap Lagrange Multiplier test for under-identification. Standard errors in parentheses are clustered at the birth-year*district level. Statistical levels of significance are: *indicates $p < 0.1$, **indicates $p < 0.05$, ***indicates $p < 0.01$. The sample comprises the FPE cohort (those who were born from 1989 [September–December] to 1998) as the treatment group and the control group who were born from 1983 to 1989 (January–August). Regressions include controls for religion, ethnicity, urban residence, employment status, whether respondent's household has a radio, whether respondent's household has a television, whether respondent's household has a fridge, and a set of wealth status indicators. Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS). Regressions are weighted by sample weight from the SLDHS

an impact on women's ability to have the final say in decisions in the household. An additional year of schooling increases the probability that a woman has the final say in her own health (6.2 percentage points), in making major household purchases (7.9 percentage points), and in determining how the husband's earnings will be used (8.1 percentage points). There is no evidence that increased education, triggered by the policy, has any effect on married women's ability to have a final say in family visits. These results are respectively shown in columns 1–4. These estimates are broadly consistent with the findings in work related to studies on the effects of cash transfer programs on women's decision-making. de Brauw et al. (2014) show that the *Bolsa Família* conditional cash transfer program had a positive or insignificant effect on women's ability to make decisions regarding children's health visits and expenses, use of contraceptive, and purchases of durable goods (Table 4).

We also run models based on an index as a dependent variable. The index is based on the proportion of women who indicated having a final say on household decision variables (column 5). Schooling has a positive impact on this index, in which one more year of schooling increases the index of having a final say in making decisions on average by 6.3 percentage points.

Table 4 The impact of the FPE program on schooling: ordinary least squares regression (first-stage results)—married females

	(1) Dependent variable: Years of Schooling	(2)
FPE Cohort * R	0.498***	0.401***
	(0.101)	(0.086)
Christian		0.701***
		(0.213)
Temne		0.338
		(0.238)
Mende		0.641***
		(0.175)
Urban		0.869***
		(0.180)
Employed		−0.286**
		(0.125)
Radio		0.217**
		(0.098)
Fridge		1.362***
		(0.228)
TV		0.966**
		(0.362)
Wealth 1		−0.257
		(0.208)
Wealth 2		−0.144
		(0.138)
Wealth 4		0.565***
		(0.141)
Wealth 5		1.983***
		(0.242)
District fixed effects	Yes	Yes
Birth year fixed effects	Yes	Yes
Survey year fixed effects	Yes	Yes
Observations	6019	6019
R-square	0.117	0.215

Notes Standard errors in parentheses are clustered at the birth-year*district level. Statistical levels of significance are: *indicates $p < 0.1$, **indicates $p < 0.05$, ***indicates $p < 0.01$. The sample comprises the FPE cohort (those who were born from 1989 [September–December] to 1998) as the treatment group and the control group who were born from 1983 to 1989 (January–August). FPE Cohort*R is the interaction between FPE Cohort and R, where R is the amount of funding (in millions of Sierra Leone Le) allocated for primary school education. Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS). Regressions are weighted by sample weight from the SLDHS. Constant term is not reported

We now turn to the estimates of covariates, which show some definitive correlations with women's ability to have a final or joint say in household decisions. For the most part, we find being Christian is negatively associated with having a final say in making these household decisions. This pattern also holds true for being associated with one of the ethnic origins (Temne or Mende), living in the urban area, living in a household where there is a radio, fridge, and television, and for being in a higher wealth bracket. Employed married women are more likely to report having final decision-making powers in the household.

Reduced-Form and Ordinary Least Squares (OLS) Estimates

We present results from the reduced-form models in which each outcome is regressed on the instrument and the vector of exogenous covariates. From this reduced-form strategy, we are able to examine whether there is a direct relationship between the district-level intensity of education resources to which the treatment cohort is subjected and the probability that the *exposed* cohort are empowered to make decisions in the household. Table 5 reports the estimated coefficients of the effect of exposure to the education reform on household decision outcome variables. These results correspond to the models as depicted by Eq. (3). Similar to the IV estimates, we find that being exposed to the education reform increased the likelihood that a married woman reports having a final say in making decisions about her own health (column 1), in making major purchases (column 2), in making visits to family and relatives (column 3), and in deciding how the husband's earnings are used (column 4). The above results are qualitatively similar to the IV estimates, but only smaller in magnitude.

The OLS results are also reported in Table 6. These estimates reveal positive but insignificant associations between education and autonomy in making decisions in the household. It is particularly important to note that the estimates in these models are smaller than both the OLS and IV estimates, suggesting that the OLS coefficients are biased in the downward direction.

Robustness and Sensitivity Analysis

We use a variety of quantitative tests to investigate the sensitivity of our results. Table 7 presents a series of checks to evaluate a variety of identification assumptions. First, we consider the possibility that some individuals, whose

Table 5 The impact of education on household decision making: reduced-form (ordinary least squares) regressions—married females

Variables	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say—Index of overall decision making
FPE Cohort *R	0.025*	0.032**	0.012	0.033**	0.025***
	(0.013)	(0.012)	(0.013)	(0.013)	(0.009)
District fixed effects	Yes	Yes	Yes	Yes	Yes
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes
Survey year fixed effects	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	6019	6019	6019	6019	6019
R-square	0.030	0.024	0.043	0.037	0.039

Notes Standard errors in parentheses are clustered at the birth-year*district level. Statistical levels of significance are: *indicates $p < 0.1$, **indicates $p < 0.05$, ***indicates $p < 0.01$. The sample comprises the FPE cohort (those who were born from 1989 [September–December] to 1998) as the treatment group and the control group who were born from 1983 to 1989 (January–August). Cohort*R is the interaction between FPE Cohort and *R*, where *R* is the amount of funding (in millions of Sierra Leone Le) allocated for primary school education. Regressions include controls for religion, ethnicity, urban residence, employment status, whether respondent's household has a radio, whether respondent's household has a television, whether respondent's household has a fridge, and a set of wealth status indicators. Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS). Regressions are weighted by sample weight from the SLDHS

age range from 12 to 14, may have benefitted from the reform. This is important because even though Sierra Leone has witnessed improvements in access to education, gross enrollment rates remain stubbornly high (Government of Sierra Leone, Ministry of Education, Science and Technology 2018).[7] A contributing factor is the large number of "over-age" children who enroll late or repeat classes. We account for this occurrence by giving partial-eligibility status to the cohort born in 1987, 1988, and 1989 (January–August). In one scenario, we assign a value of 0.5 (Panel A) and in another, this cohort group is given the value of 0.33 (Panel B). These results are similar in both magnitude to our baseline findings.

Table 6 The impact of education on household decision-making: ordinary least squares regressions—married females

Variables	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say—Index of overall decision making
Schooling	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Christian	−0.004	−0.007	−0.017	0.012	−0.004
	(0.009)	(0.007)	(0.011)	(0.015)	(0.008)
Temne	−0.009	0.002	−0.008	−0.006	−0.005
	(0.015)	(0.010)	(0.021)	(0.018)	(0.011)
Mende	0.023*	0.017	0.025	−0.009	0.014
	(0.013)	(0.017)	(0.019)	(0.017)	(0.012)
Urban	−0.006	−0.011	0.005	−0.020	−0.008
	(0.013)	(0.013)	(0.015)	(0.012)	(0.011)
Employed	0.019	0.006	0.025**	0.024*	0.018**
	(0.012)	(0.008)	(0.010)	(0.012)	(0.008)
Radio	−0.031**	−0.028**	−0.032***	−0.008	−0.025**
	(0.013)	(0.013)	(0.010)	(0.011)	(0.010)
Fridge	−0.009	−0.008	−0.030	−0.002	−0.012
	(0.011)	(0.014)	(0.019)	(0.025)	(0.012)
TV	−0.025**	−0.038***	−0.016	−0.010	−0.022*
	(0.012)	(0.013)	(0.026)	(0.014)	(0.012)
Wealth 1	−0.018	−0.015	−0.014	−0.000	−0.012
	(0.016)	(0.014)	(0.012)	(0.014)	(0.011)
Wealth 2	−0.007	−0.008	−0.008	−0.011	−0.009
	(0.017)	(0.012)	(0.017)	(0.016)	(0.013)
Wealth 4	−0.005	−0.005	−0.012	−0.000	−0.006
	(0.017)	(0.015)	(0.018)	(0.018)	(0.015)
Wealth 5	−0.007	0.011	−0.001	−0.010	−0.002
	(0.020)	(0.020)	(0.032)	(0.028)	(0.020)
District fixed effects	Yes	Yes	Yes	Yes	Yes
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes
Survey year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	6019	6019	6019	6019	6019
R-square	0.029	0.023	0.043	0.035	0.038

Notes Standard errors in parentheses are clustered at the birth-year*district level. Statistical levels of significance are: *indicates $p < 0.1$, **indicates $p < 0.05$, ***indicates $p < 0.01$. The sample comprises the FPE cohort (those who were born from 1989 [September–December] to 1998) as the treatment group and the control group who were born from 1983 to 1989 (January–August). Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS). Regressions are weighted by sample weight from the SLDHS

Table 7 The impact of education on household decision-making: instrumental variables regression—married females

	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say—index of overall decision making
Panel A: Birth cohorts 1987, 1988, 1989 (Jan.–Aug) assign value of 0.5					
Schooling	0.062*	0.079**	0.029	0.081*	0.063**
	(0.035)	(0.037)	(0.031)	(0.042)	(0.028)
Kleibergen-Paap (First-stage) Wald F-stat	21.804	21.804	21.804	21.804	21.804
Kleibergen-Paap LM stat	9.937	9.937	9.937	9.937	9.937
Kleibergen-Paap LM *p*-value	0.002	0.002	0.002	0.002	0.002
Observations	6019	6019	6019	6019	6019
Panel B: Birth cohorts 1987, 1988, 1989 (Jan–Aug) assign value of 0.33					
Schooling	0.081***	0.084*	0.037	0.086**	0.072**
	(0.025)	(0.045)	(0.039)	(0.038)	(0.033)
Kleibergen-Paap (First-stage) Wald F-stat	7.049	7.049	7.049	7.049	7.049
Kleibergen-Paap LM stat	4.636	4.636	4.636	4.636	4.636
Kleibergen-Paap LM *p*-value	0.031	0.031	0.031	0.031	0.031
Observations	4595	4595	4595	4595	4595
Panel C: Include husband's years of schooling as a control variable					
Schooling	0.072	0.092**	0.033	0.094*	0.073**
	(0.045)	(0.036)	(0.034)	(0.049)	(0.030)
Husband schooling	−0.019	−0.024**	−0.008	−0.024*	−0.019**
	(0.012)	(0.010)	(0.010)	(0.014)	(0.008)
Kleibergen-Paap (First-stage) Wald F-stat	16.324	16.324	16.324	16.324	16.324
Kleibergen-Paap LM stat	8.820	8.820	8.820	8.820	8.820

(continued)

Table 7 (continued)

	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say—index of overall decision making
Kleibergen-Paap LM *p*-value	0.003	0.003	0.003	0.003	0.003
Observations	6019	6019	6019	6019	6019
Panel D: Placebo test (instrumental variables regression)					
Schooling	0.121	−0.467	−0.342	−0.440	−0.282
	(0.778)	(2.262)	(1.638)	(2.361)	(1.416)
Kleibergen-Paap (First-stage) Wald F-stat	0.041	0.041	0.041	0.041	0.041
Kleibergen-Paap LM stat	0.045	0.045	0.045	0.045	0.045
Kleibergen-Paap LM *p*-value	0.8322	0.8322	0.8322	0.8322	0.8322
Observations	7530	7530	7530	7530	7530
Panel E: Placebo (reduced-form)					
FPE Cohort *R	0.005	−0.010	−0.005	−0.011	−0.005
	(0.014)	(0.012)	(0.010)	(0.010)	(0.008)
R-square	0.030	0.021	0.038	0.031	0.034
Observations	7530	7530	7530	7530	7530
Panel F: Clustered at the birth-cohort-district level (84 clusters)					
Schooling	0.080**	0.071*	0.034	0.082*	0.067**
	(0.035)	(0.039)	(0.038)	(0.045)	(0.032)
Kleibergen-Paap (First-stage) Wald F-stat	5.614	5.614	5.614	5.614	5.614
Kleibergen-Paap LM stat	4.716	4.716	4.716	4.716	4.716
Kleibergen-Paap LM *p*-value	0.030	0.030	0.030	0.030	0.030
Observations	5733	5733	5733	5733	5733
Panel G: Residing in rural area					
Schooling	0.064**	0.034*	−0.025	0.066	0.035*
	(0.029)	(0.020)	(0.030)	(0.044)	(0.020)
Kleibergen-Paap (First-stage) Wald F-stat	11.130	11.130	11.130	11.130	11.130
Kleibergen-Paap LM stat	8.090	8.090	8.090	8.090	8.090

(continued)

Table 7 (continued)

	(1) Final say in own health	(2) Final say in major purchases	(3) Final say in family visits	(4) Final say in partner earnings	(5) Final say—index of overall decision making
Kleibergen-Paap LM *p*-value	0.005	0.005	0.005	0.005	0.005
Observations	4181	4181	4181	4181	4181

Notes Wald F-statistic is the Kleibergen–Paap test for weak identification. LM statistic is the Kleibergen-Paap Lagrange Multiplier test for under-identification. Standard errors in parentheses are clustered at the birth-year*district level (or clustered at the birth-cohort*district level in Panel F). Statistical levels of significance are: *indicates $p < 0.1$, **indicates $p < 0.05$, ***indicates $p < 0.01$. Unless stated elsewhere, the sample comprises the FPE cohort (those who were born from 1989 [September–December] to 1998) as the treatment group and the control group who were born from 1983 to 1989 (January–August). In Panels D and E, the sample comprises the "placebo" FPE cohort (1983 to 1989 [January–August]) as the treatment group and the control group who were born from 1977 to 1982. Cohort*R is the interaction between FPE Cohort and *R*, where *R* is the amount of funding (in millions of Sierra Leone Le) allocated for primary school education. Regressions include controls for religion, ethnicity, urban residence, employment status, whether respondent's household has a radio, whether respondent's household has a television, whether respondent's household has a fridge, a set of wealth status indicators, as well as district-, survey-year- and birth-year- fixed-effects. Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS). Regressions are weighted by sample weight from the SLDHS

Second, we test whether our estimates might be driven by possible omitted variables. Specifically, it is possible that the extent of decision-making by women will depend on the education level of her partner. For example, a more educated woman may have more decision-making powers with a less educated husband than a more educated woman living with a more educated husband. Panel C shows that the results largely remain robust to the inclusion of the husband's years of schooling as a control variable.

Third, we show that our base results are not influenced by cohort trends. A key identifying assumption of Eq. (1) is a parallel trend, which posits that in the absence of the education reform, changes in the household decision-making outcomes would be the same across high- and low-intensity districts. This nullifies any concerns that the introduction of the FPE policy reflects country-wide trends. In Panel D, we examine a placebo reform by performing a regression as specified in Eq. (1) with a placebo young treatment cohort comprising married women born from 1983 to 1989 (January–August) and an older control group of married women born from 1977 to 1982. Panel E

provides results based on an estimation of the reduced-form effect as depicted in Eq. (3). None of the estimated coefficients are significantly different from zero. Both the IV and reduced-form results support the parallel trends assumption.

Next, we cluster the standard errors at the district-by-birth cohort level. To do so, we divided the exposed or treated women into three groups based on the year ranges in which they were born (i.e., 1990 to 1992; 1993 to 1995; 1995 to 1998). A similar approach was also taken for the control group (i.e., 1983 to 1984; 1985 to 1986 and 1987 to 1988). We clustered the standard errors by older/middle-aged/younger in treatment/control and district. With three age groups for each of the treatment and control cohorts in 14 districts, we end up with 84 clusters in our specification. This specification also includes the husband's education as a control variable. The results, as presented in Panel F, are robust to this type of clustering.

We also investigate the extent to which our results vary by whether these women reside in the rural as opposed to the urban area. These results for individuals residing in the rural areas, presented in Panel G, are consistent with those reported in Table 3. We find that education increases the likelihood that married women have the final say in making household decisions, except for those related to family visits. In the models for married women residing in the urban area, the significant reduction in the sample size has likely resulted in imprecise estimates arising from very small first-stage test statistics. In the interest of space, the results are not reported. These findings that show a significant effect of education in the rural areas are consistent with the greater progress being made to reduce severe geographical disparities in school attendance. Significant reductions in the distance to education in rural areas have led to a sizable narrowing of the rural–urban gap in the percentage of children who have never been to school (UNESCO 2015).[8]

In addition to the above, we also estimated models by restricting the sample to only those individuals who were age 18 and above at the time of the survey. This is because marriage is more or less illegal under age 18 in Sierra Leone, which is allowed only under certain circumstances. By focusing on those who were at or above the legal age during the interview, we believe the responses of such individuals are more likely to be free of coercion. Our results, available upon request, are qualitatively similar to those reported in Table 3. There is the possibility that other confounders (e.g., migration and the effects of the civil war) may be driving our results. This is unlikely to be the case since Cannonier and Mocan (2018) find no impact on education for movers and non-movers. They also find exposure to the civil war

has no significant impact on the educational effects of women's empowerment. To the extent that the additional survey data used in this study take us further away from any post-conflict lingering effects, we are even more encouraged that Sierra Leone's landmark education policy reform and the associated benefits from increased schooling have improved married women's position in household decision-making.

Possible Channels

Why are more educated Sierra Leonean women, who were clearly the beneficiaries from the government's landmark education policy, more likely to be final decision-makers in household activities? In this section, we discuss a potential mechanism to explain our results.

Educated women may be more likely to command greater responsibilities in the home if they are sufficiently literate to undertake household activities, such as making purchases, taking care of themselves, and managing income. To test this directly, we investigate whether increased education, due to the policy, increases literacy rates. We created two binary variables to measure literacy based on the ability to read a sentence from a card.[9] One of these indicators, *fully literate*, takes the value of one if the married woman is able to read all of the sentence and zero otherwise. The second variable, *partially-fully literate*, takes the value of one if a married woman is able to either read some parts of the sentence or is able to read all of the sentence, otherwise the variable takes the value of zero. This variable accounts for respondents with some minimum amount of literacy. Summary statistics in Table 3 indicate that about 17% of married women are considered fully literate while 20% are deemed partially or fully literate.

Table 8 presents results regarding the relationship between education and literacy rates, where schooling is instrumented as before, and the model includes a full set of control variables. The results in columns 1 and 2 clearly show that education significantly improves literacy rates. An additional year of schooling increases the likelihood of being fully literate by 9 percentage points (42%) and the probability of being partially or fully literate by about 10 percentage points (57%). The effect of education on both forms of literacy is significant in the rural areas (columns 5 and 6) compared to the urban areas (columns 3 and 4). Together, this evidence implies that education is valuable in terms of improving married women's ability to read and thus, facilitate greater participation in household decisions.[10]

Table 8 The impact of education on literacy rates: instrumental variables regressions—married females

Variables	(1) Fully literate (Full sample)	(2) Partially-fully literate (Full sample)	(3) Fully literate (Urban)	(4) Partially-fully literate (Urban)	(5) Fully literate (Rural)	(6) Partially-fully literate (Rural)
Schooling	0.087***	0.095***	0.078***	0.046	0.082***	0.114***
	(0.014)	(0.019)	(0.022)	(0.037)	(0.019)	(0.025)
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Survey year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen-Paap (First-stage) Wald F-stat	21.293	21.293	2.321	2.321	11.319	11.319
Kleibergen-Paap LM stat	9.924	9.924	1.618	1.618	8.203	8.203
Kleibergen-Paap LM *p*-value	0.002	0.002	0.203	0.203	0.004	0.004
Observations	6009	6009	1834	1834	4175	4175

Notes Wald F-statistic is the Kleibergen–Paap test for weak identification. LM statistic is the Kleibergen-Paap Lagrange Multiplier test for under-identification. Standard errors in parentheses are clustered at the birth-year*district level. Statistical levels of significance are: *indicates $p < 0.1$, **indicates $p < 0.05$, ***indicates $p < 0.01$. The sample comprises the FPE cohort (those who were born from 1989 [September–December] to 1998) as the treatment group and the control group who were born from 1983 to 1989 (January–August). Regressions include controls for religion, ethnicity, urban residence (columns 1 and 2 only), employment status, whether respondent's household has a radio, whether respondent's household has a television, whether respondent's household has a fridge, and a set of wealth status indicators. Sample period based on two rounds (2008 and 2013) of the Sierra Leone Demographic and Health Surveys (SLDHS). Regressions are weighted by sample weight from the SLDHS

6 Conclusion

The role of education on women's overall empowerment has become increasingly prevalent in the literature. In this paper, we focus on whether an increase in education improves women's autonomy in making household-related decisions. We use IV methods to address potential endogeneity, mainly relating to unobservable characteristics affecting both years of schooling and a woman's influential role in household decision bargaining. We apply both IV and reduced-form estimation methods to a rich set of nationally representative, extensive data that is relevant to this study. Our results show that education increases married women's power to make household decisions. One more year of schooling increases the woman's likelihood of having final say on her own health, in making major purchases, and in deciding how the husband's/partner's earnings are used by 6.2 percentage points, 7.9 percentage points, and 8.1 percentage points, respectively.

These results have important policy implications in that education appears to be a cause as opposed to simply being a correlate of greater autonomy among women. Indeed, the extent to which these findings translate into significant modifications in the bargaining process is, in part, dependent on men's attitudes. It must also be noted that potential bias exists in our measures of women's decision-making power since they are based on the respondent's own subjective assessment of the role they played in these decisions. Further, to the extent that our outcome variables are mostly categorical, it is difficult to know to what extent does "having a say in decision-making" means. For instance, a female reporting having a *final* say in making decisions provides little in the way of information on the process that led to the final decision. It is possible that both couples (and perhaps, others as well) were involved in the decision-making process, but only one member had the final say.[11] Nevertheless, the fact that we are able to find significant differences in these household decision powers between the treated cohort (who were exposed to the education reform) and the control group (who did not benefit from the policy) provides some comfort that the FPE policy was a causal factor.

Notes

1. These districts were grouped in the following regions as follows. Eastern: Kailahun, Kenema, Kono districts; Northern: Bombali, Kambia, Koinadugu, Port Loko, Tonkolili districts; Southern: Bo, Bonthe, Moyamba, Pujehun districts; Western: Western Area Urban and Western Area Rural districts.

2. The sampling was based on a two-stage, randomized sampling procedure as follows. In the first stage, 353 Census clusters were selected from a list of enumeration areas. In the second stage, a complete listing of households was carried out in each of selected cluster. Twenty-two households were then systematically selected from each cluster for participation in the survey.
3. The relevant age for primary school in Sierra Leone is 6–11, with the school academic year beginning in September and ending in July. For more details on this FPE policy, see Cannonier and Mocan (2018).
4. Although the legal minimum age of marriage in Sierra Leone is 18, marriage under the legal minimum is allowed with the consent of the parents or guardians of the prospective spouses. If such consent cannot be obtained or is unreasonably withheld by the parents/guardians, then consent may be obtained from a magistrate or local government official (Parliament of Sierra Leone 2009).
5. Through a process of decentralization, which began in 2004, grants and other funding made to local district councils or directly to schools are based on a formula that takes into account school enrollment or the number of schools (Government of Sierra Leone 2013).
6. Our first-stage results, presented in Table 5, are based on estimates obtained from Eq. (2).
7. Gross enrollment rate is the ratio of total enrollment to the population of the age group corresponding to the level of education. Based on available data obtained from the World Bank Development Indicators, since 2001 (the year of the reform), primary school gross enrollment rates have exceeded 100%. Many children may start primary school at an age that is above the official starting age of 6. The accuracy of the gross enrollment rates is complicated by the fact that many families fail to register births, thus making age verification unreliable.
8. Over the period of decade, the rural–urban gap declined from 31 percentage points (59% in the rural areas, 27% in the urban areas) in 2000 to approximately 8 percentage points (19% in rural areas, 11% in urban areas) in 2010.
9. On each card, there are four sentences appropriate to the country and written in the language in which the respondent is most literate. The cards are passed to the respondent who is asked to read back the information found on the card. Examples of questions: "The child is reading a book," "The rains came late this year," "Parents must care for their children" and "Farming is hard work" (ICF International 2011).
10. Cannonier and Mocan (2018) found no significant impact of education on literacy rates, however, their study only utilized the 2008 wave of the SLDHS. Further, they did not consider the heterogeneous effect of education on literacy rates in rural versus urban areas. Significantly, Cannonier and Burke (2019) uses the 2008 SLDHS to obtain significant impacts of education on literacy rates among men (overall and those in living in urban residence) and women living in urban areas.

11. Some studies have considered women having a "joint say" in decision making as an indicator of women's empowerment. One limitation to this approach is that interpretation of joint decision making will vary across and within countries with varying degrees of gender preferences (Acosta et al. 2020).

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A Critical Evaluation of Tanzania's Tourism Sector

Evelyn F. Wamboye

1 Introduction

Tanzania is endowed with rich and diverse natural resources (particularly wildlife, forests, mountains, and the rift valley) that form the mainstay of the country's tourism industry. Almost a third of Tanzania's land area is under government protection and is reserved for the purpose of either forest reserve, national park, conservation area, or game reserve. In total, Tanzania has 16 national and 2 marine parks, 28 game (including marine) reserves, 44 game-controlled areas, multiple forest reserves, and one conservation area; which host the world's renowned biodiversity, wildlife, and unique ecosystems. Thus, it is not surprising that the tourism sector is one of Tanzania's three growth sectors, and the second largest foreign exchange earner after agriculture. For example, in 2016 alone, it generated US$2.1 billion in revenues (4.7% of total gross domestic product [GDP]), employed approximately 3.9% of the country's total labor force (equivalent to 470,500 jobs); and contributed about 21.4 and 8.7% of total export earnings (US$2446.6 million) and investment (US$1.2 billion), respectively (World Travel and Tourism Council [WTTC]—Tanzania 2017). These economic benefits are amplified when linkages with allied sectors such as hospitality, manufacture

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of arts and crafts, transportation, and logistics are taken into consideration. For instance, the total contribution of the sector in 2016 to Tanzania's GDP and employment in percentage terms, more than tripled that of direct contribution to roughly 13.5 and 11.6%, respectively (WTTC—Tanzania 2017).

Despite the aforementioned attractions and the increasing importance of tourism in the Tanzanian economy, tourism demand (both domestic and international) for Tanzania lags that of other African countries like Egypt, Morocco, Tunisia, and South Africa; and the sector's total contribution to GDP growth also lags that of Uganda, Botswana, Senegal, Namibia, and Kenya (WTTC—Tanzania 2017; Naudé and Saayman 2005). Moreover, the Tanzanian tourism products are becoming increasingly noncompetitive (even though its wildlife resources is considered the finest in the world (Tourism Statistical Bulletin 2015; World Economic Forum—Travel and Tourism Competitiveness Report [WEF-TTCR] 2017)) partly due to underdevelopment of the sector (in comparison to North African countries, South Africa, Botswana, and Kenya). Therefore, there is an urgent need for Tanzania to offer demand-driven tourism products that encourage local tourism and ensure international tourists come to Tanzania and stay longer. This could be achieved by first investigating and understanding factors that influence domestic and international tourists' decision to visit Tanzania's attractions, and second, use the research findings to inform policies that guarantee a thriving and sustainable tourism sector.

There are several reasons why this chapter focuses on tourism in Tanzania. First as previously mentioned, tourism is the biggest foreign exchange earner for the country, yet, its products are relatively noncompetitive; and thus, it befits to empirically investigate factors that determine tourism demand and use the findings to inform policies that could help stimulate the sector. Second, given the few opportunities that Tanzania has for diversifying its export earnings away from the primary sector, and the potential that the tourism sector has in contributing to economic growth and employment, this sector emerges as a viable option for export diversification, employment creation and ultimately, contribute to economic growth and development. Third, Tanzania like many other African economies has a huge informal sector that forms the economic backbone of many households, and therefore, the trickle-down effects through horizontal linkages could yield greater indirect benefits to the informal sector than manufactures or agriculture sectors. Last but not least, the government of Tanzania has already identified tourism industry as a robust source of growth in its second 5-year development plan (Ministry of Natural Resources and Tourism [MNRT] report 2017). This is

based on the fact that annual tourist numbers have been increasing, doubling from about 500,000 in 2000 to over 1 million visitors in 2013. Consequently, the findings in this study will provide some crucial information that could help enhance the government's development plan.

A few studies have attempted to investigate the importance of tourism in the economy. However, most have focused on developed countries (Lim 1997a, b; 1999). Studies on African countries are more recent and very few compared to those for developed and other developing nations (Seetanah et al. 2010; Kweka et al. 2003; Naudé and Saayman 2005; Saayman and Saayman 2008, 2015; Saayman and Cortes-Jimenez 2013; Saayman etal. 2012; Fayissa et al. 2008; Muchapondwa and Stage 2013). In the case of Tanzania, we could only find 3 studies (Luvanga and Shitundu 2003; Kweka et al. 2003; Odhiambo 2011). Furthermore, these studies evaluate the impact of tourism sector on poverty alleviation (Luvanga and Shitundu 2003), economic potential of tourism (Kweka et al. 2003), and tourism impact on economic growth (Odhiambo 2011) rather than the factors that determine tourism demand. Thus, not only is this research timely (falling within the scope of the increasing importance of services sector in economic development of African economies), but also, relevant as Tanzania has recently placed tourism industry at the center of its development plan.

Tourism sector in Africa is undoubtedly under-developed. The essential infrastructure is either absent or below-par, and the business model required to drive the sector is missing. Christie and Crompton (2001) single out lack of price and quality competitiveness as the greatest obstacle to Africa's tourism sector's growth. They point out that a seamless tourism industry structure and operation that consist of tour operators, travel agents, and transport services (that sell integrated tour 'packages' to tourists) is not well developed in African countries. What is even more alarming is the dismissal amount of research that has been done on these issues, and the African tourism industry in general. As alluded above, more than 90% of the available research is on developed countries; and the little that is available is largely on South Africa.

It is for the above-mentioned reasons that this study attempts to contribute to the tourism demand literature (especially in Africa), and specifically to the debate on how to expand and increase the efficiency of the tourism sector in Tanzania by seeking answers to the following questions:

I. What are the recent trends in the flow of tourists in Tanzania?
II. Where are these tourists coming from, and what is the most commonly used mode of transportation?

III. What is the contribution of the tourism sector to Tanzania's gross domestic product and employment?
IV. What are the key factors that influence international tourists to visit Tanzania?
V. What policy implications are arising from the empirical analysis, and how do these policies fit in the current national policies related to the key determinants of international tourism demand?

The rest of the chapter is organized as follows; the next section provides trends and economic impact of the tourism sector in Tanzania. Among other things, it summarizes the sector's contribution to gross domestic product and employment. This is followed by a review of relevant literature, and the methodology. The last two sections provide discussions of the empirical results and policy implications, and study limitations, respectively.

2 Trends and Economic Impact of Tourism Sector in Tanzania

The United Nations World Tourism Organization (UNWTO) recognizes tourism as one of the largest and fastest growing industries in the world. The growth of tourism industry is demonstrated by the ever-increasing number of destinations and tourists arriving at those destinations, and investments in tourism development; turning modern tourism into a key driver for socio-economic progress through job creation and enterprises, infrastructure development and, foreign currency earned through exports (UNWTO 2016). For example, in 2016 alone, travel and tourism directly contributed US$2306 billion (3.1% of total GDP) to the global economy and roughly 109 million jobs (3.6% of total employment) worldwide (WTTC 2017). Both GDP and employment contributions are expected to increase by 4.0 and 2.0% per year over the next ten years. Indirect effects are even larger, where they amounted to US$3639 billion in contributions to the global economy and supported approximately 125 million jobs. This was equal to 7.1% of the World's GDP, and roughly 6% of all jobs created in 2016 (see Fig. 1).

The Global Impact of Travel and Tourism in the Economy

Travel and tourism's impact includes people traveling for both leisure and business, domestically and internationally. In 2016, 76.8% of all travel spend was as a result of leisure travel, compared to 23.2% for business travel

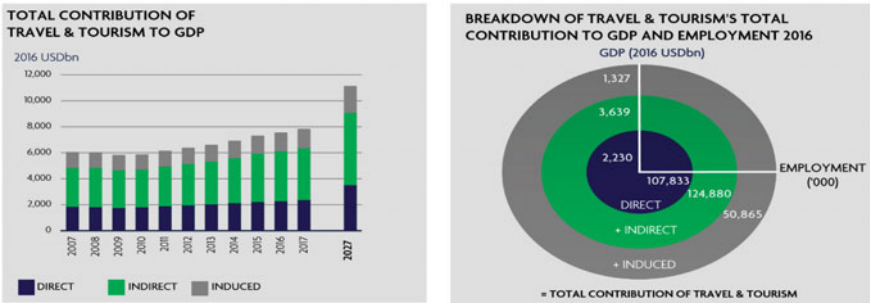


Fig. 1 Global contributions of travel and tourism to GDP and employment (*Note* All values are in constant 2016 prices & exchange rates *Source* Travel and Tourism Economic Impact [WTTC 2017])

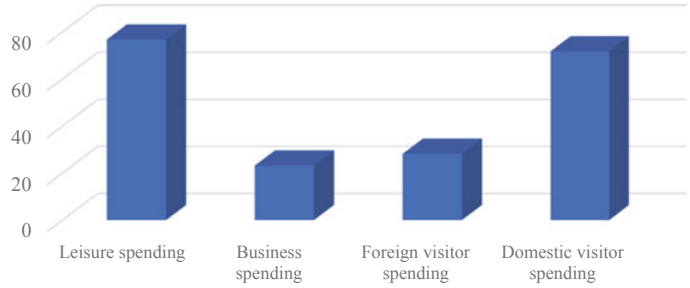


Fig. 2 Global spending by type of activity and tourist (*Data source* Travel and Tourism Economic Impact [WTTC 2017])

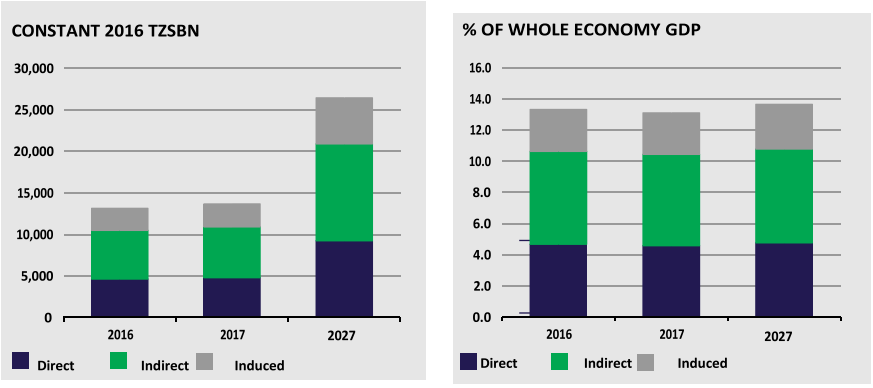
(see Fig. 2). Moreover, domestic tourism generated 72% of the sector's contribution to GDP, thus making a significantly larger contribution than international tourism, which contributed only 28% of the sector's share in global GDP.

The Impact of Travel and Tourism in Tanzanian Economy

In developing countries, tourism plays an important role in stimulating investments in new infrastructure, as well as generating government revenues through various taxes and fees. In Africa, tourism has been identified as a key sector for the achievement of shared economic growth and poverty alleviation (Mitchell and Ashely 2006; World Bank 2006). In the case of Tanzania, the most recent data reported in World Travel and Tourism (2017) shows that the direct contributions of the tourism industry to Tanzania's total GDP and employment was 4.7% (US$2.1 billion) and 3.9% (470,500 jobs), respectively. The total contributions are even greater when indirect effects are taken

into consideration. For example, in 2016, the sector's share in the country's GDP was 13.3% (US$5.9 billion), and 11.6% (1,389,000 jobs) of all jobs created. The outlook is good as well, since the sector's contribution in total GDP and employment is projected to increase by 6.8 and 3.8% per annum until 2027, respectively (see Figs. 3 and 4).

The increasing number of tourists traveling to Tanzania and the revenues that result from their spending, explain the observed contribution of the tourism sector to GDP and employment. Specifically, both the number of arrivals and revenues have been increasing steadily since 2011, albeit the revenues lagging the number of visitors (see Fig. 5).



[1]All values are in constant 2016 prices & exchange rates

Fig. 3 Total contribution of travel and tourism to Tanzania's GDP (*Source* Travel and Tourism Economic Impact [WTTC-Tanzania 2017])

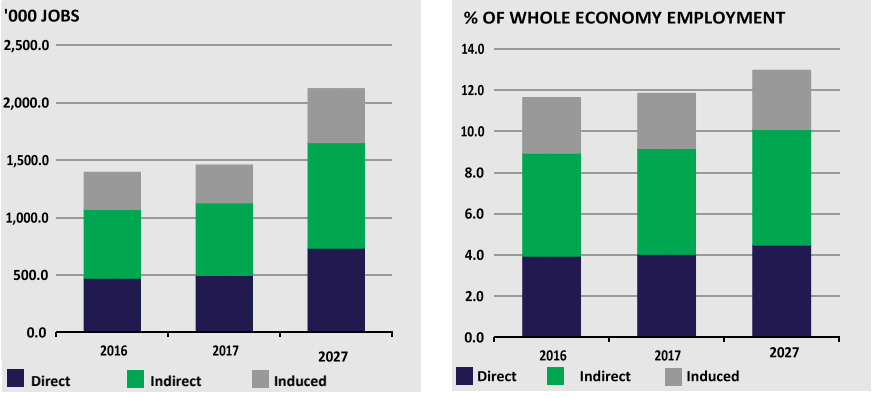


Fig. 4 Total contribution of travel and tourism to Tanzania's employment (*Source* Travel and Tourism Economic Impact [WTTC-Tanzania 2017])

In terms of the salient characteristics of these tourists, evidence in Fig. 6 shows that most of them arrive in the second half of the year, between July and December, with the peak being in August. Furthermore, majority of them tend to be from Africa (44.3% in 2016; compared to 31.8% for Europe and 9.2% for Americas), particularly, East Africa (Tourism Statistical Bulletin 2016). They travel for leisure and holiday (73%, 2016) with very few traveling to visit friends and relatives (11%). Business travelers account for a very

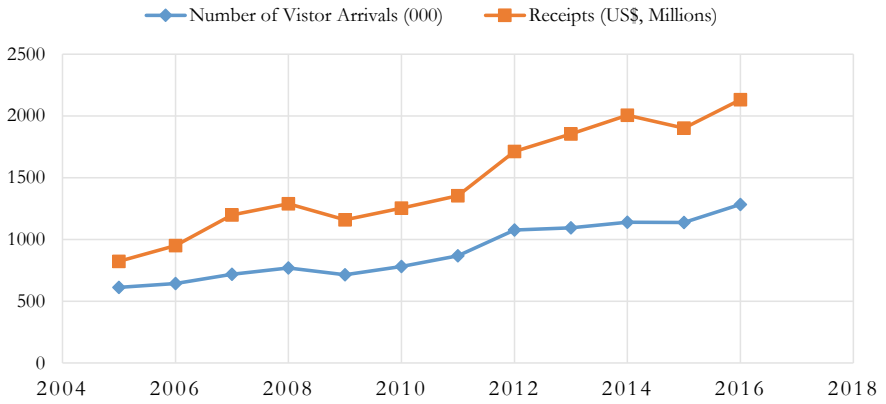
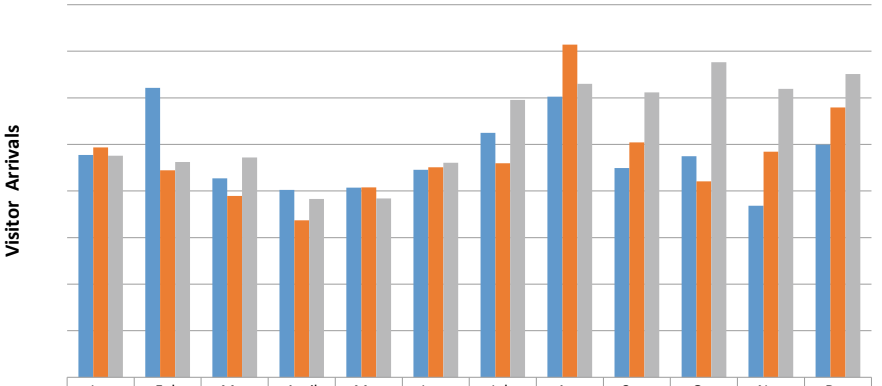


Fig. 5 International visitor arrivals and receipts, 2005–2016 (*Data source* Tourism Statistical Bulletin 2017)



	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2014	95,486	1,24,264	85,484	80,519	81,421	89,093	1,04,955	1,20,536	89,856	94,981	73,628	99,933
2015	98,710	88,939	77,841	67,447	81,538	90,236	91,896	1,42,885	1,00,829	84,121	96,873	1,15,865
2016	95,127	92,475	94,345	76,558	76,770	92,077	1,19,140	1,26,054	1,22,350	1,35,314	1,23,895	1,30,174

Fig. 6 Monthly trends of international visitor arrivals in Tanzania, 2014–2016 (*Source* Chat 2, MNRT Tourism Statistical Bulletin 2016)

small proportion of all the tourists (only 5% in 2016). Over half of these tourists travel by air, followed by road (see Fig. 7).

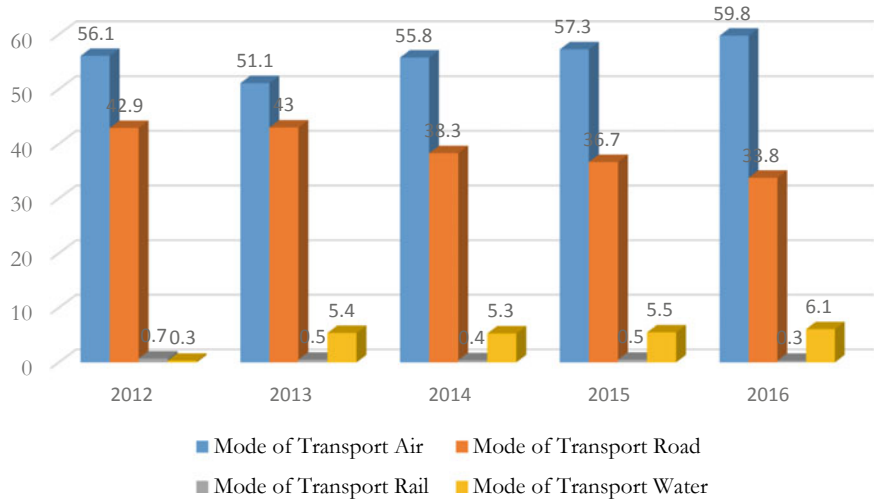


Fig. 7 International visitor arrivals by mode of transportation (in percent), 2012–2016 (*Data source* MNRT Tourism Statistical Bulletin 2017)

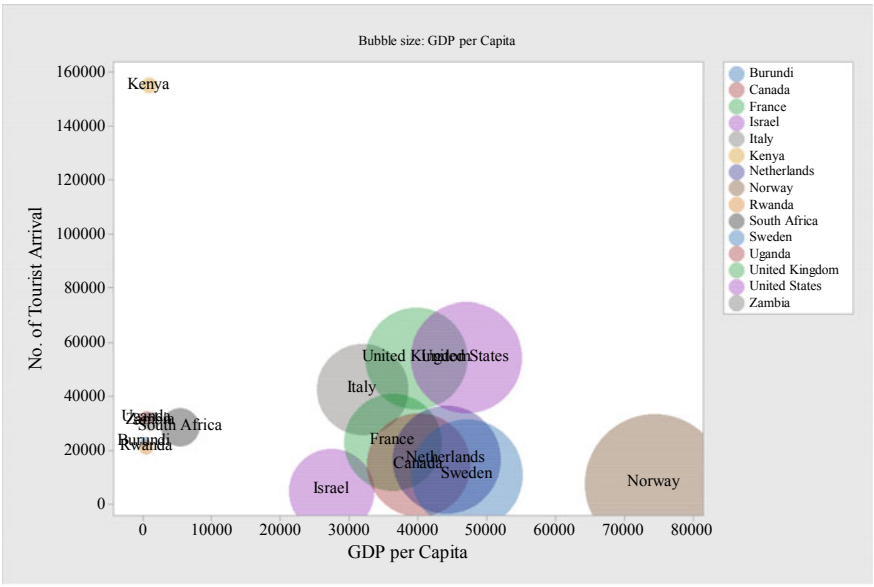


Fig. 8 Bubble plot of average no. of tourist arrival versus GDP per capita, 2000–2016 (*Data source* Author's calculation)

3 Literature Review

Theoretical Literature

The gravity model holds that bilateral exchanges between countries/regions i and j are positively related to the countries'/regions' economic masses, and negatively related to the distance between them. This model has been used to explain international trade flows (including trade in services), investment, and migration (Head and Ries 2008; Bergstrand and Egger 2007; Eichengreen and Tong 2007; Gil-Pareja et al. 2006; Anderson and Van Wincoop 2003; Karemera etal. 2000). The basic gravity model is usually formulated as shown below:

$$F_{ij} = \beta \frac{(GDP_i)^{\alpha}\left(GDP_j\right)^{\lambda}}{\left(Dist_{ij}\right)^{\xi}} U_{ij} \tag{1}$$

where F_{ij} is the international flow between countries/regions i and j.

GDP is the gross domestic product of each country/region.[1]

Dist is the distance between country/region i and j.

U_{ij} is a log-normal distributed error term.

$B, \alpha, \lambda, and\, \xi$ are parameters to be estimated.

For empirical analysis, Eq. (1) can be transformed using natural logarithms to yield Eq. (2):

$$lnF_{ij} = \beta + \alpha lnGDP_i + \lambda lnGDP_j + \xi lnDist_{ij} + \varepsilon_{ij} \tag{2}$$

where ε_{ij} is a normal error term with $E\left(\varepsilon_{ij}\right) = 0$ and $\beta = ln(B)$.

Earlier studies on tourism (a tradable service subsector) used the gravity model to explain the movement of international tourists and travelers (including business travelers and medical tourists) (Durden and Silberman 1975; Gordon and Edwards (1973); Kliman 1981; Pyers 1966; Quandt and Baumol 1969). But, the initial problem with the use of the gravity model was that it lacked a theoretical grounding. To address this problem, some economists (in late 1990s and early 2000s) attempted to apply the gravity model in empirical analysis within the context of Heckscher-Ohlin (H–O) theory (Deardorff 1998; Anderson and Van Wincoop 2003). However, that attempt was immediately abandoned as there seemed to be no clear strong theoretical support of H-O theory for the gravity model in explaining international tourism flows. This is evidenced by the fact that much of the

literature on tourism has ignored the gravity model in their empirical analysis (Lim 1997a, 1999; Li et al. 2005; Song and Li 2008).

Notwithstanding lack of theoretical foundation, recent studies have re-induced the gravity model in the tourism demand literature (Keum 2010). Particularly, Kimura and Lee (2006) found that the gravity model performed better when predicting trade in services compared to trade in goods. Also, evidence in empirical studies on flow of trade and tourism support the ease of applicability of gravity equations and robustness of the results (Keum 2010; Morley et al. 2014).

The original formulation of the gravity equation that included exclusively economic masses (measured by population concentration or GDP) and distance between two geographical areas has evolved to include other relevant explanatory variables such as price levels, substitute prices, cultural effects, and destination's income (Prideaux 2005). Thus, the modified version of the gravity model, which has gained popularity in recent tourism demand literature is as shown below:

$$\ln N_{ij} = \beta + \sum_{s=1}^{s} \alpha_s lnZO_i^s + \sum_{p=1}^{p} \lambda_p lnZD_J^P + \sum_{r=1}^{r} \xi_r lnOD_{ij}^r \quad (3)$$

where N_{ij} is tourist demand measured by number of tourists arriving in country/region j.

ZO_i^s is a vector of S variables determining the push force for outbound tourists from origin country/region i (including GDP per capita of country/region i).

ZD_J^P is a vector of variables determining the pull force for inbound tourists to country/region j (including GDP per capita of country/region j).

OD_{ij}^r is a vector of r variables determining the costs (or attractiveness forces) for tourists from country/region i to visit country/region j (including distance between the two countries/regions).

$\beta, \alpha_s, \lambda_p, and \ \xi_r$ are vectors of parameters to be determined.

Different studies have applied Eq. (3) based on different specifications. For example, Eilat and Einav (2004) evaluated determinants of bilateral tourism movements over time, with the right-hand side variables including; price elasticities, exchange rates, destination risk, common border, and common language. They found all these variables to be relevant determinants of tourism demand. Gil-Pareja et al. (2006, 2007) focused on the role of embassies and a common currency on influencing tourism flow. Others evaluated the effects of different exchange rate regimes (Santana et al. 2010; Santana, Ledesma, et al. 2010), mega-events (Fourie and Santana 2011), and,

cultural affinity and ethnic reunion (Fourie and Santana 2013) on tourism flows. Also, other studies used the gravity model to understand tax implications (Durbarry 2008) and role of transport infrastructure (Khadaroo and Seetanah 2008), visa restrictions (Neumayer 2010) and religious affiliation (Vietze 2012) on tourism demand. While the gravity model has performed well in all these studies, lack of theoretical background remains a problem.

One recent study has sought to put this problem to rest. Specifically, they have proposed the consumer economic theory described in Morley (1992) as a fitting alternative to H-O in providing a theoretical background to the gravity model (Morley et al. 2014). The authors assume that individuals derive their utility from visits to different destinations and attractions (in terms of quantity and quality) as well as from the consumption of a vector of other goods and services within their country/region (Provencher and Bishop 1997; McConnell 1992). Thus, an individual's utility function can be stated as in Eq. (4):

$$U_{ijt} = f\left(N_{ijt},\ \ Q_{it},\ ZO_{it}^{s'},\ \ ZD_{Jt}^{P'}\right) \tag{4}$$

where U_{ijt} is the utility of an individual from the origin i visiting a destination j during period t.

N_{ijt} are the number of visits by an individual from origin i to destination j during period t.

Q_{it} is a vector of consumption of other goods in origin country/region i in period t.

ZO_{it}^{s} and ZD_{Jt}^{P} are vectors of sites qualities of dimension s' and P' preferred to the origin and destination, respectively.

The constraint attached to the choices of a particular destination or tourism site is:

$$\pi_{ijt} \cdot N_{ijt} + p_{it} \cdot Q_{it} \leq M_{it} \tag{5}$$

where π_{ijt} is the cost of visiting destination j for an individual from origin country/region i during period t.

p_{it} is the price vector of consumption of other goods in country i in period t.

M_{it} is personal income of an individual in country i during period t.

The constraint maximization of Eq. (4) can be solved to find an individual tourist's optimum levels of consumption of number of trips between country/region i and j and other goods in country/region i in period t (see Morley et al. 2014, for details). After several transformations, Morley et al.

(2014) arrive at a solution that is similar to Eq. (3) above (see Eqs. 14 and 15) and appears like the expression from the consumer economic theory.

Empirical Literature

Tourism started experiencing expansion and diversification in the 1950s, especially in developed countries. By the 1980s, developing nations jumped on board, and recognized the importance of tourism (particularly, international tourism) as a key driver in their development agenda. This was more so because researchers were observing (through indirect measures), the economic significance of the tourism industry in development and growth models (Bhagwati and Srinivasan 1979; Krueger 1980; Helpman and Krugman 1985; Davis et al. 1988). Since then, tourism sector has become one of the largest and fastest-growing economic sectors in the World (UNWTO 2012). This has led to increased interest in this sector among scholars and researchers, who have taken bold steps to directly estimate the importance of the sector in the economy (see Castro-Nuno et al. [2013] for a meta-analysis of panel data studies on the relationship between tourism and gross domestic product [GDP]). The findings in these studies have served to emphasize the urgency of developing this sector. For example, in addition to being a labor-intensive sector and thus, immensely contributing to job creation (especially for low-skill workers); the sector has real impact on poverty reduction and infrastructure development, and is a good source of foreign currency and tax revenues (Saayman and Saayman 2015; Naudé and Saayman 2005; Onder et al. 2009; Martins et al. 2017).

More recently, studies have gone beyond the tourism-growth/development nexus to focus on tourism demand models (see Lim 1977a, b, 1999 for a meta-analysis of studies on tourism demand). The later literature provides essential information on how to grow the sector, and in turn, amplify its beneficial effects on economic growth and development. Such information is necessary for policy formulation in African countries that heavily rely on the sector.

Lim (1977a, b, 1999) conducted extensive meta-analysis on the tourism demand literature. Among other things, the author documents the most common proxies of tourism demand and the corresponding explanatory variables. The number of tourist arrivals and tourism expenditure—which capture the quantity and value aspects of tourism demand, respectively—stand out as the popular proxies for the left-hand-side variable, with the former being preferred due to data availability. In fact, Lim (1977a, b) found that 51% of the studies used number of tourist arrivals and/or departures,

while tourist expenditure and/or receipts were used in 49% of the studies. Regarding the right-hand-side: income of tourists (proxied by nominal or real per capita personal, disposable or national income, or GDP and gross national product (GNP) was used in 84% of the studies; relative prices (measured by CPI ratio), and transportation costs were in 73 and 55% of the studies, respectively. Exchange rate, and trends were also employed, but, in 25% of the studies. Studies that were published after 1999 have also incorporated a measure of tourism infrastructure development as one of the explanatory variables (Naudé and Saayman 2005; Saayman and Saayman 2008; Cleverdon 2002; Onder et al. 2009).

A study by Brida and Scuderi (2013) provides a detailed review of 86 papers that used tourist expenditure as a measure of tourism demand. In all these studies, they do not find any conclusive evidence of the determinants of tourism demand, partly because the composition of the determinants used in the estimation models varied across the studies. In addition, there were differences in the estimation techniques, the sample size, and sample specification; not to mention the heterogeneity across countries and regions. The same is true in studies that used tourism arrivals, whereby, the findings varied across studies (Tavares and Leitao 2017; Untong et al. 2015; Gatt and Falzon 2014; Saayman and Saayman 2013; Chao et al. 2013; De Vita and Kyaw 2013; Garin-Munoz 2009; Eugenio-Martin et al. 2008).

However, there are some studies, which provide a comparative analysis of the performance of both the quantity (tourist arrivals) and value (tourist expenditure) measures of tourism demand. These studies are more appropriate in comparing the two proxies since they subject them to the same model, dataset, and estimation techniques. For example, Song et al. (2016) estimates a tourism demand model for Hong Kong for the 1981–2006 period, and find that income of tourists was a better predictor of tourist arrivals, while real exchange rate performed well when tourism demand was proxied by tourism expenditure. Also Martins et al. (2017) arrived at a similar conclusion.

Performance of Selected Tourism Demand Determinants in Literature

In this study we use tourist arrivals for the same reason as previous studies—data availability—and select the determinants that have been commonly used in related studies. Specifically; income of tourists, measures of prices (exchange rate, consumer price index), transportation cost, and infrastructure development. In addition, we include a measure of political stability, an

issue that impacts the tourism sector in African countries. To provide some context, we evaluate how these variables have fared in literature.

Income of Tourists

Income of tourists measures the ability of the tourists to afford overseas travel and tourism related expenses. As previously indicated, it has been used in more than 80% of the studies on tourism demand (Lim 1997a, b). In most of these studies, especially those that proxy tourism demand with tourist arrivals or departure, income of tourists has a positive relationship with tourism demand (Saayman and Saayman 2008; Seetanah et al. 2010; Song et al. 2010; Onder et al. 2009; Usta 2008).

Inflation and Exchange Rate

Relative prices and exchange rate are other determinants of tourism demand that are commonly used in regression models (Oh and Ditton 2006; Dwyer and Forsyth 2002; Saayman and Saayman 2013; Chao et al. 2013; De Vita and Kyaw 2013). In general terms, these variables are defined as the ratios of domestic prices (currency) over foreign price (currency), and are often proxied by consumer price index and nominal exchange rate, respectively. Since most rational tourists want to travel to destinations where they can get the most out of their money, they will travel to destinations where prices (exchange rate) are relatively favorable. Thus, the sign of the relative exchange rate is expected to be positive, while that of consumer price index negative (Martins et al. 2017). In other words, an increase in the nominal exchange rate could cause a rise in tourism demand as domestic prices in the tourist destination country become relatively cheaper than those in the tourist origin country. Conversely, the higher the cost of living in the tourist destination relative to origin country, the lower the probability of increasing the number of tourists and vis-à-vis. The performance of the two variables in empirical studies has been found to depend on the tourism demand variable used. For example, Chao et al. (2013) show that exchange rate has a dominant impact on the number of tourists arriving in the country, while rising domestic price (inflation in the destination country) can be passed on to tourists through consumption spending while they are already in the country. This implies that relative price effects are dominant in models that use tourist expenditure as a measure of tourism demand.

Transportation Cost

The distance between tourist origin and destination countries impacts the transportation costs, and could decrease the chances of a tourist choosing certain destinations if the transportation costs appear to be higher (Dritsakis 2004; Hanafiah and Harun 2010; Culiuc 2014; Kosnan et al. 2013). This variable is particularly important for African countries, and especially Tanzania, where the air transport sector (that is commonly preferred by most tourists) is underdeveloped in terms of competition of carriers, on-ground facilities (low standard airports) and safety of travelers. Consequently, the cost of air transport within Africa and to African countries, tends to be higher relative to other destinations in Asia, Europe, and Americas. Studies that incorporated this variable in their tourism demand models found significant negative effects (Seetanah et al. 2010; Culiuc 2014).

Infrastructure Development

As observed in developed nations, infrastructure development in a country is a critical component for industrialization. Yet, one of the key factors retarding Africa's industrialization is insufficient stock and poor quality of infrastructure in transport services, power and water (AEO 2018). In fact, Africa lags other developing regions in terms of its level of infrastructure development (AEO 2018). This has a huge negative impact on the tourism sector as well. A number of studies (including those on African countries) have considered infrastructure development as one of the determinants (Naudé and Saayman 2005; Saayman and Saayman 2008). According to Kester (2003, pp. 204–205), the major obstacles to tourist arrivals in Africa are insufficient air transport, deficiency in facilities and accommodation, lack of image and poor perceptions, poverty, disease, and conflict. Gauci et al. (2002, p. 4) add poor public health services and fears of personal safety as some of the factors. Other constraining factors include lack of banking and communication facilities, lack of quality tourism products, weak marketing, and fragmentation among tour operators (Cleverdon 2002).

Political Stability

In addition to the aforementioned determinants, a measure of political and social (in)stability has featured in studies on African countries (Naudé and Saayman 2005; Seetanah et al. 2010). A cross-country study by Eilat and

Einav (2004) found that political risk had significant impact on tourism demand in both developed and developing countries. Studies on other developing countries have included a measure of political risk as well. For example, Lee et al. (1996) included a measure of political unrest for the case of South Korea. Dritsakis (2004) and Salleh et al. (2008) also considered political instability as an important determinant of tourism demand.

4 Methodology and Descriptive Analysis

To evaluate the determinants of tourism demand in Tanzania, we assume an individual's utility function within the framework of consumer economic theory (Morley et al. 2014), and adopt a commonly used international tourism demand model (Lim 1997b) written as:

$$DT_{ij} = f\left(Y_i, TC_{ij}, ER_{ij}, CP_j, O_j\right) \tag{6}$$

where;

DT_{ij} is demand for tourism products by tourists from origin i in destination j. This is measured by the number of tourists arriving in country j from origin country i.

Y is the income of tourists. This is usually proxied by GDP per capita of country i.

TC is the transportation costs between country i and j.

ER is the bilateral exchange rate between country i and j.

CP is the price of goods and services paid by tourists in destination country j. It is usually measured by the consumer price index.

O are other factors in country j that impact tourism demand— which, in this study, include infrastructure development, and a measure of political stability.

Equation (6) can be transformed through natural logarithm as shown in Eq. (7) below, so that the estimated coefficients are interpreted directly in terms of elasticity. This equation is related to the gravity equation in 3 above, and Eqs. (15) and (16) in Morley et al. (2014).

$$\begin{aligned} InTA_{ijt} =& \beta_0 + \beta_1 InINC_{it} + \beta_2 InINFRA_{jt} \\ &+ \beta_3 InEXR_{jit} + \beta_4 InDIST_{jit} + \beta_5 InCPI_{jt} + \varepsilon_{it} \end{aligned} \tag{7}$$

where;

ln = is natural logarithm.

Subscripts i and j are as previously defined, referring to country of origin (*foreign country*, and tourist destination country *(Tanzania)*, respectively. t is time period ($t = 2000–2016$)

TA is the number of tourists arriving in Tanzania from country *i.*

INC is income of tourists, which is measured by GDP per capita of country *i*.

INFRA is a measure of level of infrastructure development in country *i.* We use two proxies for this variable. The first proxy, which is used in the baseline specification, is the percentage of the population with access to improved sanitation facility. The second proxy is used in the robustness checks, and is measured as the percentage of the population with access to electricity.

EXR is the relative exchange rate measured as the annual currency exchange rates between Tanzania and a foreign country *i.*

Dist is a proxy for transportation cost calculated as product of the distance between country *i* and *j,* and the cost of fuel in country *i.*

CPI is the consumer price index in Tanzania, which captures the cost of living.

In other specifications presented in the robustness check section, we include *Gov, an* index (polity2 index from the polity IV project) used as a proxy for political stability in country *j.*

ε is stochastic disturbance term and β are parameters.

Hypotheses

In line with the objective of the chapter, and the discussions in the literature on the determinants of international tourism, we test three hypotheses.

1. **H01**: Income of tourists and infrastructure development are the key determinants of international tourism demand in Tanzania. We hypothesize that both factors will positively influence international tourism demand in Tanzania.

   Infrastructure development: Better and widespread infrastructure [such as roads, airports (and airline carriers), and railway line] is more likely to reduce transportation cost, make the country (and its regions) more accessible to tourists, and reduce the time it takes to reach the tourist attraction sites. Also, other infrastructure related to electricity, access to clean water and sanitation, information and communication technology, and security will reduce the operational costs of allied sectors that serve the tourism industry; and will attract potential investors in the sector

as well (which includes building accommodation and conference facilities near the tourist attraction sites). Thus, we hypothesize that good and widespread infrastructure will increase the attractiveness of the country as a tourist destination and in turn, increase the number of tourists coming to Tanzania.

Income of tourists: Moreover, in as far as tourism is a luxury 'good' rather than a necessity; and that it's a household want rather than a need, and is income elastic; it implies that only those households that have excess income (beyond what is required to cover their needs), will engage in tourism activities. This applies to business travelers as well (including medical tourism). In other words, we expect income of tourists to vary directly with demand for tourism activities; whereby, countries with relatively higher income than Tanzania, will supply more tourists.

2. **HO2**: Increasing transportation cost will negatively impact tourism demand in Tanzania. Transportation cost is impacted, among other things, by the level of development of transportation infrastructure (in terms of quality and quantity), competitiveness of transportation services (such as the number of air carriers [to the country and within country], availability and reach of vehicles [public mass transportation and for-hire vehicles), and availability and efficiency of trains), and fuel cost. As mentioned in the proceeding sections, the level of infrastructure development in Tanzania is relatively low compared to other countries. Moreover, the country is a net importer of fuel. In this regard, we expect a negative relationship between the number of tourists visiting Tanzania and transportation cost.
3. **HO3**: Other factors that are more likely to influence the demand of international tourism in Tanzania are relative exchange rate and cost of living. In particular, we hypothesize that **relative exchange rate** (between Tanzanian shilling and currency of tourists source country) will *likely* have a positive relationship with tourism demand; while the sign of **cost of living** (inflation rate) in Tanzania in the regression models cannot be determined prior to empirical estimations

   As shown in the literature review section, the performance of the two factors in empirical studies has been found to depend on the tourism demand variable used. For example, Chao et al. (2013) show that exchange rate has a dominant impact on the number of tourists arriving in the country, while rising domestic price (inflation in the destination country) can be passed on to tourists through consumption spending while they are already in the country. This implies that relative prices effects are dominant in models that use tourist expenditure as a measure of tourism demand.

Estimation Technique

Fixed effects (FE) model is our primary estimation technique, however, we also employ a number of other estimation models for two reasons: (1) to address other panel data biases that may not have been accounted for in FE model, and thus, negatively impact the FE estimates; and (2) for robustness checks.

Data Source, Variable Description, and Descriptive Analysis

Data Source and Variable Description

The chapter uses panel data drawn from various sources from Tanzania's top 15 tourist origin countries covering the period 2000–2016. Tourism arrival data is from Tanzania Tourism Sector surveys of 2007–2017, jointly compiled by the Bank of Tanzania (BoT), Ministry of Natural Resources and Tourism, and the National Bureau of Statistics. GDP per capita in current US$ of tourist origin country *i* (a proxy for tourists' income) and a measure of infrastructure development (the percentage of the population with access to improved sanitation facility) in destination country *j* are obtained from World Bank's World Development Indicators database; while Currency exchange rate (TZ (shillings) versus foreign) is from United Nations Commission on Trade and Development. Governance index (Polity2), which measures political stability is from the Polity IV project of the International Country Risk Guide (Marshall and Jaggers 2011). The index is measured on a 10-point scale with −10 signifying pure autocracy and 10, pure democracy. Finally, the proxy for transportation cost is author calculated as an interaction of the distance between country *i* (foreign) and *j (Tanzania)*, and the cost of fuel in country *i*.

The sample selection is based on the countries that had the number of tourists visiting Tanzania during much of the study period consistently above 1000. A list of the countries used in the chapter is presented in Table 1. Correlation covariance matrix is in Table 2

Descriptive Analysis

Table 3 presents summary statistics of the 15 tourist origin countries and Tanzania. On average, over 34,000[2] tourists arrived in Tanzania between

Table 1 Tanzania's top 16 tourist origin countries, 2000–2016

Burundi	Norway
Canada	Rwanda
France	South Africa
Germany	Sweden
Israel	Uganda
Italy	United Kingdom
Kenya	United States
Netherlands	Zambia

Note Germany was dropped out in the regressions due to lack of sufficient data on relative exchange rate

2000 and 2016. The median number of tourists (23,459) was less than the mean, implying that the distribution was skewed to right. In other words, most of the years (53%) had arrival values less than the mean value. The lowest number of tourists arriving within this period was roughly 799 (Israel 2000). The average income per capita for the 15 countries was US$26,445, which was largely driven by the OECD countries. About 60% (9 of 15) of the countries in the sample were OECD member countries with a mean GDP per capita of US$43,138 during the study period; this is compared to only US$2841 for the 6 African countries.

The infrastructure development is proxied by the percentage of the population with access to improved sanitation facility. As previously indicated, this variable is chosen due to data limitation on more direct measures such as roads. However, it is highly correlated with other related measures of infrastructure development such as total kilometer of rail line route (0.82), electricity consumption (Kwh) (0.92), air transport (freight in million ton-km) (0.86), percentage of the population with access to fixed line telephone (0.89), percentage of population with access to improved water sources (0.97),[3] and percentage of population with access to electricity (see Table 2). On average, only about 15% of Tanzanians had access to improved sanitation, compared to 30% (Kenya) and 66% (South Africa) of competitor countries in the region (see Table 4). This also applies to access to electricity; Tanzania had the lowest percentage of the population having access to electricity (13%), relative to Kenya (24%) and South Africa (81%). By all accounts, these percentages are very low, suggesting that infrastructure development in the country is at very low levels.

Country-level summary statistics over the 2000–2016 period are presented in Table 5. The top tourist origin country for Tanzania is Kenya, which averaged 154,798 tourists during the study period. This was almost 3 times the number of tourists from the United States (54,161) and United

Table 2 Correlation-covariance matrix, 2000–2016

	No. of Tourist Arrivals	GDP per Capita (Foreign Country)	Currency exchange rates, annual, (TZ versus foreign)	Transportation cost	Population with access to improved sanitation facility (%)	Population with access to improved water sources (%)	Fixed Tel subscriptions	Consumer Price Index (Tanzania)	Population with access to electricity (%)
No. of tourist arrivals	1.000								
GDP per Capita (Foreign Country)	−0.183	1.000							
Currency exchange rates, annual (TZ versus foreign)	−0.002	0.869	1.000						
Transportation cost	−0.262	0.928	0.759	1.000					
Population with access to improved sanitation facility (%)	0.307	0.132	0.082	0.267	1.000				

(continued)

Table 2 (continued)

	No. of Tourist Arrivals	GDP per Capita (Foreign Country)	Currency exchange rates, annual, (TZ versus foreign)	Transportation cost	Population with access to improved sanitation facility (%)	Population with access to improved water sources (%)	Fixed Tel subscriptions	Consumer Price Index (Tanzania)	Population with access to electricity (%)
Population with access to improved water sources (%)	0.302	0.132	0.082	0.270	0.995	1.000			
Fixed Tel subscriptions	−0.271	−0.111	−0.071	−0.212	−0.831	−0.803	1.000		
Consumer Price Index (Tanzania)	0.305	0.126	0.078	0.258	0.990	−0.989	0.795	1.000	
Population with access to electricity (%)	0.291	0.114	0.075	0.230	0.914	−0.893	0.75420	0.906	1.000

Data source Author's calculation

Table 3 Summary statistics for selected model variables, 2000–2016

Variable	Mean	Std. Deviation	Minimum	Maximum	*N*
No. of tourist arrivals	34,512.460	38,367.320	799.000	233,730.000	255
GDP per capita (Foreign Country)	26,445.280	24,194.840	112.849	103,059.300	255
Consumer Price Index (Tanzania)	96.284	38.244	51.710	166.190	255
Infrastructure development	12.150	1.942	9.300	15.600	240
Transportation cost	9,129.114	7,363.926	461.776	29,143.530	255
Relative exchange rate	721.010	816.372	0.487	3,042.404	255
Polity2	−0.529	1.291	−1.000	3.000	255

Data Source Author's calculation

Table 4 Average infrastructure measures, 2000–2016

	Kenya	South Africa	Tanzania
People using at least basic sanitation services (% of population)	30.386	66.495	14.784
Access to electricity (% of population)	24.516	81.021	13.371
Access to electricity, urban (% of urban population)	60.550	89.085	42.250

Data source Author's calculation based on World Bank's World Development Indicators Database

Kingdom (54,015), the countries in the second and third positions, respectively. Uganda (31,870), Zambia (30,734), and South Africa (28,503) were in 5, 6, and 7 positions. This suggests (as previously observed) that majority of Tanzania's tourists tend to be from African countries despite the relatively lower GDP per capita levels of these countries. To supplement this observation, we generate a bubble plot of the average number of tourists arriving from each country in the sample during the 2000–2016 period. In fact, evidence shows that the country with highest GDP per capita, Norway, supplied the lowest number of tourists to Tanzania. Kenya, which shares a common border and language with Tanzania supplied the highest number of tourist despite a relatively low GDP per capita of US$851. In fact, studies that directly incorporated a common language and border in the tourism demand models found that both variables have a significant and positive impact on

Table 5 Summary statistics for selected Tanzania's top tourist origin countries, 2000–2016

Country	No. of tourist arrival	GDP per capita	Transportation cost	Relative exchange rate	
Burundi	22,906.76	184.66	1672.57	1.10	Mean
	18,924.73	46.56	474.80	0.10	Std. Deviation
Canada	14,474.59	40,061.35	10,407.11	1148.05	Mean
	4090.78	10,275.11	3569.51	387.62	Std. Deviation
France	22,953.06	36,302.82	14,467.46	1657.95	Mean
	5,250.63	7487.60	3847.54	524.74	Std. Deviation
Israel	4,858.12	27,453.09	8976.67	340.26	Mean
	5,709.79	7116.31	3844.65	115.23	Std. Deviation
Italy	42,398.41	31,911.43	15,425.02	1657.95	Mean
	16,462.39	6225.12	4712.13	524.74	Std. Deviation
Kenya	154,798.10	851.14	780.94	16.43	Mean
	42,660.60	370.22	219.91	3.17	Std. Deviation
Netherlands	16,442.71	44,123.16	15,594.63	1657.95	Mean
	42,15.49	9778.27	4606.16	524.74	Std. Deviation
Norway	7,638.94	74,491.21	20,929.36	202.47	Mean
	2,660.43	22,556.09	5065.78	61.54	Std. Deviation
Rwanda	21,064.76	459.12	1759.06	2.29	Mean
	15,770.37	206.06	464.79	0.28	Std. Deviation
South Africa	28,503.00	5400.09	3311.46	157.23	Mean
	6,496.97	1657.49	1179.88	32.70	Std. Deviation
Sweden	10,865.53	47,104.22	18,614.05	179.36	Mean
	3,283.68	10,963.31	5333.91	56.98	Std. Deviation
Uganda	31,870.82	455.10	1674.51	0.61	Mean
	5,372.23	174.46	365.83	0.07	Std. Deviation
United Kingdom	54,015.88	39,810.54	9134.13	2179.35	Mean

(continued)

Table 5 (continued)

Country	No. of tourist arrival	GDP per capita	Transportation cost	Relative exchange rate	
	10,717.28	6573.11	2782.37	538.24	Std. Deviation
United States	54,161.29	46,988.56	11,839.02	1344.57	Mean
	16,503.46	6602.80	2476.72	377.06	Std. Deviation
Zambia	30,734.94	1082.71	2350.72	269.58	Mean
	15,470.89	530.95	736.14	41.96	Std. Deviation
Total	34,512.46	26,445.28	9129.11	721.01	Mean
	38,367.32	24,194.84	7363.93	816.37	Std. Deviation

Data source Author's calculation

tourism demand (Deluna and Jeon 2014; Kosnan et al. 2013; Leitao 2010; Moorthy 2014; Seetanah et al. 2010).

The relative exchange rate was more favorable to OECD member countries in comparison to African countries in the sample. For example, between 2000 and 2016, one Kenya shilling was equivalent to roughly 16 Tanzanian shillings in contrast to a British pound and American dollar being equivalent to an average of 2179 and 1344 Tanzania shillings, respectively (see Table 5). Also we generated a bubble plot of number of tourist arrivals versus relative exchange rate (see Fig. 9), and find that favorable exchange rate did not always translate to more tourists arriving in Tanzania.

5 Diagnostic Tests, Empirical Results, and Interpretations

To complement the descriptive analysis above, we estimate the empirical model in Eq. (7) using panel data for selected Tanzania's top 15 tourist origin countries during the 2000–2016 period. Fixed effects (FE) model is our primary estimation technique, however, we also employ a number of other estimation models for two reasons: (1) to address other panel data biases that may not have been accounted for in FE model, and thus, negatively impact the FE estimates; and (2) for robustness checks. The FE model assumes that time variant characteristics are unique to each country, and that they are not correlated with another country's characteristics. This assumption holds if the

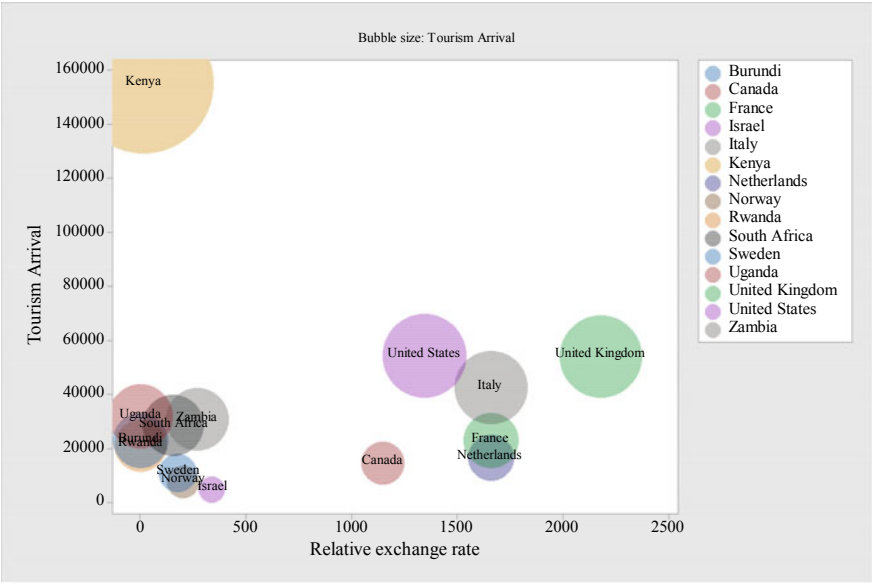


Fig. 9 Bubble plot of No. of tourists arrival versus relative exchange rate, 2000–2016 (*Data source* Author's calculation)

country's error terms are not correlated. However, if the error terms are correlated, the assumption does not hold and fixed effects model cannot be used. Consistent with panel data estimations, we conducted the Hausman specification test in order to determine whether to use Random effects (RE) or FE. The test rejects the null hypothesis that the difference in random and fixed effects coefficients are not systemic, thereby affirming FE as the model of choice.

Diagnostic Tests

A number of diagnostic tests are also conducted on the data. First, we tested for unit root in each variable using Levin–Lin–Chu (LLC) (Levin et al. 2002) panel unit root test, analogous to the time-series augmented Dickey–Fuller test (ADF). The null hypothesis of unit root is rejected in all variables (tourist arrivals, GDP per capita, transportation cost, relative exchange rate and consumer price index) except the infrastructure development measure (percentage of population with access to improved sanitation). To solve this problem, we take first difference on the infrastructure development series and conduct the test again.

Results reported in Table 6 reject the null hypothesis of unit root in all variables. Second, we ran the FE regression on the revised data and conduct a test of heteroscedasticity using the modified Wald test for groupwise heteroscedasticity in fixed effect regression model, with the null of homoscedasticity (or constant variance). The test results reject the null and conclude heteroskedasticity. Lastly, given the number of years in our sample (15 years) we do not conduct tests for serial correlation and contemporaneous correlation since they are problems that impact macro panels with long time series (over 20–30 years).

Table 6 Levin-Lin-Chu Panel Unit Root Tests (2000–2016)

Variable	Adjusted *t*
No. of tourist arrivals	−7.576
	(0.000)
GDP per capita (foreign country)	−5.494
	(0.000)
Currency exchange rates, annual (TZ versus foreign)	−6.942
	(0.000)
Transportation cost	−3.313
	(0.000)
Population with access to improved sanitation facility (%)	−8.383
	(0.000)
Consumer Price Index (Tanzania)	−3.250
	(0.000)

Notes All statistics are based on data at levels, except, infrastructure measure (population with access to improved sanitation) and consumer price index, which are based on first-differenced data, *p*-values in parenthesis, time trend is included. Ho: Panels contain unit roots; Ha: Panels are stationary
Data source Author's calculation

Regression Results and Interpretations

In this section we present panel regression results, and those from the time series analysis that evaluate the importance of key tourism determinants in each tourist source country. A summary of the results based on whether the coefficients are robust (at the panel and country levels), and the direction of impact on tourism demand are tabulated in Table 7.

Comparative Overview of Results for Selected Variables

Generally, as shown in Table 7, the positive effects of ***GDP per capita*** (which measures the income of tourists) on tourism demand in Tanzania are evident in the panel regression estimates and the time series analysis for Zambia and the United States. This suggests that overall, income is an important determinant, but more specifically, in the two mentioned countries. That is, people with relatively high income in Zambia and the United States are more likely to demand Tanzania's tourism products. However, it is crucial to note that even though in the other countries the results for the income variable are not significant (in fact, the effects are significant but negative in Uganda), it does not imply that income (as a determinant of tourism demand) is not relevant in these countries. Rather, it could be that there are other primary determinants that influence the decision of the tourists from those countries. Also, the estimation technique (OLS) used in the time series regressions could be imposing some biases on the results.

Another important determinant of tourism demand is the level of ***infrastructure development*** in Tanzania. This variable is robust with a positive impact in the panel results, and in 6 of the 15 countries (Burundi, Kenya, Uganda, Canada, Israel, and Sweden). Given the number of countries where this variable is relevant, it alludes to its relative importance, above that of income of tourists.

Transportation cost also has the right sign (negative) and robust, not only in the panel output, but also in Burundi and Netherlands. Because we use proxies for infrastructure development and transportation costs, this leaves room for other proxies depending on data availability. For this reason, the impact and significance of these two variables could vary, especially at the country level.

Finally, we find negative but insignificant effects for ***inflation*** in the panel data regressions, and mixed signs (where significant) for both ***relative exchange rate*** and ***political stability*** variables. The impact of inflation was

Table 7 Summarized results for panel and time series regression analysis—selected variables

Country	Variable					
	GDP per capita	Infrastructure development	Transportation cost	Inflation	Relative exchange rate	Political stability
Panel (Table 8, FE)	Positive***	Positive***	Negative*	Negative	Positive	Positive
Burundi (Table 11, column 5)	Positive	Positive***	Negative***		Positive	Negative
Kenya (Table 11, column 5)	Negative	Positive***	Positive		Negative	
Rwanda (Table 12, column 5)	Positive	Positive	Negative		Negative	Negative
South Africa (Table 12, column 5)	Positive	Positive	Negative		Positive	Negative
Uganda (Table 13, column 5)	Negative**	Positive***	Positive		Negative	Negative
Zambia (Table 13, column 5)	Positive***	Negative	Negative		Negative	Positive
Canada (Table 14,column 5)	Positive	Positive***	Negative		Negative	Negative
France (Table 14, column 5)	Negative	Positive	Negative		Positive	Negative
Israel (Table 15, column 5)	Positive	Positive***	Negative		Negative	Positive***
Italy (Table 16, column 5)	Negative	Negative	Positive		Positive**	Positive
Netherlands (Table 16, column 5)	Positive	Positive	Negative**		Positive	Negative

(continued)

Table 7 (continued)

Country	Variable					
	GDP per capita	Infrastructure development	Transportation cost	Inflation	Relative exchange rate	Political stability
Norway (Table 17, column 5)	Positive	Positive	Negative		Negative	Negative
Sweden (Table 17, column 5)	Positive	Positive***	Negative		Negative***	Negative
United Kingdom (Table 18, column 5)	Negative	Negative	Positive		Positive	Negative***
United States (Table 18, column 5)	Positive***	Negative	Negative		Negative	Negative

Note *** $p < 0.01$, ** $p < 0.05$, *$p < 0.1$. All variables are expressed in natural log. Results for political stability for panel regression are based on findings in Table 9. Infrastructure development is proxied by the percentage of the population with access to improved sanitation facility

not tested in the time series regressions because it was found to be consistently insignificant in preliminary estimations, and thus, was dropped out of the final regressions. Also, as mentioned before in the literature review section, the performance of inflation and exchange rate variables in empirical studies has been found to depend on the tourism demand variable used. For example, Chao et al. (2013) show that exchange rate has a dominant impact on the number of tourists arriving in the country, while rising domestic price (inflation in the destination country) can be passed on to tourists through consumption spending while they are already in the country. This implies that inflation effects are dominant in models that use tourist expenditure (rather than number of tourists arrivals) as a measure of tourism demand.

Relative exchange rate and ***political stability*** measures have mixed signs where significant. Both variables are insignificant in the panel results, but with the right sign (positive). ***Relative exchange rate*** is measured as Tanzania shilling versus individual source country currency. It is positive and significant in Italy, but negative and significant in Sweden. These contradicting signs in the two countries could be attributed to the limitations of the estimation technique used (OLS).

The Governance index (Polity2), which measures ***political stability*** in a country is from the Polity IV project of the International Country Risk Guide (Marshall and Jaggers 2011). The index is measured on a 10-point scale with −10 signifying pure autocracy and 10, pure democracy. As mentioned before, the variable has the right sign in the panel regressions, albeit with insignificant effects. But at the country level, it is significant in Israel and United Kingdom with positive and negative effects, respectively. One plausible explanation for this difference in the signs of the coefficients is as previously stated; the limitations associated with OLS estimation technique.

In the sections that follow, we discuss each of these variables in detail (including the magnitude of effect) and contextualize the findings. First, we start with the panel regression results, followed by the robustness checks, which include the time series regressions.

Income of Tourists Effects on Tourism Demand

Regression results presented in Table 8 use a modified equation that is corrected for unit root. As previously mentioned, FE model is our primary estimation technique. Results in column 1 of Table 8, and those based on other estimation techniques (column 2 through 6), consistently show that the main determinants of tourism demand in Tanzania are the income of tourists and the infrastructure development in Tanzania. The higher the income per

Table 8 Determinants of tourism demand in Tanzania, evidence from top tourist origin countries in Africa and OECD member countries (panel data estimation), 2000–2016

Variables	FE 1	FE-instrumental variable 2	GEE-population averaged 3	SGMM 4	Difference GMM 5	Linear dynamic panel estimation 6
GDP per capita	0.460***	0.460***	0.196***	0.061***	0.272**	0.572***
	(0.123)	(0.123)	(0.091)	(0.028)	(0.139)	(0.136)
Infrastructure development	1.180***	1.180***	1.615***	0.592***	1.121***	0.925***
	(0.258)	(0.258)	(0.219)	(0.216)	(0.255)	(0.228)
Transportation cost	−0.271*	−0.271*	−0.238	−0.153	−0.128*	−0.282***
	(0.164)	(0.164)	(0.163)	(0.152)	(0.076)	(0.034)
Relative exchange rate	0.277	0.277	0.382	0.049	−0.144	0.168
	(0.269)	(0.269)	(0.267)	(0.264)	(0.172)	(0.117)
CPI	−0.859	−0.859	−0.322	0.110	−0.247	−1.294***
	(0.834)	(0.834)	(0.816)	(0.705)	(0.261)	(0.318)
Constant	2.952*** (0 0.695)	2.952*** (0 0.695)	4.200*** (0.637)			
No. of instruments				33	31	174
Arellano-Bond test for zero autocorrelation in first-differenced errors [AR(2)], Prob > *z*				+ + 1	0.147	0.321
Sargan test of overidentifying restrictions (Prob > chi2)				0.230	0.970	0.960
Hansen-Sargan (*p*-value)		0.000(+ +2)				
No. of countries	15	15	15	15	15	15
No. of observations	225	225	225	225	195	210

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log. Models 4, 5 and 6 use GMM 2-step estimation. Instruments used in all cases are GMM-style (lagged values of independent variables). Sargan test: H0: overidentifying restrictions are valid. Arellano-Bond test: H0: no autocorrelation. + + 1 = Arellano-Bond test (artests) are not computed for one-step system estimator with VCE (GMM). + + 2 = equation exactly identified. Infrastructure development is proxied by percentage of the population with access to improved sanitation

capita of the tourist's origin country (in relative terms), the greater the probability that he/she will demand tourism services. Also, these tourists are more likely to travel to countries and visit places that have well-developed infrastructures that include transportation, water, sanitation, and hospitality facilities. As we are going to show below in robustness checks, these results also hold regardless of the model specification. In terms of magnitude of effect; a one percentage point increase in GDP per capita of the tourist's origin country leads to roughly 0.5% increase in the number of tourists arriving in Tanzania (column 1) per year. An improvement in the infrastructure development leads to even more traffic of tourists to Tanzania annually of about 1.2% with each percentage increase in infrastructure development. In both cases, the effects are significant at one percent level.

The above results are consistent with findings in related studies that use tourism arrivals as a response variable in the tourism demand equation. For example, Onder et al. (2009) found income of tourist as the main determinant of tourism demand in the Izmir, Antalya, and Istanbul regions of Turkey. Martins et al. (2017) find similar results (of income of tourist being the key determinant) in a study of 218 countries. Other studies that find income of tourists relevant for tourism demand include Lee et al. (1996), Garin-Munoz (2009), and Song et al. (2016).

Moreover, it is important to note that most of Tanzania's top tourist source markets have income per capita larger than Tanzania. Also, majority are OECD member countries as exemplified in our sample and Fig. 10. Given that tourism is a luxury 'good' and it's a household want rather than a need, and is income elastic; it implies that only those households that have excess income (beyond what is required to cover their needs), will engage in

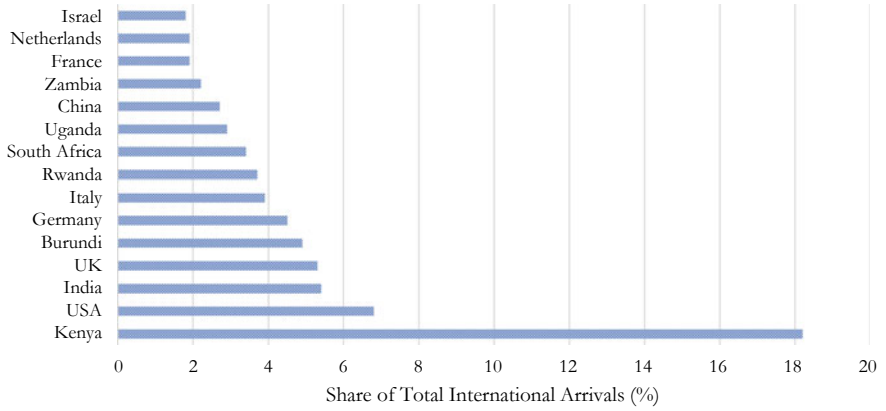


Fig. 10 Tanzania's Top 15 tourist origin countries, 2016

Northern Tourism Circuit			Southern Tourism Circuit		
	Residents	Non-residents		Residents	Non-residents
Lake Manyara national park	62,287	92,341	Mikumi national park	35,311	17,117
Serengeti national park	204,998	167,988	Ruaha national park	7,403	11,558
Tarangire national park	55,585	116,590	Udzungwa national park	6.31	2,608
Ngorongoro Conservation Area	278,922	289,061	Selous game resource	4,750	13,447

Fig. 11 Number of visitors in protected areas in 2015 (*Data source* MNRT 2017)

tourism activities. This applies to business travelers as well (including medical tourism). In as far as their primary reason for travel is business (conference or meeting or seeking medical treatment), they are only likely to engage in tourism activities if they are willing to forego additional income for tourism activities (whether as an individual or part of a group). This provides a self-selection process based on income within tourists' source country.

Infrastructure Development Effects on Tourism Demand

As previously mentioned, Tanzania has 16 national parks and 17 game reserves, which are located in two regions; the Northern circuit and Southern circuit. While the Southern circuit consists of the largest and unique game parks/reserves (including Selous game reserve, which is the largest in Africa and designated a UNESCO world heritage site), it has the lowest tourist traffic relative to the Northern circuit (see Fig. 11).While there are a number of reasons that could be contributing to the popularity and success of the Northern circuit relative to the Southern circuit (including Mount Kilimanjaro and proximity to Kenya), the most obvious one is poor/limited infrastructure, including accommodation capacity (see MNRT 2017). In fact, Tanzania International Visitors' Exit Survey Reports published by the Ministry of National Resources and Tourism consistently point to Roads and other infrastructure as the top area that requires improvement. For example, in the 2014 survey, all the top 4 areas that the tourists pointed out as requiring improvement were infrastructure related; roads (22.7% of the tourists), traffic jam (13.4%), airport facilities and inland transport (12.2%), and utilities (toilets, water) and public places (11.9%) (Tanzania Tourism Sector Survey 2014). In 2016, many more tourists were still dissatisfied with the quality of infrastructure as indicated in the exit survey, where; 40% of the tourist indicated that roads and other infrastructure was the top aspect that required improvement, followed by cleanliness of public washrooms (18.5%) and traffic jams (10.1%) (Tanzania Tourism Sector Survey 2016).

The regression findings in Table 8 (column 1) correctly capture the observations and sentiments of the tourists in the exit surveys; that is, an improvement in the infrastructure development in Tanzania could have larger positive contributions to the inflow of tourists in the country (1.2% increase with each percentage increase in infrastructure development per year). In fact, the effects are significant at one percent level. This finding is consistent with what has been established in literature. Particularly, studies such as Naudé and Saayman (2005) showed that infrastructure development was one of the major determinants for 43 African countries. Eugenio-Martin et al. (2008) and Seetanah et al. (2010) also established that infrastructure development was important in influencing tourism demand

It is important to remind readers that in the baseline results, percentage of the population with access to improved sanitation facility in the country is used as a proxy to infrastructure development in Tanzania. This variable is chosen due to data limitation on more direct measures such as roads. However, it is highly correlated with other related measures of infrastructure development such as total kilometer of rail line route (0.82), electricity consumption (Kwh) (0.92), air transport (freight in million ton-km) (0.86), percentage of the population with access to fixed line telephone (0.89), percentage of population with access to improved water sources (0.97),[4] and percentage of population with access to electricity (see Table 2). On average, only about 15% of Tanzanians had access to improved sanitation, compared to 30% (Kenya) and 66% (South Africa) of competitor countries in the region (see Table 4). This also applies to access to electricity; Tanzania had the lowest percentage of the population having access to electricity (13%), relative to Kenya (24%) and South Africa (81%). By all accounts, these percentages are very low, suggesting that infrastructure development in the country is at very low levels and the government should continue to take proactive measures to improve it.

Transportation Costs Effects on Tourism Demand

Notwithstanding, there are other aspects that matter in the tourism demand equation for Tanzania. For example, proximity, which cuts down transportation costs; and common culture and language. This explains why majority of Tanzania's international tourist are from Kenya (where they share a common border, Swahili language, and culture), and other English-speaking countries (the United Kingdom and the United States) (see Fig. 10). Also, we cannot underestimate the importance of targeted and aggressive marketing, which

has helped to boost Kenya and South Africa's tourism industry relative to that of Tanzania.

The effects of transportation cost have been captured in the regression analysis as well (see Table 8). Specifically, an increase in the transportation cost deters tourism services demand, and thus, decreases the number of tourists coming to Tanzania. In terms of magnitude of effect, an increase in the transportation cost by one percentage point, decreases the number of tourists arriving in Tanzania by 0.3 percentage points (Table 8, column 1) every year. These effects are robust at 10% level of significance. Studies such as Seetanah et al. (2010) and Culiuc (2014) have also found negative effects of transportation cost on tourism demand.

The negative effects of transportation costs could be alleviated by improving the infrastructure in the country, similar to what the government is currently doing by investing in airports, roads, and rail. As observed above (Fig. 7), most tourists travel to the country via air followed by roads. Therefore, improving the air transport infrastructure, and increasing competition in the airline market (in terms of the number of local and international carriers) could offer more travel options to tourists and lower transportation cost as well. While the government has revived Air Tanzania, and currently renovating/expanding Julius Nyerere International Airport, better quality regional airports (especially in regions that are key to the tourism industry), and more domestic and international carriers are still needed.

Inflationand Exchange Rate Effects on Tourism Demand

Other determinants such as a high cost of living (as measured by the inflation rate) in the host country (Tanzania) has a negative impact on demand for tourism services (Table 8, column 6), while, favorable exchange rate (Tanzania shilling versus foreign) encourages demand of tourism services. The effects of inflation rate are significant (at one percent level) where Linear Dynamic Panel regression estimation technique is used (Table 8, column 6), with a 1% increase in the inflation rate in Tanzania, reducing demand for tourism product by 1.3 percentage points per year. Exchange rate effects are not robust across all model specifications.

Robustness Checks

Impact of Different Estimation Techniques on Tourism Demand

To ensure the robustness of our results; first, we employ various estimation techniques on the baseline model. Results reported in Table 8—based on estimation techniques that account for potential endogeneity problems (FE instrumental variable [column 2], SGMM [column 4], difference GMM [column 5], and Linear dynamic panel estimation [column 6]), and those that account for possible unknown correlation between variables (GEE population averaged [column 3])—all yield results similar to those in the baseline specification that use FE model. Specifically, the signs on the coefficients are consistent across all model specifications but there are minor variations in terms of level of significance and magnitude of effect.

Political Stability Effects on Tourism Demand

Second, we use different model specifications and apply the same estimation techniques mentioned above. Specifically, we introduce a proxy for government stability. African countries are generally assumed to be politically unstable, and most Western countries (where majority of tourists originate), tend to lump them as 'Africa' despite the heterogeneity across these countries. Thus, when one country is experiencing political instability, or social unrest, it tends to cause unintended negative externalities that usually impact other countries. For example, political unrest in Kenya, could deter tourists intending to visit the Serengeti national park or Ngorongoro conservation area given the proximity of these attractions to Kenya. Thus, it makes sense to include a variable in the model that would capture the effects of political stability/instability. Inclusion of this variable is consistent with related studies that have evaluated the determinants of tourism demand (using number of tourist arrivals as the dependent variable) for African countries (Naudé and Saayman 2005). The proxy used in this chapter is polity2 index from Polity IV project (Marshall and Jaggers 2011). It is measured on a scale of −10 to 10, with −10 indicating a strongly autocratic (political suppression) and 10 a strongly democratic (political freedom) political system. Results tabulated in Table 9 show that inclusion of the new variable does not change the findings observed in the baseline specifications in Table 8. Specifically, income of tourists and infrastructure development consistently enhance the number of tourists arriving in Tanzania with robust effects at 1% level of significance. The other determinants also carry the expected signs as previously discussed.

Table 9 Determinants of tourism demand in Tanzania, evidence from top tourist origin countries in Africa and OECD member countries (panel data estimation), 2000–2016

Variables	FE 1	FE-instrumental variable 2	GEE-population averaged 3	SGMM 4	Difference GMM 5	Linear dynamic panel estimation 6
GDP per capita	0.470***	0.470***	0.181**	0.044	0.324**	0.591***
	(0.128)	(0.128)	(0.092)	(0.028)	(0.184)	(0.139)
Infrastructure development	1.135***	1.135***	1.691***	0.923***	1.173***	0.819***
	(0.313)	(0.313)	(0.264)	(0.216)	(0.247)	(0.235)
Transportation cost	−0.273*	−0.273*	−0.235	−0.200	−0.072	−0.271***
	(0.162)	(0.162)	(0.163)	(0.146)	(0.097)	(0.053)
Relative exchange rate	0.270	0.270	0.393	0.160	−0.179	0.123
	(0.267)	(0.267)	(0.268)	(0.245)	(0.172)	(0.128)
CPI	−0.778	−0.778	−0.473	−0.623	−0.264	−1.000***
	(0.885)	(0.885)	(0.891)	(0.721)	(0.302)	(0.386)
Political stability	0.007	0.007	−0.012	−0.058***	−0.002	0.014
	(0.027)	(0.027)	(0.027)	(0.021)	(0.011)	(0.009)
Constant	2.976***		4.143***			
	(0.703)		(0.658)			
No. of instruments				125	32	174
Arellano−Bond test for zero autocorrelation in first-differenced errors [AR(2)], Prob > *z*				+ + 1	0.147	0.261
Sargan test of overidentifying restrictions (Prob > chi2)				0.230	0.970	0.960
Hansen-Sargan (*p*-value)		0.000 (+ + 2)				
No. of countries	15	15	15	15	15	15
No. of observations	225	225	225	225	195	210

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log. Models 4, 5 and 6 use GMM 2-step estimation. Instruments used in all cases are GMM-style (lagged values of independent variables). Sargan test: H0: overidentifying restrictions are valid. Arellano-Bond test: H0: no autocorrelation. + + 1 = Arellano-Bond test (artests) are not computed for one-step system estimator with VCE (GMM). + + 2 = equation exactly identified. Infrastructure development is proxied by percentage of the population with access to improved sanitation

Impact of Different Measures of Infrastructure Development on Tourism Demand

Next, we use a different measure of infrastructure development, specified as the percentage of population with access to electricity. As previously shown in the descriptive analysis, the infrastructure development measures have a high pairwise correlation, and thus we do not expect the results to change. Accordingly, results reported in Table 10 show consistency with those in the baseline estimations in Table 8.

Country-Level Analysis

Finally, we evaluate these issues using time series data for the 16 top tourist origin countries for Tanzania. Because of the sample size, we limit the number of independent variables to 5 and use stepwise regressions with OLS estimation technique. The objective of using stepwise regressions is to isolate those variables that are key in the tourist demand equation and unique to each source country. The findings are reported in Tables 11, 12, and 13 for African countries and 14, 15, 16, 17, and 18 for OECD member countries in the sample. These tables can be found in the appendix. In most cases and where significant, the results mimic those in the panel estimations. Specifically, increasing income per capita of tourist origin countries and infrastructure development in Tanzania, both enhance demand for tourism services. In other words, they lead to an increase in the number of tourists coming to Tanzania

However, this generalization overshadows the heterogeneity across the countries. Again, focusing only on those instances where these determinants are significant, we find that, in countries such as Uganda, Germany, and Sweden, income per capita has a negative sign. Also, infrastructure development in Tanzania, seems to deter tourists from the United States. However, these results should be taken with a grain of salt since they are not robust across all model specifications, and OLS estimation technique has been found to imposes certain biases on the regression results.

Summary of Results

Generally, the results above indicate that income of tourists and infrastructure development are the two main determinants of international tourism demand for Tanzania. These findings hold across model and sample specifications.

Table 10 Determinants of tourism demand in Tanzania, evidence from top tourist origin countries in Africa and OECD member countries (panel data estimation), 2000–2016

Variables	FE 1	SGMM 2	Difference GMM 3	Linear dynamic panel estimation 4
GDP Per Capita	0.655***	0.075***	0.447***	0.736***
	(0.102)	(0.026)	(0.098)	(0.091)
Infrastructure development	0.509***	0.228***	0.355***	0.382***
	(0.117)	(0.099)	(0.049)	(0.048)
Transportation cost	−0.172	−0.047	−0.194***	−0.179***
	(0.169)	(0.151)	(0.059)	(0.066)
Relative exchange rate	0.139	−0.045	−0.447***	0.015
	(0.274)	(0.259)	(0.124)	(0.137)
CPI	0.298	0.994	0.071	−0.579
	(0.926)	(0.684)	(0.389)	(0.372)
Constant	2.743***			
	(0.719)			
No. of Instruments		35	33	189
Arellano−Bond test for zero autocorrelation in first-differenced errors [AR(2)], Prob > *z*		+ + 1	0.120	0.311
Sargan test of overidentifying restrictions (Prob > chi2)		0.733	0.995	0.960
Hansen-Sargan (*p*-value)				
No. of countries	15	15	15	15
No. of observations	240	240	210	225

Note ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log. Models 4, 5 and 6 use GMM 2-step estimation. Instruments used in all cases are GMM-style (lagged values of independent variables). Sargan test: H0: overidentifying restrictions are valid. Arellano-Bond test: H0: no autocorrelation. + + 1 = Arellano-Bond test (artests) are not computed for one-step system estimator with VCE (GMM). Infrastructure development is proxied by percentage of the population with access to electricity

Other factors such as transportation cost, cost of living in the host country (as measured by consumer price index), and relative exchange rate bear the right sign where significant.

Focusing on panel estimations in Table 8 and in instances where the coefficients are significant; we find that a one percentage point increase in GDP per capita of the tourist's origin country leads to roughly between 0.1 and 0.6% increase in the number of tourists arriving in Tanzania per year. On other hand, an improvement in the infrastructure development by 1%, leads to even more traffic of tourists to Tanzania annually of about 0.6–1.2%.

Contrary to the effects of income of tourists and infrastructure development in Tanzania, an increase in transportation cost is detrimental to the demand of Tanzania's tourism products. Specifically, when transportation cost increases by one percentage point, the number of tourists coming to Tanzania decreases by 0.1–0.3 percentage points every year. Inflation also has negative effects on tourism demand; equivalent to 1.3% decrease in the number of tourists visiting Tanzania annually, with every 1% increase inflation rate.

6 Conclusion, Policy Implications, and Recommendations

Conclusion

The general objective of this chapter is to establish how Tanzania could increase the number of international tourists' arrivals, and in turn, enhance the sector's effectiveness in contributing to the country's second 5-year development plan. This general objective was achieved by addressing two specific objectives; first, by empirically investigating the relevant determinants of international tourism demand for Tanzania. Broadly, these factors are categorized as economic (income of tourists, infrastructure development, transportation cost, cost of living in the host country and relative exchange rate) and political (polity2 index, which measures the extent to which a country is a democracy vis-à-vis autocracy. This index is a broad measure of the health of political institutions in the country) factors. Second, the chapter uses the findings to inform evidence-driven policies. The empirical analysis uses panel data for Tanzania's top fifteen tourist source countries, during the 2000–2016 period. The sample selection is based on the countries that had the number of tourists visiting Tanzania during most of the study period consistently above 1000.

Generally, results from the econometric analysis indicate that income of tourists and infrastructure development are the two main determinants of international tourism demand for Tanzania. These findings hold across model and sample specifications. Other factors such as transportation cost, cost of living in the host country (as measured by consumer price index), and relative exchange rate bear the right sign where significant. These findings are consistent with predictions of hypotheses 1–2.

Focusing on panel estimations in Table 8 and in instances where the coefficients are significant; we find that a one percentage point increase in GDP per capita of the tourist's origin country leads to roughly between 0.1 and 0.6% increase in the number of tourists arriving in Tanzania per year. On other hand, an improvement in the infrastructure development by 1%, leads to even more traffic of tourists to Tanzania annually of about 0.6–1.2%.

Contrary to the effects of income of tourists and infrastructure development in Tanzania, an increase in transportation cost is detrimental to the demand of Tanzania's tourism products. Specifically, when transportation cost increases by one percentage point, the number of tourists coming to Tanzania decreases by 0.1–0.3 percentage points every year. Inflation also has negative effects on tourism demand; equivalent to 1.3% decrease in the number of tourists visiting Tanzania annually, with every 1% increase inflation rate.

Policy Implication

General Policy Recommendations

Taking into consideration the findings in this chapter, we recommend the Government of Tanzania and its stakeholders to work toward making Tanzania tourism products more competitive by developing/improving infrastructure in the country. Tanzania's international visitors' exit survey reports point to the need for improvement/development of roads and other (transport) infrastructure, cleanliness of public washrooms, and easing congestion on the roads. Moreover, there should be a policy that encourages developing tourism packages that fit the demands of tourists from relatively high-income countries, and also make conscious efforts to market these products in the target countries.

The number of tourists originating from neighboring and other African countries should not be ignored, since transportation cost is one of the factors that influence tourism demand. At a regional level, improving transportation network across these countries could also boost the inflow of tourist to Tanzania, but at the home front, Tanzania could ease visa requirements from

the target countries. Lowering the cost of living and improving the exchange rate are also some of the areas that the government could work on to help grow the tourism industry.

Tanzania National Tourism Policy

The Tanzania national tourism policy paper was published in 1999 (MNRT 1999). This policy is currently under review for revision, and therefore, an updated one has not been published. Nonetheless, below are excerpts from existing specific policy strategies of the tourism policy as they pertain to the findings in this chapter:

1. Policy strategies for product development (MNRT 1999, p. 8)
    a. Enhancing the existing tourist products and developing others
    b. Developing infrastructure, increasing and improving accessibility to tourist products
2. Policy strategies for marketing (MNRT 1999, p. 9)
    a. Identifying and locating the target market with a view towards putting into place cost-effective means of communication and influencing the market segments identified
    b. Promoting the image of Tanzania's quality resorts and diverse cultural and tourist attractions and its position as a leading destination for wildlife viewing and hunting expeditions
3. Policy strategies for international and regional cooperation (MNRT 1999, p. 13)
    a. Acquiring and maintaining membership, and making use of Tanzania's membership in various international and regional cooperation organizations and ventures that are beneficial to Tanzania's tourism industry
    b. Optimizing and utilization of international markets and the marketing systems of the tourism industry
    c. Co-operating in the regional and international exchange of information likely to influence the tourist industry (e.g. information on health, internal security, technology, standards, and legal provisions)
    d. Putting into place a mechanism to ensure that private foreign investments enter, and are coordinated and protected in accordance with the provisions of the Investment Policy and the Investment Code
4. Policy strategies for infrastructure development (MNRT 1999, p. 15)

a. Upgrading, developing, and maintaining a multi-modal transport system of surface (road and rail), marine, and air transport in national network of complementary grids and feeders that is friendly to the environment through EIA
b. Enhancing the provision of national infrastructure networks through the maintenance of links between national entry and exit points as well as important international networks
c. Encouraging adequate, high quality, efficient and environmentally friendly communication services responsive to the increasing needs of the tourism sector
d. Providing support and assistance for the renewal, upgrading and replacement of existing accommodation facilities and the establishment of additional facilities of the kind
e. Ensure that EIA is undertaken for each infrastructure development in tourist areas

5. Policy strategies related to the government's role as a regulator (MNRT 1999, p. 23)

a. Putting into place conducive macro-economic, social, and political policies
b. Providing and maintaining law and order and ensuring the safety and security of residents and visitors alike

6. Policy strategies related to safety and security for tourists

a. Undertake both short- and long-term actions and strategies to reduce crime on tourists in collaboration with relevant organizations such as the Tanzania police
b. Ensure that adequate resources are devoted to providing for the safety of tourists.
c. Coordinate cooperation among appropriate stakeholders to work together to ensure the safety and security of all tourists

The Tanzania Tourist Board was legally established under the Tanzania Tourist Board act, CAP 364 of 1962 and amended by act No. 18 of 1992 with a sole mandate of promoting and developing all aspects of tourism industry in Tanzania, which includes marketing Tanzania's tourism industry nationally and internationally. Specifically, the board is commissioned to (MNRT 1999, p. 26):

I. Promote Tanzania's tourism potential abroad and within the country

II. Conduct publicity campaigns (advertising, public relations, road shows, etc.) within the objectives of attracting more tourists
III. Preparation and publication of destination brochures and other promotional literature
IV. Provide tourist information through the establishment of tourist information centers within Tanzania

The Link Between the National Tourism Policy and the Chapter's Policy Recommendation

Income of Tourists: The National policy strategies for product development, marketing, and international and regional cooperation are in line with our recommendations for the government to proactively market Tanzania's tourism products. As mentioned above, the Tanzania Tourism Board (TTB) is the body concerned with marketing the sector. The question now is whether the marketing is done in a way that targets specific relatively high-income countries that form the market for Tanzania's tourism products. Note that the target countries should include African countries as well. On this basis, we recommend that as the MNRT work on revising the national tourism policy, it should also evaluate the current marketing strategies and find ways to formulate strategies that optimize market segmentation.

Infrastructure Development: Infrastructure encompasses several aspects that include both physical (roads, rail, airports, ports, electricity, water, and sanitation) and soft infrastructure (information and communication technology, safety and security) (AEO 2018). These infrastructure facilities tend to go hand in hand, whereby, where you find one that is well-developed; you will inevitably find the other. For example, you will tend to find a high percentage of the population with access to electricity, sewage, and clean water in urban areas, as well as high road density, airports, and rail. This applies to the penetration of internet and mobile telephony services as well as and facilities that enhance public safety and security. This suggests two things; first, that the level infrastructure development could signify a country's level of economic development; and second, any of these infrastructure could be used to measure the degree of general infrastructure development in a country. As previously shown, there is a very high correlation among the various measures of infrastructure development.

The findings of this chapter show that infrastructure development in Tanzania is an important determinant of tourism demand. The is true regardless of the measure of infrastructure used (see baseline results in Table 8 and robustness checks results in Table 9). Consistent with these findings and

our recommendations above, MNRT has a national policy on infrastructure development as shown in policy strategies for infrastructure development documented above. But from a practical perspective; the government of Tanzania has been making concerted efforts in recent years (in partnership with development partners such as African Development Bank, World Bank, and China) to improve infrastructure in the country as evidenced by the current massive investments in renovating and expanding Julius Nyerere International airport, road and standard gauge rail constructions from Dar es Salaam to Morogoro, Dodoma and Mwanza, and increasing the percentage of population with access to electricity through rural electrification program and improving access to piped water. Also, the MNRT has been proactively attracting 'high-end' tourists who are willing to pay more for specialized tourism products.

While these government measures are in line with our policy recommendations mentioned above, more has to be done; including improving the quality of hospitality facilities, expanding internet access and mobile cellular coverage (especially in the national parks and other attraction areas), ensuring public safety and security, cleanliness of public washrooms, and easing congestion on the roads.

Transportation Cost: Transportation cost is highly tied to the infrastructure development, especially, transport infrastructure. Thus, the policy strategies for infrastructure development if well implemented, should have huge spillover effects on the cost of transportation. As previously mentioned the government of Tanzania recently revived Air Tanzania, and is currently expanding Julius Nyerere International Airport. Also, there is massive road construction and rail, with an intention of making the different regions within the country, and neighboring countries more accessible. However, more is needed in terms of increasing the number of domestic and international air carriers, and improving the quality of regional airports (especially in regions that are key to the tourism industry). These changes will improve access to tourist attractions by lowering travel cost, and therefore, would have a positive effect on the cost of transportation.

Inflation and Exchange Rate: The MNRT policy strategies related to the government's role as a regulator should address macroeconomic aspects as they pertain to inflation and foreign exchange. So far, in Tanzania, (as it has been in many African countries), the inflation rate has been relatively low, and there has been an improvement in the forex policy in the last 5 years (Economic Survey Report 2017). This suggests that the country is already taking proactive measures to address some of the constraints that are hindering the expansion of the tourism sector.

Political Stability: Policy strategies related to safety and security for tourists, directly address the issue of political stability. Compared to its neighboring countries, Tanzania has not had civil war/strive or social unrest in recent years. However, the most recent developments that have popped up in the news relating to the government policies on human rights (Burke 2018; Sopelsa 2018), freedom of press and speech (Wanjiru 2018; Nyabola 2018), crack down on opposition (Schwikowski 2017; Ng'wanakilala 2016) could have unintended negative effect on the tourism sector, especially in Western countries.

Limitations of the Chapter and Recommendations for Further Research

It is important that readers of this chapter interpret the results, and conclusions within the backdrop of limitations that were beyond our control. First, the tourist arrivals variable used is an aggregate measure that ignores pertinent issues such as purpose of travel, length of stay, amount spent within the country, and the sectors in which this money was spent. Understanding these issues and incorporating them in research could help provide targeted policy recommendations. For example, these issues could inform decisions on what amenities to provide (conference centers if purpose is business), market segmentation (based on tourists' income), and finally understanding how to provide meaningful linkages between the tourism sector and allied industries.

In terms of econometric analysis, an aggregate variable (such as tourist arrivals) may affect the sizes of elasticities obtained. For instance, UNWTO (2016) identifies leisure tourism, visiting friends and relatives, business and professional travel, and travel for religious purposes as the four major reasons for travel. By simple looking at the number of arrivals and ignoring these 'reasons for travel', obscure the economic principles, which suggest that business travelers are less sensitive to price changes than leisure travelers. Unfortunately, sufficient detailed data on purposes of travel to African countries are not available.

Second, this chapter uses annual data, which masks interesting seasonal effects (Brännäs et al. 2002). For example, evidence in Fig. 6 showed that more tourists arrived in the second half of the year; from July onward compared to the first 6 months of the year. Again, while monthly data would have been useful to capture the impact of these seasonal variations, such data (with exception of tourist arrivals) is not available for most of the variables used in this chapter.

As it is with most studies, there is always room for improvement, and opportunities for more research. The same applies to this chapter. Follow-up studies could take the aforementioned shortcomings into consideration, and use them to develop new studies. This will not only help to inform targeted policies, but also, provide more understanding into Tanzania's tourism sector. Specifically, future studies should consider using disaggregated and monthly data as such data become available.

Appendix

See Tables 11, 12, 13, 14, 15, 16, 17, and 18.

Notes

1. Some studies have used pop instead of GDP as a measure of a country/region's economic mass (Taplin and Qiu 1997).
2. Also, notice that the standard deviation (38,367) of the number of tourists visiting Tanzania during the study period is higher than the mean, which is due to the nature of the distribution of the number of tourist arrivals (skewed to the right). Moreover, the country (Kenya) with the maximum number of tourist coming to Tanzania supplied almost 4 times as much tourists as the countries with the minimum number (Israel), and three times as much tourists as the country supplying the second largest number of tourists (see Table 5, column 1). Thus, the higher range (difference between the maximum and minimum values) of 23,931 is reflected in the standard deviation.
3. Data used is from World Bank's African Development Indicators' database. The most recent year available is 2012. Data on roads is not available.
4. Data used is from World Bank's African Development Indicators' database. The most recent year available is 2012. Data on roads is not available.

Table 11 Determinants of tourism demand in Tanzania, evidence from Burundi and Kenya (Stepwise Regressions, OLS), 2000–2016

	Burundi					Kenya				
Variables	1	2	3	4	5	1	2	3	4	5
GDP Per Capita	2.691***	0.915	2.956**	2.617**	2.125	−0.357	−0.317	−0.504	−0.157	−0.350
	(0.491)	(1.308)	(1.145)	(1.172)	(1.354)	(0.852)	(0.306)	(0.304)	(0.330)	(0.451)
Infrastructure development		2.814	3.517**	3.812**	4.909**		1.437***	1.518***	1.363***	1.485***
		(2.134)	(1.601)	(1.606)	(2.167)		(0.164)	(0.159)	(0.165)	(0.253)
Transportation cost			−2.077***	−2.129***	−2.255***			0.380	0.235	0.310
			(0.613)	(0.608)	(0.641)			(0.220)	(0.213)	(0.248)
Relative exchange rate				1.555	2.428				−0.938*	−0.620
				(1.388)	(1.810)				(0.498)	(0.708)
Governance					−0.115					−0.022
					(0.149)					(0.034)
Constant	−4.261	−2.116	0.894	2.165	2.751	11.976***	8.351***	8.148***	8.554***	8.231***
	(2.549)	(2.669)	(2.176)	(2.433)	(2.592)	(0.095)	(0.412)	(0.399)	(0.419)	(0.658)
R-square	66.7	69.41	84.4	85.97	86.76	1.24	86.62	89.5	92.24	92.59
Adjusted *R*-square	64.49	64.70	80.5	80.86	80.13	5.81	84.4	86.6	89.13	88.47
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 12 Determinants of tourism demand in Tanzania, evidence from Rwanda and South Africa (stepwise regressions, OLS), 2000–2016

	Rwanda					South Africa				
Variables	1	2	3	4	5	1	2	3	4	5
GDP Per Capita	1.271***	−0.160	1.245	1.493	1.364	0.449***	0.421**	0.950***	0.485	0.291
	(0.195)	(0.793)	(1.093)	(1.210)	(1.324)	(0.136)	(0.217)	(0.239)	(0.564)	(0.816)
Infrastructure development		4.338*	3.210	3.358	3.865		0.058	0.963**	1.307**	1.578
		(2.431)	(2.352)	(2.436)	(2.986)		(0.487)	(0.477)	(0.610)	(1.015)
Transportation cost			−2.008*	−2.113*	−2.283			−0.831***	−0.791***	−0.787
			(1.153)	(1.203)	(1.361)			(0.268)	(0.273)	(0.285)
Relative exchange rate				−1.146	−0.728				0.506	0.667
				(2.051)	(2.499)				(0.554)	(0.745)
Governance					−0.049					−0.021
					(0.154)					(0.061)
Constant	2.048*	−0.191	9.15	9.007	9.412	6.394***	6.467	6.369	6.617***	6.745***
	(1.177)	(1.822)	(5.627)	(5.801)	(6.181)	(1.163)	(1.063)	(0.825)	(0.873)	(0.985)
R-square	73.93	77.54	82.1	82.57	82.75	42.08	52.10	73.4	75.29	75.58
Adjusted *R*-square	72.19	74.09	77.6	76.23	74.12	38.22	44.73	66.8	66.30	63.36
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, ** $p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 13 Determinants of tourism demand in Tanzania, evidence from Uganda and Zambia (stepwise regressions, OLS), 2000–2016

	Uganda					Zambia				
Variables	1	2	3	4	5	1	2	3	4	5
GDP Per Capita	0.313***	−0.454	−0.665*	−0.694	−0.823**	0.970***	1.145***	1.269***	2.146***	2.907**
	(0.078)	90.282)	(0.361)	(0.402)	(0.412)	(0.104)	(0.297)	(0.452)	(0.845)	(1.324)
Infrastructure development		1.978***	2.150***	2.196***	2.755***		−0.659	−0.652	−3.074	−5.296
		(0.718)	(0.743)	(0.807)	(0.932)		(1.114)	(1.153)	(2.285)	(3.749)
Transportation cost			0.298	0.349	0.267			−0.219	−0.269	−0.525
			(0.315)	(0.412)	(0.412)			(0.588)	(0.578)	(0.680)
Relative exchange rate				−0.808	−0.152				−1.546	−2.109
				(0.399)	(0.398)				(1.268)	(1.492)
Governance					−0.044					0.107
					(0.039)					(0.141)
Constant	8.462***	8.159***	6.792***	6.439***	6.364***	3.541***	3.998***	4.827*	13.899*	19.440*
	(0.471)	(0.423)	(1.507)	(2.344)	(2.311)	(0.715)	(1.157)	(2.530)	(7.843)	(10.844)
R-square	51.99	68.45	70.6	70.75	74.17	85.25	86.31	86.5	88.07	88.72
Adjusted *R*-square	48.79	63.60	63.30	60.11	61.26	84.27	84.20	83.1	83.74	83.08
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 14 Determinants of tourism demand in Tanzania, evidence from Canada and France (stepwise regressions, OLS), 2000–2016

	Canada					France				
Variables	1	2	3	4	5	1	2	3	4	5
GDP per capita	0.963***	0.468*	0.847**	1.587**	1.246	0.385*	−0.337	0.087	0.369	−1.052
	(0.130)	(0.260)	(0.367)	(0.644)	(0.807)	(0.223)	(0.323)	(0.445)	(0.959)	(1.116)
Infrastructure development		0.946**	1.586***	2.597***	2.771***		1.287***	1.913***	1.309	1.342
		(0.461)	(0.635)	(0.957)	(1.006)		(0.469)	(0.651)	(1.301)	(1.283)
Transportation cost			−0.558	−0.637	−0.614			−0.671	−0.650	−0.722
			(0.395)	(0.386)	(0.395)			(0.499)	(0.516)	(0.513)
Relative exchange rate				−0.916	−0.726				0.530	1.053
				(0.666)	(0.728)				(0.979)	(1.067)
Governance					−0.038					−0.078
					(0.052)					(0.068)
Constant	−0.630	2.225	1.765	1.464	0.154**	5.987***	10.345	10.755***	12.948***	16.813***
	(1.378)	(1.787)	(1.753)	(2.893)	(3.692)	(2.337)	(2.538)	(2.482)	(4.789)	(5.794)
R-square	78.40	85.00	87.14	89.03	89.58	16.56	47.07	53.98	55.18	60.41
Adjusted *R*-square	76.96	82.70	83.92	85.04	84.38	10.99	38.92	42.47	38.88	40.62
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 15 Determinants of tourism demand in Tanzania, evidence from Germany and Israel (stepwise regressions, OLS), 2000–2016

	Germany					Israel				
Variables	1	2	3	4	5	1	2	3	4	5
GDP per capita	1.126***	−0.821**	−0.409			2.587***	−0.874	−0.089	0.673	1.159
	(0.331)	(0.375)	(0.586)			(0.515)	(1.246)	(1.401)	(1.621)	(1.461)
Infrastructure development		3.110***	3.263***				5.045***	6.382***	11.268**	11.063**
		(0.557)	(0.585)				(1.945)	(2.234)	(5.624)	(4.999)
Transportation cost			−0.412					−0.853	−0.725	−0.048
			(0.447)					(0.731)	(0.747)	(0.746)
Relative exchange rate									−3.329	−4.938
									(3.513)	(3.226)
Governance										0.229**
										(0.116)
Constant	−1.593	11.123***	10.368***			−18.279***	4.308	0.669	−1.259	−2.357
	(3.483)	(2.784)	(2.918)			(5.258)	(8.225)	(8.692)	(8.964)	(7.986)
R-square	43.56	84.02	85.08			62.63	74.51	77.11	78.83	84.80
Adjusted *R*-square	39.80	81.56	81.34			60.14	70.59	71.38	71.14	77.20
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, ** $p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 16 Determinants of tourism demand in Tanzania, Evidence from Italy and Netherlands (stepwise regressions, OLS), 2000–2016

	Italy					Netherlands				
Variables	1	2	3	4	5	1	2	3	4	5
GDP Per Capita	2.775***	2.336***	4.448***	−1.724	−1.452	0.686***	0.369	0.928***	0.203	0.153
	(0.386)	(0.537)	(0.743)	(1.526)	(1.835)	(0.214)	(0.327)	(0.3779)	(0.754)	(0.887)
Infrastructure development		0.857	0.419	6.699**	−6.591		0.566	2.155***	1.118	1.154
		(0.729)	(1.725)	(2.90)	(3.051)		(0.514)	(0.833)	(1.249)	(1.338)
Transportation cost			0.288	0.600	0.626			−1.194**	−1.226***	−1.247**
			(1.021)	(0.824)	0.865)			(0.5287)	(0.525)	(0.572)
Relative exchange rate				4.946***	4.704**				0.968	1.011
				(1.773)	(2.022)				(0.875)	(0.978)
Governance					0.031					−0.008
					(0.106)					(0.066)
Constant	−18.215***	−15.821***	−16.061***	2.973	1.445	2.351	4.302	5.865***	9.385	9.712**
8	(3.998)	(4.448)	(4.692)	(7.787)	(9.616)	(2.284)	(2.574)	(2.348)	(3.940)	(4.875)
R-square	77.49	81.22	81.35	89.07	89.17	40.67	49.97	64.90	68.42	68.47
Adjusted *R*-square	75.99	78.33	76.68	85.10	83.75	36.72	42.28	56.12	56.93	52.70
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 17 Determinants of tourism demand in Tanzania, evidence from Norway and Sweden (stepwise regressions, OLS), 2000–2016

	Norway					Sweden				
Variables	1	2	3	4	5	1	2	3	4	5
GDP per capita	1.271***	−0.160	1.245	1.493	1.363	−0.0153	−1.284***	−0.591	1.997*	1.944
	(0.195)	(0.793)	(1.093)	(1.210)	(1.324)	(0.291)	(0.525)	(0.766)	(1.099)	(1.338)
Infrastructure development		4.338*	3.210	3.358	3.865		2.0153***	2.799***	5.363***	5.397***
		(2.431)	(2.352)	(2.436)	(2.986)		(0.853)	(1.055)	(1.234)	(1.362)
Transportation cost			−2.01	−2.113	−2.283			−0.974	−0.359	−0.378
			(1.153)	(1.203)	(1.361)			(0.797)	(0.670)	(0.743)
Relative exchange rate				−1.146	−0.727				3.592***	−3.546***
				(2.051)	(2.499)				(1.269)	(1.455)
Governance					−0.049					−0.007
					(0.154)					(0.085)
Constant	2.048*	−0.190	9.151	9.006	9.412	10.894***	17.993***	18.158***	3.649	−3.213
	(1.176)	(1.823)	(5.627)	(5.801)	(6.181)	(3.123)	(3.914)	(3.844)	(8.292)	(10.315)
R-square	73.93	77.54	82.07	82.57	82.75	0.02	32.18	39.68	65.09	65.11
Adjusted *R*-square	72.19	74.09	77.59	76.23	74.12	0.01	21.75	24.60	52.39	47.66
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

Table 18 Determinants of tourism demand in Tanzania, evidence from United Kingdom and United States (stepwise regressions, OLS), 2000–2016

	United Kingdom (14)					United States (15)				
Variables	1	2	3	4	5	1	2	3	4	5
GDP per capita	0.974***	0.680***	0.652***	0.180	−0.379	2.019***	3.598***	3.765***	4.289***	4.301***
	(0.180)	(0.224)	(0.233)	(0.683)	(0.656)	(0.189)	(0.879)	()0.984)	(0.868)	(0.894)
Infrastructure development		0.435*	0.145	−0.478	−0.507		−1.401**	−1.361**	−0.002	−0.092
		(0.249)	(0.516)	(0.995)	(0.872)		(0.730)	(0.759)	(0.868)	(0.906)
Transportation cost			0.164	0.272	0.185			−0.143	−0.202	−0.309
			(0.254)	(0.297)	(0.263)			(0.327)	(0.280)	(0.337)
Relative exchange rate				0.545	1.109				−1.157***	−0.977
				(0.738)	(0.701)				(0.493)	(0.586)
Governance					−0.071***					−0.021
					(0.034)					(0.034)
Constant	0.569	2.586	2.105	3.514	**5.932	−10.845***	−24.317***	−24.867	−25.057***	−25.259***
	(1.906)	(1.969)	(2.148)	(2.905)	(2.799)	(2.029)	(7.672)	(8.021)	(6.841)	(7.051)
R-square	66.11	76.09	76.90	77.99	84.63	88.41	89.47	89.63	93.09	90.01
Adjusted *R*-square	63.85	72.41	71.12	69.98	76.94	87.64	87.85	87.04	90.58	90.88
No. of observations	17	16	16	16	16	17	16	16	16	16

Notes ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. All variables are expressed in natural log

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Banking Services and Inclusive Development in Sub-Saharan Africa

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1 Introduction

Africa's financial system is largely dominated by banks (Beck and Levine 2004). Thus, one would expect that this dominance of banks in Africa's economy should bring about development to a large segment of the population. However, evidence is lacking in this respect. Much of the literature on the effect of banking on African economies focuses on economic growth (see Demetriades and James 2011; Ibrahim and Alagidede 2018; Issahaku 2019; Rousseau and D'Onofrio 2013) and much less on growth inclusiveness. Even the global literature focuses on the finance-growth nexus ignoring inclusive development (see King and Levine 1993; Levine and Zervos 1998).

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It has now become clear that economic growth, though imperative, does not necessarily lead to economic development or more precisely, inclusive development. First, growth can occur but very few individuals might benefit from this growth leading to inequality. Second, economic growth may lead to the production of negative externalities (e.g., air pollution, noise pollution), the consumption of which can injure social welfare. Third, economic growth might come at the cost of over exploitation of resources, which can damage sustainable development. Fourth, economic growth is a poor and misleading measure of economic development given how it is calculated. In other words, a country could be earning 90% of its income from the natural resources sector, which is highly mechanized and its income distribution is largely to the government and companies engaged in the extraction. Based on this analysis, this chapter deviates from much of the existing knowledge base by examining the impact of banking services on inclusive development.

In as much as the banking sector controls the financial system in Africa, corruption is equally, if not more pervasive on the continent. According to the Corruption Perception Index (CPI) for 2017 and 2018, Africa has the worst record in the world in terms of corruption perception (Transparency International 2018, 2019). Indeed, 6 African countries (Somalia, South Sudan, Sudan, Libya, Guinea Bissau, and Equatorial Guinea) were among the worst 10 performers in terms of corruption perception in 2017 and 2018 (Transparency International 2018, 2019). The problem with pervasive corruption is that it can obstruct economic growth, distort markets and prevent the efficient allocation of resources (Dantani and Muftau 2017), thereby becoming detrimental to inclusive development. Also, corruption can hinder banks from effectively performing their financial intermediation functions. This means that African countries that are able to control corruption stand to have a better handle on pro-poor development agenda. In this regard, this chapter further assesses the impact of corruption on inclusive development in Africa.

The chapter contributes in many ways to the bank-economic development literature. First, it is among the very few studies (Fasih 2012; Sarma and Pais 2008) that have examined the link between banking sector development and inclusive development in the global and African banking literature. Second, to the best of our knowledge, this is the maiden attempt to assess the impact of corruption and banking services on inclusiveness of development in the same study. The chapter's contribution is further imperative because it transcends at least five of the Sustainable Development Goals (SDGs), namely, Goal 3 (good health and wellbeing), goal 4 (quality education), goal 8 (decent work and economic growth), goal 10 (reduced inequalities), and goal 16

(peace, justice, and strong institutions). Thus, the findings of this study could contribute to the discussions on attaining the SDGs.

The rest of the chapter is organized as follows. The next section describes stylised regularities on banking sector development, corruption and inclusive development in SSA. This is followed by a catalogue of the literature, and a discussion on the empirical strategy. The last two sections present empirical results and robustness test; and the conclusion, respectively.

2 Stylised Facts: Banking Sector Development, Corruption, and Human Development in Africa

Banking Sector Development in Africa

Table 1 reports selected banking sector development indicators (for depth, breadth, efficiency and stability) in SSA from 2011 to 2014. Africa's banking sector consistently lags behind the global average in the period under discussion. For instance, the credit to private sector as a percentage of GDP (which measures banking sector depth) was 16 for SSA relative to the global average of 40.

Similarly, bank accounts per 1000 adults (banking sector breadth) averaged 150.3 for SSA relative to the global mean of 511.7. Cost to income ratio (banking efficiency) was an average of 58% for SSA as compared to the global average of 55%, implying that it is more costly to do business with banks in SSA. In terms of stability, on the average, SSA banks have a higher non-performing loans and lower z scores than the global average. This indicates that the banking system in SSA is less stable compared to the global expectation.

Notwithstanding the dismal performance of SSA in terms of banking indicators, there are some positive trends. For instance, cost to income ratio declined from 60% in 2011 to 58% in 2014. Also, bank accounts per 1000 adults improved from 132 in 2011 to 150 in 2014. In the light of these indicators, this chapter investigates whether banking services in general and some of these improvements affect inclusive development in SSA.

Current State of Corruption in SSA

Though corruption is a global canker, it is more pervasive in SSA compared to elsewhere in the world. According to the Corruption Perception Index (CPI)

Table 1 Selected indicators of banking sector development in SSA

Banking Sector Development Indicator		Year				Period average
		2011	2012	2013	2014	
Depth						
Private credit by deposit money banks to GDP (%)	World	37.6	38.4	40.2	43.7	40.0
	SSA	16.4	16.4	16.5	15.7	16.3
Deposit money banks' assets to GDP (%)	World	45.1	48.9	49.8	52.7	49.1
	SSA	21.0	20.8	22.8	23.8	22.1
Breadth						
Bank accounts per 1000 adults	World	433.1	461.0	499.1	653.5	511.7
	SSA	132.2	157.9	153.4	157.7	150.3
Bank branches per 100,000 adults	World	14.1	13.2	13.9	15.5	14.2
	SSA	3.7	3.8	4.2	4.1	3.9
Efficiency						
Bank net interest margin (%)	World	4.2	4.1	3.8	2.7	3.7
	SSA	6.6	6.1	6.4	3.7	5.7
Cost to income ratio (%)	World	55.8	55.0	56.2	51.5	54.6
	SSA	60.0	60.9	61.2	49.5	57.9
Stability						
Bank *Z*-score	World	10.0	9.9	9.9	9.9	9.9
	SSA	8.0	8.4	7.7	7.7	8.0
Bank nonperforming loans to gross loans (%)	World	4.1	4.1	4.4	4.4	4.2
	SSA	5.6	4.6	5.1	5.2	5.1

Source World Development Indicators 2016 (World Bank 2016), online

of 2018, SSA was the lowest scoring region in the world in terms of the perception of citizens about corruption. SSA scored 32 out of 100 compared to the highest scoring region, Western Europe and European Union, which scored 66 out of 100. The CPI scores are ranked on a 100-point scale, where 0 means highly corrupt and 100 not being corrupt. According to Transparency International (2019), SSA has stagnated in fighting corruption. Out of 180 countries assessed globally in the 2018 CPI, 6 of the bottom 10 performers were found in SSA. Many countries in the region have struggled to translate anticorruption pledges into action owing to inefficient institutions, lack of political will and weak democratic governance. Globally, only 66% of the countries have a CPI score below 50, with a global average score of 43, which is a dismal performance. Thus, the data indicates that the fight against corruption should not just be an African agenda but a global one.

Inclusive Development in SSA

Globally, the focus has shifted from using economic growth as a measure of wellbeing, to "inclusive development" as the latter is well suited to measuring human progress. In this chapter, inclusive development is measured by the Human Development Index (HDI)[1] and the Inequality-adjusted-HDI (IHDI). Table 2 presents statistics on the HDI for several regions of the world including SSA over the period 1990–2017. The HDI scores are ranked on a 1-point scale, where 0 is the lowest score and 1 the highest. HDI values of less than 0.550 are classified as low human development, while 0.550–0.699, 0.700–0.799, and higher than 0.800; are classified as medium, high, and very high human development, respectively. Evidence in Table 2 shows that SSA lags behind all other regions in terms of human development, with a score of 0.537 (2017) relative to 0.728 for the world. This places SSA in the low human development category and the global average within the high human development bracket.

Notwithstanding the low HDI scores for SSA, there is some glimmer of hope. On average, there have been improvements in the HDI scores over the years. HDI score for SSA improved from 0.398 in 1990 to 0.537 in 2017. Though this still leaves the region in the low human development bracket, it shows that progress is being made, albeit rather slowly. There is a need

Table 2 Human Development Index: 1990–2017

	1990	2000	2010	2012	2014	2015	2016	2017
Developing Countries	0.515	0.570	0.642	0.657	0.669	0.673	0.678	0.681
Arab States	0.557	0.613	0.675	0.686	0.690	0.694	0.697	0.699
East Asia and the Pacific	0.517	0.597	0.692	0.707	0.720	0.725	0.730	0.733
Europe and Central Asia	0.653	0.668	0.733	0.749	0.761	0.764	0.767	0.771
Latin America and Caribbean	0.626	0.686	0.731	0.740	0.751	0.754	0.757	0.758
South Asia	0.439	0.503	0.584	0.602	0.618	0.625	0.634	0.638
Sub-Saharan Africa	0.398	0.421	0.498	0.514	0.526	0.531	0.534	0.537
Organisation for Economic Cooperation and Development	0.785	0.835	0.874	0.880	0.886	0.890	0.893	0.895
World	0.598	0.642	0.698	0.709	0.718	0.722	0.726	0.728

Source UNDP (2018)

to find innovative ways of improving human development in the continent in an accelerated fashion. One of this chapter's contributions is an attempt to uncover ways through which banking services and control of corruption could contribute to inclusive development in SSA. In this chapter, the HDI and IHDI are used as measures of inclusive development.

3 Theoretical Framework and Literature

Theoretical Review

The finance-led growth theory stems from Schumpeter (1911) who argued that a well-performing financial system boosts growth through innovation. He emphasized that enterprise is promoted through the financial system redirecting credit from less productive sectors of the economy to productive sectors that propel economic growth. This is referred to as the supply-leading hypothesis, which holds that economies can facilitate the process of growth by making available finances to innovative enterprises. The second theoretical strand for the finance-growth nexus is the McKinnon (1973) and Shaw (1973) theory of financial liberalization, which contends that a repressed financial market dampens savings, interferes with efficient resource allocation, augments financial market segmentation, constrains investments, and eventually depresses growth.

Embedded in the finance-growth nexus is the concept of inclusive development. According to Ali and Son (2007) and Ali and Zhuang (2007) there exist no agreeable definition of inclusive growth or inclusive development in the international community. However, Rauniyar and Kanbur (2010) defined inclusive development as "when all members of a society participate in and contribute to the growth process equally regardless of their individual circumstances" (p. 457). Inclusive development does not discriminate in terms of age, gender, class, clique, and faith; and is sensitive to changes in income, assets and opportunity for development (Huang and Quibria 2013).

The implication is that inclusive growth that creates economic opportunities should be available for all; including the poor in the society, in order for them to maximize their possible best. According to Gupta and Vegelin (2016) inclusive development places emphasis on social, ecological, and political dimensions of development.

We discuss the three cardinal principles of inclusive development which aim at reducing vulnerabilities arising from natural disasters and civil conflicts (Rauniyar and Kanbur 2010). The first principle is social inclusiveness,

which entails providing opportunities for all (in particular, the disadvantaged) to participate in society and benefit from the development process. Social inclusiveness is aimed at empowering the vulnerable through investment in human capital and increasing openings for participation. Gupta et al. (2014) suggest that social inclusiveness is based on five fundamental principles. (i) Ensuring that all are included in development opportunities; (ii) incorporating the knowledge of all (including the vulnerable) in crafting the development process; (iii) ensuring a social minimum through a higher level of protection for the most marginalized; (iv) customizing capacity building for the poor to help them capitalize upon development opportunities; and (v) involving everybody in the politics of development. When these principles are at work, individuals are empowered to effectively participate in society and to benefit from the same, thereby improving their ability to cope with risk and uncertainties.

Ecological inclusiveness which is the second principle of inclusive development refers to the control of resources and safeguarding the local ecosystem. Ecological inclusiveness can be addressed both from national and international perspectives. At the national front, it requires a prudent management of resources and ecosystem sustainability. At the global level, it entails countries being at peace with one another and using shared but differentiated responsibility for solving universal problems. Ecological inclusiveness has three strands. First, the livelihood argument perspective, which suggests that the poor survives on the ecosystem. Second, the vulnerability strand that dwells on how climate change can affect the vulnerability of the poor; and this requires building resilience of the poor. Third, the anthropocene argument, which states that the increasing demand for scarce land, water, and other resources may result in ecospace grabbing or transfers of these resources from the poor to the rich (see Zoomers 2010; Fairhead et al. 2012; Leach et al. 2012). This may push the poor into more vulnerable positions (Joyeeta Gupta 2014).

The third principle of inclusive development is relational inclusiveness. It projects the fact that ecological degradation and poverty are a result of actions taken by others due to increasing inequality and the substance and the process of politics in the society. Stakeholders of relational inclusiveness advocate the need to understand and address the issues of inequality, exclusion, and vulnerability in a multi-level manner.

The three dimensions of inclusiveness point to the fact that inclusive development is multidimensional, and for that matter, cannot be captured by a single variable such as income or poverty or inequality. Any measure of inclusive development must capture its multifaceted nature.

Empirical Literature Review

Owing to the theoretical postulation on the link between finance and growth from the Schumpeterian framework and the McKinnon and Shaw perspective; a series of empirical studies have been conducted. In this sub-section, we review the literature on the link between finance and growth and the nexus between finance and inclusive development.

Nexus Between Finance and Economic Growth

Making banking services inclusive for development requires making them affordable and available to all segments of the population, including poor households and small-scale businesses. Empirical research on inclusive banking services and growth is lacking. However, the link between finance and growth has thoroughly been investigated dating back to Schumpeterian and McKinnon and Shaw theories on the connection between finance and growth (see Demirgüç-Kunt and Detragiache 1998; Levine and Zervos 1998; Rajan and Zingales 1998; King and Levine 1993). In this sub-section we survey some of this literature.

Earlier empirical literature on the finance-growth connection used cross-sectional data to establish a positive link between growth and finance (see King and Levine 1993; Levine and Zervos 1998). The proxies for growth in these studies were average growth rate and productivity. However, a number of researchers raised issues of casual effects and endogeneity problems with these cross-sectional studies leading to panel data analysis in the early 2000s.

One of the studies that employed panel data analysis is Samargandi et al. (2015) who used data for 52 middle-income countries for the 1980–2008 periods to investigate the bond between financial development and economic growth. They found an inverted U-shaped long run link between finance and economic growth. The short run relationship was insignificant.

Another panel study conducted by Ibrahim and Alagidede (2018) on 29 SSA economies revealed that the degree to which the financial system supports economic growth hinges on the simultaneous growth of the real sector and the financial sector. They also discovered that the pass-through effect via the finance-growth nexus is stronger using an investment channel. The panel study led by Hsueh et al. (2013) concentrated on the nature of the causal link between finance and growth, and publicized that the causal direction is contingent on the proxy used for financial development. Their findings corroborate the supply-leading hypothesis.

In a more recent study, Issahaku (2019) employed SGMM for a sample of countries in SSA to show that banking services promote economic growth only in countries with a strong governance structure and well developed financial sector.

From a time series perspective, Adusei (2013) examined the finance-growth link for Ghana from 1971 to 2010 using three proxies of financial development. The author established that while domestic credit and broad money had a significant but adverse impact on the economy, credit to private sector had no significant effects; implying that financial development served as a drag on the Ghanaian economy.

Link Between Finance and Inclusive Development

The study of the relationship between finance and inclusive development is a recent phenomenon. Some recent studies have surveyed the link between inclusive finance and inclusive development. For example, Abor et al. (2018) showed that mobile telephony and financial inclusion significantly reduced the likelihood of a household becoming poor and increased household consumption. Also, Sarma and Pais (2011) established a positive correlation between human development and financial inclusion. Their finding also strengthens the fact that financial exclusion derives from social exclusion.

Asongu and Le Roux (2017) investigated the effect of information communication technology (ICT) on inclusive development for a sample of 49 African countries and discovered that policies that promoted ICT penetration also helped to increase inclusive development in Africa. However, their results varied across different measures of inclusive development. In a related study, Asongu and Nwachukwu (2016) studied the implications of governance and mobile telephony for inclusive human development in SSA and found that, mobile phones and political, institutional, and economic governance enhanced inclusive development.

The work of Fasih (2012) demonstrated that Islamic banking is capable of fostering inclusive growth by uplifting vulnerable groups such as farmers and SMEs. This is because the concept of profit and risk sharing in Islamic banking makes credit affordable to disadvantaged groups. Similarly, Corrado and Corrado (2017) opined that access to banking services has a significant and positive relationship with a nation's economic performance. However, they also argued that there is a possibility of a reverse causation between economic growth and banking sector development.

4 Empirical Strategy

Conceptualizing Inclusive Development

Inclusive development is easier to define than to measure largely because of its multidimensional nature and the paucity of data. Its multidimensional nature makes it inappropriate to use single measures such as poverty, income, inequality among others as measures. In this regard, this study employed the measures of inclusive development developed by the United Nations Development Programme (UNDP) and disseminated in annual Human Development Reports. Particularly, we used the Human Development Index (HDI) and the Inequality Human Development Index (IHDI). These two measures of inclusive development quantify three main dimensions of human progress: long and healthy life; knowledge; and decent living standard. Each dimension consists of sub-indicators as shown in Fig. 1. The main difference between the HDI and the IHDI is that the IHDI adjusts the HDI for inequalities in the three dimensions of human development. Thus, the IHDI is more inclusive than the HDI. The values of the HDI/IHDI range

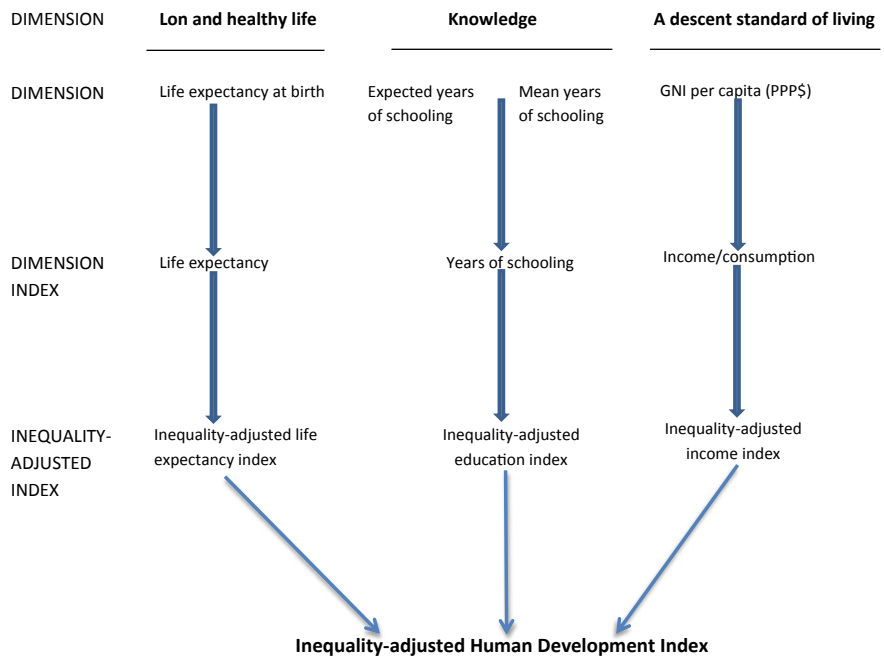

Fig. 1 Inequality-adjusted human development index (*Source* UNDP [http://hdr.undp.org/en/content/inequality-adjusted-human-development-index-ihdi.], online)

from 0 to 1, with 0 being the lowest human development and 1 being the best human development. HDI/IHDI values lower than 0.550 are classified as low human development, 0.550–0.699 as medium human development, 0.700–0.799 as high human development, and 0.800 or greater as very high human development.

We have chosen the UNDP indices as our measures of inclusive development because the dimensions they cover are very useful for monitoring human progress and sustainability. Unlike GDP (the most commonly used measure of welfare), these measures capture inclusive income, life expectancy, healthy leaving, and educational attainments. Also, our measures of inclusiveness are available for many economies worldwide over a fairly long-time span which allows for panel analysis. Lastly, the selected measures cover at least four of the 17 SDGs: Goal 3 (good health and wellbeing), goal 4 (quality education), goal 8 (decent work and economic growth) and goal 10 (reduced inequalities). The main weakness of these measures of inclusive development is that they do not address issues of security, environmental sustainability and women empowerment. Nonetheless, they offer insights that are useful for empirical work on sustainable human development.

The Econometric Model

The empirical model used for this chapter is anchored on the Schumpeterian and McKinnon and Shaw theories on the finance-growth association presented in Sect. 3, the empirical literature (see King and Levine 1993; Levine and Zervos 1998; Issahaku 2019), and the conceptualization of inclusive growth discussed in section "Conceptualising Inclusive Development". The model is specified as follows:

$$\begin{aligned} Inclusive\ development_{i\tau} &= \beta_0 + \beta 1\ Banking\ Services_{i\tau} \\ &+ \beta_2 Corruption\ control_{i\tau} + \beta_3 Interation_{i\tau} \\ &+ \beta_4 Capital_{i\tau} + \beta_5 Population_{i\tau} + \beta_6 Trade_{i\tau} + \varepsilon_{i\tau} \end{aligned} \quad (1)$$

Where inclusive development is proxied by HDI and IHDI. *Banking Services* is measured by private sector credit provided by banks as a ratio of GDP because the provision of credit is one of the most important functions of banks (Issahaku 2019). *Corruption control* is a measure of the perception of corruption in a particular country as developed by Kaufmann et al. (2011) and integrated into the World Governance Indicators (WGI). According to the WGI, the control of corruption variable measures the "perceptions of the

extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests." Control of corruption is a continuous variable and ranges from 0 to 100; 0 signals worst corruption control while 100 indicates the best corruption control. *Population* is the growth rate of the population. The other control variables (trade and capital formation) are expressed as ratios of GDP. These variables are included in the model as controls based on Issahaku (2019). The rationale for the inclusion of each control variable is espoused below.

A high population growth rate is indicative of a growth in market size and in this sense should promote inclusive development. However, if many citizens are unemployed and/or unproductive, a high population growth may lower inclusive development. Again, if the population grows faster than the rate of expansion of the economy, this may reduce growth inclusiveness.

Economies with high trade openness are expected to earn more foreign exchange, embrace new ways of doing things and expand the range of goods and services available for consumption. This may improve wellbeing. The greater the capital stock, the greater the productive capacity of a country and hence the greater the degree of economic inclusiveness.

Interaction defines a multiplicative interaction term between *banking services* and *corruption control*. The interaction term is included in order to gauge the ability of corruption control to mediate the link between banking services and inclusive development. The thinking is that when a country is able to bring corruption under control, it will enable access to credit and related banking services and products by the citizenry, increase the efficiency of investment and lower the cost of transactions and in so doing enhance inclusive development.

Estimation Strategy

Due to the potential existence of endogeneity and reverse causation between the dependent variables and the right-hand side variables (especially banking services), estimating Eq. (1) using OLS will not be appropriate. We therefore employed instrumental variable techniques to resolve this problem. We used a complement of panel instrumental variable techniques which are able to handle econometric problems such as autocorrelation, heteroscedasticity and simultaneity. Four main instrumental variable techniques as espoused in Baum, Schaffer, and Stillman (2007), are employed. The first estimation strategy is the heteroscedasticity and autocorrelation-consistent instrumental variable (HAC-IV) estimation, which is capable of yielding results that are efficient even when heteroscedasticity and autocorrelation exist (Baum et al. 2007). The second strategy is the efficient GMM estimator which gives unbiased estimates even when the assumption of independently and identically distributed (i.i.d) errors is violated (see Hayashi 2000). Thirdly, we used the limited information maximum likelihood (LIML) procedure which evaluates the single equation model through the method of maximum likelihood (Baum et al. 2007). LIML is superior to other single equation methods when the sample size is small to moderate and when identifying restrictions are many (Davidson and MacKinnon 1993). According to Greene (2003) when normality is assumed, LIML is the most efficient among all single equation estimators. The fourth estimation technique used is the continuously updated GMM (CUE-GMM). It is a GMM generalization of the LIML to account for arbitrary heteroscedasticity and autocorrelation in the errors (see Hansen et al. 1996). We used the *ivreg2* command developed by Baum et al. (2007), which is available in STATA, to estimate all models.

We used regulatory quality as an instrument for banking services. A key characteristic of a worthy instrument is that it should be uncorrelated with the error term while being strongly related with the endogenous variable (banking services). The instrument should affect the dependent variable only indirectly (through its impact on the endogenous regressor). In the finance literature, the legal regime is often the preferred instrument. This is because the legal background of a country is usually endogenous and very critical for financial development (Levine 1999; La Porta et al. 1997). We used regulatory quality as a proxy for the legal regime of a country.

We conducted checks to ensure that the models were valid. These diagnostics tests entailed test of under identification and weak identification.

The models were exactly identified, hence there was no need for over-identification test. The Kleibergen-Paap rk LM statistic (Kleibergen and Paap 2006) was used to test for under identification of instruments. The test is an LM test used to examine whether the equation is identified, that is the excluded instruments are valid. The null hypothesis tested is that the equation is under identified. If the null hypothesis is rejected, it implies that the equation is identified. The Kleibergen-Paap Wald *F* statistic (Kleibergen and Paap 2006) was used to test for the existence of weak identification. Weak identification comes about when the excluded instruments are weakly associated with the endogenous variables. Weak instruments affect the performance of estimators. The null hypothesis test indicated the instruments are weakly identified.

Data

The chapter employs panel data for 47 SSA economies over the period 2000–2017. The data used was obtained from various databases. HDI and IHDI were sourced from the UNDP. The measure of corruption was derived from the WGI. All other control variables were obtained from the World Development Indicators 2019 (WDI) online database. HDI data cover a much longer time period than the IHDI and are available online. Therefore, we used HDI as our main measure of inclusive development and IHDI for robustness checks.

5 Results and Discussion

Descriptive Statistics

Table 3 shows that HDI values range from 0.252 (low human development) to 0.797 (high human development) for the 47 SSA countries. The average HDI score during the study period (2000–2017) was 0.480, which falls within the low human development category. This means, on the average, inclusive development is low in Africa. Seychelles had the highest HDI score (0.797) while Niger had the lowest score (0.354) in 2017. In terms of the IHDI, the values fall within the range 0.198 (low human development) to 0.683 (medium human development). The mean IHDI score is 0.340. The IHDI values are lower than the HDI values, meaning that when we account for inequality, inclusive development in SSA is even much lower.

Table 3 Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Inequality adjusted Human Development Index	317	0.340	0.086	0.198	0.683
Human Development Index	811	0.480	0.107	0.252	0.797
Banking Services	790	0.180	0.171	0.000	1.062
Trade	771	0.761	0.380	0.207	3.114
Capital	741	0.226	0.096	0.011	0.738
Population	832	3.660	10.803	−2.629	148.427
Corruption control	784	0.321	0.219	0.005	0.848

Table 4 Correlation matrix

	1	2	3	4	5	6	7
IHDI (1)	1						
HDI (2)	0.9353*	1					
Banking Ser. (3)	0.5668*	0.5537*	1				
Trade (4)	0.1604	0.3845*	0.1705*	1			
Capital (5)	0.0075	0.2632*	0.1106	0.3592*	1		
Population (6)	−0.0831	−0.0519	0.0424	0.0233	0.0616	1	
Corruption control (7)	0.4153*	0.5055*	0.5428*	0.2452*	0.2484*	−0.0264	1

The average private-sector credit provided by SSA banks is 18.000% of GDP which is quite low and typifies the generally low access to banking services by the private sector. Trade as a fraction of GDP is quite high (76.100) and this should engender inclusive development. Gross fixed capital formation as a proportion of GDP (capital) has a mean value of 22.600, signifying a generally low capital formation in the subregion. The high average population growth rate of 3.660% could put pressure on infrastructure and other services if not properly harnessed. Corruption control ranges from 0.500 to 84.800 with an average of 21.900. Thus, on the average SSA scores low in terms of bringing corruption under control and this could hamper the smooth and efficient delivery of goods and services.

Evidence from the correlation matrix in Table 4 suggests the absence of multicollinearity. Most of the significant correlations occur between the

right-hand side variables (HDI and IHDI) and the explanatory variables. The key regressors (banking services and corruption control) are significantly correlated with the measures of inclusive development which is an initial indication that these variables could promote inclusive development.

Effects of Banking Services on Inclusive Development (HDI)

The results in Table 5 were estimated using HAC-IV, CUE-GMM, two-step GMM and LIML. The diagnostic tests all suggest that the equations do not suffer from under identification and weak identification and that the equations are correctly identified. The main regressor of interest, banking services, shows significance at 1% level and with a positive coefficient in all four models. This suggests that banking services promote inclusive development

Table 5 Effects of banking services on inclusive development (dependent variable: HDI)

Variables	(1) HAC-IV	(2) CUE-GMM	(3) GMM	(4) LIML
Banking services	0.0919***	0.0919***	0.0919***	0.0919***
	(0.00644)	(0.00644)	(0.00644)	(0.00644)
Trade	0.0655***	0.0655***	0.0655***	0.0655***
	(0.00852)	(0.00852)	(0.00852)	(0.00852)
Capital	0.103**	0.103**	0.103**	0.103**
	(0.0480)	(0.0480)	(0.0480)	(0.0480)
Population	−0.00103***	−0.00103***	−0.00103***	−0.00103***
	(8.49e-05)	(8.49e-05)	(8.49e-05)	(8.49e-05)
Constant	0.673***	0.673***	0.673***	0.673***
	(0.0175)	(0.0175)	(0.0175)	(0.0175)
Observations	663	663	663	663
F-statistic	90.78***	90.78***	90.78***	90.78***
Kleibergen-Paap rk LM statistic	128.715***	128.715***	128.715***	128.715***
Kleibergen-Paap rk Wald *F* statistic	374.987***	374.987***	374.987***	374.987***

Note All variables with the exception of HDI and Population are measured in natural logs. Values in the parenthesis are robust standard errors. A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level. HAC-IV is heteroscedasticity and autocorrelation consistent instrumental variable estimation; GMM is efficient general method of moments estimator; LIML is limited information maximum likelihood (LIML) procedure; CUE-GMM is continuously updated GMM. Regulatory quality is used as an instrument for Banking services in all models

irrespective of the estimation technique used. The coefficient is 0.0919 and is the same in all models. There are several functions discharged by banks which could lead to inclusive development. The banking system mobilizes savings from surplus spending units and allocates the funds to units that require them. Also, it facilitates exchange of goods and services, evaluates projects and screens borrowers, mitigates risks, exercises corporate governance responsibilities, and reduces information asymmetry and transaction costs (Levine 1997). By performing these functions, individuals and households are able to enjoy better education, good health care, and earn more income to enable them consume a wide array of goods and services. These findings are corroborated by Sarma and Pais (2011) and Abor et al. (2018).

In addition to banking services, trade, and capital positively impact inclusive development at 1 percent level and 10 percent level, respectively. These mean that African countries that are open to trade and devote more capital to investment are likely to attain inclusive development. A country with high degree of trade openness is able to earn more foreign exchange, attract new technology, capital, and innovations and these could stimulate inclusive development. Furthermore, the injection of more capital into the economy would boost economic activity and this could positively affect inclusive development. Population growth does not positively promote inclusive growth. As discussed earlier, population growth can either promote or impede development, depending on how it is harnessed. Particularly, if population growth outpaces economic growth, this may lead to increased pressure on limited resources and infrastructure, and unemployment and underemployment.

Effects of Banking Services and Corruption Control on Inclusive Development (HDI)

Using the results presented in Table 6, we analyzed how banking services and corruption control affect inclusive development. The diagnostic tests show that all the equations are properly specified and identified. The coefficients for banking services are still significant at 1% and with positive signs even after controlling for corruption. This suggests that the effect of banking services on development inclusiveness is quite robust to a number of controls. Also, the coefficients of corruption control are positive and bear significance at 1% in all models. This means, countries that are able to control corruption stand to enjoy more inclusive development. The control of corruption would promote inclusive development because it would encourage savings and investment, stimulate entrepreneurship, reduce the cost of doing business, inspire fairness, entrench a merit system and increase the efficiency of capital.

Table 6 Effects of banking services and corruption on inclusive development (dependent variable: HDI)

Variables	(5) HAC-IV	(6) CUE-GMM	(7) GMM	(8) LIML
Banking services	0.402***	0.402***	0.402***	0.402***
	(0.0924)	(0.0924)	(0.0924)	(0.0924)
Trade	0.0123	0.0123	0.0123	0.0123
	(0.0165)	(0.0165)	(0.0165)	(0.0165)
Capital	0.0415	0.0415	0.0415	0.0415
	(0.0738)	(0.0738)	(0.0738)	(0.0738)
Population	−0.000351**	−0.000351**	−0.000351**	−0.000351**
	(0.000143)	(0.000143)	(0.000143)	(0.000143)
Corruption control	0.944***	0.944***	0.944***	0.944***
	(0.209)	(0.209)	(0.209)	(0.209)
Interaction	−0.269***	−0.269***	−0.269***	−0.269***
	(0.0692)	(0.0692)	(0.0692)	(0.0692)
Constant	0.0494	0.0494	0.0494	0.0494
	(0.130)	(0.130)	(0.130)	(0.130)
Observations	658	658	658	658
F Statistic	47.61***	47.61***	47.61***	47.61***
Kleibergen-Paap rk LM statistic	17.594***	17.594***	17.594***	17.594***
Kleibergen-Paap rk Wald *F* statistic	17.768***	17.768***	17.768***	17.768***

Note All variables with the exception of HDI, Corruption control, Interaction, and Population are measured in natural logs. Values in the parenthesis are robust standard errors. A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level. HAC-IV is heteroscedasticity and autocorrelation consistent instrumental variable estimation; GMM is an efficient general method of moments estimator; LIML is limited information maximum likelihood (LIML) procedure; CUE-GMM is continuously updated GMM. Regulatory quality is used as an instrument for Banking services in all models

According to Dantani and Muftau (2017) corruption impedes inclusive growth by diverting national resources from productive uses, discouraging savings, increasing debt accumulation, aggravating poverty and inequality, accelerating decay of infrastructure and social services, and lowers the level of living in general. Thus, countries that are able to curtail these repercussions of corruption can hope to enjoy a higher standard of living. According to the International Monetary Fund (IMF) the absence of endemic corruption boosts macroeconomic stability and ensures inclusive growth and sustainable development (IMF 2019).

Next, we examined whether corruption and banking services produce synergy effects, and this result is presented in Table 6. Synergy effects are

depicted by the interaction term, which is significant at 1% level with a negative sign in all the models. This means, as far as inclusive development is concerned, banking services play independent and non-complementary roles. That is, banking services and control of corruption are substitutes in inclusive development and therefore, do not produce positive synergy effects. Further research is required to explain this finding. For now, we opine that, the substitutory nature of banking services and corruption in inclusive development might be due to lack of coordination between banking sector policy and public policy on corruption in Africa.

Effects Banking Services and Corruption Control on Inclusive Development: Robustness Checks

In this sub-section, we assessed the impact of banking services and corruption on inclusive development using the IHDI as a measure of inclusive growth. The results in section "Effects of Banking Services and Corruption Control on Inclusive Development (HDI)" showed that our estimation techniques yielded the same results. For this reason, in this section, we will present results based on only two of the estimation techniques. Table 7 shows the effects of banking services on the IHDI while Table 8 depicts the effects of banking services and corruption on the IHDI. The results are fairly consistent with the previous results where the HDI was used as the measure of inclusive development. Banking services significantly impact inclusive development positively in all the results presented (Tables 7 and 8), with the coefficients being fairly large (ranging from 0.108 to 0.569). Similarly, control of corruption is significant in all the models and shows a positive sign throughout, with coefficient of 1.295. Likewise, the interaction term is significant and bears a negative sign throughout, implying that banking services and control of corruption are substitutes in inclusive development. Thus, the robustness checks using IHDI as a measure of inclusive development confirms our earlier findings that banking services and control of corruption are on their own bastions of inclusive development.

6 Conclusion

This chapter analysed the impact of banking services and control of corruption on inclusive development employing a panel of 47 SSA economies over the period 2000–2017. Four main panel instrumental variable methods were

Table 7 Effects of banking services on inclusive development (dependent variable: IHDI)

VARIABLES	(1) HAC-IV	(2) CUE-GMM
Banking services	0.108***	0.108***
	(0.0123)	(0.0123)
Trade	0.0231**	0.0231**
	(0.0106)	(0.0106)
Capital	0.0960	0.0960
	(0.0677)	(0.0677)
Population	−0.000962***	−0.000962***
	(0.000106)	(0.000106)
Constant	0.522***	0.522***
	(0.0269)	(0.0269)
Observations	283	283
F statistic	25.76***	25.76***
Kleibergen-Paap rk LM statistic	55.198***	55.198***
Kleibergen-Paap rk Wald *F* statistic	238.426***	238.426***

Note All variables with the exception of IHDI and Population are measured in natural logs. Values in the parenthesis are robust standard errors. A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level. HAC-IV is heteroscedasticity and autocorrelation consistent instrumental variable estimation; CUE-GMM is continuously updated GMM. Regulatory quality is used as an instrument for Banking services in all models

used to ensure robust results. These are HAC-IV, CUE-GMM, two-step efficient GMM, and LIML. Three main findings emerged from the analysis. First, banking services promote inclusive development in SSA. Second, SSA countries that are able to reign in corruption are able to attain higher inclusive development. Lastly, though banking services and control of corruption promote inclusive development on their own, they do not produce positive synergy effects. Thus, the main conclusion of this chapter is that banking services and control of corruption are bulwarks of inclusive development in Africa.

Our results give rise to three policy implications: First, measures, reforms, and interventions by the government and the private sector that seek to make banking services accessible, affordable, stable, and efficient should be promoted as these would lead to higher inclusive development. Second, a vote against corruption is a vote for inclusive development. Thus, African countries should mount robust and relentless attack on corruption as the control of corruption would lead to greater inclusive development. Lastly, African countries should consider improving banking services and controlling corruption as important policy options for achieving the SDGs.

Table 8 Effects of banking services and corruption on inclusive development (dependent variable: IHDI)

Variables	(1) HAC-IV	(2) CUE-GMM
Banking services	0.569***	0.569***
	(0.129)	(0.129)
Trade	−0.000864	−0.000864
	(0.0204)	(0.0204)
Capital	0.383**	0.383**
	(0.156)	(0.156)
Population	−0.000407**	−0.000407**
	(0.000174)	(0.000174)
Corruption control	1.295***	1.295***
	(0.319)	(0.319)
Interaction	−0.399***	−0.399***
	(0.104)	(0.104)
Constant	−0.426*	−0.426*
	(0.234)	(0.234)
Observations	283	283
F statistic	12.24***	12.24***
Kleibergen-Paap rk LM statistic	11.637***	11.637***
Kleibergen-Paap rk Wald *F* statistic	14.085***	14.085***

Note All variables with the exception of IHDI and Population are measured in natural logs. Values in the parenthesis are robust standard errors. A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level. HAC-IV is heteroscedasticity and autocorrelation consistent instrumental variable estimation; CUE-GMM is continuously updated GMM. Regulatory quality is used as an instrument for Banking services in all models

Note

1. The HDI has three main components: long and healthy life (longevity), knowledge (education) and standard of living (income per capita).

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Finance-Growth Nexus: Evidence from a Dynamic Panel Model on ECOWAS Countries

Toussaint Houeninvo and Germain Lankoande

1 Introduction

The finance-growth nexus debate dates back to at least Bagehot (1873) and Schumpeter (1934), who both indicated that finance promotes economic growth. Although the relationship has been theoretically and empirically researched since then, there is still no consensus among researchers on the issues (Levine 2005; Esso 2010; Al-Malkawi and Abdullah 2011; Arestis et al. 2014; Marwa and Zhanje 2015).

Finance was not discussed by some of the pioneers of development economics—including three Nobel Prize laureates (Levine 2005). Robert Lucas (1988) claimed that the finance-growth link is not important and economists "badly over-stress" the role of financial factors in economic growth, while Joan Robinson (1952) argued that "where enterprise leads, finance follows." For these laureates, finance does not promote growth.

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Rather, it responds to changing demand from the real sector. At the other extreme, Merton Miller (1998) argued that "the idea that financial markets contribute to economic growth" is a proposition too obvious for serious discussion. Between these two extremes are John Hicks (1969) and authors such as Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973), who argued that finance facilitates growth. Their particular claim is that financial liberalization that removes financial repression and promotes financial development will in turn boost economic growth.

A number of empirical studies on the link between finance and growth yield a range of diversified findings, and the contradictory positions found in the theoretical literature are far from resolved at the empirical level, thus leaving a fundamental lacunae in understanding of the finance-growth nexus. Among the most significant factors behind such a multiplicity of findings are empirical problems, namely, the choice of proxies for the financial variable, the kind of data used, and whether the studies consider endogeneity (Arestis et al. 2014). Moreover, empirical studies of West African countries are rare.

2 Literature Review

The literature categorizes the causal relationship between financial development and growth into four hypotheses:

- The supply-leading hypothesis.
- The demand-following hypothesis.
- The bidirectional causality hypothesis.
- The irrelevance hypothesis.

In the supply-leading hypothesis, causality runs from financial development to real economic growth through efficient improvements in capital accumulation—increases of savings and investment rates. In the demand-following hypothesis, causality runs from economic growth to financial development, while the bidirectional hypothesis contains both mutually supply-leading and demand-following hypotheses. The irrelevance hypothesis, in line with neoclassical theory, supposes an independent or noncausal relationship between financial development and growth that postulates zero transaction costs and a perfect information assumption.

According to Levine (1997, 2005), financial development can facilitate economic growth through five channels:

- Producing ex ante information about possible investment and facilitating capital flows from savers to the highest return investments.
- Reducing the cost of acquiring information, monitoring investment projects, and exerting corporate governance after providing finance.
- Facilitating the trade, diversification, and management of risk.
- Mobilizing and pooling savings.
- Easing the trade of goods and services.

Empirical studies include cross section, time series, panel data, firm level data analysis, and others. Methodologies vary from ordinary least squares (OLS), two-stage least squares (2LS), three-stage least squares (3SLS), pooled cross-section time series, cointegration and VAR, and generalized method of moments (GMM). Some of the studies highlight a threshold effect (see Appendices, Tables 5 and 6 for details).

Among the studies arguing that financial development leads to economic growth (the majority of the existing studies), some find a positive impact on economic growth independent of the level of income or development.[1] In others, the positive effect is observed for developed countries only (Roja and Valev 2003; Barajas et al. 2013). Other studies find a long-run effect with no effect in the short run (Samargandi et al. 2013; Menyah et al. 2014; Prettner 2016). Still others find there was no effect either for the whole sample or for a regional group (Al Tamimi et al. 2001; Al-Zubi et al. 2006; Barajas et al. 2013; Effiong 2015). Finally, some studies find a threshold effect with the effect being negative after a certain level of credit or financial development is achieved (Arcand et al. 2011; Samargandi et al. 2013; Prettner 2016).

Very few countries are covered by studies that support the thesis that economic growth leads to financial development, and often the conclusion holds for a subsample of countries (Demetriades and Hussein 1996; Thornton 1996; Darrat 1999; Arestis and Demetriades 1999; Habibullah 1999; Asghar and Hussain 2014). There are a number of studies supporting bidirectional/reciprocal or simultaneous effects (Arestis and Demetriades 1999; Enisan and Olufisayo 2009; Esso 2010; Bangake and Eggoh 2011; Asghar and Hussain 2014).

While the relationship has been extensively investigated in developed and emerging countries, empirical studies on African countries in general and Economic Community of West African (ECOWAS) member countries in particular remain rare. Appendix, Table 5 (multicounty studies) and Table 6 (country-specific studies) summarize the literature review, highlighting the authors, year of the study, sample, period covered, methodology, and key findings.

Among the existing studies on Africa, Effiong (2015), in a standard panel data growth regression on 21 African countries over the 1986–2010 period, found that financial development had no significant effect on economic growth. Menyah et al. (2014), using a panel causality approach on 21 African countries over the period 1965–2008, found no causality between financial development and economic growth. Nyamongo et al. (2012) used panel data on 36 African countries over 1980–2009 and found that financial development had a weak effect on economic growth. In their study, Enisan and Olufisayo (2009), using an ARDL bounds test and a Granger causality test on a sample of seven African countries over 1980–2004, found that financial development leads to economic growth for Egypt and South Africa, while there is a bidirectional effect for Côte d'Ivoire, Kenya, Morocco, and Zimbabwe.

Kakilli-Acaravci et al. (2009), in their study of 24 Sub-Saharan countries over the period 1975–2005 using panel cointegration and GMM, found that economic growth leads to financial development (domestic credit) in the short term, but there is no causality in the long run. Barajas et al. (2013), who used a GMM model for 150 countries over the 1975–2005 period in a dynamic panel with differentiated effects by regions, found that the effect of credit to the private sector on growth is not significant for Sub-Saharan Africa as opposed to Europe, Central Asia, the Middle East, North Africa, and Latin America and the Caribbean.

Esso (2010), using the Toda and Yamamoto approach to a cointegration non-causality test and data on ECOWAS countries over 1960–2005, found that financial development causes economic growth in just two countries—Ghana and Mali. But growth causes finance in three countries (Burkina Faso, Côte d'Ivoire, and Sierra Leone), a bidirectional causality in two countries (Cabo Verde and Liberia), and has a nonsignificant relation in the remaining eight countries.[2] Jalloh (2011), who investigated the extent to which economic growth has been affected by financial deregulation policies in ECOWAS, used a dynamic panel approach over 1994–2009. Jalloh used a fixed-effects model for the estimation of the levels equations and a dynamic GMM for the model in the first difference. He concluded that both the fixed effects and dynamic models indicated a positive but insignificant effect of financial deepening on growth of income per capita in ECOWAS. The dynamic model, however, indicated that a 10% rise in financial market deregulation induced a 0.6% increase in real income per capita for ECOWAS as a whole, with 0.5% for the West African Economic and Monetary Union (WAEMU), and 0.9% for non-WAEMU countries. This led Jalloh to conclude that the impact of financial deregulation on economic growth is more effective in non-WAEMU countries than in WAEMU countries.

3 Stylized Facts

This section analyzes the key macroeconomic variables likely to affect economic growth over the period 1960–2018. These include inflation (GDP deflator), trade openness (exports and imports as percentage of GDP), credit to the private sector (as percentage of GDP), net inflows of foreign direct investment (FDI), and government general consumption (as percentage of GDP). In addition, average real GDP per capita is computed to see how these variables, especially credit to the private sector, have evolved compared with economic growth.

The section also compares credit to the private sector in the four leading ECOWAS countries (Côte d'Ivoire, Ghana, Nigeria, and Senegal)[3] to their East Asian peers (Indonesia, Korea, Malaysia, and Thailand). Real GDP per capita growth over 1960–2018 has been very low for the region—1.05% for ECOWAS, 0.87% for WAEMU,[4] and 1.31% for non-WAEMU countries (see Table 1). Credit to the private sector—14.48% of GDP—is also weak for the ECOWAS region, with 16.55% for WAEMU countries, and 11.62% for non-WAEMU countries. Although the effect of credit on real income per capita growth for the region cannot be rigorously assessed through the comparisons in Table 1, the link between the volume of credit and GDP per capita growth indicates that credit to the private sector is more effective in non-WAEMU than in WAEMU countries. In fact, for a smaller credit to the private sector in the non-WAEMU zone, the real income per capita growth rate is "larger" in non-WAEMU than in WAEMU countries. This suggests an efficiency effect similar to Jalloh's (2011) study, where it was found that the impact of financial deregulation on economic growth is more effective in non-WAEMU than WAEMU countries.[5]

Comparing the four leading economies of ECOWAS with their comparators in East Asia shows a positive trend between credit to the private sector

Table 1 Sample means (ECOWAS, Non-WAMU, and WAMU), 1960–2018, in %

Means			
	ECOWAS	WAEMU	Non-WAEMU
Domestic credit to private sector	14.48	16.55	11.62
Inflation	9.24	5.79	14.24
Trade Openness	57.57	53.23	49.57
General government final consumption	12.77	13.92	10.78
Foreign direct investment, net inflows	2.79	1.78	4.11
GDP per capita growth	1.05	0.87	1.31

Source Authors' own calculations based on WDI database, 2020

and real GDP per capita growth (Fig. 1). Thus, the East Asian high growth rate of real GDP per capita is positively related to its high private sector credit. Similarly, the low credit to the private sector of ECOWAS may explain the very low growth of real income per capita over the period 1960–2018.

The ECOWAS and East Asia comparison over time suggests that the quality of credit matters and that volume alone cannot lead to growth (see Fig. 1). For example, Senegal—which has double the credit to the private sector than Ghana and Nigeria and higher credit to the private sector than

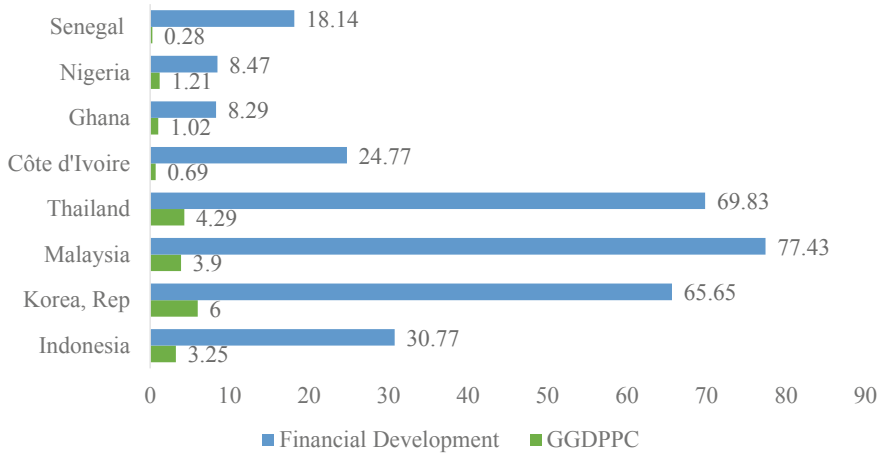

Fig. 1 Average real per capita GDP growth rates and financial depth in the leading economies of ECOWAS and East Asia, 1960–2018, in % (*Source* Authors' own calculations based on WDI database, 2020)

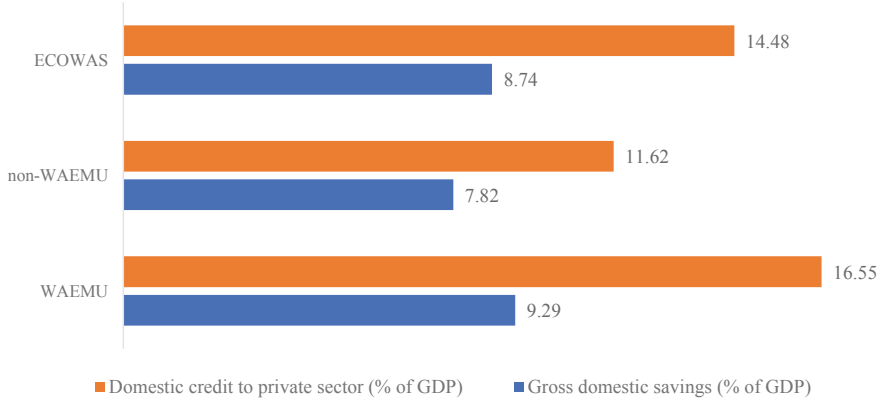

Fig. 2 Average gross domestic savings and credit to the private sector as percentage of GDP in ECOWAS, 1960–2018 (*Source* Authors' own calculations based on WDI database, 2020)

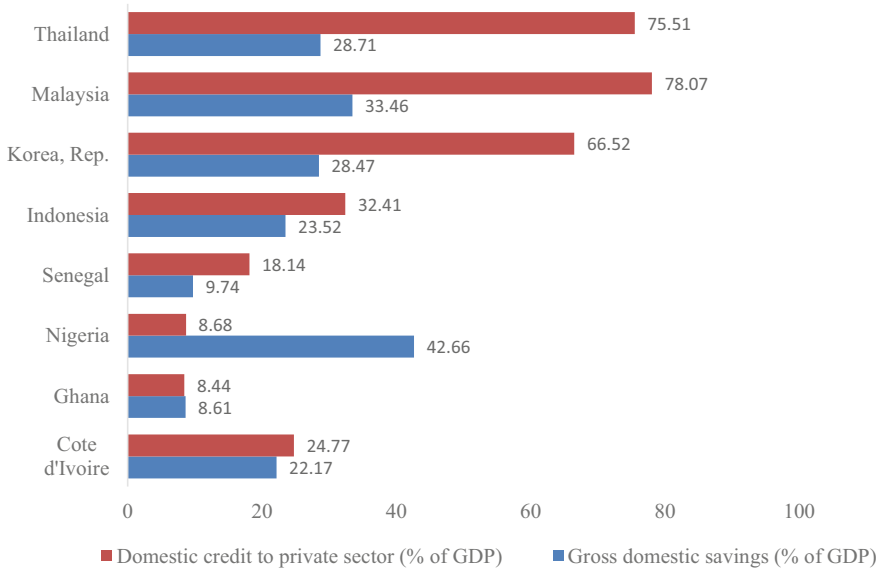

Fig. 3 Average gross domestic savings and credit to the private sector, leading economies of ECOWAS and East Asia, 1960–2018, % of GDP (*Source* Authors' own calculations based on WDI database, 2020)

Indonesia—has a GDP per capita growth of 0.28% over the 1960–2018 period. Ghana's GDP per capita growth was almost 1%, Nigeria's 1.2%, and Indonesia' 3.2%. Côte d'Ivoire, which has almost three times credit to the private sector compared to Ghana and Nigeria, has only 0.3% GDP per capita growth over the same period.

More than the quality and the volume of credit to the private sector, the differences in ECOWAS countries and East Asian countries' performances is the quality of their financial reforms. In fact, efficient financial markets and policies that mobilized saving and promoted credits have contributed to the rapid growth of East Asian economies. Financial sector reforms in East Asian countries targeted measures that improved the chances of success and reduced opportunities for abuses. "Policies that did not work out were dropped without hesitation and were adapted to changing economic conditions" (Stiglitz and Uy 1996). These East Asian financial reforms have been classified into five categories: "promoting savings, regulating banks to fortify their solvency, creating financial institutions and markets, enforcing financial restraint, and intervening directly in credit allocation" (Stiglitz and Uy 1996).

In Korea, for example, there was a competitive mechanism for access to credit and for office rents at better conditions for companies that exported the most, which was an efficient way of discouraging credit to consumption.

Moreover, government owned banks in Korea—until their privatization in 1983—seemed to be more prudent. For instance, government imposed strict performance criteria to guide Korean banks in their decisions about allocating loans. And in Malaysia, one of the established governance rules is that public officials cannot serve on the boards of public banks.

Unlike East Asian economies, ECOWAS countries were characterized by high intermediation costs and heavy taxation rates that weakened the financial system. Since the structural adjustment era, some progress was made in financial liberalization, but there are still regulations in the real sector, along with political interference in managing public and even some private banks, that discourage the private sector. In particular, high transaction costs, institutional impediments, bureaucratic hurdles, and high collateral requirements remained constraints to the private sector in West Africa (Word Bank 1994; IMF 2015).

A closer look at the data confirms the role policies have played for East Asia countries. Several ECOWAS countries, since their independence in the 1960s, were in a better situation than the East Asian countries. Over the period 1960–64, the average real GDP per capita of Côte d'Ivoire was greater than Korea's—US$1352 against US$1016. During the same period, the real GDP per capita of Nigeria was double that of Indonesia—US$1406 against US$690. Côte d'Ivoire, Malaysia, and Senegal were almost at the same level of GDP per capita in the first half of 1960. Senegal's real GDP per capita in the first half of 1960s was more than the double that of Thailand—US$1338 against US$613 (see Appendix, Table 7). This trend was maintained throughout the 1960s and to some extent until the second half of the 1970s.

In the 1970s, the gap reversed in favor of the East Asian economies, including during the second half of 1990s when they were hit by the Asian economic crisis. Even with the 1997 Asian crisis, the real GDP per capita of Korea from 1995–99 was nine times that of Côte d'Ivoire—US$13,000 against US$1404. The real income per capita of Indonesia was at least one-and-a-half times that of Nigeria—US$2233 against US$1365—and the real income per capita of Malaysia was seven times that of Ghana—US$6600 against US$906. The real income per capita of Thailand was three times Senegal's—US$3470 against US$1049.

This East Asian performance was maintained for over 50 years so that by the end of the period considered in this study—2015–18—the real income per capita of Korea was sixteen times the real income per capita of Côte d'Ivoire—US$25,817 against US$1578. The real income per capita of Indonesia was one-and-a-half times the level of Nigeria—US$4049 against

US$2457. The real income per capita of Malaysia was almost-seven times the level of Ghana—US$11,501 against US$1703—and almost eight times that of Senegal—US$11,501 against US$1462. The real income per capita of Thailand was four times Senegal's—US$6035 against US$1462.

While all the countries considered experienced an increase in real GDP per capita from 1960 to 2018, the increase is much lower for ECOWAS countries, even though they started the 1960s in a better economic position. Over these years, Senegal experienced an increase of 9% in income per capita, Côte d'Ivoire 17%, Ghana 60%, and Nigeria 74%. By contrast, Asian countries increased their real income level by 700%. Real income per capita between 1960–64 and 2010–14 increased by 2181% in Korea, 773% in Thailand, 570% in Malaysia, and 394% in Indonesia. ECOWAS countries such as Côte d'Ivoire, Ghana, and Nigeria benefitted from the 1970s oil boom, as did Indonesia and Malaysia. But, unlike their East Asian counterparts who implemented sound economic policies and reforms, ECOWAS countries did not benefit from the boom because of high government consumption and nonproductive spending.

Analysis of Fig. 1 and Table 2 indicate that countries that increased real income per capita by several hundred percent were those that increased credit to the private sector while also paying attention to the quality and efficiency of credit. Conversely, countries that showed less volume and less efficient credit to the private sector experienced a weaker increase in their levels of real income per capita over the almost-seven decades. These differences in the finance-growth nexus contributed to the reversal in the initial observed trend between the two sets of countries.

Data also show that the capacity to service credit to the private sector depends on the saving level. As suggested by economic theory, Figs. 2 and 3 show that higher the saving rate, the higher the credit to the private sector. In ECOWAS countries, the low saving rate and weak resource mobilization capacity are explained by the negative real interest rate, political and

Table 2 Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
GDPPC	776	881.507	590.989	238.855	3759.553
CPPGDP	743	14.481	10.61	0.403	65.742
FDI	669	2.79	8.059	−28.624	103.337
OPEN	885	51.575	33.73	0	311.354
GEXP	705	12.775	5.597	0	45.959
INF	761	10.77	19.862	−29.172	219.003

Source World Development Indicators 2020

macroeconomic instability, and excessive political interference. Parastatals often account for a large share of unpaid loans. As a result, the lack of confidence in the banking system leads to individuals and firms keeping their savings in more tangible assets or placing their capital abroad (World Bank 1994).

An analysis by subperiod shows the positive dynamic of saving and credit in East Asia as opposed to ECOWAS. In the first five years of the 1960s, Senegal had almost the same level of saving as Ghana, three times the level of Korea, and almost twice the level of Indonesia (see Appendix, Table 9). Côte d'Ivoire's saving level in the early 1960s was higher than that of Malaysia and Thailand. At the end of the period—2015–18–the saving rate in Côte d'Ivoire had been reduced by 26%, Senegal's level has been reduced by 8%, while Korea's saving rate had increased by 629%. Ghana had increased its saving rate by 56%, Malaysia by 42%, Thailand by 51%, and Indonesia by 323%.

As for credit to the private sector (Appendix, Table 8), Senegal's level in the early 1960s was estimated at 12% and was higher than Korea's (10%), Malaysia's (11%), and Thailand's (12%). At the end of the period, Senegal had increased its credit to the private sector by 133% (to reach 28% of GDP) and Côte d'Ivoire by 27%. In contrast, Korea increased its level of credit to the private sector by 1350% to reach 145% of its GDP, Malaysia increased its level by 967% to reach 120% of its GDP, and Thailand increased its level by 1166% to reach 146% of its GDP.

For the growth rate of per capita GDP in the early 1960s, the growth of GDP per capita was higher in Côte d'Ivoire than in the four leading economies of East Asia, with Indonesia even negative (see Appendix, Table 10). At the end of the period, the growth of GDP per capita for Côte d'Ivoire decreased by 22% to reach 5.27%. Senegal increased its GDP per capita by 6951% from—0.62% in 1960–64 to reach 3.69% in 2015–18. Korea, Malaysia, and Thailand maintained their level of growth of GDP per capita for over half a century. Nigeria experienced its highest peak in the early 1970s with a GDP per capita growth of 9.2% and its biggest drop in the early 1980s with a GDP per capita of −8.02%. The growth of GDP per capita in the 2000s fell in 2015–18 to reach −1.7%. Indonesia, which experienced a boom in the first half of 1970s with a GDP per capita growth rate of 4.7%, was able to maintain this growth during the oil counter-shock at the end of the 1970s, while Nigeria went from 9.2% GDP per capita growth in the first half of 1970s to −0.8% at the end 1970s and −8.02% in the first half of 1980s.

4 Methodology and Data

Variables and Expected Effects

The review of the literature on growth indicates that economic growth is influenced by the following factors: credit to the private sector as a percentage of GDP (CPPGDP), openness (the sum of exports and imports as a percentage of GDP), government expenditure as a percentage of GDP (GEXP), foreign direct investment as a percentage of GDP (FDI), and real GDP per capita of the previous period (GDPPC). FDI inflows are expected to complement the domestic investment effort and have a positive effect on economic growth. Openness is expected to have a positive impact by boosting exports of goods and services and by importing inputs for production of those goods and services. GEXP is expected to have a negative effect on economic growth. Finally, the GDPPC of the previous period is expected to have a negative impact on the actual real GDP per capita (the convergence hypothesis).

Source of Data and Sampling

The data used were drawn from the 2020 edition of the World Bank's World Development Indicators. For the descriptive statistics and stylized fact analysis, data on the 15 ECOWAS member countries were analyzed over the period 1960–2018, with the 4 East Asian countries as benchmarks. Econometric analysis used the sample of 15 ECOWAS countries over the same period. Descriptive statistics are presented in Table 2 and the correlation matrix showing the relationship between the variables are presented in Table 3.

Table 3 Correlation matrix and relationship among the variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)
GDPPC	1.000					
CPPGDP	0.584	1.000				
FDI	−0.000	−0.026	1.000			
OPEN	0.129	0.283	0.262	1.000		
GEXP	−0.006	0.417	−0.002	0.298	1.000	
INF	−0.019	−0.243	−0.056	−0.129	−0.273	1.000

Source World Development Indicators 2020

Empirical Model and Estimation Technique

The main research question is whether financial development, as measured by credit to the private sector, has an impact on real per capita GDP growth. A subsidiary question investigates whether a common monetary policy or a common currency itself has a direct effect on growth (a direct effect of monetary union on growth). A second subsidiary question is whether membership in a monetary union leads credit to have a stronger effect on growth (an indirect effect in terms of better efficiency of the union rules on growth) as compared to a country that is not a member. The dependent variable is measured by real GDP per capita. Explanatory variables include credit to the private sector as a percentage of GDP, a dummy variable for common monetary policy or common currency or common legal origin, and a set of control variables—inflation, trade openness, school enrollment, the previous level of real GDP per capita, foreign direct investment as a percentage of GDP, and government expenditure as a percentage of GDP.

The study uses a dynamic panel model on the 15 ECOWAS countries over the period 1960–2018, applying generalized method of moments (GMM) as the econometric approach. To smooth out cyclical variation in growth of real GDP per capita, and to comply with the technical requirement of GMM—that the number of periods should be smaller than the number of cross-sectional observations to avoid asymptotic imprecision and biases (Levine et al. 2000a, b; Beck 2008; Roodman 2009; Barajas et al. 2013)—we construct five-year average nonoverlapping periods for each country. This leads to 15 countries over 12 periods of five-year averages.

Using panel data offers several advantages, including more informative data, more exploitation of time series and cross-section variation, more control for heterogeneity, less collinearity, more degrees of freedom, and more efficiency (Baltagi 2005). Applying the GMM techniques has the advantage of dealing with biases associated with simultaneity, or endogeneity and lags of the dependent variable, and provide more efficient estimators (Levine et al. 2000a,b; Beck and Levine 2004; Barajas et al. 2013).

The GMM estimator is used in this study, following the Levine et al. (2000a, b), Beck and Levine (2004) and Barajas et al. (2013) models, and based on the econometric work of Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998).

Based on the literature, a dynamic panel model of the finance–growth nexus can be written as follows:

$$g_{it} = y_{it} - y_{it-1} = \alpha + \beta f_{it} + kInteract_i{}^* f_{it} + \gamma X_{it} + C_i + \varepsilon_{it} \quad (1)$$

where:

- g_{it} is the growth rate of real GDP per capita in period t.
- y_{it} is the log of the real GDP per capita.
- $y_{(it-1)}$ is the log of the real GDP per capita of the previous period.
- β measures the effect of financial development on growth, the main focus of the paper.
- f_{it} stands for financial development variable (credit to the private sector).
- k measures the interaction terms (Interact) between financial development and each of the two subregional grouping (WAEMU and non-WAEMU countries) capturing common monetary policy, common currency, or legal origin. k is the subsidiary focus of the paper.
- X_{it} stands for a set of control variables other than the financial development, and the regional dummy (West African Monetary Union and non-West African Monetary Union subregions of ECOWAS).
- γ measures the effect of the set of control variables.
- C_i stands for unobserved country-specific time-invariant variable.
- ε_{it} is the error term, a white noise error with a mean zero.

The convergence hypothesis can be tested by introducing the real GDP per capita of the previous period:

$$y_{it} = \alpha + \beta f_{it} + kInteract_i{}^* f_{it} + \gamma X_{it} + \delta y_{it-1} + C_i + \varepsilon_{it} \quad (2)$$

where δ measures the effect of lagged income (or initial income in some cases) and tests the convergence hypothesis.

When the variables used for the empirical analysis are considered, Eq. (3) can be written as:

$$\begin{aligned} \log GDPPC = {} & \complement + \beta_1 \log CPPGDP + \beta_2 \log FDI \\ & + \beta_3 \log OPEN + \beta_4 \log GEXP \\ & + \beta_5 \log INF + \beta_6 logGDPPC - 1 \\ & + \beta_7 \mathrm{DUMMY} + \beta_8 \log(CPPGDP * DUMMY) + \varepsilon_i \end{aligned} \quad (3)$$

where:

- β_1 measures the direct effect of credit to the private sector (CPPGDP) on growth
- β_2 measures the direct effect of net inflows of foreign direct investment (FDI) on growth
- β_3 measures the direct effect of openness (OPEN) on growth
- β_4 measures the direct effect of general government final consumption (GEXP) on growth
- β_5 measures the direct effect of inflation (INF) on growth
- β_6 measures the direct effect of the GDPPC of the previous period on growth
- β_7 measures any specific direct effect related to monetary union (DUMMY) on growth
- β_8 measures the interaction terms (Interact) between the monetary union (DUMMY) and credit to the private sector (CPPGDP). β_8 measures the indirect effect of belonging to a monetary union on growth through the interaction between "monetary union status and credit to the private sector variable." For example, any stronger effect due to more efficiency in a monetary union.

The presence of the lagged dependent variable to be estimated in Eq. (3) indicates an endogeneity problem. In fact, the lagged dependent variable is correlated with the error term. That situation and the potential endogeneity of the explanatory variables require the use of instrumental variables to avoid spurious regression bias. The Hansen test of over-identification restrictions tests the overall validity of the instruments (lagged variables used as instruments), and the Arellano and Bond second-order autocorrelation tests that the error term (ε_{it}) is not serially correlated. The Hansen test and the Arellano and Bond test are used to check whether using the GMM estimator specification is valid.

This paper improves on previous studies on the West Africa region by using the following methodologies and data:

- It uses real GDP per capita as the dependent variable rather than just real GDP as in the Esso study (2010).
- It uses the GMM in a dynamic panel method rather than time series as in the Esso study, thus allowing the GMM to deal with biases related to time series and cross-country studies.

- It uses a set of control variables in addition to credit to the private sector as opposed to using a causality test between credit to the private sector and real GDP.
- It uses updated data covering the period 1960–2018 as compared to the period 1960–2005 in Esso (2010) and 1994–2009 in Jalloh (2011).

5 Empirical Results

We tried several variables, including the interaction between credit to the private sector and the dummy for Monetary Union (WAEMU), but dropped those that did not contribute significantly to the explanatory power to the model. The estimation results are summarized in Table 4. The p values of Hansen test (greater than 10%) suggest that we cannot reject the null hypothesis of the validity of the lag variables used as instruments, while the p values of Arellano-Bond second-order autocorrelation test (greater than 10%) suggest that we cannot reject the absence of the second-order autocorrelation assumption, thus validating the use of GMM method.

The results of the model indicate that credit to the private sector (financial development) is significant at 5%, and the results have the expected

Table 4 System GMM results with log of real GDP per capita as dependent variable and credit to the private sector direct and indirect effect through monetary union

VARIABLES	
Credit to the private sector [Log (CPPGDP)]	0.0830**
	(0.0350)
Foreign Direct Investment [Log (FDI)]	0.0343*
	(0.0110)
Government Consumption [Log (GEXP)]	−0.0260
	(0.0683)
Lag of log of real income per capita [Log (GDPPC) L1]	0.985***
	(0.0674)
Observations	118
Countries	15
Instruments	9
Hansen test (*p-value*)	0.464
Arellano-Bond test for AR (2) (*p-value*)	0.664

Note All variables are measured in natural logs. Values in the parenthesis are standard errors. A single asterisk (*) denotes significance at 10%, two asterisks (**) at 5% and three asterisks (***) indicate significance at 1%

positive signs. There is no monetary union direct effect. The subsidiary variable test for the interaction of the dummy with the financial variable, measuring whether a common currency or a common monetary policy exerts any differentiated effect on growth through the credit to private sector, is not significant. As far as the control variables of the model are concerned:

- Foreign direct investment has a positive and significant effect at 10%.
- Lagged real GDP per capital has a positive and strongly significant effect at 1%, suggesting that the convergence hypothesis (Barro and Sala-i-Martin 1992) is not corroborated. This may be explained by the fact that the ECOWAS member countries are low-income per capita countries.
- Inflation has a negative effect on the growth of real income per capita as expected but is insignificant. The statistically non-significance of inflation may be explained by the fact that West African Economic and Monetary Union countries, which account for half of the sample, record strong low inflation as a result of monetary union.
- Government consumption has the expected sign even though it is not significant.

Overall, a 10% increase in credit to the private sector as a percentage of GDP in ECOWAS leads to 0.8% increase in real GDP per capita. A rise of 10% in FDI net inflows leads to 0.3% growth of the GDP per capita. The common monetary policy, common currency, or legal origin (French versus British) seems to have no specific effect on growth through credit to the private sector. In addition to the low saving rate, information asymmetry between banks and borrowers seems to be a big obstacle to credit. To reduce the information asymmetry, and thus the risk associated with credit, in 2016 the Central Bank of WAEMU launched a Credit Bureau reform in the 8 WAEMU countries.

These findings, which are the first for ECOWAS member countries, are consistent with results of several other empirical studies. On the positive effect of access to credit by the private sector, the results are consistent with worldwide studies such as those of King and Levine (1993a, b); Levine (1997); Levine et al. (2000a, b); and Beck and Levine (2004). The positive foreign direct investment effect is also consistent with Makki and Somwaru (2004), Agrawal (2015), and Asongu and Odhiambo (2018). In contrast the positive effect of the Lagged real GDP per capita is not consistent with Barro and Sala-i-Martin (1992). This may be explained by the fact that the sample

is entirely made of countries of low income that continue to grow faster. The common monetary policy or common currency or legal origin seems to make no difference in ECOWAS's growth pattern. This is also consistent with the Levine etal. (2000a,) study which found no significant effect for legal origin through the financial variable. Finally, in terms of such a topic on regional regrouping, our results are consistent with Al-Malkawi and Abdullah's (2011) study on Middle East and North African countries.

6 Concluding Remarks and Policy Implications for ECOWAS

This chapter assessed the effect of financial development on growth for ECOWAS member countries and investigated whether there is specificity for member countries belonging to the West African Economic and Monetary Union. Evidence, based on a set of panel data analysis for the period 1960–2018 using generalized method of moments (GMM), indicates that credit to the private sector plays a key role in boosting economic growth in the West Africa region. The findings show that there is no specific effect for member countries that belong to the West African Economic and Monetary Union. The findings also show a positive effect on economic growth of foreign direct investment and the level of GDP per capita of the previous period. These findings are the first on ECOWAS member countries and they are consistent with the results of several other empirical studies that use a worldwide sample (Levine et al. 2000a,b).

The results call for policy recommendations, including the following:

- Accelerate the ongoing credit bureau reforms (CBR) launched by the Central Bank of West African States (BCEAO) in order to boost credit to the private sector and thus stimulate economic growth.
- Launch and synchronize CBR reforms with non-WAEMU countries, some of whom have already started similar reforms. These reforms will contribute to increasing real GDP per capita and thus lead to a growing middle class in ECOWAS.
- Implement CBR in parallel with other business-enabling reforms that will increase credit to the private sector and thus promote economic growth. Achieving the target of the common currency in ECOWAS—postponed from 2020 to 2027—without appropriate reforms will have no impact on the growth of GDP per capita and on the welfare of ECOWAS people.

Appendix

See Tables 5, 6, 7, 8, 9, and 10.

Table 5 Synthesis of multiple country studies on finance–Growth nexus

Authors	Sample and period	Methodology	Key findings
Prettner (2016)	45 developed and developing countries (1995–2011)	Cointegration and ECM	FD ⇒ EG (in the long run) FD—EG (no effect in the short run) FD ⇒ EG (for low FD) At a high FD level, FD loses its positive effect of EG The effect becomes negative for a FD above a threshold above 68.5%
Otchere et al. (2016)	17 African countries (those that have stock markets) (1996–2009)	Granger causality test between FDI, FD, and EG GMM	FDI ⇔ FD FDI ⇒ EG FD ⇒ FDI ⇒ EG
Azam et al. (2016)	4 Asian countries (1991–2012)	Cointegration	FD ⇒ EG (China and Singapore in the long term) FD ⇒ EG (India and China in the short term)
Effiong (2015)	21 Sub-Saharan African countries (1986–2010)	Standard panel data growth regression	FD—EG (no significant effect)
Asghar and Hussain (2014)	15 developing countries (1978–2012)	Panel cointegration and causality test	FD ⇒ EG
Herwartz and Walle (2014)	73 developed and developing countries (1975–2011)	Flexible semiparametric approach	FD ⇒ EG (stronger in developed countries)
Samargandi et al. (2013)	52 middle income countries (1980–2008)	Pooled mean group estimations	FD ⇒ EG but too much financial could have a negative impact on growth (inverted U-shape

(continued)

Table 5 (continued)

Authors	Sample and period	Methodology	Key findings
			Relationship between FD and EG in the long run) FD—EG (no effect in the short run)
Barajas et al. (2013)	150 countries (1975–2005)	GMM	FD ⇒ EG (high income countries) The effect is weak/small for oil exporting countries (including Middle East and North Africa) FD—EG (no effect for Sub-Saharan Africa)
Bittencourt (2012)	4 Latin American countries (1980–2007)	Panel time series regressions	FD ⇒ EG
Nyamongo et al. (2012)	36 African countries (1980–2009)	Panel regressions	FD ⇒ EG (has a weak influence on)
Jalloh (2011)	15 ECOWAS member countries (1994–2009)	Haussmann specification for the regression in level GMM for the dynamic model	FD—EG (positive but nonsignificant for ECOWAS as a whole for both models) Deregulation ⇒ EG with more effectiveness in non-WAEMU countries than in WAEMU countries
AL-Malkawi and Abdullah (2011)	13 Middle East and North Africa countries (1980–2005)	Pooled OLS, fixed model with instrumental variables	FD ⇒ EG
Al-Zubi et al. (2006)	11 Arab countries (1980–2001)	Haussman specification for fixed and random effects model	FD—EG (no effect)
Beck and Levine (2004)	40 countries (1976–1998)	GMM	FD ⇒ EG
Goldsmith (1969)	35 countries (1860–1963)	OLS	FD ⇔ EG
Roubini and Sala-i-Martin (1992)	53 countries (1960–1980)	Barro-type growth regression model	FD ⇒ EG
Atje and Jovanovic (1993)	94 countries (1980–1988)	OLS	FD ⇒ EG

(continued)

Table 5 (continued)

Authors	Sample and period	Methodology	Key findings
King and Levine (1993a)	80 countries (1960–1989)	OLS	FD ⇒ EG FD ⇒ Capital accumulation FD ⇒ Efficient capital allocation
King and Levine (1993b)	Extended King and Levine (1993a) + 5 countries' experiences with financial sector reforms + firm level evidence	OLS, pooled cross section time series, and 3SLS	Finance ⇒ EG (King and Levine (1993a) corroborated
Harris (1997)	49 countries (1980–1991)	2SLS	FD ⇒ EG (developed countries) FD—EG (developing countries)
Levine and Zervos (1998)	42 countries (1976–1993)	OLS	FD ⇒ EG
Levine (1999)	77 countries (1960–1989)	GMM	FD ⇒ EG
Levine et al. (2000a)	74 countries (1960–1995)	Cross-section and GMM	FD ⇒ EG
Xu (2000)	41 countries (1960–1993)	VAR	FD ⇒ EG (via domestic investment)
Roja and Valev (2003)	74 countries (1961–1995)	GMM	FD ⇒ EG (high income countries)
Christopoulos and Tsionas (2004)	10 countries (1970–2000)	Panel Unit Root and Cointegration Tests	FD ⇒ EG
Aghion et al. (2005)	72 countries (1960–2000)	OLS	FD ⇒ EG
McCaig and Stengos (2005)	71 countries (1960–1995)	GMM and OIR	FD ⇒ EG
Apergis et al. (2007)	101 countries (1975–2000)	Panel data co-integration methodology	FD ⇔ EG
Caporale et al. (2009)	10 EU countries (1994–2007)	GMM	FD ⇒ EG
Bangake and Eggoh (2011)	71 developed and developing countries (1960–2004)	VECM	FD ⇔ EG (across country long run) EG ⇒ FD (short run for high-income countries) FD—EG (short run for middle- and low-income countries)

(continued)

Table 5 (continued)

Authors	Sample and period	Methodology	Key findings
Gupta (1984)	14 countries (1961–1980)	VAR and Granger Causality	FD ⇔ EG
Arestis and Demetriades (1997)	US and Germany (1979–1991)	Cointegration, VECM	FD ⇒ EG (Germany) FD—EG (no link for US)
Rousseau and Wachtel (1998)	5 developed countries (1870–1929)	VECMs and Granger causality	FD ⇒ EG
Fase and Abma (2003)	9 Asian countries (1978–1999)	Error Correction Model and ADF	FD ⇒ EG
Abu-Bader and Abu-Qarn (2008)	6 countries of North Africa and Middle East (1960–2004)	VAR, Granger Causality, Cointegration and VEC	FD ⇒ EG
Esso (2010)	15 Economic Community of West Africa member countries (1960–2005)	Cointegration; Non causality test of Toda and Yamamoto	FD ⇒ EG (Ghana, Liberia, and Mali) -EG ⇒ FD (Côte d'Ivoire) FD ⇔ EG (Cabo Verde and Sierra Leone) FD—EG (other countries)
Enisan and Olufisayo (2009)	7 African countries (1980–2004)	ARDL Bounds Test; Granger causality test	FD ⇒ EG (Egypt and South Africa) FD ⇔ EG (Côte d'Ivoire, Kenya, Morocco, and Zimbabwe)
Abu-Bader and Abu-Qarn (2006)	5 MENA countries (Algeria, Egypt, Morocco, Syria and Tunisia) (1960–2004)	VEC methodology; Granger causality tests	FD—EG (the short run)
Al-Tamimi et al. (2002)	8 Arab countries with different periods for each country	Granger causality test; Cointegration tests	FD—EG
Darrat (1999)	3 Middle Eastern countries (Saudi Arabia, Turkey, and United Arab Emirates). (Period not reported)	Multivariate Granger causality Tests	FD ⇒ EG (Turkey) EG ⇒ FD (United Arab Emirates) FD ⇔ EG (Saudi Arabia)

(continued)

Table 5 (continued)

Authors	Sample and period	Methodology	Key findings
Arestis and Demetriades (1999)	12 countries (1949–1992)	Cointegration and Causality Tests	FD ⇔ EG (UK, USA, Germany, South Korea, Greece, India and France) FD ⇒ EG (Japan) EG ⇒ FD (Turkey and Chile)
Habibullah (1999)	7 Asian countries (1980–1990)	Granger Causality Test; VAR; VECM	FD ⇒ EG (Philippines) EG ⇒ FD (Malaysia, Myanmar and Nepal) FD ⇔ EG (Indonesia, Sri Lanka and Thailand)
Demetriades and Hussein (1996)	5 Asian countries (1965–1992)	ADF, Engle-Granger, Johansen cointegration Test	FD ⇒ EG (SriLanka) EG ⇒ FD (Pakistan) FD ⇔ EG (India South Korea and Thailand)
Thornton (1996)	22 developing countries (1950–1990)	Granger Causality Tests	FD ⇒ EG (Nepal, Malysia, Philippines and Thailand) EG ⇒ FD (Myanmar and Korea)
Kar et al. (2011)	15 MENA countries (1980–2007)	Bootstrap Panel Granger Causality Analysis	EG ⇒ FD FD ⇒ EG No consensus
Menyah et al. (2014)	21 African countries (1965–2008)	Panel Causality Approach	FD—EG (no causality)
Hsueh et al. (2013)	10 Asian countries (1980–2007)	Bootstrap Panel Granger Causality Analysis	FD ⇒ EG (Malaysia, Indonesia, Korea, Singapore) Thailand, Taiwan and China) While no causality FD—EG (Philippines, India and Japan)
Chow and Fung (2013)	69 countries (1970–2004)	Regime Switching Panel Vector-Autoregressive Model	In all clusters EG ⇒ FD or FD ⇔ EG

(continued)

Table 5 (continued)

Authors	Sample and period	Methodology	Key findings
Jun (2012)	27 Asian countries (1960–2009)	Panel Cointegration Techniques	EG ⇔ FD
Hassan et al. (2011)	177 low-, middle-, and high-income countries classified by geographic regions (1960–2005)	Panel estimation and Multivariate Time series Methodology	In the short run; FD ⇔ EG (Europe & Centrale Asia, Middle East & North Africa, South Asia, High Income OECD and non-OECD Countries) FD ⇒ EG (Sub-Saharan Africa and East Asia & Pacific)
Rachdi and Mbarek (2011)	6 OECD and 4 MENA regions countries (1990–2006)	Panel data cointegration and GMM system approaches	EG ⇔ FD (OECD Countries) FD ⇒ EG (MENA Countries)
Kakilli-Acaravci et al. (2009)	24 Sub-Saharan African countries (1975–2005)	Panel Cointegration and GMM	EG ⇒ FD (Domestic credit) EG—FD (No causality in the long run)
Habibullah and Eng (2006)	13 developing Asian countries (1990–1998)s	System GMM	FD ⇒ EG
Calderon and Liu (2003)	109 developing and industrial countries (1960–1994)	Geweke Decomposition test	FD ⇔ EG

Source Saqib (2015), Topcu (2016), and authors' update
Note FD => EG: Causality runs from financial development to economic grow. EG => FD: Causality runs from economic growth to financial development. FD <=> EG: Bidirectional/simultaneous causality. FD—EG: No causality/no effect

Table 6 Synthesis of country specific studies on Finance-Growth Nexus

Authors	Country and period	Methodology	Key findings
Adu et al. (2013)	Ghana (1961–2010)	ARDL	FD ⇒ EG
Uddin et al. (2013)	Kenya (1971–2011)	ARDL Gregory Hansen Cointegration Techniques	FD ⇒ EG (long run)

(continued)

Table 6 (continued)

Authors	Country and period	Methodology	Key findings
Eita and Jordan (2007)	Botswana (1977–2006)	VAR Granger causality Test	FD ⇒ EG
Khan et al. (2005)	Pakistan (1971–2004)	ARDL	FD ⇒ EG (long run). FD—EG (Short run)
Katircioglu et al. (2007)	India (1960–2004)	VEC Model and Causality Analysis	FD ⇔ EG
Ray (2013)	India (1991–2011)	Granger Causality Test	FD ⇒ EG
Ndlovu (2013)	Zimbabwe (1980–2006)	Multivariate Granger Causality Test- Johansen Cointegration Test	EG ⇒ FD
Qin and Ndiege (2013)	Tanzania 1990–2012	Wald Granger Causality Test	FD ⇔ EG
Carby et al. (2012)	Barbados (1946–2011)	VAR-VECM	EG ⇒ FD (in the short run) FD ⇔ EG (in the long run)
Bojanic (2012)	Bolivia (1940–2010)	Granger Regression- ECM	FD ⇒ EG
Chimobi (2010)	Nigeria (1970–2005)	Cointegration-Granger Causality test	FD ⇒ EG
Koetter and Wedow (2010)	Germany (1995–2005)	Panel estimation	FD ⇒ EG (for quality of credit) FD—EG (for the volume of credit)
Maswana (2009)	China (1980–2002)	Hsia's version of the Granger Causality Tests	FD ⇔ EG
Perera (2009)	Sri Lanka (1955–2005)	Johansen Cointegration-Granger Causality Test	Broad Money ⇒ EG Private sector credit ⇒ EG EG ⇒ narrow money, total credit, private sector credit to total domestic credit
Yucel (2009)	Turkey (1989–2007)	Johansen Granger Causality Test	FD ⇔ EG
Klimani (2009)	Uganda (1970–2006)	Granger Causality Test	FD ⇒ EG

(continued)

Table 6 (continued)

Authors	Country and period	Methodology	Key findings
Ozturk (2008)	Turkey (1975–2005)	VAR	EG ⇒ FD FD—EG (in the long run)
Odhiambo (2008)	Kenya (1969–2005)	Cointegration and error Correction Techniques	EG ⇒ FD
Acaravci et al. (2007)	Turkey (1986–2006)	VAR	FD ⇒ EG
Liang and Teng (2006)	China (1952–2001)	VAR Approach	EG ⇒ FD
Shan and Jianhong (2006)	China (1978–2001)	VAR Approach	FD ⇔ EG
Odhiambo (2005)	Tanzania (1988–2012)	Johansen Cointegration-ECM	FD ⇔ EG
Lee (2005)	Canada (1870–1926 & 1948–2002)	VAR	FD ⇒ EG
Bolbol et al. (2005)	Egypt (1974–2002)	Relation with total factor productivity (TFP)	FD has a negative impact on TFP as long as it is not related to per capita income threshold
Akinboade (1998)	Botswana (1976–1995)	Granger Causality Test- Error Correction Method	EG ⇔ FD
Dritsakis and Adamopoulos (2004)	Greece (1960–2000)	VAR-Granger Causality Test	FD ⇒ EG
Rousseau and Sylla (1999)	United States (1792–1850)	VAR	FD ⇒ EG EG—> FD (no feedback of real growth on finance)
Rousseau (1999)	Japan (1880–1913)	VAR	FD ⇒ EG

Source Saqib (2015); Topcu (2016) and authors update

Note FD = > EG: Causality runs from financial development to economic grow EG = > FD: Causality runs from Economic growth to financial development FD ⇔ EG: Bidirectional/simultaneous causality. FD—EG: No causality/No effect

Table 7 Real GDP per capita, 1960–2018, leading economies of ECOAWS and East Asia ($ 2010)

Years	[60–64]	[65–79]	[70–74]	[75–79]	[80–84]	[85–89]	[90–94]	[95–99]	[00–04]	[05–09]	[10–14]	[15–18]
Cote d'Ivoire	1352.42	1644.67	2015.55	2318.08	1908.59	1623.25	1388.54	1403.72	1280.94	1208.96	1248.43	1577.58
Ghana	1066.03	1001.21	1071.49	905.04	776.29	777.93	842.148	906.42	991.39	1153.42	1506.12	1703.38
Nigeria	1406.02	1339.47	1923.87	2039.82	1616.22	1366.25	1467.60	1364.76	1578.69	2004.60	2413.7	2457.03
Senegal	1337.51	1267.19	1191.94	1202.75	1132.55	1114.11	1042.92	1049.41	1146.44	1255.57	1291.825	1462.36
Indonesia	690.86	687.04	845.37	1046.17	1305.91	1492.64	1886.59	2233.44	2270.107	2754.87	3414.106	4049.35
Korea, Rep	1016.45	1400.37	2137.77	3259.08	4295.26	6623.56	9765.29	13,004.08	16,509.73	20,005.5	23,188.88	25,817.2
Malaysia	1455.67	1737.68	2222.98	2841.42	3598.13	3917.44	5174.96	6599.91	7220.93	8448.76	9748.29	11,501.3
Thailand	613.01	784.73	982.20	1224.51	1510.37	1920.90	2889.31	3470.06	3778.85	4631.16	5351.34	6035.89

Source Authors' own calculations based on WDI database, 2020

Table 8 Credit to the private sector in Leading Countries of ECOWAS and East Asia 1960–2018 in %

	[60–64]	[65–79]	[70–74]	[75–79]	[80–84]	[85–89]	[90–94]	[95–99]	[00–04]	[05–09]	[10–14]	[15–18]
Cote d'Ivoire	19.75	20.5	28.28	37.63	40.46	35.81	30.34	16.54	13.84	15.7	19.15	25.01
Ghana	6.22	8.48	8.38	4.6	1.91	3.77	4.72	8.23	12.73	14.53	14.67	14.16
Nigeria	5.14	7.24	5.44	9.01	7.39	6.27	6.69	7.1	8.71	14.98	13.46	13.76
Senegal	12.08	10.26	13.17	21.73	27.67	22.24	19.07	12.11	13.24	16.98	24.54	28.21
Indonesia	n.a	n.a	n.a	n.a	13.89	27.18	50.83	48.73	22.16	26.14	32.65	39.01
Korea, Rep	9.97	19.12	34.6	32.71	42.8	46.43	50.41	58.43	104.03	133.95	136.8	144.54
Malaysia	11.31	14.98	24.82	36.95	63.04	92.26	93.47	146.41	123.36	104.02	114.03	120.67
Thailand	11.56	14.97	21.52	37.08	47.46	62.15	100.92	146.54	96.86	100.76	134.11	146.38

Source Authors' own calculations based on WDI database, 2020

Table 9 Saving rate in Leading Countries of ECOWAS and East Asia 1960–2018 in %

	[60–64]	[65–79]	[70–74]	[75–79]	[80–84]	[85–89]	[90–94]	[95–99]	[00–04]	[05–09]	[10–14]	[15–18]
Cote d'Ivoire	28.64	29.01	27.03	27.69	20.85	18.39	13.81	21.11	18.60	17.80	21.75	21.14
Ghana	13.55	9.14	11.73	8.56	4.02	5.47	6.51	8.54	6.86	2.13	8.17	21.16
Nigeria	n.a	n.a	n.a	n.a	78.24	56.11	54.92	43.38	39.64	31.52	23.91	15.15
Senegal	15.18	15.16	17.29	13.17	4.07	4.57	2.46	8.30	9.28	6.26	7.96	13.95
Indonesia	7.87	2.25	16.68	23.09	25.45	27.89	29.18	27.62	27.10	29.40	34.34	33.27
Korea, Rep	4.93	12.49	18.33	26.92	28.42	38.20	38.68	37.30	34.00	33.54	34.41	35.92
Malaysia	21.34	21.48	24.42	31.49	31.68	34.84	36.78	44.51	43.16	42.80	36.65	32.16
Thailand	23.79	27.66	20.90	21.93	22.55	29.37	35.80	35.51	31.28	31.81	31.13	33.77

Source Authors' own calculations based on WDI database, 2020

Table 10 Growth of GDP per capita in leading countries of ECOWAS and East Asia 1960–2018 in %

	[60–64]	[65–79]	[70–74]	[75–79]	[80–84]	[85–89]	[90–94]	[95–99]	[00–04]	[05–09]	[10–14]	[15–18]
Cote d'Ivoire	6.72	3.14	2.2	3.53	−6.86	−1.47	−3.61	1.82	−2.98	−0.06	2.67	5.27
Ghana	0.33	−1.17	1.66	−3.53	−3.86	2.13	1.18	1.77	2.06	3.45	5.74	2.69
Nigeria	2.29	−0.62	9.18	−0.77	−8.02	1.01	0.02	−0.46	5.86	4.01	3.3	−1.66
Senegal	−0.62	−2.3	−0.32	0.79	−1.26	0.09	−2.04	2.01	1.68	1.13	1.06	3.69
Indonesia	−0.46	1.8	4.68	4.35	3.83	3.25	5.14	0.2	3.16	4.24	4.39	3.78
Korea, Rep	4.37	8.57	8.29	8.8	5.91	8.99	7.39	4.87	5.08	3.11	3.14	2.41
Malaysia	3.36	3.69	6.54	4.56	4.31	1.91	6.48	2.56	3.25	2.12	4.22	3.59
Thailand	3.78	5.34	4.07	5.45	3.53	7.14	7.63	0.45	4.61	2.54	3.37	3.28

Source Authors' own calculations based on WDI database, 2020

Notes

1. Levine et al. (2000a, b), Beck and Levine (2004), Al-Malkawi and Abdullah (2011), Otchere et al. (2016), Jung (2017).
2. Those eight countries are: Benin, Gambia, Guinea, Guinea–Bissau, Niger, Nigeria, Senegal, and Togo.
3. ECOWAS member countries are: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Four economies represent almost 89.5% of ECOWAS GDP in 2014 with Nigeria the largest economy (78%), followed by Ghana (4.8%), Côte d'Ivoire (4.6%), and Senegal (2.1%). See UNECA (2015, p. 10) for more details.
4. West African Economic and Monetary Union is made up of eight countries that have a monetary union with a common currency, the CFA. The countries are: Benin, Burkina Faso, Côte d'Ivoire, Guinea–Bissau, Mali, Niger, Senegal, and Togo.
5. Financial deregulation is defined here as the removal or simplification of government rules and regulations that constrain the operation of market rules.

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The Impact of COVID-19 on Africa: Health and Economic Implications

Marcus Hollington and Monique Bennett

1 Introduction

The first case of COVID-19 was reported in China, Hubei province in December 2019 before being declared a pandemic by the World Health Organization (WHO) in January 2020. In Africa, the first case of COVID-19 was reported in Egypt on 14 February 2020. The pandemic is believed to have been transmitted from animals (bats) to humans, making it the 5th zoonotic disease and 3rd coronavirus to infect human-beings over the last 2 decades. At the time of writing, the continent had recorded 1.75 million confirmed cases, 42.17 thousand deaths and 1.43 million recoveries (Africa CDC 2020).

The COVID-19 pandemic presents a difficult road ahead for Africa. South Africa's President Cyril Ramaphosa currently chairs the African Union (AU) and will influence the continent's fight against the virus. A holistic analytical approach must be employed to combat the outbreak and should be tailored toward the continent's complex developmental dynamics and socio-economic issues. This must coherently inform the political-economic policy in the public and private sectors. Doing so may successfully reduce the pandemic's

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peak caseload (flatten the curve), save lives, and better equip the continent for similar, or worse pandemics in the future. This should help curb the probability of Africa experiencing a second wave of infections, as seen in China with the arrival of citizens from overseas travel (Yan 2020).

To this end, this chapter conducts a comprehensive risk assessment on some of the continent's risk factors as informed by the aforementioned and discusses how these are currently, or may inevitably hamper Africa's fight against COVID-19. It also seeks to avert the cataclysmic effects of the pandemic on the continent in both the medium and long-term, should they not be addressed accordingly. The chapter asserts that the risk factors discussed in-depth in subsequent sections to mitigate the continent's vulnerability to the outbreak, despite the continent's slight "head start" in preparing for the pandemic's arrival facilitated by its prompt lockdowns and stringent social distancing measures (Hollington and Bennett 2020).

The analysis will also examine an array of factors to better inform COVID-19 response policy in Africa, namely: availability of physicians, access to basic sanitation and drinking water services. It will discuss the economic impact that COVID-19 has had on the African economy and project potential losses on some of the continent's vital economic sectors and informal economic activities as informed by the continent's travel restrictions, thereafter. It will then conclude with viable recommendations to address some of the continent's shortfalls in its fight against the pandemic.

2 Historical Review of Global Pandemics in Africa

This section serves to review literature on notable episodes of global pandemics over the past century, except for HIV/AIDS as it has been exhaustively documented. The chapter will access the health, social, and economic coping mechanisms that nations deployed to solve problems of the pandemics to better inform nations on how best to cope with the COVID-19 predicament.

Spanish Flu

The Spanish flu was a zoonotic influenza that was transferred from birds to humans during World War I. It has been coined the worst pandemic to affect mankind in recent history, killing an estimated 50 million people within a year and infecting a 3rd of the world's populace at the time (Bootsma

and Ferguson 2007; USCDC 2019; WHO 2018). In Africa, an estimated 2% (2.5 million people) of the continent's populace died during the first 6 months of the outbreak (Phillips 2020). South Africa emerged as not only the most affected country on the continent but constituted as 1 of 5 most affected countries in the world (Phillips 2020). In West Africa, an estimated 4% of Freetown's population in Senegal died during the first 3 weeks of the disease's arrival. In East Africa, around 6% of Kenya's populace at the time died over a period of 9 months.

The pandemic transpired in three waves in Africa spanning from March 1918 to July 1919 (Africa Center for Strategic Studies 2020). Facilitating the spread of the disease was the movement of 150,000 African soldiers and the transportation of an estimated 1.4 million logistical support laborers in Europe to fight alongside their colonizers during the First World War. This imported the disease into Africa via seaports in Freetown, Senegal; Cape Town, South Africa and Mombasa, Kenya. The second wave is believed to have mutated into a more lethal strain that spread through West Africa.

This had a devastating impact on socio-economic issues for affected countries due to a disease-induced reduction in labor causing employee absenteeism and death. Businesses closed and many found it difficult to stay afloat in the absence of adequate labor. No sector in the economy was spared from the devastating economic effects of the outbreak (African Center for Strategic Studies 2020). The third wave was less devastating but had a compounding effect on the continent. Similar to the ongoing 2019-nCoV pandemic, in the absence of a vaccine, mitigation revolved around the imposition of non-pharmaceutical interventions (NPI) such as social distancing measures and quarantines for suspected cases.

Asian Flu

The Asian Flu was the second notable pandemic that occurred during the latter part of the 1950s. Identified as influenza of an H2N2 strain in China, it spread around the world killing nearly 2 million people worldwide (Wilkin 2020). According to Saunders-Hastings and Krewski (2016), the pandemic's mortality curve shifted more toward the young than the old suggesting a pre-existing immunity most likely developed from their previous encounter with the Spanish Flu nearly 4 decades earlier. Similar to the Spanish flu, the Asian flu made its way to Africa primarily via seaports (John Hopkins School of Public Health 2020).

The continent was minimally affected by the pandemic due to its geographic location (Strohm 2020). Many African states did not implement

comprehensive NPIs in response to the pandemic and economies continued to function as normal with employees going to work despite the presence of the pathogen (Taylor 1958). The discovery of a vaccine in 1958 subsequently slowed the spread of the disease and contained it before it evolved into another common cold (Saunders-Hastings and Krewski 2016). Economic recovery, thereafter, was fairly swift bringing about relief to countries (Gavi 2020).

Hong Kong Flu

A decade after the Asian Flu, the Hong Kong Flu emerged. According to Saunder-Hastings and Krewski (2016: 8), the new H3N2 pandemic was an essentially evolved version of the Asian flu that "underwent an antigenic shift, resorting to H3N2 and emerging as a new pandemic known as the Hong Kong flu." This influenza was the first virus to illustrate accelerated global spread rate due to increased global integration. Fortunately, the pandemic had a minimal impact on Africa and only reached continent by 1969 where public health warnings and symptoms had been comprehensively documented in scientific journals and domestic health sectors were prepared to respond. Additionally, a vaccine was approved prior to its inception into Africa, hence, its minimal impact therein (Pancevski 2020). Similar to the Asian flu, the socio-economic burden of the pandemic was minimal. As such, there was no need to implement costly NPIs that would hurt the economy such as those currently being experienced by nations in their efforts to curb the 2019-nCoV pandemic.

SARS-CoV

SARS-CoV is a zoonotic disease that was first identified in China in 2002. The animal reservoir has not yet been established by WHO and scientists are suspecting that the pathogen was transmitted from bats which infected civet cats and subsequently humans (WHO, n.d.; Wang et al. 2006). The pandemic spread to an estimated 26 countries, inflecting 8000 people and killing approximately 800 people with a case-fatality ratio of 9.6%. According to Wilder-Smith and Freedman (2020), to combat the pandemic countries implemented cost-efficient NPIs such as social distancing and quarantines for the infected.

In Africa, South Africa was virtually the only African country that that was affected with a few isolated cases. These did not hamper social and

economic life in the country, the economy continued to operate as normal (The Globalist 2020). To curb imported cases, countries around the world including those in Africa imposed travel restrictions which had negative economic effects for the global airline industry and the world economy due to a decline in export services and international skilled labor (Wilder-Smith and Freedman 2020). Recovery post the pandemic was swift as a result of the pandemic's mild nature which saw economies stabilize around the world (Dvorak 2020).

Swine Flu

The Swine Flu (pH1N1) was first identified in Mexico in April 2009. The virus entered the US as a result of the country's migratory labor relations with Mexican seasonal farm laborers. According to Smith et al. (2014), the pandemic spread to 30 countries in 6 weeks and then to 122 countries by the end of July 2009, killing nearly 800 people. African governments deployed mitigation measures which included the immediate treatment and quarantine of suspected cases, increasing medical personnel at airports to screen passengers, banning the import of pork and pork products in some African countries which had negative economic consequences for poultry traders (BBC News 2009). Countries such as Nigeria opted for stockpiling antiviral treatments and the deployment of task forces to deal with possible swine flu cases (Reuters 2009; BBC News 2009).

Ebola

According to Jan et al. (2015) the Ebola virus (EBV) was discovered in 1976. The worst outbreak occurred in 2014 in West Africa, where the virus spread from remote villages to major cities across the region. Liberia, Sierra Leone, and Guinea emerged as the worst affected countries. In their study of the Bombali virus, Goldstein et al. (2018) provide evidence suggesting that fruit bats are the natural reservoir of EBV making it the 4rd zoonotic pandemic to affect human-beings over the last two decades. Countries such as Liberia, Sierra Leone, Guinea, and Guinea-Bissau promoted social distancing such as the restriction of public gatherings, and good hygiene practices as they emerged as the worst affected (Wright et al. 2014).

Screening at ports of entry such as airports, borders and sea docks were implemented to identify suspected cases, isolate and treat patients immediately across the continent (UNDP 2014). According to the UNDP (2015),

the EBV pandemic disrupted supply chains across West Africa as the supply of labor fell due to deaths, work absenteeism, employee migration and the repatriation of expatriates. The Ebola pandemic exacerbated socio-economic issues such as food insecurity, unemployment, and poverty. Farmers were reluctant to harvest their produce amidst fears of contracting the disease (FAO 2016). The USCDC (2019) suggests that Liberia, Sierra Leone, and Guinea lost an estimated $2.2 billion from the pandemic and recovery post the peak of the pandemic was gradual due to the underdeveloped nature of most West African economies while it was much faster for developed countries.

2019-NCoV

The 2019-nCoV is the 3rd and most lethal coronavirus to infect humans over the last 2 decades. According to WHO (2020b), the 2019-nCoV pandemic emerged from China in 2019. Contrary to the mortality trends of previous SARS-like diseases, the mortality curve of the virus shifted toward the elderly reinforcing the novel nature of the virus (Girard et al. 2010; Saunders-Hastings and Krewski 2016; Lu et al. 2020). Africa's young population, pre-emptive country-wide lockdowns and experience with an array of outbreaks such as Ebola and cholera somewhat fortified the continent against the adverse effects of the virus through preparation (Edward-Ekpu 2020; Hollington and Bennett 2020). In 2019, the continent undertook a Joint External Evaluation (JEE) as part of its bid to honor the International Health Regulations which enhanced its detection, prevention and response capacities to public health threats such as the 2019-nCoV (Edward-Ekpu 2020).

However, the country-wide lockdowns that were implemented across Africa had a devastating effect on the socio-economic wellbeing of 85% of Africans that fall under the "self-employed" category. Street vendors and day-laborers have been greatly affected by the national lockdowns (Deutsche 2020). In response to the social strife experienced by citizens and residents alike, African governments mobilize resources both domestically and internationally in the form of financial aid and protective equipment donations to combat the pandemic. However, as with historic and contemporary trends corruption would soon take root as state officials began to utilize public procurement as an avenue of corruption as they diverted government and donor-aid resources for personal gain leaving millions of people vulnerable to the pandemic (Schipani et al. 2020). Containing the pandemic will prove difficult without a vaccine and with the global economy projected to contract by "$8.5 trillion over the next 2 years" (United Nations 2020). Recovery

post the pandemic may not be as smooth as that experienced in previous post-pandemic situations.

In summary, this section highlighted topical literature on notable epidemics leading up to the 2019-nCoV. Notable pandemics such as the Spanish Flu, Asian Flu, Hong Kong Flu, SARS-CoV, Swine Flu, MERS-CoV, Ebola and the ongoing 2019-nCoV were reviewed to assess the key characteristics of each pandemic as well as the coping mechanisms that countries used to solve the health and economic challenges they encountered depending on the disruptive nature of the respective pandemics. Recognizing the past body of literature to which the chapter contributes better informs the paper's contribution to literature around COVID-19 and provides viable solutions thereof.

3 Methods

The findings presented in this risk assessment chapter draw on risk factor datasets derived from the Global Health Repository of the WHO and The World Bank. This is analyzed against emerging COVID-19 data sourced from the Africa Centres for Disease Control and Prevention herein known as Africa CDC. Complementarily, the chapter employs documentary analysis to find, appraise, and synthesize data in the economic section (Hollington 2018). In addition, to gauge Africa's pandemic preparedness, or ability to combat COVID-19, the chapter made use of the Global Food Security Index (GFSI) to add value to the insights.

Using the data derived from the sources mentioned, a Pearson r correlation test was employed using R statistical modeling software to measure the degree of the relationship between health risk factors, African government responses, and the confirmed COVID-19 cases and deaths using the Pearson r correlation formula below:

$$r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2 - \left(\sum x_i\right)^2}\sqrt{n\sum y_i^2 - \left(\sum y_i\right)^2}}$$

The scale of the correlation coefficient utilized in this study ranges from −1 (perfect negative downhill linear relationship) to 1 (perfect positive uphill linear relationship), where 0 indicates that there is no linear relationship.

Variables

There are a number of risk factors that make Africa more susceptible to increased infection and the negative consequences of COVID-19. One, the availability of physicians in Africa which provides important insights on how countries can or cannot cope with an increase in confirmed COVID-19 cases or deaths. This factor is particularly important to assess given the continent's rampant socio-economic issues which often drive health professional brain drains. Two, the percentage of people using at least basic sanitation services across the continent is assessed. Herein, the percentage of people with access to at least safe drinking water were incorporated into the analysis as an explanatory variable to enhance the insights provided by the study to gauge the level of risk that a developing continent such as Africa finds itself in during the pandemic.

4 Risks Factors for Africa During COVID-19

The following section provides an analysis of some of the factors that are currently or will influence the manner in which the continent will combat the COVID-19 pandemic. The sample of countries utilized per factor is dependent on the availability of data from African countries. As such, not all African countries will be discussed in the analysis except where data are available. In the event that no data are available at all for some countries, then these will be alluded to on a regional basis.

Availability of Physicians

According to the World Health Organization (WHO) (2020a), over 45% of its member countries have less than 1 physician per 1000 people. Relative to their populations, this is very low. Moreover, of the 194 member countries in WHO, 26% have less than 3 physicians for every 10,000 people, many of them being in Africa (World Economic Forum 2020). This illustrates an uneven distribution of health workers around the world. Africa has the greatest disease burden and one of the smallest healthcare workforces (Gouda et al. 2019). Figure 1 provides insight on the number of physicians available in Africa to fight the pandemic and attempt to save the lives of the infected through available treatment options. The color of the bubbles indicates a country, while the size of the bubble indicates recoveries (see Fig. 1).

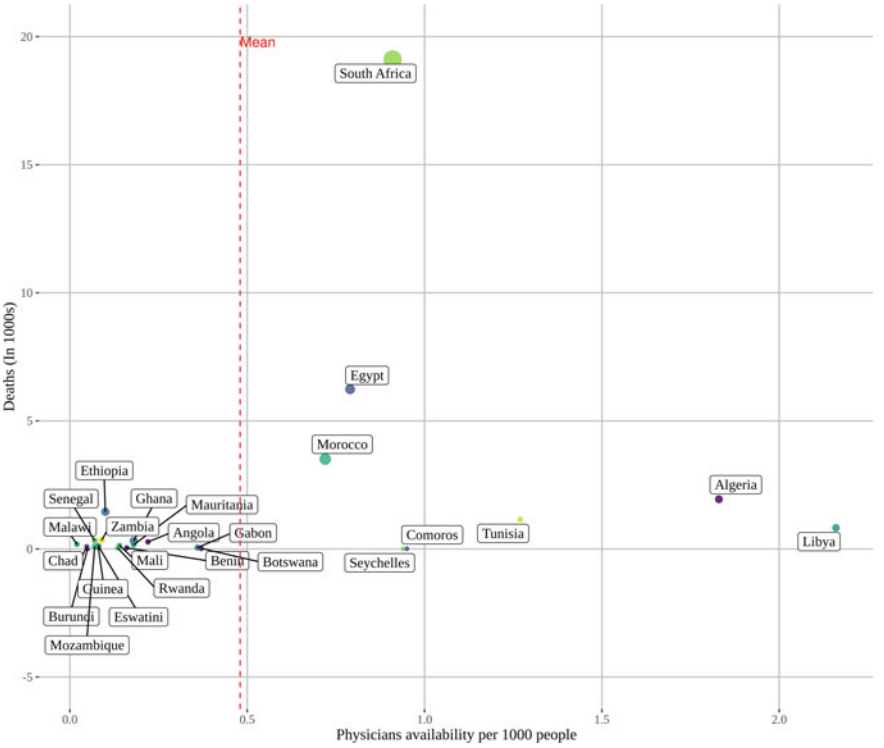
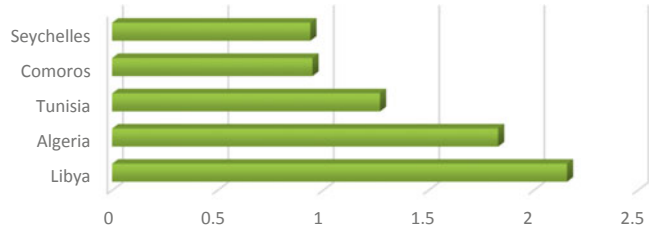


Fig. 1 Physician Availability (*Source* Africa CDC and World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data. Accessed December 2020)

As such, the larger the bubble, the higher the number of 2019-nCoV recoveries in a country. A correlation test reveals a positive relationship of 0.27 or 27% between lack of physician availability and COVID-19 deaths.

According to Fig. 1, North African countries have the highest number of physicians available to tackle Covid-19 cases in their respective geographical territories. Theoretically, this should put them in a position to better reduce the peak caseload of the virus in their countries. While Egypt, South Africa, and Algeria have some of the highest COVID-19 deaths in Africa, overall the continent has managed to keep the death toll and indeed the number of confirmed cases at a minimum as a result of screening, social distancing, and costly lockdown measures (Africa CDC 2020).

These solutions are temporal and might see positive cases and deaths escalate should more efficient measures such as scaling up testing, treating, and fumigation not be implemented on a continent-wide scale. The former plays a pivotal role in bringing to light the infection status of a country and better



	Libya	Algeria	Tunisia	Comoros	Seychelles
Top 5 Africa countries with most available number of Physicians per 1,000 people	2.16	1.83	1.27	0.95	0.94

Fig. 2 Top 5 African countries with the highest number of physicians per 1000 people (*Source* World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data. Accessed December 2020)

inform the manner in which it should implement measures to combat and curb the virus.

Despite the continent not having adequate resources to effectively combat COVID-19, some African countries are more protected from the virus than others due to their availability of physicians. Figure 2 represents the best and well-resourced countries in the segment with Libya ranking 1st followed by Algeria, Tunisia, Comoros, and the Seychelles, respectively. While these are in a much better position to combat COVID-19, Libya's ability to administer services to its populace despite being a leading country in this category is questionable. This assertion comes after years of armed conflict and state failure which has left its health system in near collapse despite its robust health labor-force (Raghavan 2020; WHO 2019). This puts the citizens of Libya and other African countries in similar conflict situations at a hybrid risk of fatality, not only to the pandemic, but to conflict, or in the event that both mediums are utilized to facilitate victory for either side of the conflict resulting in high civilian casualties.

Sanitation

Washing hands with soap and water has been identified as one of the most effective ways to prevent the spread of COVID-19. Access to basic sanitation is crucial if countries are to prevent the spread through hand washing. Access to sanitation services in Africa is fragmented, with an average of only 42.1% having basic access to sanitation services. Figure 3 explores the relationship between confirmed COVID-19 cases as well as levels of basic sanitation access

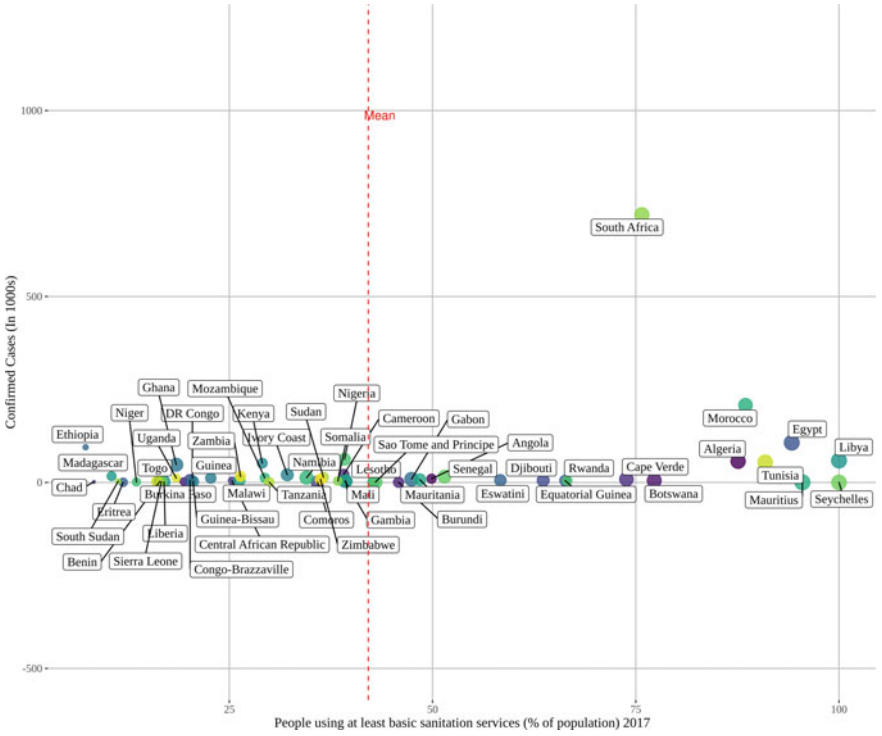
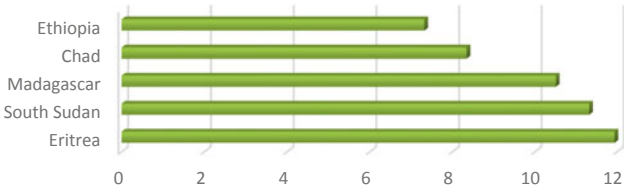


Fig. 3 Sanitation and confirmed COVID-19 cases (*Source* Africa CDC and World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data. Accessed December 2020)

for Africans in their respective countries. The size of the bubble represents the percentage of people making use of at least basic water services per country. A correlation test revealed a positive relationship of 0.28 or 28% between access to basic sanitation services and confirmed COVID-19 cases.

Worrying is the fact that more than half of the sample of African countries analysed provide basic sanitation services to less than 50% of their populations. Emerging studies on the pandemic have indicated that there is a possibility that the virus can be transmitted through feces as the alternative to cough, sneeze, and contact transmission (Wu et al. 2020, Zhang et al. 2020). Without adequate sanitation services the majority of the continent is at the risk of a continued spread COVID-19. Figure 4 shows countries with the highest risk of COVID-19 transmissions based on poor sanitation services with Ethiopia and Chad being the most vulnerable in the segment as they only provide basic sanitation services to 7.32 and 8.34% of their populations. The deficit in basic sanitation services in the aforementioned as well as other



	Eritrea	South Sudan	Madagascar	Chad	Ethiopia
African countries with the worst sanitation services	11.94	11.32	10.51	8.34	7.32

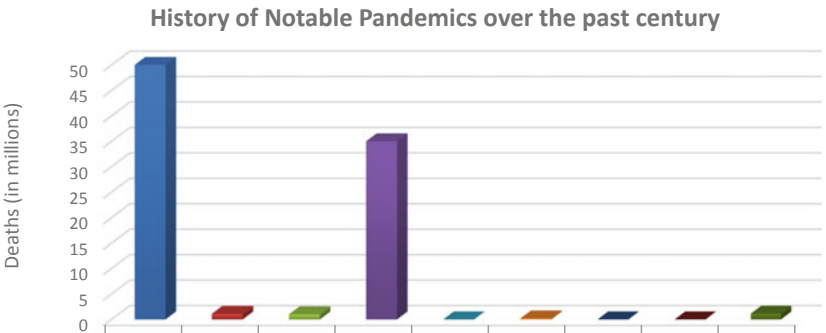
Fig. 4 African countries with the least accessible basic sanitation services (*Source* WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene 2017. Accessed December 2020)

African countries struggling to provide basic sanitation services to their populaces puts them in a situation where they do not only have to contend with the threat of the virus, but also risk contracting diarrhoea, cholera, dysentery, and typhoid as result thereof (The Conversation 2016).

Address Health Risk Factors to Prepare for the Next Pandemic

As the continent mobilizes to contain COVID-19, it is important that it looks at the bigger picture and considers the possibility of another pandemic occurring in the near future as the global outbreak of COVID-19 is no coincidence. The last century has been characterized by the emergence and re-emergence of pandemics at an alarming rate (see Fig. 5). As such, it is important that the continent addresses the risk factors assessed in this paper to, not only combat COVID-19 but to better prepare for subsequent pandemics. Between 1980 and 2010, the global number of disease outbreaks rose from 1000 to just over 3000, with the leading drivers thereof being bacteria and viruses representing 70% of diseases (vector-borne) and causing 88% of outbreaks over the period of analysis. Zoonoses accounted for 56% of outbreaks with the 2019-nCoV pandemic presenting itself as the latest zoonotic disease (Smith et al. 2014; Mackenzie and Smith 2020).

Communicable diseases such as HIV/Aids, TB, Cholera, Ebola kill hundreds of thousands of Africans every year. These outbreaks disrupt economies and cause panic globally. COVID-19 has exposed the vulnerability of Africa's health system, public service delivery, and deficits in government and non-governmental organizations' coordination and inefficient disease



	Spanish Flu	Asian Flu	Hong-Kong Flu	HIV/Aids	SARS	Swine Flu	MERS	Ebola	COVID-19
2019-Present									1.13
2014-2016								0.011	
2012-Present							0.00085		
2009-2010						0.2			
2002-2003					0.000077				
1981-Present				35					
1968-1970			1						
1957-1958		1.1							
1918-1919	50								

Fig. 5 History of notable pandemics over the past century (*Source* Centers for Disease Control and Prevention, WHO, Historical Records, John Hopkins University updated as of 28 October 2020 14:54 CAT)

monitoring. The wake of Ebola should have triggered a radical shift toward the redressing of the aforementioned inadequacies across the continent.

Change the Paradigm

Africa needs to invest in stronger health systems that are capable of monitoring, detecting, and swiftly containing diseases. This would mean developing an integrated disease monitoring system that connects laboratory data with demographic data and health measures so that health organizations and research firms, as well as think-tanks, can adequately monitor, analyze and predict outbreaks. This is important as a country's probability of coming into contact with a pathogen, identifying it, and reporting outbreaks is influenced mostly by its monitoring capabilities (Smith et al. 2014).

To achieve this, the continent will have to increase investment for the treatment of existing pandemics such as HIV/Aids and TB to lower their risk of fatality by novel pandemics. Additionally, Africa will have to invest heavily in

discovery science to develop vaccines intra-continentally, enhance diagnostics, and treatment. It should also bolster information sharing and coordination. In addition to the Africa CDC, the continent would benefit greatly from supporting independent infectious disease structures. This would complement its efforts and provide an array of insights and solutions to enhance how the continent responds to existing and prospective viruses.

The continent should encourage innovation in combating COVID-19. Senegal, for example, developed cheap $1 testing kits and $60 ventilators that have been leveraged by the country's experience with Ebola and Aids (Sylvester 2020). This is cost-effective and should be integrated into the continent's pandemic response efforts. Such structures would need to be led by public health and policy experts with experience in addressing pandemics through emerging data analytics. These structures would have to operate external of the political landscape to avoid being used as a tool for political advancement and being corroded.

Additionally, the continent must embark on a robust infrastructural development program that seeks to enhance its populace's access to basic sanitation and drinking water services. Currently, only 24% of African countries provide over 60% of their populace's with access to basic sanitation services (World Bank 2017). While the continent has made progress in the provision of these services, deficits in access continue to make the continent susceptible to novel contagious pandemics such as COVID-19. We are of the assertion that until such a time that African governments provide basic sanitation and drinking water services to their citizens in their entirety, the continent will remain susceptible to pandemics that require access thereof to effectively contain and defeat.

5 Impact on the African Economy

The COVID-19 pandemic has affected the global economy negatively with the German economy experiencing a technical recession as its economy shrinks by 2.2% while the Eurozone's GDP has declined by 3.8% for the first time in decades (Nagarajan 2020). Africa's key sectors such as merchandise trade, agriculture, tourism, and oil are feeling the adverse effects of the continent-wide lockdown as intra-Africa and international trade regresses in an effort to curb the spread of the virus. While these measures are necessary for combatting the COVID-19 pandemic, the economic effects are disproportionately affecting the continent as a result of its rampant socio-economic issues that are dependent on economic activity to address as this section shall illustrate.

Macroeconomic Outlook

The African Union (AU) has projected macroeconomic declines of -0,8% (optimistic) and −1.1% (pessimistic) as a result of economic inactivity in vital sectors like tourism, merchandise trade, and agriculture among others due to COVID-19 (AU 2020). However, the World Bank has projected an even worse economic outlook of between −2.1 and −5.1% that would result in the continent facing its first-ever recession in 25 years (World Bank 2020). Whichever forecast yields the most accuracy, one thing is for sure; Africa stands to perform poorly in 2020 with the pandemic poised to disrupt the economy as supply chains weaken and commodity prices abruptly decline amid the pandemic (World Bank 2020). Likely to be affected the most are 2 of Africa's fastest-growing trade blocs, namely: West African Economic and Monetary Union (WAEMU) and the East African Community (EAC) (World Bank 2020) (Fig. 6).

Africa is projected to lose an estimated $270 billion in trade while the funds required to effectively curb the spread of the pandemic and treat patients are estimated to be $130 billion (AU 2020). Three of Africa's largest economies, namely: Nigeria, South Africa, and Angola have been suffering the devastating effects of COVID-19 with poor growth and investment as well as falling oil and industrial metal prices (World Bank 2020). As such, the year 2020 is projected to be bleak for most African countries and will take years to redress post-pandemic given the continent's long-standing socio-economic challenges with as many as 210 million people living in countries affected by conflict and over 600 million people living without electricity (World Bank 2020).

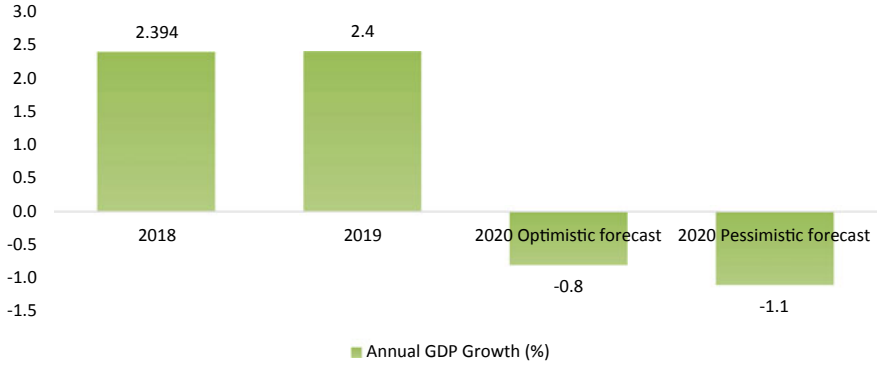


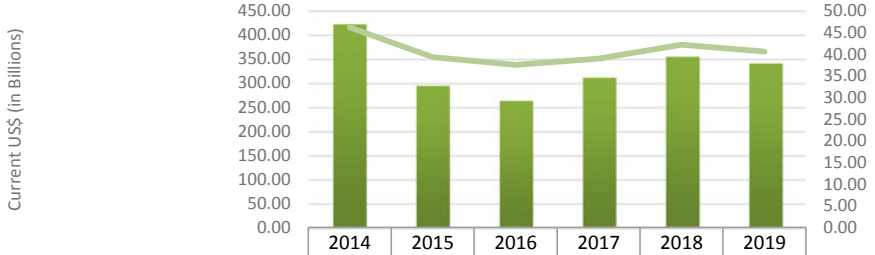
Fig. 6 GDP growth forecast for 2020 (*Source* World Bank and African Union 2020. Accessed December 2020)

Loss of Business in Merchandise Trade

The period between 2014 and 2018, total Africa merchandise export value was $329.99 billion per year on average (see Fig. 7). Yet, despite its importance, intra-Africa trade remains relatively low in contrast to other regions around the world at 17% (African Union 2020). Poor intra-Africa monetary integration and deficits in infrastructure and industrial investment, among other things, are at the center of the continent's low levels of intra-Africa trade. South Africa pioneers trade in the continent accounting for 27% aggregate intra-Africa exports and 12% imports in 2019. South Africa's exports into the continent amounted to $24 billion in 2019 while imports from the continent amounted to $10.20 billion, resulting in a balance of trade (BoT) of $13,8 billion in favor of South Africa.

With one of the strictest lockdowns in the world, South Africa finds itself in a technical recession (Tralac 2019). The country's deep economic integration into the continent's economic system, particularly in the Southern African Development Community (SADC) and Southern African Customs Union (SACU) where two-thirds of the continent's intra-trade takes place makes African countries susceptible to any trade measures adopted by South Africa in its fight against COVID-19. Travel restrictions, as well as border delays in South Africa and the continent at large have disrupted Africa's supply chain, exacerbating the adverse effects of COVID-19 on economically fragile countries across the continent.

This could potentially amplify economic-migration in the region and the world at large as those negatively affected by the pandemic are likely to seek better economic opportunities elsewhere. Figure 8 shows countries that are



	2014	2015	2016	2017	2018	2019
Merchandise exports (current US $)	422.98	295.3	264.27	312.44	355.73	341.75
Merchandise Trade % of GDP	46.17	39.296	37.53	38.95	42.21	40.6

Fig. 7 Africa merchandise exports (Current US) and Merchandise trade (% of GDP)—Sub-Saharan Africa (*Source* World Trade Organization, and World Bank GDP estimates 2019. Accessed December 2020)

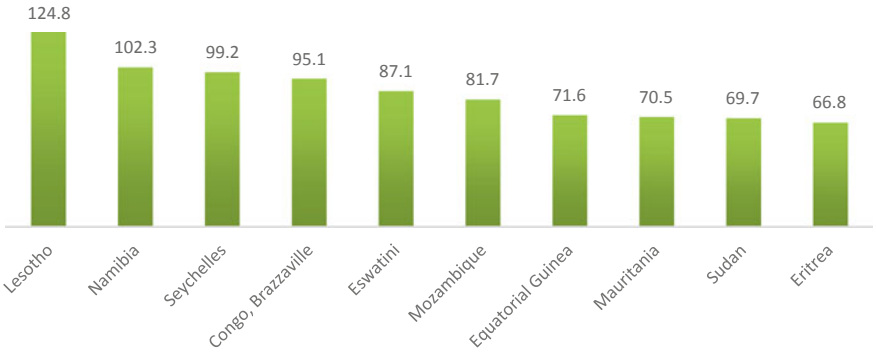


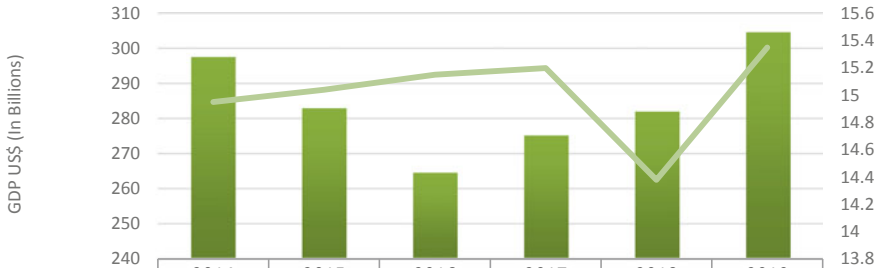
Fig. 8 Top 10 African countries most reliant on merchandise trade (% of GDP) (*Source* World Trade Organization, and World Bank GDP estimates 2019. Accessed December 2020)

most likely to be negatively affected by the pandemic due to their GDP dependence on merchandise trade. The GDP of Lesotho, Seychelles, and the Republic of Congo are entirely dependent on merchandise trade and are most likely to disproportionately suffer the adverse effects of the continent's lockdown which hampers trade. To this end, the AU has noted that it fears that 20 million people might lose their jobs by the end of 2020 due to the economic inactivity and a loss of business across all economic sectors (Martin 2020).

Additionally, informal cross-border trade (ICBT), a common trade practice that is rarely illegal and is under-documented in trade statistics, plays a significant role in merchandise trade has been greatly affected by the disruption caused by COVID-19 (Tralac 2020). The lack of formal employment opportunities across the continent contributes to the rampant nature of ICBT as an avenue of generating income. Tariff and non-tariff barriers (NTBs) as well as rules of origin create an enormous pool of informal traders that are currently being affected by the continent's border closures in its efforts to combat the virus.

Loss of Business in Agriculture

The African agricultural sector contributes to just over 60% of the continent's jobs many of which are smallholder and subsistence farmers (Diop 2020). Figure 9 shows between the period 2014–2018, the average revenue generated from agriculture, forestry, and fishing was $293.08 billion per year, constituting 15.55% of the continent's GDP. Agriculture supports millions of families in ICBT and is currently less active due to border closures across the continent and will exacerbate hunger and poverty. Moreover, greatly



	2014	2015	2016	2017	2018	2019
Current ($)	297.48	282.9	264.52	275.13	281.93	304.58
% of GDP	14.95	15.04	15.15	15.2	14.38	15.35

Fig. 9 Agriculture, forestry, and fishing, value added (Current US$ and % of GDP—Sub-Saharan Africa (*Source* Authors own calculations based on World Bank national accounts data, and OECD National Accounts data files 2019. Accessed December 2020)

affected are smallholder farmers as their ability to sell, or purchase inputs by social distancing measures. This will result in the loss of revenues, yields, and potentially impair future agronomy seasons as seen with the case of China (Zhang et al. 2020).

Exacerbating the effects of COVID-19 in Africa's agrarian and fishery sector is the continent's long-existing food security issues. According to the Food and Agriculture Organization (FAO) as of 2018, an estimated 20% of the continent's population are undernourished. Africa's food security is among the worst in the world (FAO 2019). Only 6 of Africa's 32 countries ranked on the GFSI, namely: South Africa, Egypt, Botswana, Ghana, Morocco, and Tunisia have reliable food security while the rest ranked moderate to weak putting the continent at severe risk of hunger during the pandemic. South Africa ranks 48th yet it is the best performing African country on the index with a score of 67.3 (Fig. 10).

The effects of the lockdown have exacerbated South Africa's socio-economic issues. Many have turned to looting for subsistence as government feeding programs are falling short (Roelf 2020). This puts the rest of the continent at a heightened risk of hunger as many are less developed than South Africa. Countries most likely to suffer the adverse economic effects of COVID-19 in the agrarian, forestry, and fishing sector are presented in Fig. 11 Somalia ranks first with 62.7% of its GDP comes from agriculture, forestry and fishing followed by Sierra Leone with 58.9% of its GDP stemming from the sector. GDP dependency for the remaining 8 countries ranges from 31.5 to 47.5%. This puts them at risk of suffering negative revenue shocks due to social distancing measures imposed by governments to combat the pandemic.

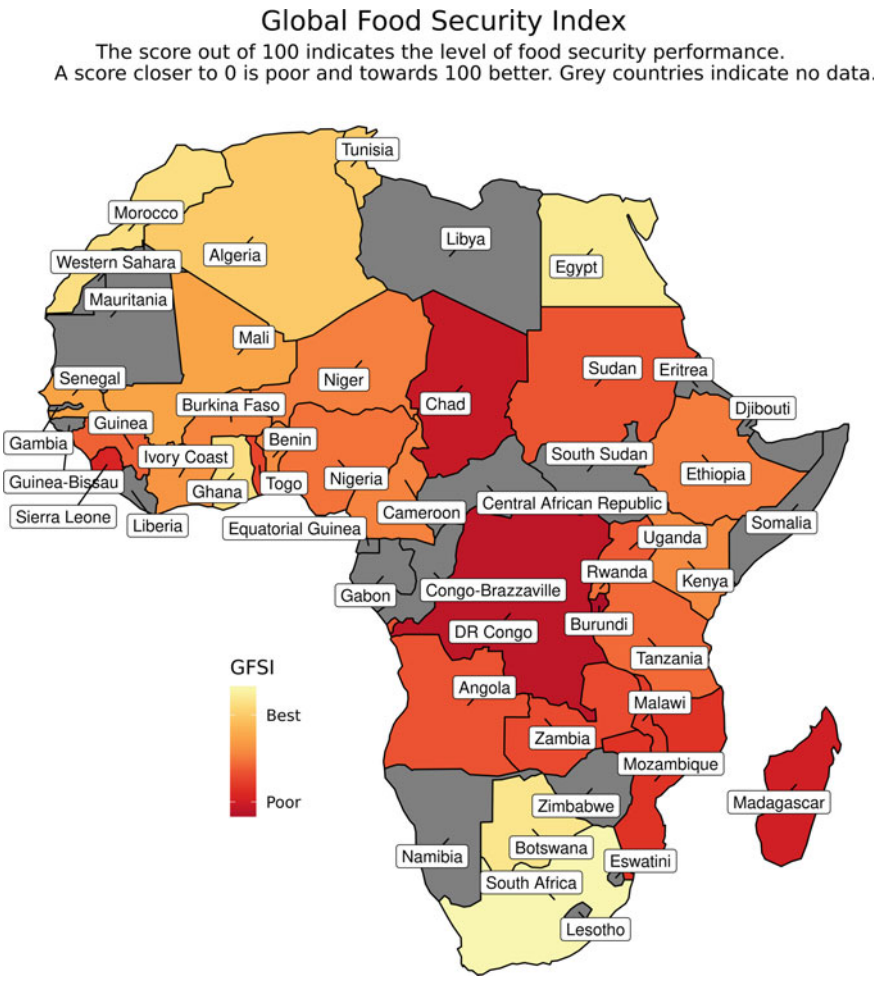


Fig. 10 Global Food Security Index (*Source The Economist Intelligence Unit*, December 2019)

East African countries are at an even higher risk of hunger and malnutrition owing to the impact of COVID-19 on food security and the unprecedented locust outbreak. The latter has resulted in over $8 billion in damaged crops and dead livestock due to a deficit in grazing grass (Kray and Shatty 2020). The Sahel and the Lake Chad region are plagued with water scarcity, usually a source of conflict in the region (Pai 2014). This synergy of factors coupled with the social distancing measures implemented by African governments is most likely to exacerbate the continent's socio-economic issues as a 3rd of its populace live below the global poverty line, survive on less than $2 a day and represent 70% of the world's poorest people (Hamel et al. 2019).

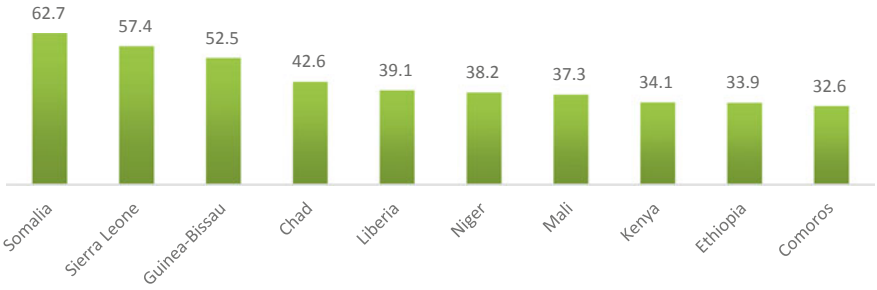


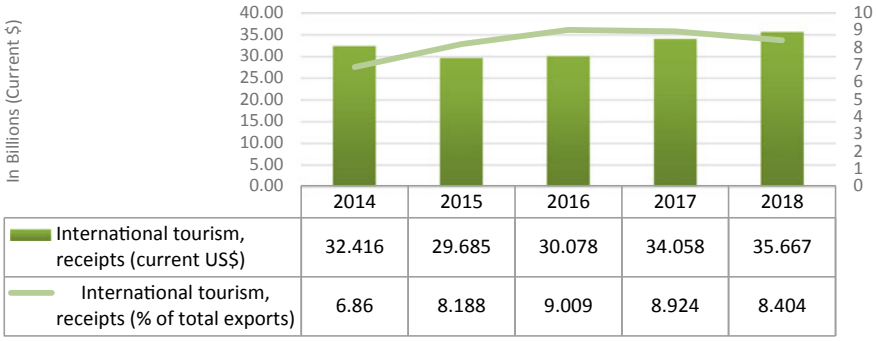
Fig. 11 Agriculture, forestry, and fishing revenues in the GDP (%) of Top 10 African countries (*Source* World Bank national accounts data, and OECD National Accounts data files 2019. Accessed December 2020)

Tourism

Tourism is among the worst affected sectors hit by COVID-19 globally. The Policy Center for the New South projects losses of $300–$450 billion in global tourism receipts (exports) (Maniga 2020). According to the World Trade Organization (WTO), the current trajectory in international tourist travel points toward a decline of up to 78% in scenario 3 (December) of 2020. This is dependent on how swift countries contain the pathogen, and commence the relaxation of travel restrictions (UNWTO 2020). The future remains uncertain as cases continue to rise globally. Currently, available data points show a decline of 22% with arrivals declining by 57% equating to an estimated loss of 67 million global arrivals, or $80 billion.

These scenarios potentially put the jobs of an estimated 100–120 million people at risk, disrupting the constant growth that the industry has enjoyed over the last decade (WTO 2020). In Sub-Saharan Africa, the pandemic threatens revenues generated from the sector. As illustrated in Fig. 11, between 2014 and 2018 international tourism receipts (from exports) contributed $32.38 billion to the region's economy. With the pandemic causing global economic shocks, Sub-Saharan Africa will be disproportionately affected as 1 in 20 are employed within tourism (United Nations 2020). According to a study by the AU (2020), an estimated 2 million jobs in both the formal and informal sector in Africa might be lost as a result of the pandemic.

Countries like Sao Tome and Principe, Cabo Verde, Comoros, Gambia, and Ethiopia are projected to suffer the worst of COVID-19 disruption in the sector as it constitutes a significant percentage of their tourism receipts (exports) as illustrated in Fig. 12. African airlines are also projected to suffer



	2014	2015	2016	2017	2018
International tourism, receipts (current US$)	32.416	29.685	30.078	34.058	35.667
International tourism, receipts (% of total exports)	6.86	8.188	9.009	8.924	8.404

Fig. 12 International tourism, receipts (Current US$ and % of Total Exports)—sub-Saharan Africa (*Source* Authors own calculations based on World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files 2018. Accessed December 2020)

the effects of COVID-19 with the African Airlines Association (AFRAA) estimating revenue losses of $8.103 billion for 2020 (AFRAA 2020). AFRAA does also project recovery in the industry to commence from the 3rd quarter of 2020 with domestic and subsequently international flights. The top 5 African airlines whose operations have been affected the most by the pandemic some of whom have already started retrenching employees due to a loss of business are Ethiopian Airlines, Egypt Air, South African Airways, Royal Air Maroc, and Kenyan Airways (AFRAA 2020) (Fig. 13).

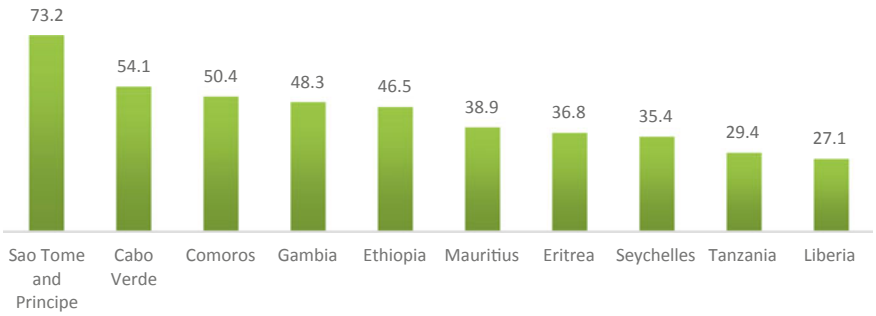


Fig. 13 Top 10 African countries with the highest International tourism, receipts (% of total exports) (*Source* World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files 2018. Accessed December 2020)

Oil

The economic prospects of oil-producing countries in Africa are projected to be bleak and disproportionate to non-oil-producing countries across the continent. Their reliance on international market demand makes them vulnerable to unexpected disruptions in international trade. Revenues generated from oil exports are essential for the international commitments and national budgets of countries like Nigeria, Angola, Algeria, Congo, Gabon, and Chad. They are facing a crisis much worse than that of 2014, wherein the last oil shock due to failures by the aforementioned to diversify their economies. According to Akalpler and Bukar (2020), in 2014, oil prices declined from $110 to less than $40 per barrel.

In 2020, oil prices fell from $66.03 to $25.54 per barrel in April, the lowest in 18 years. It increased to $42.11 per barrel as of 1 July 2020, the lowest since 2014 as a result of not only COVID-19 which led to a decline in demand due to measures implemented by governments to overcome COVID-19. Saudi Arabia oil price war in March 2020 resulted in a fatal disagreement between the aforementioned and Russia which later left the Organization of the Petroleum Exporting Countries (OPEC) as a result thereof (Defterios 2020).

Russia's rationale was that the organization's strategy to cut oil supply by 2.1 million barrels per day to stabilize oil prices globally inadvertently facilitated growth for American oil producers. The outcome was an all-out oil war that resulted in Saudi Arabia disrupting the oil market by slashing oil prices to a historic $4–$7 per barrel amidst collapsing global demand reducing the oil revenues of major oil-producing countries with African oil producers being disproportionately affected due to poor economic diversification and rampant socio-economic issues (Defterios 2020). Oil rents refer to the profits that countries get from the production of oil that is revenue generated after subtracting production costs (see Fig. 14).

The top 5 countries whose oil rents have been greatly affected by both the oil price war and stalled trade by COVID-19 are Libya, the Republic of Congo, South Sudan, Equatorial Guinea, and Angola. Libya is perhaps the most affected due to the presence of conflict in the country as highlighted earlier. The current series of events have seen production declines from 1139 BBL/D/1 K (thousands of barrels per day) in December 2019 to just 82 BBL/D/1 K in April, or an 867.07% decline in production resulting in a loss of much-needed revenues in the state. As of June 2020, production had risen to 7% from the record production decline of 867.07% in May. However,

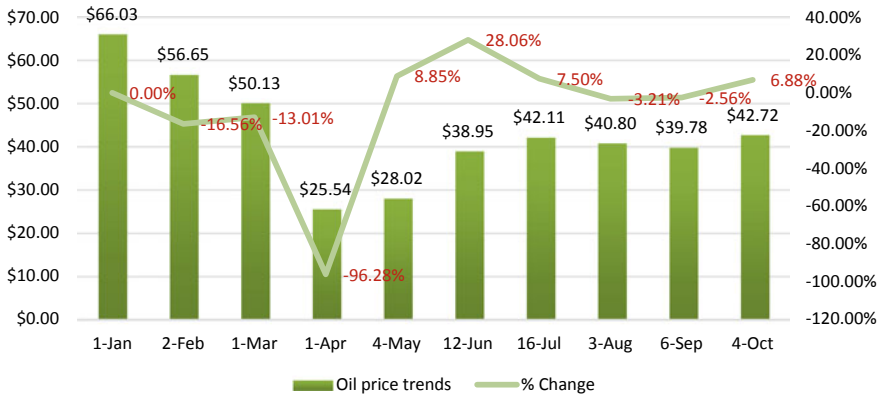


Fig. 14 Monthly 2020 oil price trends leading up to August (*Source* Authors own calculations based on SAshares database, 2020)

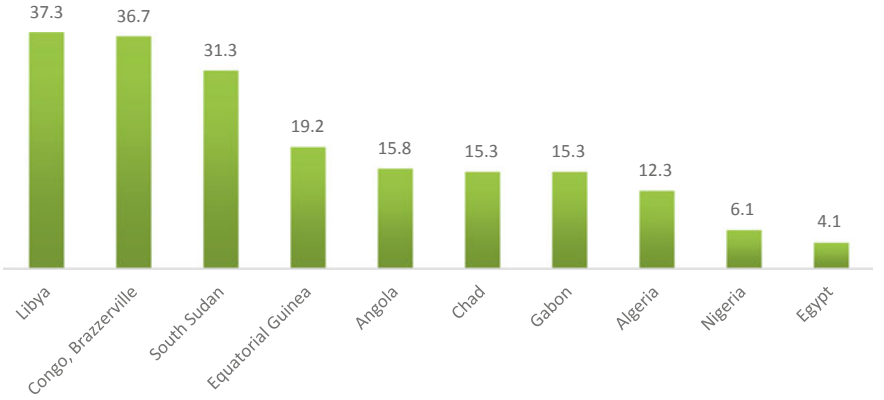


Fig. 15 Oil rents (% of GDP) 2017 (*Source* World Bank staff estimates based on sources and methods described in the World Bank's The Changing Wealth of Nations 2017. Accessed December 2020)

this is significantly lower than the October 2019 peak of 1166 BBL/D/1K (Figs. 15 and 16).

Plummeting oil prices may lead to capital flight for African countries due to the uncertainty associated with the current oil price war and the pandemic as investors shift toward safe assets like medical supplies. This could contribute to a decline in financial inflows. This will most certainly affect the fiscal positions of oil-dependent countries like Ghana, Nigeria, and South Africa where investors purchased local currency securities (World Bank 2020). Nigeria is projected to be the biggest loser in the pandemic as it could lose an estimated $14–$19 billion as it could reduce oil exports in 2020 (AU

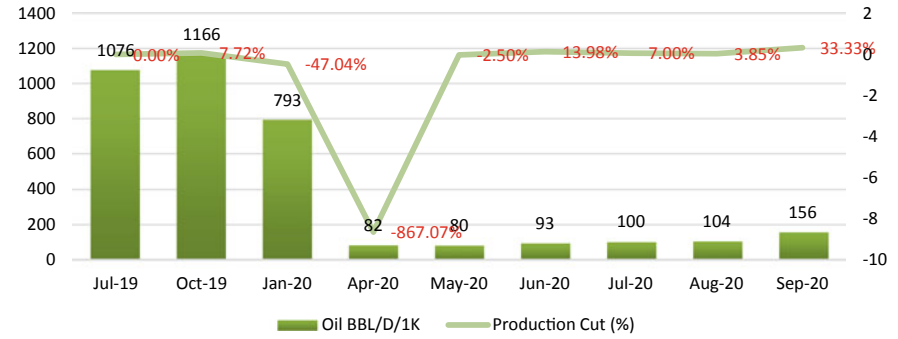


Fig. 16 Impact of Conflict, oil price war and COVID-19 on Libya oil production (*Source* Authors own calculations based on Trading Economics database, 2020)

2020). Overall, the decline in oil demand and prices will reduce the financial capacity that African oil producers have in provisioning fiscal socio-economic assistance to citizens during the pandemic.

6 Conclusion and Recommendations

The COVID-19 pandemic threatens to worsen healthcare systems and existing socio-economic challenges across Africa. The consequences of a novel virus are projected to be extensive, despite all measures implemented by countries globally. The world economy is in decline from reduced economic activity in efforts to combat the pandemic. The spill-over effects from the global community with broken supply chains will hamper growth and development in its social, political, and economic landscapes due to its susceptibility to economic shocks. Though the pandemic has exposed Africa's socio-economic inadequacies like poor public service delivery and fragile socio-economic security, the continent is faced with an unprecedented opportunity to learn from COVID-19 to draw lessons for the future.

Understanding the risk factors will help equip the continent to overcome the current pandemic, but also better prepare for future outbreaks. To mitigate the impacts, African can make use of artificial intelligence (AI) and information and communication technologies (ICTs) to effectively combat the pathogen with minimal risk to Africa's small and under-equipped health force. To mitigate the economic impact of COVID-19, the continent will need to maintain the momentum and ambition that it had in the African

Continental Free Trade Area (AfCFTA) prior to the emergence of COVID-19. The trade agreement will act as a stimulus package to facilitate economic recovery and create conditions for accelerated industrialization.

Post the pandemic, Africa will need to urgently invest in infrastructure, particularly its energy sector. This sector remains dependent on fossil fuels while the world shifts toward cleaner renewable energy in its fight against climate change. According to Cust and Manley (2018: 98), revenues generated from the trade of fossil fuels constitutes 9% of Sub-Saharan Africa's GDP. To adapt, African countries can utilize rents generated from the export of fossil fuels and minerals to accelerate their transition into the green economy, subsequently diversifying their energy portfolio and expanding their electricity grids facilitating energy security for Africa's growing population.

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Does Increased Government Spending on Additional Teachers Improve Education Quality?

Mumbi E. Kimani

1 Introduction

South Africa's apartheid era government was discriminatory in its provision of educational services and resources. It prioritized White schools at the expense of Black[1] schools. This meant less spending on Black schools, which translated to fewer and less qualified teachers in the schools that provided education to most of the population. At the end of apartheid, the pupil-teacher ratio stood at between 20:1 and 30:1 for Whites, and between 40:1 and 70:1 for African pupils (Case and Deaton 1999). This large difference in pupil-teacher ratio between the two categories of schools translated into a divergence in educational attainment between Blacks and Whites, a divergence that has resulted in inequality in skills and consequently earnings by race.

Post-apartheid governments' efforts have addressed these historical injustices through implementation of targeted policies, such as increased government spending on teachers leading to a reduced pupil-teacher ratio. Teacher's

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salaries at the primary education level make up about 90% of recurrent education expenditure in South Africa, which is 21 percentage points higher than the average in sub-Saharan Africa (SSA) (UNESCO-UIS 2011). Although resource provision has changed a great deal with measures to redress past inequity in resource allocation, inequality in school quality persists (Van der Berg 2007; Yamauchi 2011). To date, formerly White schools (commonly known as 'Model C' schools) remain better resourced and have had the best educational outcomes, as measure by the number of students who matriculate and the high matriculation[2] pass rate in these schools. Although the historical context puts the racial dimension of education quality at the fore, all schools across South Africa are beneficiaries of government-employed teachers. We therefore consider all schools and control for race, among other factors.

There is consensus among researchers that the quality of education in South Africa is low relative to education expenditure. This view is supported even within the government (Department of Education 2003, p. 107). Public discontent with the quality of education, particularly in public schools, has been on the increase. In addition to these quality concerns, inefficiency in the Education Department from the national level to the school level has been a concern (Taylor et al. 2008), and evidence suggests that there has hardly been any improvement in the quality of education for 80% of children in South Africa (Van der Berg and Moses 2011). According to Van der Berg (2007), the increase in allocation of resources to poor schools has not reduced the quality differentials among schools. These concerns cannot be overstated, particularly with education viewed as an equalizer of income inequality through better job prospects, and as an engine for economic growth. In addition to supporting the human capital needs of the economy, the argument for the public provision of education is based on the need to distribute incomes and build social cohesion. Investigating how government policies on schooling, such as increased spending through hiring more teachers, affects educational outcomes for students is not just essential for education policymakers, but also for informing development policies more generally.

Further, quantifying this relationship is of research interest because firstly, pupil-teacher ratio is the most common quality measure used in the South African education quality literature, which offers an avenue for comparison. Secondly, there is hardly any consensus on the relationship between pupil-teacher ratio and educational outcomes in South Africa and globally. Lastly, most education quality studies in South Africa consider the test score as the outcome variable, however, in this chapter, we consider educational attainment as our measure of education quality, which makes this analysis a

significant contribution to the currently limited literature. The study hypothesizes that an increase in government spending as measured by a reduction in pupil-teacher ratio will lead to an improvement in classroom instruction quality, resulting from improved interaction between pupils and teachers. This in turn leads to an increase in education quality. We define education quality (also commonly referred to as school quality) as the investment and consumption value of education as measured by educational attainment, which is an immediate student outcome that has been shown to directly affect earnings, and this connection to earnings, a benefit of schooling, makes it a good proxy for education quality (Ladd and Loeb 2013; Adams 1993).

Our analysis is based on Wave 1[3] of the National Income Dynamic Study (NIDS) survey data, which was collected in 2008. Using a partial proportional odds model, we find that an increase in the government's spending on hiring teachers (as indicated by a smaller pupil-teacher ratio), increases education quality in South Africa. Hiring one more teacher increases educational attainment with each cumulative logit, the effect is first a decrease of 16.3 percentage points in the attainment of primary education, then reverses sign to an increase of 10.7 and 5.6 percentage points in the likelihood of secondary and tertiary education attainment, respectively. This is an indication that the benefits of a small pupil-teacher ratio are cumulative and take time to be realized. Overall, the results show that increasing the number of teachers employed is important, they also indicate that education quality is also driven by factors outside of these inputs. For instance, we find age, gender, father's education, household income, and school quintile to be other strong determinants of education quality in South Africa.

In the remainder of the chapter, we first, offer some background information followed by a review of the relevant literature. Next we outline the empirical approach applied in the analysis. We follow this with a description of the data and summary statistics and then discuss the empirical results on the effect of the pupil-teacher ratio on education quality. We conclude the chapter with a summary of the results and a conclusion.

Background

South Africa has a low-quality basic education system, which characterizes most schools and is evident in the low global rankings of South African primary and secondary students (Mlachila and Moeletsi 2019). Cross-national assessments of achievement such as Progress in International Reading and Literacy Study (PIRLS), Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ), and Trends in Mathematics

and Science Study (TIMSS) have consistently provided evidence of low-quality education in South Africa compared to countries such as Kenya and Tanzania. For example, a pre-PIRLS study of 2011 showed that 50% of South African students could not read by grade 4, implying that they could not engage meaningfully with the curriculum (Spaull 2015). Also, results from TIMSS for the period of 1995–2015 showed all South African students in basic education to be lagging in science and mathematics and the country had the weakest performance (Spaull 2015; Mlachila and Moeletsi 2019). However, about 1.3% of TIMSS 2015 grade 5 learners were benchmarked as "Advanced Learners" (Mlachila and Moeletsi 2019), which is indicative of inequality in education quality.

Historical inequalities in education such as high pupil-teacher ratios in Black schools, which have proved persistent, are key drivers of the poor performance. It is important that these ratios, as one measure of inequality of education provision, be addressed. The heterogeneous provision of- and access to education in the apartheid era[4] led to disparities in educational attainment by race and type (or level) of skills acquired by the different racial groups. Van der Berg and Moses (2011) attributed persistence in income inequality to this heterogeneity in education attainment, while Bhorat et al. (2009) found wage income to be the main driver of income inequality in the country, which is skewed by skill and by race.[5]

The need to close the gap in skills and enhance social mobility (Council on Higher Education (CHE) 2004) remains a priority in the country. The provision of high-quality education for all is a necessary requirement to close this skills gap. Education policies such as increasing the number of government funded teachers to lower the pupil-teacher ratio in all schools, are part of the effort to improve education quality and offer equal educational opportunities to all South Africans.

2 A Review of Literature

In developing countries, where resources are scarce, the pupil-teacher ratio is substantially higher than in developed countries, schools are characterized by overcrowding of students, and under-staffing of teachers. Although it is expected that a lower pupil-teacher ratio would have a positive effect on educational outcomes, the evidence has been inconclusive at best. In a detailed review of the literature on school resources and educational outcome, Glewwe et al. (2011) found most of the studies indicated that pupil-teacher ratio had a negative and significant effect on outcomes. However, a few

studies have found a positive and significant effect (Lee and Barro 2001), while others found a positive but insignificant effect (Dearden et al. 2002; Wößmann 2003). These positive coefficients could result from high-quality schools having large classes because they enroll high numbers of students (Glewwe et al. 2011; Wößmann 2003). Some studies have found negative and even ambiguous effects. On the one hand, Hanushek's (1995) review of the literature showed overall little support for the beneficial effect of a low teacher–pupil ratio. On the other hand, most studies in this review found an ambiguous relationship between pupil-teacher ratio and educational outcomes even when family background and other education inputs were accounted for.

Endogeneity is a common problem in any study that uses pupil-teacher ratio or class size to predict education quality. Addressing this issue by using the Maimonides rule as an instrument for class size,[6] Angrist and Lavy (1999) found a positive relationship between class size and test scores, and their interaction of class size with a variable for percentage of disadvantaged students showed smaller classes largely benefit schools with the highest proportion of learners from poor backgrounds. Their results were, however, insignificant for lower grades 3, which they associated with the cumulative nature of education, meaning that benefits of smaller classes take time to be realized.

The effect of pupil-teacher ratio by gender has also been examined. Using the British National Child Development Survey (NCDS) Dearden et al. (2002) found the effect of pupil-teacher ratio on educational attainment of both men and women was insignificant and nonlinear. However, their finding also indicated that lower pupil-teacher ratios benefited lower ability female learners.

In South Africa, the literature on the effects of education quality is limited but growing. A pioneering study by Case and Deaton (1999) investigated the relationship between pupil-teacher ratio and three educational outcomes, namely years of schooling, enrollment, and numeracy and literacy test scores. They found that the pupil-teacher ratio had a negative and insignificant effect for Whites across all outcomes, but it had a negative and significant effect on the years of schooling of Black pupils.

In the post-apartheid era too, evidence of the effect of pupil-teacher ratio on education attainment has been ambiguous and mixed at best. For instance, Gustafsson (2007) found the effect of class size on test scores did not stand out in historically disadvantaged schools. Similarly, using test scores, Van der Berg (2007) found the effect of pupil-teacher ratio was insignificant in Black schools. Given the history of racial segregation, the findings from both studies

are not unexpected since most historically disadvantaged schools remain inadequately resourced in inputs such as textbooks. By contrast, Moloi and Chetty (2011) found improvement in education quality was a result of a decrease in the mean pupil-teacher ratio from 37:1 to 34:1, and this was despite an increase in class sizes from 42 to 44 during the same period.[7] However, the work by Bhorat and Oosthuizen (2008) suggests that this negative relationship might be robust only in the upper tail of the distribution. In a quantile regression, they found that the effect of the pupil-teacher on the school pass rate was insignificant except above the 95th percentile.

This empirical literature has been inconclusive for the most part, both in developed countries and in South Africa. In the South African context, the analysis is limited both in quantity and in the educational outcomes considered, primarily focused on specialized test scores and matriculation. In this regard, there is a need for exploring alternative measures of school outcomes, a major contribution of this chapter.

3 Empirical specification

Based on a schooling production function (see Aturupane et al. 2013; Behrman 2010; Glewwe and Kremer 2006 for details) we estimate the effect of pupil-teacher ratio on educational attainment, our measure of education quality. Adopting a specification by Dearden et al. (2002), we model for pupil-teacher ratio heterogeneity in the population as follows:

$$A_i = \alpha_0 + \alpha_{1t} T^I + \alpha_{2t} F_i + \alpha_{3t} F_i \otimes T^I + \varepsilon_i \tag{1}$$

where A is the highest education level attained for individual i, T is the pupil-teacher ratio; F represents all other characteristics, such as individual, household, and school's characteristics; and ε_i is an error term.

Education level attained has a natural order related to it. However, the difference between having no schooling and having a primary education is not the same as the difference between having a secondary education and having tertiary education. The effect of various factors on schooling is therefore unlikely to be the same, which rules out the use of an ordinary least square that assumes a linear expected value locus. In the analysis, we employ an ordered logit, specifically a generalized ordered logit, also known as a proportional odds model. This is because a standard ordered logit fails the test for parallel assumption. A likelihood ratio test (using omodel in Stata) gives

us a $\chi^2_{26} = 283.78$ with a p-value $= 0$, an indication that the assumption that the coefficients are constant across categories is violated at 1%-level.

Specifically, for the analysis, we apply a partial proportional odds model by Williams (2006, 2016) which follows the generalization model proposed by Boes and Winkelmann (2006). This model relaxes the three assumptions of the standard ordered logit, allowing for more flexibility. It allows for heterogeneous controls that vary in each category to vary, and those that are constant in each category to remain constant. A test of the parallel lines for each variable in the partial generalized model indicates that age and its quadratic, race, home language, father's education, household income, number of siblings, location, and school quintile, violate the parallel line assumption and are therefore allowed to vary with education level attained. A Wald test of the partial generalized model gives a $\chi^2_{14} = 11.85$ with a p-value $= 0.618$ an indication that this model does not violate the parallel lines regression. The partial proportional odds model for the ordinal highest education level attained A with J categories is presented as:

$$P(A_i > j) = g(X_i\beta_j) = \frac{exp(\alpha_j + X_i\beta_j)}{1 + [exp(\alpha_j + X_i\beta_j)]}, \quad j = 1, \ldots, J-1 \tag{2}$$

with $P(A_i = 1) = 1 - g(X_i\beta_i)$, $P(A_i = j) = g(X_i\beta_{j-1}) - g(X_i\beta_j)$ $P(A_i = J) = g(X_i\beta_{J-1})$

where i refers to the individual, X_i is a vector of predictors for the i-th individual and β_j is a vector of parameters to be estimated.

4 Data and Summary Statistics

Data Description

Our analysis is based on data from the National Income Dynamics Study (NIDS), a nationally representative household and individual level panel survey that commenced in 2008 and is undertaken every two years with the most recent wave of the survey, Wave 5, conducted in 2017. NIDS collects data on household composition and structure, education, labor market participation and economic activity, health, and agriculture, among other information (Leibbrandt et al. 2009). The survey data is collected with four instruments, namely, household, individual adult, individual proxy, and child questionnaires. In arriving at the households' sample, it employed a stratified

two-stage cluster sample design. Wave 1 response rate was 69%, that is, 7305 households and 28,225 individuals across South Africa responded (Leibbrandt et al. 2009). To take care of sample non-response and representativity, NIDS has both design weights and post-stratification weights (Leibbrandt et al. 2009). To ensure that we can make inferences from the sample to the South African population, we use the post- stratification weights in the analysis. The sample we consider is of 6236 individuals aged 15 years and above and who have at least 1 year of formal education.

Individual and socioeconomic characteristics are available in the NIDS data collected using individual and household questionnaires. The education outcome variable we consider is the highest level of education of the respondent. Variables on school characteristics are mainly from the NIDS school administrative data sourced from government administrative records on schooling which NIDS merged with the entire panel.[8] This administration data provides us with the pupil-teacher ratio and school quintile. The pupil-teacher ratio is the total number of pupils in a given school in 2005, 2007, and 2008 divided by the total number of teachers, as provided by the Department of Basic Education.[9] The pupil-teacher ratio includes teachers who teach and those who are involved in administration of the school, which means that the ratio is an indicator of the total number of teachers hired by the government and therefore a good proxy for government spending. We do not control for the quality of teachers, and it is possible that if the overall teacher quality in the country is low(high) a positive coefficient would be reduced (increased). For instance, Bhorat and Oosthuizen (2008) controlled for teacher quality and found the pupil-teacher ratio to be insignificant. We expect pupil-teacher ratio to have a negative effect on education quality. In the regressions, we opt to use a log of the pupil-teacher ratio rather than the ratio itself. This is mainly because the logged ratio gives invariant results whether we use teacher–pupil ratio or pupil-teacher ratio.

Before 1994, schools were categorized by race and region (largely the Republic of South Africa and the 10 "homelands").[10] The geographical and racial differentiation in education funding lasted until the end of apartheid in 1994 (Levy et al. 2019). In recent years, government efforts to bring down these barriers and deal with inequality in the provision of education have mainly been through subsidies (Republic of South Africa 1998). The School Act of 1996 provided for school-fee exemption for students from poor backgrounds attending fee paying schools (quintile 4 and 5 schools), and the National Norms and Standards for School Funding Notice of 2006 provided for no-fees schools.[11] The objectives of these laws were to ease the financial burden of education for poor families, and to promote equitable access to

quality education for all. The government implements this through a school quintile system that is used to determine funds allocated to schools. All ordinary public schools are assigned to a quintile based on the poverty level of the surrounding community, and the physical condition, facilities, and population of the school (South African School Amendment Act, no. 84 of 1996, as amended: 2006, pp. 24–29).[12] Schools in quintile 1 are the poorest schools and receive the highest per pupil fiscal allocation, and those in quintile 5 are the least poor schools and receive the lowest allocation per pupil. This approach to the allocation of funds ensures that more funds are allocated to pupils in the largest and neediest schools.[13] The school quintile variable in the NIDS data reflects the classification of schools in 2005, 2007, and 2008. The school quintile is correlated to apartheid classification of schools because most formerly Black schools are in quintile 1, 2, or 3 while most formerly White schools are in either quintile 4 or 5. We therefore do not control for historical classification of school type by race.

We include age, gender, and race as individual characteristics, and the squared term of age to capture nonlinear effects of age on educational attainment. Household characteristics include mother's and father's highest education level, which we consider as a proxy for both household well-being and parental taste for education,[14] home language and location, number of siblings, household size, and household monthly per capita income in real terms.

Characteristics of the Sample

Table 1 presents the summary statistics of the controls, including individual, household, and school characteristics by education attainment, the outcome variable. The sample of 6236 individuals shows declining numbers in attainment the higher the education level. Most individuals (69%) have a primary education, a fifth have a secondary education, and about a tenth have attained a tertiary education. This is in line with current statistics on the high attrition rate post-compulsory education, which is at grade 9. About 50% of students dropout of school before grade 12 and a further 10% drop out of secondary school due to education quality problems, financial constraints, and teenage pregnancies (Gustafsson, 2011). The ultimate consequence of this high dropout rate is that only a small proportion of South Africans enter tertiary education.

From Table 1 we can see that the pupil-teacher ratio averages between 26 and 31 pupils per teacher. Notably, those with a primary level of education show the highest average ratio, at 31, while those with tertiary education

(which includes a further education and training (FET) or a university certification) have the lowest average ratio, at 26 pupils per teacher. This is a lower ratio than the average of 40 in the early 1990s (Case and Deaton 1999) and reflects the national average which has been less than 35 in the last 10 years (Department of Basic Education 2010). The ratio in the sample is much more dispersed for those who have attained a primary education than for those who have attained a secondary education. A clearer picture of the ratio's distribution by the level of education attained is presented in Fig. 1.

Figure 1 shows that the densities of the pupil-teacher ratio by educational attainment for individuals with a primary education is more skewed to the right, peaks at a higher ratio, and has a thicker tail than the other levels. On the other hand, the density for those with a tertiary education is slightly skewed to the left, and peaks at a lower ratio. We infer from these distributions that smaller pupil-teacher ratios are associated with the attainment of higher education levels, while larger ratios are associated with the attainment of lower levels of education.

From Table 1, the sample is of South Africans in their thirties, on average, and of predominantly African women across the different educational levels, who use an African language at home. Most of their parents, both mothers, and fathers, have, on average, no formal education, while a small proportion has parents with at least some secondary education. Notably, of individuals who have a tertiary education only 12 and 15% of their mothers' and fathers' have a tertiary education, which is low compared with the 71% of parents with primary education or no formal education. Although this is contrary to the conventional wisdom that parental education matters for children's educational attainment, it is expected in this context given that most Blacks (who are likely the parents in the sample) had no access to tertiary education pre-1994. On average, these individuals have 3 siblings and come from households of about 5 members, a likely indication of relatively low dependency ratios.

The average household monthly income per capita in the sample increases with increased education attainment. There is more than a six-fold difference in the average household income between individuals with a primary education and those with a tertiary education. This is likely an indication that household income plays an important role in education quality. Most individuals with a primary education live in both rural and urban areas, while most of those with secondary and tertiary education live in urban areas. Most of the sample (78%) with primary education attended quintile 1, 2, and 3 schools, while a majority (59%) of those with a tertiary education attended quintile 4 and 5 schools. This is in line with empirical research that shows

Table 1 Summary statistics by educational attainment

	Primary	Secondary	Tertiary
Pupil-teacher ratio	31.10	28.70	26.00
	(0.230)	(0.335)	(0.670)
Age	34.01	30.88	38.17
	(0.412)	(0.594)	(0.826)
Gender (Female = 1)	0.561	0.554	0.555
	(0.0115)	(0.0234)	(0.0232)
Race: African	0.894	0.738	0.516
	(0.0148)	(0.0330)	(0.0546)
Colored	0.0566	0.0681	0.0703
	(0.0086)	(0.0168)	(0.0160)
Indian	0.0152	0.0166	0.0587
	(0.0075)	(0.0067)	(0.0232)
White	0.0340	0.177	0.355
	(0.0085)	(0.0315)	(0.0551)
Home language: African	0.888	0.729	0.475
	(0.0151)	(0.0333)	(0.0537)
Afrikaans	0.0682	0.155	0.269
	(0.0092)	(0.0230)	(0.0456)
English	0.0432	0.109	0.255
	(0.0100)	(0.0254)	(0.0452)
Other	0.0001	0.0078	0
	(0.0001)	(0.0059)	(.)
Mother's education: None	0.721	0.523	0.333
	(0.0127)	(0.0228)	(0.0330)
Primary	0.235	0.320	0.380
	(0.0112)	(0.0235)	(0.0342)
Secondary	0.0345	0.113	0.168
	(0.0055)	(0.0186)	(0.0219)
Tertiary	0.0099	0.0444	0.120
	(0.0029)	(0.0121)	(0.0239)
Father's Education: None	0.628	0.420	0.234
	(0.0135)	(0.0207)	(0.0296)
Primary	0.314	0.366	0.396
	(0.0131)	(0.0193)	(0.0284)
Secondary	0.0452	0.157	0.221
	(0.0054)	(0.0192)	(0.0277)
Tertiary	0.0131	0.0574	0.150
	(0.00331)	(0.0121)	(0.0243)
Household income monthly pc (*Rands*)	1033.50	2759.53	6899.98
	(72.41)	(363.28)	(884.78)

(continued)

Table 1 (continued)

	Primary	Secondary	Tertiary
Number of siblings	2.087	1.566	1.386
	(0.0794)	(0.102)	(0.100)
Household size	5.606	5.290	5.315
	(0.0458)	(0.0578)	(0.131)
Location: Rural	0.450	0.270	0.124
	(0.0314)	(0.0281)	(0.0244)
Urban	0.452	0.688	0.817
	(0.0301)	(0.0291)	(0.0334)
Farms	0.0981	0.0424	0.0594
	(0.0191)	(0.0111)	(0.0247)
School quintile: First	0.288	0.184	0.109
	(0.0180)	(0.0202)	(0.0226)
Second	0.203	0.137	0.107
	(0.0146)	(0.0144)	(0.0213)
Third	0.293	0.309	0.194
	(0.0194)	(0.0264)	(0.0295)
Fourth	0.131	0.149	0.192
	(0.0119)	(0.0198)	(0.0298)
Fifth	0.0853	0.221	0.397
	(0.0124)	(0.0288)	(0.0506)
Sample	4322	1238	676
N	6236		

Notes (1) Standard errors in parentheses. (2) The sample includes individuals 15 years and older and those still attending learning institutions. (3) Higher education includes those with a certificate, a diploma or a degree. (4) Household income is in real Rands, deflated by CPI with 2008 as base year. (5) Post-stratification weights are used

quintile 4 and 5 schools, which are predominantly formerly Whites only schools, achieve better matriculation results and their students have a higher transition rate into tertiary education institutions (Bhorat and Oosthuizen 2008; Gustafsson 2007). To further illuminate an underlying explanation, we present the distribution of pupil-teacher ratios by school quintile in Fig. 2. The figure shows a bi-modal distribution. The distribution of the ratio in quintile 5 is skewed to the right and peaks at a smaller ratio, while the distributions for all other quintiles overlay each other, with quintile 4 skewed slightly to the right and peaking at a smaller ratio. This split in attainment and pupil-teacher distribution reflects the divide in education quality along the quintiles.

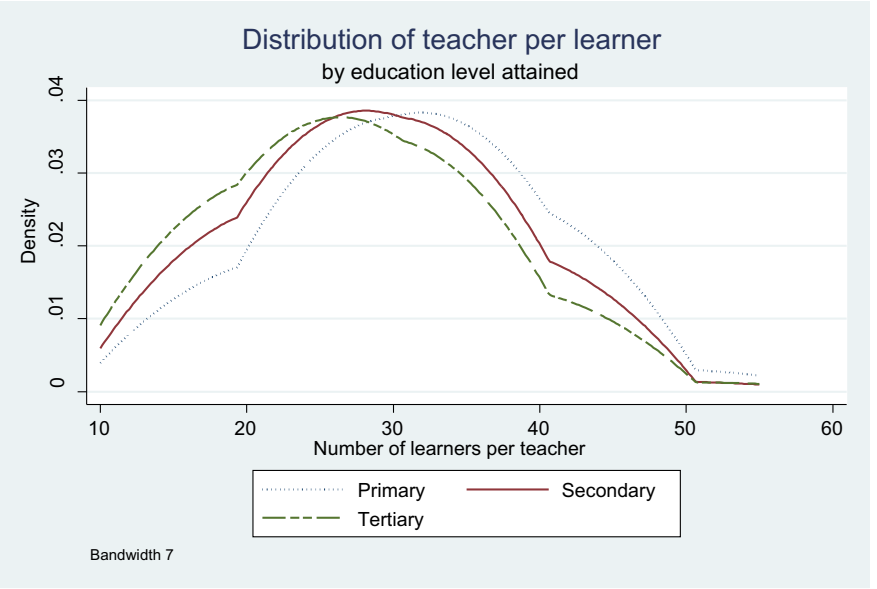

Fig. 1 Distribution of the pupil-teacher ratio (*Source* Author's calculation based on NIDS Wave 1, 2008)

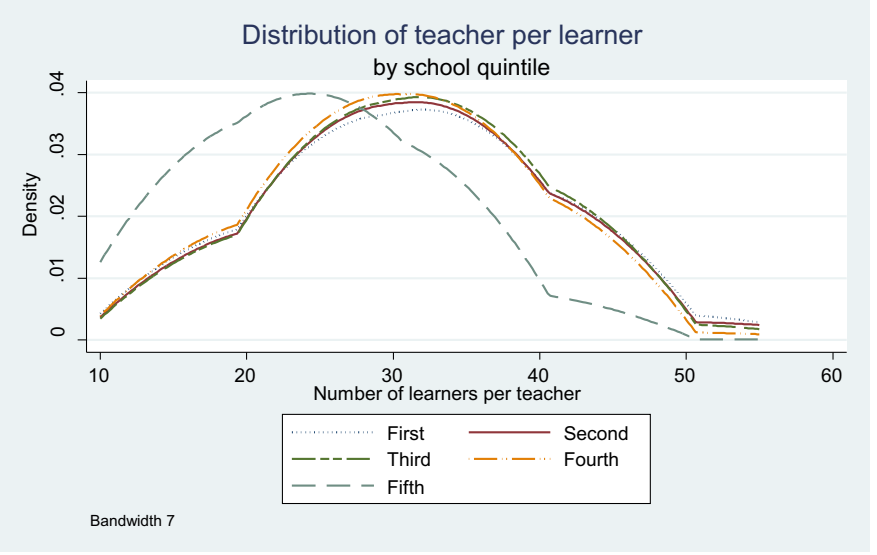

Fig. 2 Distribution of pupil-teacher ratio by school quintile (*Source* Author's calculation based on NIDS Wave 1, 2008)

5 Empirical Results

In this section, using the reduced form production function detailed in Eq. 2, we estimate the effect of government spending on education on levels of education attained -our measure of education quality, while controlling for other determinants of educational attainment. We use the number of teachers employed as a proxy for government spending, as measured by the pupil-teacher ratio. We analyze the education quality using a partial proportional odds model and present the following results.

Partial Proportional Odds

The model estimates two different parameter vectors $\theta 1$ and $\theta 2$. These vectors give a series of estimated logit analyses expounded as follows: $\theta 1$ presents a logit analysis of attaining primary education versus having either secondary or higher education; and $\theta 2$ presents a logit analysis of having a primary or secondary education versus having a tertiary education qualification. In Table 2, we present the results from the full specification which, in addition to the logarithmic pupil-teaching ratio and its quadratic, controls for age, age squared, gender, mother's and father's education, number of siblings, real household monthly per capita income, home location, and quintile classification of the school attended.

The coefficients of the logarithmic pupil-teacher ratio indicate that an increase in the ratio decreases the likelihood of attaining primary education or higher levels of education, holding all other characteristics constant. These coefficients are identical in magnitude and level of significance at all the levels of education considered, suggesting constant parallel lines. However, a lack of significance in its quadratic is an indication that the effect of the ratio is likely to vary across levels.

The rest of the model shows that education quality increases with age and household income, that colored women whose home language is English, whose mothers have a tertiary education, and who attended either a quintile 3 or 4 schools are more likely to attain higher levels of education. Also, having an educated father and living in a household with a high income increases the odds of educational attainment across all levels. Having more siblings increases the odds of attaining a tertiary education, while living in a farm relative to living in other rural areas increases the likelihood of attaining only a primary education. To determine the magnitude of these effects, we estimate the marginal effects and present them next.

Table 2 Coefficients the partial odds model (Dependent variable: Highest education level attained)

Variables	Primary vs Secondary and Tertiary	Primary and Secondary vs Tertiary
Logarithmic Pupil-Teacher ratio	−0.698***	−0.698***
	(0.227)	(0.227)
Logarithmic Pupil-Teacher ratio squared	−0.545	−0.545
	(0.406)	(0.406)
Age	0.142***	0.177***
	(0.0285)	(0.0278)
Age squared	– 0.0022***	−0.0022***
	(0.0004)	(0.0004)
Gender (Female = 1)	0.240***	0.240***
	(0.0869)	(0.0869)
Race (African = 1): Colored	−0.890**	−2.013***
	(0.425)	(0.566)
Asian/Indian	−0.691	−1.730***
	(0.525)	(0.629)
White	0.124	−1.757***
	(0.498)	(0.596)
Home language (African = 1): Afrikaans	0.585	1.546***
	(0.459)	(0.577)
English	0.990**	1.935***
	(0.443)	(0.582)
Other	2.948**	−19.18***
	(1.349)	(0.463)
Mother's Education (none = 1): Primary	0.186	0.186
	(0.132)	(0.132)
Secondary	0.228	0.228
	(0.240)	(0.240)
Tertiary	0.726**	0.726**
	(0.357)	(0.357)
Father's Education (none = 1): Primary	0.313***	0.313***
	(0.121)	(0.121)
Secondary	0.832***	0.525**
	(0.179)	(0.223)
Tertiary	1.066***	1.066***
	(0.301)	(0.301)

(continued)

Table 2 (continued)

Variables	Primary vs Secondary and Tertiary	Primary and Secondary vs Tertiary
Household income monthly pc (*Rands*)	0.638***	0.856***
	(0.0606)	(0.0733)
Number of siblings	0.0020	0.134***
	(0.0314)	(0.0382)
Household size	0.0663	0.0663
	(0.0482)	(0.0482)
Location (Rural = 1): Urban	0.112	0.112
	(0.121)	(0.121)
Farm	−0.702***	0.0459
	(0.165)	(0.224)
School Quintile (First = 1): Second	0.0266	0.0266
	(0.148)	(0.148)
Third	0.311**	0.311**
	(0.143)	(0.143)
Fourth	0.397**	0.734***
	(0.161)	(0.194)
Five	0.318	0.318
	(0.205)	(0.205)
Constant	−5.537***	−10.18***
	(1.070)	(1.097)
Sample	6236	6236

Notes (1) *T* statistics in parentheses. (2)*The *indicates level of significance: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ (3) The sample includes individuals aged 15 years and older and those still attending learning institutions. (4) Higher education includes those with a certificate, a diploma or a degree. (5) Household income is in real Rands, deflated by CPI with 2008 as base year. (6) Post-stratification weights are used

Marginal Effects

In Table 3, Row 1 presents the predicted probabilities of attaining the four levels of education, conditioned at the average of all covariates, and the marginal probability effects in the rest of the table. The marginal effects indicate that a small pupil-teacher ratio increases the probability of educational attainment: Hiring one more teacher and consequently having a small pupil-teacher ratio increases educational attainment with each cumulative logit. The effect is first a decrease of 16.3 percentage points in the attainment of primary education, then reverses the sign to an increase of 10.7 and 5.6 percentage points in the likelihood of secondary and tertiary education attainment. This implies that a high ratio has adverse effects where it matters

Table 3 Marginal probability of pupil-teacher ratio and socioeconomic factors (Dependent variable: Highest education level attained)

	Primary	Secondary	Tertiary
Predicted probability	0 0.6277	0 0.2849	0.0875
Log pupil-teacher ratio	0.163**	−0.107**	−0.0558**
	(3.08)	(−3.04)	(−3.09)
Log pupil-teacher ratio squared	0.127	−0.0839	−0.0435
	(1.34)	(−1.34)	(−1.34)
Age	−0.0333***	0.0191***	0.0141***
	(−5.12)	(4.23)	(6.30)
Age squared	0.0005***	−0.0003***	−0.0002***
	(5.48)	(−5.30)	(−5.34)
Gender (Female = 1)	−0.0558**	0.0369**	0.0190**
	(−2.79)	(2.74)	(2.80)
Race (African = 1): Colored	0.181*	−0.0969	−0.0836***
	(2.52)	(−1.56)	(−6.73)
Asian/Indian	0.144	−0.0708	−0.0733***
	(1.53)	(−0.83)	(−5.71)
White	−0.0293	0.115	−0.0858***
	(−0.25)	(1.08)	(−4.75)
Home language (African = 1): Afrikaans	−0.142	−0.0561	0.198
	(−1.25)	(−0.91)	(1.88)
English	−0.242*	−0.0407	0.282*
	(−2.27)	(−0.63)	(2.25)
Other	−0.547***	0.638***	−0.0904***
	(−5.37)	(6.26)	(−13.04)
Mother's education (None = 1): Primary	−0.0439	0.0286	0.0154
	(−1.40)	(1.42)	(1.34)
Secondary	−0.0543	0.0346	0.0197
	(−0.93)	(0.97)	(0.87)
Tertiary	−0.178*	0.102*	0.0765
	(−2.02)	(2.47)	(1.60)
Father's education (None = 1): Primary	−0.0738*	0.0478*	0.0261*
	(−2.57)	(2.57)	(2.51)
Secondary	−0.203***	0.153***	0.0499*
	(−4.65)	(4.87)	(1.98)
Tertiary	−0.260***	0.134***	0.126*
	(−3.68)	(5.71)	(2.57)

(continued)

Table 3 (continued)

	Primary	Secondary	Tertiary
Log household income monthly pc (*Rands*)	−0.149***	0.0809***	0.0683***
	(−10.60)	(7.07)	(11.27)
Number of siblings	−0.0005	−0.0102	0.0107***
	(−0.06)	(−1.89)	(3.42)
Household size	−0.0155	0.0102	0.00530
	(−1.38)	(1.38)	(1.38)
Location (Rural = 1): Urban	−0.0261	0.0172	0.0089
	(−0.92)	(0.92)	(0.93)
Farms	0.148***	−0.152***	0.00372
	(4.81)	(−6.74)	(0.20)
School Quintile (First = 1): Second	−0.0062	0.0045	0.0021
	(−0.18)	(0.18)	(0.18)
Third	−0.0738*	0.0475*	0.0263*
	(−2.15)	(2.21)	(2.02)
Fourth	−0.0954*	0.0225	0.0729**
	(−2.42)	(0.84)	(3.19)
Fifth	−0.0760	0.0483	0.0277
	(−1.53)	(1.59)	(1.41)
Sample	4322	1238	676

Notes (1) *T* statistics in parentheses. (2) *The * indicates level of significance:* $*p < 0.05$, $**p < 0.01$, $***p < 0.001$ (3) The sample includes individuals aged 15 years and older and those still attending learning institutions. (4) Higher education includes those with a certificate, a diploma or a degree. (5) Household income is in real Rands, deflated by CPI with 2008 as base year. (6) Post-stratification weights are used

most -at primary level, and sign reversal a likely indication that the benefits of a small pupil-teacher ratio are cumulative and take time to be realized. This also likely means that hiring more teachers plays a crucial role in ensuring education quality.[15] South Africa has a persistent skills deficit which, in this context, can be addressed by improving the quality of schooling at primary level through increasing the number of teachers at this level. The increase is likely to raise the number of students transitioning to secondary schooling and subsequently to tertiary education, where they can acquire the skills necessary to fill the skills gap in the economy.

The results show that the likelihood of educational attainment increases with age: the older the individual the less they are likely to attain a primary education but the more likely they are to attain secondary and tertiary levels of education with attainment increasing by 19 and 1.4 percentage points, respectively. Girls and women are less likely (by 5.6 percentage) to attain primary education, but they are more likely to attain a secondary

and tertiary education by 3.7 and 1.9 percentage points relative to boys and men. These gender effects decrease the higher the level of education attained. These are interesting findings, particularly because primary education is compulsory in South Africa, that suggest that increasing education quality for girls is highly dependent on successful completion of primary education. This further emphasizes the importance of ensuring girls stay in school, particularly because evidence has shown teenage pregnancy is a major driver of school dropout rates (Gustafsson, 2011). Generally, the race has no effect on education attainment in the lower levels but race matters at the tertiary level. From the results, compared with being African, Coloreds, Asians/Indians, and Whites are less likely to attain a tertiary education. This is rather surprising and is likely to result from lower sample response rates from non-Africans, particularly among Whites. The significance of speaking English at home compared with an African language, increases with education level: it decreases the likelihood of attaining only primary education by 24 percentage points, has no effect at the secondary level, and increases the likelihood of attaining tertiary education by 28 percentage points.

Household characteristics are important determinants of school quality. We consider mother's and father's education both as indicators of parental taste for education and as controls in their own right. Our results show that relative to having no formal education, a mother's educational attainment matters only if she has a tertiary education, and its effect is limited to attainment of primary and secondary education. However, relative to having no formal education, a father's education matters regardless of level, and has significant effects across all levels of education. The magnitude of these effects decreases with increased levels of education: The more educated a father is, the larger these effects are. Specifically, we find that an educated father reduces the chances of a child attaining only primary education by more than threefold than if the father only has primary education. An educated father is likely to increase attainments of secondary and tertiary education, and these effects are slightly stronger for secondary education. In general, therefore, we infer from these results that more educated parents are likely to provide more educational opportunities for their children, and, consequently, offer them more social mobility. This is in line with Gustafsson's (2007) findings for South Africa. We find the number of siblings only increases the likelihood of attainment of tertiary education, while household size has no effect, a likely indication of low dependency rates.

We also find that being in a household with a high per capita household income increases education quality. A high household income decreases the likelihood of primary school attainment by almost 15 percentage points,

this effect is likely an artifact of the fact that households do not pay for primary education. Household income, however, increases the likelihood of household members attaining a secondary and tertiary education by 8.1 and 6.8 percentage points, respectively. The positive correlation between household income and education quality implies that education is a normal good. However, the unexpected negative effects on the attainment of primary education from household income and mother's and father's education are a likely indication that there are other underlying issues beyond the control of the home environment that drive primary education attainment. Primary education is free and compulsory. However, issues such as inadequate supply of textbooks, teachers' low subject content knowledge and absenteeism, and poor school management (Mlachila and Moeletsi 2019) characterize the delivery of primary education and are a likely cause of high grade repetition and the consequent high dropout rate. According to Barile et al. (2012) students are less likely to drop out of school in schools with a positive teaching climate.

The type of school attended, as defined by school quintile, is particularly important for South Africa because this classification determines the amount of funds each school receives from the government. In including this control, we, by design of the variable, control for neighborhood characteristics, since socioeconomic characteristics are used in determining the quintile of each school. The results show that relative to attending a quintile 1 school, attending a school in either quintile 3 or 4 increases the likelihood of attaining a tertiary education, but decreases the likelihood of attaining even primary education. The lack of effect of attending a quintile 5 school is rather atypical because other empirical findings have shown that these schools have the highest matriculation rates and therefore most of their students enter university. We infer from these results that living in middle class neighborhoods, which is where schools in quintile 3 and 4 are located, is likely to increase education quality.

6 Summary and Conclusion

This chapter investigates the effect of government spending on the education quality of South Africans, with education spending measured by the number of teachers the government employs, and education quality proxied by educational attainment. In the analysis, we consider actual education attained using data from Wave 1 of the National Income Dynamics Study (NIDS) collected in 2008. NIDS is a household survey and the survey data has been matched

with national administrative data from schools to identify the educational impacts of pupil-teacher ratios and socioeconomic characteristics including parental education, home language, and home location.

We find that increasing the number of government-employed teachers increases education quality, and some individual and socioeconomic factors such as race, gender, father's education, household income, and location as measured by region and neighborhood significantly affect education quality. Specifically, our findings from the proportional odds model show that the pupil-teacher ratio has cumulative effects and the benefits take time to be realized. The results also indicate that education quality increases with age and household income, and that women are more likely to have higher educational attainment, but this gender effect decreases with education level. We find that parental education, especially having an educated father, increases the likelihood of higher educational attainment which, according to Gustafsson (2007), suggests more social mobility for South Africans with educated parents. School quintile, which is also an indicator of neighborhood characteristics, is a strong determinant of education quality, and schools in quintile 3 and 4, which are in middle class neighborhoods, are shown to offer the highest likelihood of educational attainment.

Overall, these findings suggest that the government of South Africa's spending on hiring more teachers matters in education quality, in addition to the individual and socioeconomic characteristics. They give support to the current government policy of reducing the pupil-teacher ratio through increasing the number of government hired teachers. The significant effects of the pupil-teacher ratio are, however, against the general findings in the South African literature which, on average, shows no support for a lower pupil-teacher ratio (or class size). These findings could be a result of this study using the proportional odds model which allowed us to identify the effects of different factors on educational attainment, which we would not have identified with a standard ordered logit or with the least square estimates.

Notes

1. Black in this case refers to South Africans classified as "non-white," that is, as "African," "Indian/Asian," and "Coloreds."
2. Matriculation examination is taken at the end of grade 12 and is a prerequisite for university admission.
3. We do not consider the NIDS panel because the variation in the education variable is limited.

4. At the end of apartheid, the difference in the pupil-teacher ratio between White and African schools was two-fold, while the ratio in Asian/Indian and Colored schools was in between (Case and Deaton 1999).
5. Bhorat et al. (2009) found that between 1995 and 2005, wage inequality increased by 14% across skill levels, and showed that in 2005/2006 the median income of Africans was about a tenth that of Whites in South Africa.
6. Pupil-teacher ratio and class size are used in the literature interchangeably, however, they are different. A pupil-teacher ratio often includes both teaching and non-teaching staff and as a result this ratio is often smaller than the class size, which means the two often produce different results.
7. This is a higher class size than the government's set level of 40 for primary schools and 35 for secondary schools (Department of Basic Education 2010).
8. This was through a rigorous process of matching respondents' schools with the schools in the Department of Education (DoE) register (see SALDRU 2012).
9. A major limitation is that we are assuming that the ratio was the same in these schools in the years between 1998 and 2005 which is unlikely (our sample's oldest respondents were last in school in 1998). This is likely to understate the ratio for those earlier years when the ratio was likely to be higher.
10. Homelands were areas designated for different ethnic groups by the apartheid government.
11. These are known as no fee schools. The fee status of a school is determined by the school quintile, which is determined by the national poverty ranking. It initially applied to 40% of the poorest schools (bottom two quintiles); both primary and secondary schools. These are supposed to receive 60% of the available resources. In 2011, the no-fee policy was extended to 3rd quintile schools (South African School Act of 1996, Amended National Norms and Standards for School Funding Notice 33,723, as amended: 2010, p. 2).
12. The provincial education department is mandated "to create indices based on the range of physical facilities at the school, learner: classroom ratio, the overall condition and need for repairs, and availability of basic services" (South African School Act of 1996, National Norms and Standards for School Funding Notice 2362 of 1998, p. 28).
13. The National Norms and Standards for School Funding Notice stipulates that these funds are for recurrent expenditure (South African School Act of 1996, National Norms and Standards for School Funding Notice 2362 of 1998, p. 30).
14. Parents who place a higher value are likely to relocate to a neighborhood with a higher quintile school. Parental choice of the school to enroll their child is likely to be influenced by the type of school as formerly defined along racial lines. This is a likely source of endogeneity. This bias from parent's choice of school is also likely when a parent with a high ability child selects a high or low resource school, while a similar parent with a low ability student chooses differently (Graddy and Stevens 2003).

15. This is also an indication that there are other factors at play at the basic level such as the fact that primary education is compulsory so attainment is independent of resources provided.

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The Impact of Social Media Marketing on the Performance of SMEs: The Case of Retailing Business in Tanzania

Omary Swallehe

1 Introduction

Throughout history, human beings have been known to interact with one another. The exact encounter as to when the first people started social networking using technology is, however, unknown. The early modern human beings lived in small groups and occasionally interacted with other groups. Rimskii (2011) reported that the earliest recorded social networking encounter goes back to 1792 when the telegraph system and telex machine were discovered. However, until the early 1900s, telephones and radios were the only means of social networking. It was during this same time when Emile Durkheim and Fernando Tonnies introduced the study of Sociology, hence, regarded as the fathers of sociology (Edosomwan et al. 2011).

The study conducted by DiNucci (1999) specified that the web revolution would interconnect devices like TVs, cellophanes, automobiles, and even microwaves and could be all controlled by an individual through the internet. In 2004, Tim O'Reilly and Dale Dougherty coined the term Web 2.0 in the first Web 2.0 Conference. In this conference, the speakers argued that Web 2.0 was not an update to Web 1.0, but as a change whereby the Web focuses

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on allowing users to interact and communicate with one another via social media.

From the year 2004, many organizations established their existence on different social media platforms. As of 2017, it is said that all the top 100 global companies have their existence in a number of social media platforms. It is due to this trend ever since a number of SMEs have started conducting social media marketing on various social media platforms. Today, it is obvious, for example, in Tanzania when visiting social media platforms especially on Instagram, Twitter, and Facebook, it is uncommon to see retailers and other traders advertising their products. In the modern economy, Small and Medium Enterprises (SMEs) play a great role in the development of nations. For example, according to Ward (2017), more than 98% of all firms in USA and Europe are SMEs and contribute more than 50% of the countries' GDP. In Australia, 97% of all firms are SMEs and employ 49% in the private sector.

In recent years, social media's popularity has increased tremendously and has become a buzz in today's world. However, what was created as a platform for individuals to share ideas, opinions, feelings, and thoughts is increasingly adopted and used by corporations and enterprises in framing and setting marketing strategies (Meske and Stieglitz 2013). Because of the emerging importance of social media usage in the business world, a number of studies have been conducted to examine the importance of social media in business. However, much of the literature conducted in the past focused on social media strategies on large enterprises and organizations. It is important for SMEs to gain understanding and enjoy the benefits arising from using new marketing techniques andapproaches like the use of social media marketing which has proved to promote growth, build good customer relations, and make the SME owners to have a clear understanding on how their customers can be served.

It is no secret, however, that SMEs struggle in adopting and using social media tools. A survey conducted by the Deluxe Corporation found that 49% of the SMEs Business owners' find the adoption of social media as one of their greatest challenges in reaching customers with limited resources (Small Business Trend 2011). However, due to the fact that social media tools are richly equipped with a number of marketing opportunities without the requirement of large investments, SMEs retailing businesses should look into adopting and using social media marketing since it utilizes less resources and less time consuming. The fact that SMEs are more prone to resource shortages (money and time) compared to large enterprises; the use of social media to market their products would help them reduce marketing costs

while targeting large masses. Social media would also provide a platform for business growth and provide an opportunity for the SMEs owners, not only regularly share their products with their customers, but also an opportunity to have direct communication with their customers and help them to know what their customers really want and to establish long-lasting relationships.

With the limited number of studies conducted on SMEs, they are largely based on how social media is used by SMEs (Cox 2012) and why or how SMEs adopt social media (Meske and Stieglitz 2013; Pentina et al. 2012; Ziller and Schauer 2011; Abed et al. 2015). None of the studies on SMEs social media usage covers how social media marketing can affect the performance of SMEs, especially in retailing businesses. Also, none of the studies conducted on SMEs have focused on the context reflecting the Third World countries which are rapidly adopting social media usage. Without proper knowledge of how social media platforms can be used to enhance the performance of businesses, SME retailers are less likely to enjoy the benefits derived from such a new marketing method. Thus, there emerges the need to examine and explore various social media practices and activities and their effect on the performance of retailing businesses is paramount.

2 Study Objectives

The study investigates the impact of social media marketing on the performance of SMEs in retailing businesses in Tanzania. Specifically, the study focuses on how Instagram, Facebook, and Twitter usage can bring about positive outcomes in SMEs retailing activities in the country. In other words, what is the performance differential between those companies which employ and leverage the platforms and those without. The results obtained from this study may provide a good understanding and insight of how and why SMEs retailing businesses should adopt and use social media in offering their goods and services, communicating with their customers, and building healthy long-lasting relationships and, therefore, realizing the benefits and experiencing other impacts of conducting business in the twenty-first century style. Social media marketing is the fastest growing marketing channel in the world (Chaffey 2018). In the USA alone, expenditures were predicted to reach USD 17.3 billion by 2019 (Forrester 2014).

The research question is *if there any performance differential between firms that embrace the use of social media marketing and those which do not?*

3 Review of Relevant Literatures

Overtime, Social media have played a very important role in enhancing communication and marketing at large corporations. In recent years, however, SMEs have started adopting the use of social media in their activities, realizing their importance. According to Constant Contact an American marketer, 24% of the SMEs use social media in a structured way while 20% of the SMEs use their social media in an informal way (Mielach 2012). According to Bitkom (2012), in Germany alone 47% of all firms use social media. Many of the academic literature incorporate based and give only a little emphasis to SMEs.

According to the EU (2010), SMEs make 99% of all firms in the continent. They employ half of the entire continent's population. Business practices have been made easy through technology. SMEs always tend to lag in adopting such technologies, despite the benefits that could be derived. Adoption of new technologies would help such firms to enjoy the business environment at the same level as large corporations (Richter and Koch 2008; Polach 2008) Adoption of new technologies has always been a challenge, not only to SMEs, but also large corporations. The truth, however, is that SMEs are at risk since a wrong decision made would tarnish their business. In another view, Hurley (2012) contends that more than 75% of the owners were put off companies because of an improper use of the newly adopted technologies. The studies undertaken by Constantinides (2014); Market et al. (2018); Fotis (2015) posit that given the limited amount of resources, SMEs are obliged to make well-conceived decisions regarding the adoption of new technologies such as social media.

Social media marketing has narrowed targeting approaches toward integration of the organization's communications. As opposed to online payment advertisement (Banners, Texts, search etc.), social media marketing involves the initiation of C2C communication, creating brand/organizations fan pages, and managing promotions and PR within the popular social media tools such as Facebook, Twitter, and Instagram (Evans 2009). Compared to large organizations, this marketing strategy may appear more advantageous to SMEs due to low costs and flexibility (Akehurst 2009; Berners-Lee 2007).

The Technology Acceptance Model (TAM) postulates that the decision to adopt new technologies within the organization lies entirely on the decision maker's perception of the ease and usefulness of the technology needed to be adopted in an organization. Due to the fact that the use of social media does not require any special skills, however, it is difficult to assess the factors responsible for the decision to adopt social media marketing according to

Pentina et al. (2012), who believe that social influences by experts, competitors' effects, and customers were the main drivers of adoption social media marketing by firms. These results align with earlier studies by Venkatesh and Davis (2000), Pangarkar (2000), Maslow (2011), and Lucas Jr and Spitler (1999) who argue that firms tend to adopt what their competitors do when they assess that their rivals' methods are cheaper than theirs. They do not want to be left behind when there are enough resources available to support the imitation.

Both Ziller and Schauer (2011) and Meske and Stieglitz (2013) argue that SMEs typically use a top-down strategy in adopting social media marketing. Meske and Stieglitz (2013), however, conclude that social media adoption is primarily associated with non-technical barriers and challenges including soft factors. These soft factors include management attitude and employee acceptance.

The use of social media has become so important that many companies have established their presence on various social media tools. It is due to this importance that it is no longer surprising that even the social media tools themselves (Twitter, Facebook, etc.) have official accounts on other sites to communicate with their users. It is due to this that even the largest global companies like Samsung, Apple, Coca-Cola, and Amazon have their official accounts on various social media sites. According to Marsteller (2010), 65% of the 100 fortune global companies have active account on Twitter, while Samsung, Apple, Coca-Cola, and Amazon) have (54%, 50%, and 33%) active accounts on Facebook, YouTube, and corporate blogs, respectively. The use of social media has surpassed web searching and e-mailing as the most popular activity in the internet world. It is estimated that every one out of five minutes spent online, is used on social media. Studies also show that in US alone 98% of all active users spend most of their time on social media (Chaffey 2014; Senecal and Nantel 2004).

Firms in almost all industries use social media to market and advertise their products and services. They also use social media to brand, promote, develop, and provide customer services, employee engagement, and even recruitment of new staff. A good example of such company is Infosys India which uses Twitter to address its customer and all activities mentioned above (Bhanot 2009). When companies join social media, they mainly focus on engaging with customers, keeping up with the industry's trend, reaching out for new customers, and recruiting and hiring top talents. Through social media, the companies also provide information to their customers such as about prices,

promotions, time with their services, answering customer queries, and products that are available and giving behind the curtain information (Ayarekar 2015).

According to Pempek et al. (2009), very few people predicted it would become one of the most successful and popular social media applications during the early stage of Instagram. According to the experts in the area of social media marketing, the Instagram has more than 800 million monthly active users and only tails behind Facebook and YouTube. It is believed that most of the Instagram users are female and 59% of its users are under 30 of age. The site continues by estimating that it has more than 25 million Instagram Business Profiles worldwide and more than 2 million advertisers use Instagram to share stories. The site estimates also that 200 million people visit Business Profiles on daily basis and on a survey conducted; it was found that 60% of the people asked admitted that they found the goods they had desired through Instagram (Market et al. 2018).

According to Macinnis and Folkes (2009); businesses use the app and post its content while their audience post and share photo images of them. Unlike a Normal Instagram, Business Instagram allows business owners to add up their business details (e.g. phone contacts, physical address, email, websites etc.) to their profile. The Business app also allows integration of WhatsApp with the Instagram app. Adding up such information helps Instagram to analyze various account activities like the number of likes impressions, website clicks, reach, followers, and video views.

Park et al. (2016) believe that Facebook advertising is not one way and tagging of friends and wall sharing plays a major role in Facebook advertising while paid ads provide a greater audience. According to Tranttner and Kappe (2013), social streaming by the use of Facebook helps in determining the number of normal and new customer visits to the business page, measures, if the ads posted, are revealing or not, thus determining potential buyers and the profit of the business.

In another development, Tsimonis and Dimitriadis (2014) successful Facebook posts should be those posts that promote the products, add value to the posts, entertainment related, and share other pages. The business owners should also understand their targeted audience and have good knowledge on what strategy to adopt that could help gain benefits from Facebook use. Compared to other micro-blogs, Twitter is the fastest growing platform. When Twitter is compared to other social media platforms, however, it champions them in advantages. It offers ease of engagement between the business and their customers and enhances convenience and innovation. Many organizations use Twitter even for recruitment. Twitter also played a crucial role in

the political world in the 2008 US election and the 2011 Singapore election (Wamba and Carter 2013).

The literature suggests that Twitter has helped in the increase of sales through simply listening to their target audience, knowledge flow, relationship building, and best practices within the organizations. Organizations like Dell, Sony, and Ford Motors have used Twitter to their advantage (Adentunji and Carr 2016). Fisher (2010) claims that many organizations have proved that Twitter is the most powerful social media platform in the business world. According to Fisher (2010), 1500 Twitter users when offered by Sony to customize their laptop models with a reward of a 10% discount, the company's sales increased by 1.5 million USD. This offered the Twitter followers a more personalized shopping experience. The author also reports that in June 2009, Dell announced that it had traced back more than 3 million USD in sales from their official Twitter account.

Despite this fact, many studies were conducted to explore and describe social media marketing and most of the literature focuses on a large corporate environment. With the few available studies focusing on SMEs, their focus on why and how SMEs should adopt social media marketing practices is lacking especially in developing countries. None of the literature has placed a focus on how social media marketing can affect the performance of SMEs and gives a true picture of social media marketing in third world countries.

4 Methodology

This study uses online focus group discussion as the means or tool for collecting data from different participants. Focus groups are regarded as an established tool for collecting data in social sciences whereby people from diverse backgrounds and experiences are brought together to discuss a topic under investigation. (Morgan 1996). The technological advancements have seen more and more people capitalizing in conducting focus group discussions online. According to Fox et al. (2007), Gaiser (1997), Kenny (2005), focus group discussions normally take two forms synchronous, involving real-time live chat comparable to conversational interactions of face-to-face focus groups or asynchronous, using "static" text-based communication such as forums and email lists.

In this study, the qualitative online data collected from focus group discussion and documentation was coded, analyzed, and further analyzed using Excel. The qualitative data were generated from the daily reports of two shops were then summarized to obtain total sales for the duration of the

data collection; the revenue was further analyzed using a horizontal trend analysis to examine how the introduction of social media marketing to businesses which have not adopted this marketing technique would be affected. The qualitative data were thematically analyzed. The focus group transcripts were used to analyze data. The data for this study were coded by hand and analyzed. To carry this out, the researcher coded every five written word lines on participant conversation in order to identify the key words. In order to ensure the codes had qualitative richness, it was ensured that the codes were clear, concise, and clearly stated. To ensure the integrity of the codes, code validation was applied.

This was done to ensure that the codes were not misinterpreted, or biased when reviewed by another person other than the researcher. The researcher did a double crossing on data by reading it more than once to ensure consistency and validation. Through the integration of the codes, a codebook was created where the themes emerged. After the creation of the codebook, the researcher identified sub-themes and themes that had emerged from the coded data. These themes emerged from conversations, occurrences on frequency, and certain factors. The researcher was able to define each theme sufficiently to make it clear and understandable for others.

The description of each theme was named with a few words to help communicate its information from the focus groups and was then transcribed. For the unobtrusive method, the data were collected from September 1 to 30, 2018 from the boosted ads on Facebook and Instagram to perform the content analysis on the social media activity. By this method, the researcher was able to explore the conception that manifested the conversation. The data obtained were read repeatedly until the key concepts were captured. Like in the thematic analysis, the codes were sorted in groups depending on their relationships. Since the aim of the researcher is to examine and assess the impact of social media marketing on the performance of SMEs Retailing Business, the content analysis was done to evaluate the impact of social media on the performance of SMEs in terms of sales, engagement, and strategy.

Despite being an explorative study using qualitative method, the comparison of the monthly revenue trend can be analyzed by using accounting statistical methods. The horizontal Trend analysis compares trends between consecutive periods. Despite the fact that the Horizontal analysis uses the previous period trend as a base year to predict the next period revenue, (i.e. for the March calculation, the base month becomes February and for April Calculation, the base is March) the researcher decided to use the month of February as base month for both March and April. The researcher decided

to use February as base for both months simply because the February and March sales did not vary much and the researcher wanted to compare both sales months' revenue to the base month. For example:

$$Horizontal\ analysis = \frac{New\ Month\ Date\ Revenue - Base\ Month\ Date\ Revenue}{Base\ Month\ Revenue}$$

5 The Findings

The previous section examined the research methodologies used in this study. The section further described how data were collected and analyzed. Because this study employs a qualitative design as identified above, the data collecting methods include focus group discussions, observation, documentation, and unobtrusive method. The collected data are presented, analyzed, and interpreted in this section. The collected data were thematically analyzed from code books created by the researcher. The analysis and interpretation of the collected data is basically based on the objectives of this study described in the first section and second sections.

The analysis of the boutique shop revenues after the introduction of social media marketing as depicted in Fig. 1. The figure shows social media marketing has a significant negative impact on the sales of the business. From Fig. 1, the data show that despite the use of social media marketing, the business was not able to raise its revenue. The data also show that the sales

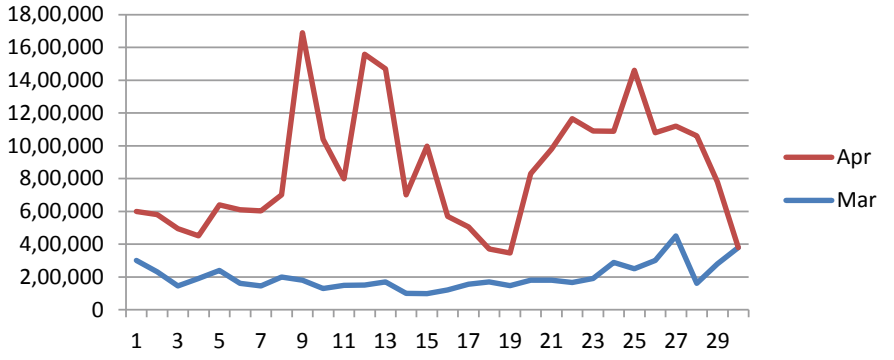

Fig. 1 Boutique Shop revenue analysis in Tanzania March–April 2018 (*Source* Author's own construct based on field data collected from online focus group discussion, 2018)

had decreased rapidly compared to the base month of February in which the business had not adopted social media marketing.

$$Horizontal\ analysis = \frac{New\ Month\ Date\ Revenue - Base\ Month\ Date\ Revenue}{Base\ Month\ Revenue}$$

For example, on March 10, if the sales of a Boutique shop are $130,000 and the previous revenue was $250,000, then

$$Horizontal\ analysis = \frac{130{,}000 - 250{,}000}{250{,}000}\ 0.48$$

This shows that the March 10 revenue decreased by 48% compared to previous February Revenue.

Through focus group discussions, it is revealed that the use of social media to market had no positive impact in boosting SMEs sales. As depicted above, businesses that opt to adopt social media are more likely to experience a decrease in their sales. The percentage change of sales revenue of sales could be resulted of the businesses being exposed to more customers who could not be reached physically, but the social media provide a platform which is less costly thus connecting the SMEs owners and their potential customers from the audience. It could not be ease to establish the reason as to why the sales revenue has gone down despite using social media marketing tools by traders. With regard to this, some of the respondents noted: The analysis of the building and construction shop revenues showed that social media marketing had little impact on influencing sales revenue as depicted in Fig. 2. This indicates that using social media marketing on this kind of business would bring little influence to raising revenue.

Moreover, the findings from the focus group discussion reveal, however, that although this is a qualitative study, for indicative purposes, 6 out of 10 respondents had their businesses already started before adopting social media marketing. This means that 60% of the respondents had already established their retailing businesses before adopting social media strategy. On the other hand, only 40% of the respondents had no business before adopting social media marketing. This means that their businesses were originally formed through social media marketing. These data would help determine if there exist differences in performance before and after adopting social media marketing. Other owners expressed that they were influenced to use social media in their marketing activities because they saw it as a new opportunity for making quick money.

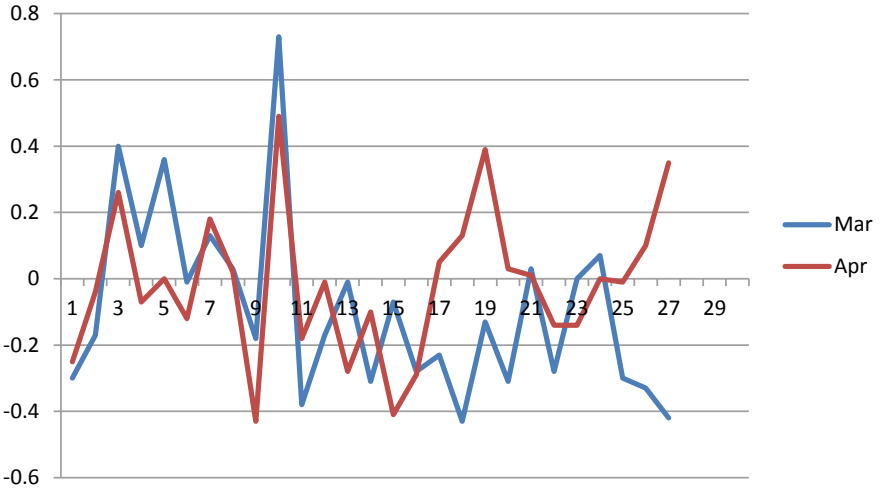

Fig. 2 Building and construction shop revenue analysis in Tanzania March–April 2018 (*Source* Author's own construct based on field data collected from online focus group discussion, 2018)

6 The Impact of Using Social Media Marketing on Performance of Retail SMEs

From the collected data, it is revealed that there exist a number of indicators that SMEs owners perceived as the measurement of their businesses performing well. The data also revealed that social media marketing helps business owners to forge relationships and networks with their customers. A number of respondents from the focus group discussions revealed one of the major benefits that could be realized through social media is the building of long last relationship with their customers:

> *Through social Media Marketing, I have created connections and friendships probably I wouldn't have forged without this strategy.* ***(Salma, Focus Group 3)***

> *Unlike with other marketing strategies, social media marketing allows one to be friend with someone just met online. That relationship may go to forming business relationship if trust emerges.* ***(Safina, Focus Group 3)***

As the field data above indicate, frequent social media activities on a business account would help increase the number of followers on Facebook, Instagram, and Twitter. When the Facebook and Instagram accounts were offered to boutique shop owner, the account had 3898 and 3908 friends and

followers on Facebook and Instagram, respectively, as of 31st of March 2018. On the other hand, the account that was offered to the building and construction shop owner had 4907 and 1678 followers on Facebook and Instagram, respectively. However, as of May 1st when the four accounts were checked, the boutique shop accounts had 5678 and 6389 on Facebook and Instagram had followers, respectively. While the building and construction shop accounts had 5045 and 1701 Facebook and Instagram followers, respectively. The collected data reveal that the use of social media for commercial purposes has a great effect in increasing the number of friends and followers on Facebook and Instagram. On the other hand, the focus group discussions revealed that the use of social media marketing had a great impact in increasing the number of followers and friends on Instagram and Facebook accounts as depicted by the two shops.

> *Having large number of followers is a great advantage. To me it's an added advantage since I get paid for every post I make to support other businesses.* ***(Halima, Focus Group 3)***

> *My business account has more Instagram followers than my private account.* ***(Hamisa, Focus Group 1)***

> *Before I started business, I had very fewer followers but now I have more than 100,000 followers on my Instagram. That's my greatest achievement though it comes with perks.* ***(Humaid, Focus Group 2)***

The data collected also reveal that the use of social media helps businesses to get larger number of likes and comments. Further analysis, however, reveals that boosted ads fetch more likes, shares, and comments compared to those which are not boosted. This is supported by the fact that boosted posts on Boutique shops got more likes than those that were not boosted. From the focus group discussions, some respondents expressed:

> *My posts always get likes both on Instagram and Facebook.* ***(Cynthia, Focus Group 3)***

> *… Boosted ads are more likely to get more likes than those not boosted …* ***(Marina, Focus Group 3)***

> *Social media has helped me get customers who contact me direct through my phone. My phone is always busy; sometimes I get calls during late nights …* ***(Hamisa, Focus Group 1)***

Other participants from the focus group discussions attributed their popularity to using social media accounts for business:

> *I was jobless after completing my studies. I had no capital to start a big business. However, I had a large number of followers on Instagram and Facebook. I used the large number of friends and followers on my accounts to my advantage … Seven years later I am the most popular Hair seller in the country. Who doesn't know (mentions a name) … I am so popular. Through social media, I have personally met people I had never thought I could talk to. This business has taken me to places …* ***(Hamisa, Focus Group 1)***

> *Instagram has helped me build a name …* ***(Isaac, Focus Group 2)***

7 Problems Facing the Use of Social Media Marketing

Any successful business that has potential faces some challenges at different levels of its growth. Like any other phenomenon, social media marketing is subjected to the number of challenges which threaten the growth of this marketing strategy. From the analysis of the focus group discussion, it is revealed that the suggestions from the participants are similar in one way, or another. The challenges identified by the participants are similar enough and are grouped into six major categories namely operational challenges, resource-based challenges, strategic challenges, technological challenges, management challenges, and other challenges as shown below.

When the above challenges are further simplified as shown in Fig. 3, however, the challenges facing social media marketing include lack of proper knowledge to conduct social media marketing, high operational costs, poor infrastructure, and improper payment systems. The participants also mentioned online rivalry, phishing and identity theft as other challenges.

When the challenges are further analyzed, the data reveal that they are challenges which were faced during the initial stages of adoption of this strategy and others which occurred after one is fully comfortable with using this strategy. Due to their repetitive nature, these challenges can be grouped into: (1) Resource-based problems, (2) Management Based problems (3) Strategic problems (4) Operational Problems (5), and Technological Problems. The researcher identifies technological problems as all challenges that are associated with the use of the technology. In the focus group discussions, technological challenges were identified as one of the factors that hinder

Fig. 3 Broad challenges facing social media marketing in Tanzania March–April 2018 (*Source* Author's own construct based on field data collected from online focus group discussion, 2018)

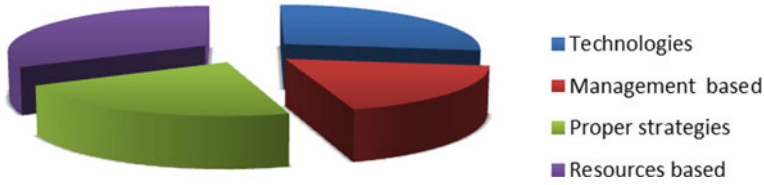

Fig. 4 Specific challenges facing social media marketing (*Source* Author's own construct based on field data collected from online focus group discussion, 2018)

SMEs owner to grow and other new owners not to engage in social media marketing.

> *My account with more than 200,000 Instagram followers was hacked twice. I am scared of losing this account. Losing this account means I am done. Getting this number of followers was not easy.* ***(Jamal, Focus Group 2)***

> *More than 75% of Tanzanians live in rural areas with no internet services. This limits us from reaching more potential customers.* ***(Asimwe, Focus Group 1)***

> *… We lack proper payment system …* ***(Flora, Focus Group 3)***

Recently, Facebook has been accused of misusing their customers" data. If our data are not safe, we are at risk. This may mean boosted ads may be not realistic. ***(Humaid, Focus Group 2)***

Another challenges highlighted by the participants in the Focus group were resource-based challenges. The resource-based challenges are all those problems associated with poor management of resources that is, time and money:

… boosting a single ad per day on Facebook and Instagram would cost you a dollar. The price may look cheap but during these hard times in business, it is a lot . . . Boosting ads is an additional cost … ***(Bertha, Focus Group 1)***

"Social media market needs a lot of time . . . this may lead to a person using a lot of time on social media surfing than marketing one's own products" ***(Rajabu, Focus Group 3)***

Sometimes I spend more time on Instagram viewing unwanted things more than reading the comments section on my post. ***(Sakina, Focus Group 1)***

The participants of the Focus group identified a lack of proper strategies as another challenge hindering the growth of SMEs using social media marketing. Strategies involved were how these participants were using social media for the future benefits.

We lack proper knowledge on how to use social media to our fruition. ***(Gerry, Focus Group 2)***

Knowing when to post is something which most of us do not know. ***(Bertha, Focus Group 1)***

Through observation of focus group discussions, the researcher identifies operational problems as all challenges faced by SME owners that were hindering smooth operation in social media activities:

My business depends on delivery . . . lack of postal address is a great challenge ***(Jacqueline, Focus Group 1)***

Sometimes I get orders from customers from cross country regions where there are no buses from Dar. This limits my ability to reach more customers. ***(Asimwe, Focus Group 1)***

I almost went bankrupt because I was swindled by my own followers. It very difficult to trust someone from Instagram. ***(Gerry, Focus Group 2)***

There are more swindlers on social media and cheaters than anywhere else. There are fake people there waiting to take advantage of you. ***(Thompson, Focus Group 3)***

8 Conclusion

A good marketing strategy always leads to a successful business. Any successful business should know how to segment its market, target its potential customers and position the product they offer in the minds of its customers. However, all that cannot be done without proper communication between SMEs owners and their customers. Communication fills such gaps and brings closer the customers to the sellers. The internet has facilitated that and through social media, the two parties are connected 24 h a day despite the disparity and distance of geographical locations. From the genesis of this study, efficient and effective use of social media is expected to be beneficial to businesses. However, the private use of social media is very different from commercial use.

Unlike the private use, the commercial use is not easy as it is thought because it requires a person to learn, not only what is the perfect time to post or engage, but it also requires the owners social commitment to the business and regular checking and engagement, decision which include making choices on what and how to post and what engaging strategy to adopt. From the literature and findings of this study, it is noted that SMEs using social media to market often lack proper use and strategies during the early periods of business. It is due to that factor that SMEs using social media marketing strategy should scrutinize and identify the purpose as to why they engage and what outcome should be expected. The creation of accounts on social media tools is not enough and randomly posting once a week, or so without checking on a regular basis. However, the business owners may take an initiative on regular posting and engaging to their customers whenever any issue of importance arises such as questions asked, or any other query which requires deep explanation from the owners themselves.

SMEs' owners should clearly understand the type of social media tool in which the target customers could be found and which strategy may be adopted since customers tend to differ from site to site. A good example is that female customers who are more likely to be found on Instagram because they prefer posting pictures on that site. For new business and their

owners, this type of marketing strategy may be a new endeavor. Learning through active participation for those lacking this type of skill should be an everyday norm. They should also learn how to effectively and efficiently use social media tools in engaging with customers and building long-lasting relationship which helps them grow their businesses.

Besides, from learning to master social media marketing strategy, the SMEs owners should be keen on their dealings since some of the problems such as online phishing, online identity theft, dishonest customers, and online rivalry which could tarnish the goodwill of the business rather than building it. Having only the knowledge of effective and efficient use of social media market to sell one's goods is not enough to boost one's sales and popularity on the social media. The SMEs owners should rather support each other through the sharing of items posted and recommending their customers to other SMEs owners. This will expand their customer bases. Depending on the organic growth of followers, it may also not be fruitful that SMEs owners should from time to time pay for the advertising service available on the social media tools. The use of social media advertising payment service eases the whole research phase. Through these services, the sites help their customers to target their interested customers for the ads to appear on their timelines even if the intended customers are not followers, or friends.

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Addressing Quality Issues in African Higher Education: A Focus on Ghana's Emerging Private, Graduate, Business Higher Education Sector

Stephen Armah

1 Introduction

This chapter addresses the challenges facing the quality of graduate university education provided by private, graduate, business universities (PGBU) in Ghana. The purpose of the chapter is to make recommendations for quality improvement of the PGBU standard in Ghana.

The issue of quality in education is important as a poor quality university system will provide poor quality human capital that will be impotent in helping Ghana to achieve its developmental aspirations. Human capital was defined by Gary Becker as the investment in humans to increase their productivity in the future. It refers to processes like investments in schooling, health, on the job training, and the acquisition of cognitive, mathematical, and technological skills (Becker et al. 1990, 2).

Education is the main engine for transforming entrepreneurship into wealth, so ensuring the effectiveness and quality of university education is essential. Quality education is pertinent for the twenty-first century development agenda given the emergence of the global knowledge economy which depends heavily on quality human capital (Adu 2014, 1). The quality of a country's human capital and its ability to support research and innovation is

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directly related to the quality of its universities. It is essential for Ghana to guarantee the quality of its universities.

I highlight Ghana because of its booming private university education sector and I focus on business education because business universities are easy to set up in Ghana and are leading the boom in private universities. I emphasize PGBUs because graduate education is still young in Ghana and PGBU education is younger still, so the issues of quality are largely unexplored.

Human capital such as schooling is important to growth (Barro and Lee 2011, 1; Griliches 1977, 2; Hanushek and Kimko 2000, 1). As demonstrated by Imperial Japan, the Asian tigers and China, very few effective development agendas can be executed without a focus on quality human capital. A quality university system is essential.

Ghana's current development goals espoused in the "Ghana Beyond Aid agenda" of President Nana Akuffo Addo are predicated on the United Nation (UN)'s Sustainable Development Goals (SDGs) (Adei and Armah 2018, 1). The SDGs emphasize the primacy of human capital in facilitating economic development. Poor quality PGBUs will produce graduates without the necessary managerial, entrepreneurial, and business skills needed to lead business innovation and growth.

The private university system in Ghana is one of the fastest growing in the world. From zero private universities and 3 public universities in 1993, there are now more than 20 public universities and about 81 private universities (NAB 2019). Of the 81 private universities, about 20 run graduate programs.

The government of Ghana needs to ensure the quality of the PGBU system for the following reasons: (i) The private universities are mandated by national law to be "mentees" in a "mentee-mentor" relationship with state universities. The state universities enjoy a reputation of being higher quality than the private universities by virtue of their longevity, experience, and larger capacity so the quality of private university education must improve. The government must ensure quality for the private university because mentor universities may not competently do it as they often regard the mentees as competition. (ii) President Nana Akuffo Addo's vision of "Ghana Beyond Aid" demands the highest standards of quality from Ghanaians institutions like the PGBUs. (iii) Ghana must work to guarantee that the PGBU degree delivers the skills it promises to students to enhance their employability.

Quality graduate business education will generate business leaders to help scale up the country's small-scale productive activities in the manufacturing, service, and agricultural sectors. As Lucas (1990) explained, capital tends to move to countries with a productive labor force (19). A quality private university system will not only enhance the productivity of the Ghanaian

workforce but will also attract capital into Ghana to take advantage of the graduates (Amwelmoo and Armah 2019). Quality Ghanaian PGBU will help negate the pernicious effects of brain drain that is undermining development efforts in Ghana because graduates often migrate to seek education elsewhere (Owusu 2016, 3; Abraham and Armah 2017). Further, given Ghana's wealth of natural resources, an improvement in the effectiveness and skills of its labor force will help it manage its resources to avoid Sachs and Warner (2001)'s resource curse and rather enjoy a resource blessing (1).

Despite the vigorous recent growth and dynamism in the private university system in Ghana, the sector is besieged by quality-related challenges from the demand-side (student related), the supply-side (university related) and the enforcement side (accreditation and enforcement related) of the private university ecosystem. The demand-side quality related problems originate from an adverse selection problem, where unmotivated students willing and able to pay for a graduate degree may constitute most students who apply for these graduate degrees. The supply-side problems emanate from a dependence of private universities on school fees as the only source of funding. The implied moral hazard problem for the PGBU dependent on student fees is that they have incentives to admit poorly prepared students, reducing quality. The policy-related quality challenges have to do with resource constraints on the part of the NAB, in charge of managing the university system in Ghana.

Defining Quality Education

Quality is a difficult concept to define (Schindler et al. 2015, 1; Harvey and Knight 1996, 1; Mishra 2007, 1; Harvey and Green 1993, 1; Green 1997; Altbach and Knight 2007, 1; Varghese 2004). When applied to Higher Education the definition of quality is even more elusive. This is because unlike the quality of an inanimate output of a manufacturing process that can be immediately tested, quality of education can only be credibly assessed over time, making its assessment particularly challenging.

Quality is often operationalized as Quality Assurance (QA). QA is "a planned and systematic review process of an institution to determine whether or not acceptable standards of education, scholarship and infrastructure are being met, maintained and enhanced" (Materu 2007, 3).

This definition of quality does capture some, but not all, of the multidimensional attributes of the type of quality education that produces an enlightened individual. Quality is used holistically in this research to imply more than just QA. This research follows Harvey and Green (1993)'s definition of quality as "transformation" (1).

Per the definition of quality as "transformation," graduates of a quality university are understood to be "transformed" by the university. They can think critically and produce new knowledge. "They can partake autonomously in reasoned discourse…perform critical self-evaluation and come to the awareness of the ultimate contingency of all thought and action" (Barro 1991, 1). Graduates of a quality Ghanaian PGBU should acquire the same critical thinking, communication, technological, quantitative, problem-solving, analytical, evaluative, and leadership skills that are typically bestowed by international graduate universities in the UK, EU, and USA.

History of the Evolution of Higher Education (Higher Ed.) in Africa: A Focus on Ghana

University education was historically considered a public good and the exclusive duty of governments (Atuahene 2006, 2). The explanation offered was that the positive externalities it generated accrued to a greater extent to the society than the individual. In standard economics, such a market failure in the production of a good or service indicates that the good is public instead of private (Mankiw 2009, Chapter 11). Public goods are typically produced not by individuals but by governments because private agents produce an inefficient amount of it. Private agents may also cut costs and undermine quality especially if the quality cannot be observed immediately as is the case of tertiary education. Not surprisingly, African universities started as state monopolies (Sawyer 2004, 5).

The universities that emerged in SSA post-independence followed the colonial master's model. For example, Ghana, Nigeria, and Kenya, and followed the British system of education while Gabon, Burkina Faso, Guinea, and Mali followed the French system (Teferra and Altbach 2005, 23).

Demand for university education increased strongly in African countries in the last three decades due to population pressure, "qualification inflation," globalization and the rise of the knowledge economy. The inability of the public universities in the African countries to cope with the explosion in enrollment encouraged privatization (Tsevi 2015, 3).

In SSA, despite the increase in opportunities for students to attend university, graduate enrollment ratios (GERs) are low. Africa still has the World's lowest Gross Enrollment Ratios or GER (Sawyer 2004, 13). The reasons for low GERs are historical but the current booming African university sector more recently is due to several reasons. On the supply-side, the process was started in the mid-1990s following the International Monetary Fund (IMF)-prescribed Structural Adjustment Programs (SAPs) which dictated

liberalization of Higher Ed. in Africa. The IMF's SAPs mandated the elimination of state monopolies in African Higher Ed. and facilitated the genesis of private universities in Africa (Tsevi 2015, 4).

A Focus on Ghana

Led by Kwame Nkrumah, Ghana was the first SSA nation to obtain independence. In conformity with Nkrumah's socialist ideas, the university system started as a monopoly and the government of Ghana held a monopoly on Higher Ed. in Ghana from independence in 1957 till 1993 when Ghana had only three public universities (Tetteh 2014, 2).

The university of Ghana was birthed in 1948 as the University College of the Gold Coast, following a recommendation for same by the Bradley Commission, set up by the ruling colonial governor at the time, Alan Burns, to advise him on the feasibility of such an endeavor (Darko 1985, 332). The University of the Gold Coast at the time was affiliated with the University of London (Tsevi 2015, 2).

The Kwame Nkrumah University of Science and Technology (KNUST) was founded in 1952 by Nkrumah, who was then head of government business even though Ghana was not independent. KNUST was founded in response to the need for advanced technical education. Kwame Nkrumah also founded the University of Cape Coast (UCC) in 1962 to train professional teachers in the arts and sciences for employment in Ghana's secondary schools and polytechnics (Darko 1985, 21).

The Research Problem, Research Questions and Relevance

The historical absence of local graduate degree awarding institutions implies there were, and still are fewer graduate degree holders in Ghana available to both the private and public universities compared to the developed world. This is not strange as foreign trained Ph.D. holders give up significant income to teach in Ghana. The average US-trained assistant professor in a business-related subject working in the USA earns an annual salary of about $80,000 while the same person working in Ghana earns about $20,000, a four-fold difference. Further, lack of access to data, quality equipment, top conferences, relevant software, top academics, and other inputs such as a thriving academic community reduces the quality of the experience for those choosing to relocate to Ghana after training in the USA.

The graduate universities can, by law, only employ Ph.D. and M.Phil holders although few qualified personnel are available. Ph.D. holders prefer the better funded public universities or abroad where salaries are higher. Qualified faculty are difficult to attract due to factors like brain drain, low salaries, competition from the public universities, institutional focus on teaching, and an inability to support research.

Supply Side Problems

For private universities, turning a profit is an obvious motivation that attracts entrepreneurs. Such business-minded people see university education as a business opportunity where they can supply students with education for a fee. Such "for profit" private universities are often tempted to employ cheap but inferior resources and inexpensive, part-time but poorly qualified faculty and staff to cut cost and make profits since monitoring by poorly resourced authorities is difficult. Another implied moral hazard problem is the perverse incentive for universities to do nothing to check academic dishonesty and deviant student behavior that reduces education quality to avoid having to dismiss such students. Since large student numbers mean more profits, PGBUs are hesitant to dismiss them for misconduct even though these same universities promised quality education ex ante.

In Ghana, what makes the quality problem challenging for the still-evolving private graduate sector is the fact that the accreditation process employed by the NAB for the undergraduate sector is not applicable to graduate education although it applies by law. The explanation is as follows: All private undergraduate degree awarding universities in Ghana are required to affiliate with a public university. However, public universities in Ghana have been awarding graduate degrees for a relatively short time and regard the private graduate institutions as direct competition. They therefore cannot credibly mentor new graduate institutions.

There are few private universities with a university charter (4 at the time of writing) although a university charter is required before mentorship. The scarcity of available chartered universities locally to affiliate with, compels the new graduate awarding institutions to seek partnerships with foreign universities. The problem here is that the profit motive may drive both the Ghana-based graduate institution and its foreign partner to collude to award easy graduate degrees to attract more students and make money since monitoring by the NAB is more difficult for an out of country affiliate.

The foreign universities that grant the affiliation themselves are often of questionable quality as some of them are in low-income countries with a

rather short history of graduate education. Others have a reputation for graduate study that raises questions.

Besides the challenges of limited sources of funding, there is also, in some cases, poor infrastructure; lack of access to study spaces and library resources; paucity of standard academic journals and software; limited contemporary books and lack of qualified Ph.D.-holding lecturers. This limits the quality of graduate education that the Ghana-based student can obtain since a major part of graduate education is research training.

Demand-Side Problems

Demand-side challenges also arise especially related to the twin problems of adverse selection and moral hazard. To illustrate, note that the type of students that are attracted to private graduate programs in SSA countries differ from what is found in developed countries, and are often subject to the phenomenon of adverse selection.

Adverse selection is the phenomenon that occurs wherein the presence of uncertainty or absence of relevant information, the types of seller (buyers) available to a consumer (seller) are not the type it desires (Mankiw 2009, Chapter 1). For example, a customer desiring to buy a used car does not want to be besieged by vendors only selling lemon cars. An insurance company does not want to sell policies only to very sick clients. As direct comparisons, the selection of graduate students that can afford private graduate universities in Ghana may be unmotivated for graduate work as they just need the degrees to secure jobs they already have. They are seeking graduate degrees not to conduct research but rather because of "qualification inflation." The majority of PGBU available may be of poor quality because excess demand and market failures prevent their elimination.

Applicants may seek graduate degrees to shore up their social standing. This occurs among traditional, religious and political leaders who feel validated by having degrees like the doctorate degree. While pastors and other religious leaders when they acquire the title of doctor tend to attract more followers, politicians who often get positions, not based on their qualifications, but rather based on their political connections, feel confident when the public is aware that they are Ph.D. holders. Such students do not care about the quality of the PGBU. The poor quality PGBUs can discern bad from good students but since their objective is purely profit, they overlook the problem.

The related problem of moral hazard is as likely on the demand-side as an adverse selection because some graduate students that apply to private universities meet all the qualification requirements and initially, earnestly, intend to obtain a graduate degree. However, once they enroll, the pressures of family life and their jobs make them more open to the idea of paying other people to do their assignments for them. This is an example of moral hazard. As soon as a student is admitted, the university also has no reason to fail them as the student constitutes the cash cow. The students know this, so even if they intended to work hard, they will not, and quality falls.

Relevant Research Questions

The supply-side questions include: What types of strategies or incentive structures will ensure that private graduate institutions enroll qualified students and make the necessary investment into providing quality private graduate education instead of focusing on the profit incentive?

From the demand-side, what types of strategies will reduce the adverse selection problem where only rich, powerful, politically or socially connected students with no need for research skills, but willing to pay for a degree, are those most likely to get the degree? From the policy-side, what strategies will incentivize the NAB to do its job more effectively? How can we make sure that a graduate degree from Ghana is quality?

2 Literature Review

The Essence of Quality Human Capital and Its Contributions to Growth and Development

From a policy perspective, it seems clear that a developing country like Ghana must improve the quality of the human capital provided by its PGBU system. A quality PGBU system will provide competent graduates needed to conduct the research that generates growth. However, although Human capital is now recognized as an essential complement to physical capital in the economic growth process, this was not always the case (Benhabib and Spiegel 1994, 144).

The consensus of the pertinence of human capital for sustained long-run growth was reached after much historical debate. The neoclassical economists initially argued and formulated models to support the idea that economic

growth was determined primarily by physical capital, at least in the short run, with negligible contribution from human capital (Domar 1946).

Solow (1956's) conclusion that technology was the secret behind long run, out of steady state economic growth, indirectly emphasized the importance of human capital in the growth process as technology is often created by highly educated and highly trained human capital (1). However, for credible reasons, based on solid evidence, provided by numerous authors, the theoretical prediction of a role for human capital in growth theory was not irrefutably supported by the evidence (Hanushek and Woessmann 2012, 1).

Estimations of the reduced form of the theoretical Solow model with human capital specified as a factor of production in a Cobb Douglas production function with decreasing returns to scale yielded mixed results. A significant number of these estimations found insignificant estimates of human capital indicating a negligible contribution of human capital to growth (Benhabib and Spiegel 1994, 144). Other authors found a significant role for human capital in the augmented form of the Solow model (Mankiw et al. 1992, 408).

Endogenous growth theory promulgated by among others, Lucas (1988) and Romer (1990) in the 1980s and 1990s sought to more precisely identify the role human capital played in the growth process. Endogenous growth theories were premised on Nelson and Phelps (1966)'s assertion that a more discernible contribution of human capital to growth was through total factor productivity or technology (1). This led to the identification of a clearer pathway for the relationship between human capital and the Solow residual or total factor productivity also known as technological change (Benhabib and Spiegel 1994, 144).

Despite the theoretical and empirical validity of the role of human capital in stimulating technological development and consequently growth, there has been significant measurement problems of the human capital variable, questioning empirical growth estimations using human capital (Hanushek and Woessmann 2012, 1). Some of the measurement problems for the human capital variable comes from the difficulty in measuring human capital which was historically proxied by the amount of schooling (Barro 1991, 407).

According to Barro and Lee (2011, 541) who built a data set to accurately measure human capital, Romer (1990, 251), Barro (1991, 407) and Mankiw et al. (1992, 407) pioneered the measurement of human capital by proxying it with schooling but these data do not adequately measure the aggregate stock of human capital available. Notable authors who criticized schooling as a measurement for human capital include De La Fuente and Doménech (2006, 1).

Measurement problems increase when cross-country data on schooling are used. There are significant quality differences in the educational system of different countries which cannot be assumed away (Hanushek and Kimko 2000, 1). There is overwhelming evidence now that it is the quality and not the quantity of education that is responsible for the technology generation responsible for rapid economic growth and development (Hanushek 2013, 204).

Hanushek and Woessmann (2007) suggests that higher levels of human capital attainment do not guarantee long-term growth (1). Rather, it is quality education that guarantees the acquisition of cognitive, technological, managerial, entrepreneurial, business, engineering, and mathematical skills that can sustain long-run growth.

Building on the human capital revolution in the 60s and 70s, the endogenous growth economists identified human capital as the source of technology creation in the neoclassical growth models of Solow (1956) by endogenizing human capital in the growth model. Solow showed how human capital, through knowledge creation, generated the technology that fueled growth.

As Pelinescu (2015) narrates, there are two sources of influences of human capital on economic progress: the level and the growth rate effect (184). Human capital affects the level of growth (so called level effect) by its decisive influence on production, through augmenting labor productivity (Romer 1990, 251) and the growth rate effect by enhancing competitive advantage through innovation and technology diffusion (Horwitz 2005, 50).

Becker et al. (1990) make the argument about the key role of human capital in the growth process most forcefully (S12). According to them, since "Human capital is embodied knowledge and skills, and as economic development depends on advances in technological and scientific knowledge, development depends on the accumulation of human capital" (Becker et al. 1990, S12). Benhabib and Spiegel (1994, 143) and Nelson and Phelps (1966, 1) argued that education facilitates the adoption and implementation of new technologies (technology transfer), which are continuously invented at an exogenous rate. They suggested that the growth of technology, or the Solow residual, depends on the gap between its level and the level of "theoretical knowledge." Benhabib and Spiegel (1994) formulated a total factor productivity model where Solow's residual or technology is inherently created by human capital (143).

This current analysis is based on the model proposed by Benhabib and Spiegel (1994) which produced the result that human capital in levels significantly stimulates economic growth (143). The arguments are also consistent with the Augmented Solow models of Mankiw et al. (1992) who insist

on conditional convergence that allows a longer period of growth but re-emphasize the importance of human capital in levels in both the adoption and generation of new technology (407). Finally, the arguments here are also consistent with the predictions of the simple model by Lucas (2015) that ascribes all productivity growth to human capital: schooling and on the job training (92).

The Evolving Private University Sector in Ghana and Related Challenges

In Ghana, the liberalization process in Higher Ed. was initiated by the University Rationalization Committee (URC) set up in 1987 by the Provisional National Defense Council (PNDC) to reform the tertiary education sector (Boateng 2014, 1). The government issued a white paper in 1991 following submission of the URC report in 1988 to reform the sector (Azameti 2013). The NAB was established by PNDC law 319, 1993 and modified by the NAB Act 744, 2007 (Boateng 2014, 1).

According to information collated from the NAB website, there are about twenty private graduate universities offering master's business degrees in Ghana. However, it is difficult to track the exact number of graduate degree awarding private universities as new ones emerge and some existing programs fold up. There are also online graduate programs offered directly by foreign universities and therefore, to some extent, bypass domestic regulation, monitoring, and quality control. This research does not consider online graduate programs.

The Role of the National Accreditations Board (NAB)

Section two of the NAB Act 744, 2007, assigns to the NAB the task of accrediting universities and their programs in Ghana. The duties of the NAB are: accrediting public and private universities; determining programs and requirements for proper operation and maintenance of acceptable levels of professional or academic standards; publishing the list of accredited institutions at the start of each year; advising the president on the issuance of Presidential Charters to private universities; determining the equivalences of degrees, diplomas, and certificates awarded by institutions in Ghana or elsewhere; and performing other function assigned by the Minister of Education.

In the international context, accreditation involves a two-stage quality assurance process that first develops standards for assessing quality and then monitors the institutions to ensure compliance (El-Khawas 2003, 1). In Ghana, "Accreditation" is the status accorded to a tertiary institution as satisfying standards defined by the NAB. The main quality assessment function of the NAB is the accreditation of private and public universities (Seniwoliba 2014, 152; Baryeh 2009). According to Utuka (2011), the NAB has a well-defined roadmap for aspiring institutions, and for existing institutions to maintain accreditation. The relevant documents are published on the NAB website (135).

Accreditation involves both an internal and external review process. The institutions complete an NAB questionnaire in the internal process. This is followed by an external visit by the NAB (Roadmap to accreditation, 2010). In Ghana, accreditation is a three-step process: Interim authorization, Institutional accreditation, and Program accreditation. Interim authorization gives the institution the right to register a name for the institution and to gather the physical resources such as buildings and other infrastructure that will be needed to run a university. Institutional accreditation occurs post the NAB visit and inspection of facilities and faculty. The final step, program accreditation, involves the validation and approval of specific programs to be offered by the university and includes an evaluation of core curricula.

Graduate University Education in Ghana: A Comparison of the Public and Private Sectors

Public universities in Ghana have historically awarded Ph.D.'s in a limited number of departments, usually as a collaboration with a foreign university to train academic staff (Sawyer 2004, 27). Fully accredited master's degree programs were common in Ghana, but Ph.D. programs were rare. Currently, all public universities in Ghana offer master's and Ph.D.s either as a standalone program or in collaboration with foreign research institutes or universities.

Private universities in Ghana started awarding undergraduate degrees after the SAP mandated liberalization of the economy. Business graduate programs are popular with private universities because unlike natural science programs they do not require the purchase of heavy equipment, yet job prospects are good. While public graduate universities have many full-time and experienced lecturers, private universities typically have few full-time lecturers. They depend on part-time lecturers, masters holding assistant lecturers, and

lecturers with Ph.D.'s but not yet on senior lecturer status though the rank of senior lecturer is required by the NAB to supervise graduate research.

A Brief Review of Literature on African Higher Education

Challenges Plaguing the Quality of Privately Provided Higher Ed. in Africa

A review of available literature on higher education in SSA reveals that key challenges private universities in Africa face are funding, an over-reliance on school fees as well as a lack of capital for essential investment into infrastructure and quality personnel (Adeogun et al. 2009, 1; Iruonagbe et al. 2015, 1; Akindele 2013, 41).

Another important problem is that majority of private universities in SSA are "for profit" universities (Tefferra and Altbach 2005, 20). These universities are typically less than 30 years and emerged post the SAP in Africa. They also have smaller total enrollments, higher student-faculty ratios and are typically situated in rented commercial buildings in urban areas with maximum access to prospective clients. Finally, they offer a narrow range of courses, calling into question the adequacy of the education provided (Sawyer 2004, 42).

Management challenges in these private universities are acute (Amponsah and Onouha 2013, 256). Other problems include lack of research focus; paucity of facilities, lecturers and administrative staff (Sawyer 2004, 42); brain drain, dominance of part-time faculty and "moonlighting" faculty (Amponsah and Onouha 2013, 4); language issues (Tefferra and Altbach 2005, 20) and a lack of effective educational policy to manage quality for the evolving private HE sector. In some African countries, accreditation boards are absent, and no external quality assessment is done.

Some universities suffer from political interference and lack of autonomy (Oseni 2015, 1). There is the perception of low quality of private universities, especially in Ghana and Nigeria as typically attract students who fail to secure admission to the public universities (Oseni 2015, 1). Some private universities also invite questions about their quality because of the heavy focus on foreign university affiliation, the quality of which is harder to monitor and verify (Tefferra and Altbach 2005, 20). Another problem that these still-evolving private university systems in Africa face is the problem of the dominance of faith-based institutions. These institutions often try to introduce part of their religious doctrine into the academic curricula and often poses a possible threat to academic freedom (Sawyer 2004, 40).

Historical Lessons in Quality Control in Higher ED Institutions from Ghana's Public Sector

Why was the quality of Higher ED in Ghana initially high? One reason is that Ghana's first public universities were set up as affiliates of reputable and established British universities (Sawyer 2004, 27). "For the British colonies, the post-war universities were set up in a special relationship with the University of London to guarantee quality. Staff appointments, syllabi, and examinations were controlled from London" (Mazrui 1978, 331).

Ghana was wealthy in the 1950s and 1960s and its population was small, so the universities were well-funded as their enrolments were small and of high quality. Universities benefited from grants from foreign donors and international donor agencies (Sawyer 2004, 27). Conditions of service for staff were excellent; senior faculty had funding for research and enjoyed sabbaticals. Moreover, ample opportunities for staff development existed to guide junior faculty to promotion (Sawyer 2004, 27). Local research was encouraged and well-funded.

Why Did the Quality of Ghana's Universities Decline in the Late 70s–2000s (Sawyer 2004).

Sawyer (2004) explains that the primary reason for the deterioration in the quality of Ghana's public university was the economic decline in Ghana in the 1970s and 1980s (29). As a result of dwindling economic fortunes, less money in the form of subventions arrived from the state for the public universities. The consequence of reduced funding in Ghana's public university sector was poorly paid staff, elimination of staff development programs, and unmotivated staff. The qualification of staff declined due to brain drain. Faculty quality plummeted as migration of Ghana's Ph.D. holders abroad, left masters holding lecturers to hold the fort.

In the 1980s and 1990s, scant resources were directed to primary education and away from Higher Ed. on the advice of the World Bank and other Bretton Woods Institutions. Another factor that dragged down on the quality of the Ghanaian public university system over time is the increase in population which put pressure on demand for more access to Higher Ed. and increased student-faculty ratios. This caused enrollment to swell, putting pressure on resources and reducing quality since the number of the state universities stayed constant.

After the cold war ended in the 1990s, international donor organizations as well as state donors from China and the Soviet Union, reduced funding to

Ghana's university system. This undermined the quality of university education in Ghana. There were no more state-sponsored Scholars from China, Cuba, and the USSR sent to Ghana. Europe, USA, and Canada withdrew subsidies of expatriate staff and this reduced the popularity of postings to Ghana. Lack of access to proper equipment and tools meant that the Western-trained African scholars who returned to teach at Ghanaian universities could not really execute useful research at home. For this reason, the research they did conduct, had a low developmental impact, making it hard for them to attract further research funding.

Increased school fees in the United States of America (USA), United Kingdom (UK), European Union (EU), Australia, and Canada made graduate degrees too expensive for Ghanaians intending to return home to teach. The low Ghanaian salaries compared to the cost of foreign graduate degrees made such a choice untenable. Not surprisingly, the faculty that remained at home struggled to replace themselves, as mentorship was weak.

3 Pragmatic Recommendations to Ensure the Quality of Graduate Degrees in Ghana

i. The adverse selection problem concerning the type of graduate students that enroll in Ghana's private graduate institutions must be tackled. Universities must enforce quality by seeking qualified students, willing to put in the necessary effort and sacrifice deserving of a graduate degree. This will negate the current sentiment where potential candidates who can afford graduate school see the graduate degree as a consumer good that they deserve to consume once they have paid the school fees.
ii. The PGBUs and the pool of prospective graduate students who enroll in these private graduate schools must be educated about the long-term opportunity costs of poor quality degrees. These opportunity costs come in the form of damage to the reputation of the quality of the degrees awarded and to the long-term reputation of those who get degrees from poor quality schools. Poor quality universities will undermine the development efforts that Ghana and its citizens are making, as the degrees awarded by private universities will be useless.
iii. In carrying out educational campaigns, emphasis must be placed on the inability of the market to weed out poor quality private graduate schools. This occurs because of excess demand for graduate degrees fueled by the

paucity of graduate degrees as against demand. Excess demand for graduate degrees, driven by qualification inflation, often incentivizes students to ignore quality and focus on access.

iv. Awareness campaigns by the media must focus on the dangers of graduates with graduate degrees but no corresponding skills. The media has an essential mandate to name and shame key figures in society getting fake degrees or buying degrees. The media must highlight differences in facilities in private universities as well as qualifications of faculty and research output.

v. The main supply-side problem underpinning the problem of quality for private universities is financing. University education is expensive in terms of infrastructure and the labor costs. Private universities must diversify their revenue sources to wean themselves of dependence on school fees. Examples of different sources of revenue that could be exploited are alumni contributions, international grants, fundraising, tax cuts from the government, guaranteed loans for students, school farms and school owned businesses, and the sale of school branded merchandise. Private universities must take steps to strengthen management and ensure effective internal quality control. Private universities in Ghana can learn from the experiences of the existing public universities as well as from the experiences of international private universities.

vi. Opportunities and incentives must be provided for faculty advancement. Lecturers must be subjected to the tenure system to challenge them to put up their best to improve quality. The tenure system must come with cutoffs so that a lecturer cannot continue in the profession if they have not attained any kind of promotion in 5 years. Faculty must be incentivized to seek career advancement or leave the field.

vii. Graduate schools must not be allowed to rely solely on adjunct lecturers and assistant lecturers to cut costs. Private universities in Ghana should seek accreditation from internationally known academic and professional accreditation agencies to signal quality.

viii. Schools can focus on quality and ethics as part of their mission and seek to identify and improve metrics that will back their claim of quality e.g., small class sizes, low student-faculty ratios, low student-computer ratios, well qualified professors, quality library resources etc. The defense of all master and doctoral thesis should be recorded by video and preserved for public record.

ix. The biggest challenge to regulation is funding. The NAB must lobby parliament to amend the law to ensure more realistic financing, given its mandate. The NAB must ensure site visiting teams comprise of quality

professionals with integrity. Site visiting teams must be larger than three as small teams are easy to influence in a developing country known for corruption. The NAB must mandate all private universities to keep public websites that lists all the full-time faculty and their qualifications, a record of their research, as well as the title of their dissertations. This will facilitate verification and help students and parents to evaluate the quality of private university when deciding which university to attend. The NAB site visitation teams must include a photographer who will take detailed pictures of the facilities as part of the record. The NAB must conduct a video recording of at least two classes in session in each institution as part of the record.

x. Since the number of Ph.D.'s that work in Africa are few, and brain drain is a serious problem, government must seek the retention of Ph.D.'s as solution to the brain drain problem. Ph.D. holders must be allowed to import cars duty-free since taxes on imported cars are exorbitant. This will incentivize them to stay in country.

xi. Another problem is student school fees so government can help the private universities foster partnerships with banks and credit organizations to grant student loans. Administrative muscle must be built to keep a database of academic records that the banks can access to predict academic success and legal obligation to pay back the loans. The issuance of the Ghana card which is a digital identification is a step in the right direction.

xii. Government can give scholarships to deserving students to attend private universities and assist students with obtaining loans for private universities. Government must take the lead in designing an overall education plan which includes private sector participation. The plan should also indicate areas where the government wants universities to locate and which types of universities are encouraged in its overall development plan as done in Asia.

4 Conclusion

A review of available statistics from the NAB reveals that the number of private universities in Ghana is high. However, the quality of these private universities has been called into question given their small-scale and tendency to enroll weak students.

The research focused on graduate private universities where several of them are business ventures set up by profit seeking entrepreneurs focused

on making money. The situation is compounded by the adverse selection problem of graduate students who are prepared to pay for the degree because they need access to any degree and not a quality degree to do research.

After desk research, learning lessons from literature and from the history of Ghana's public university systems key, conclusions, and recommendations for improving the quality of PGBUs in Ghana were made. The recommendations addressed both supply-side, demand-side, and policy-side challenges and should serve as useful information for policymakers in SSA with emerging private university systems. Further research must gather and analyze data from relevant stakeholders such as university administrators, NAB officials, faculty of both private and public universities in Ghana, current and past graduate students of private universities, and employers of alumni of private universities to interrogate the findings of this paper.

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Industry Sector

Industrial Similarity, Diversification, and the Promotion of Intra-African Trade

Patrick N. Osakwe and Jean-Marc M. Kilolo

1 Introduction

Regional integration has been a prominent and noteworthy feature of Africa's economic development over the past decades as evidenced by the relatively high number of regional economic groups, trade agreements, and other initiatives launched by the continent (UNECA 2010; WTO 2018). Since independence, integration arrangements in Africa have underscored the need to boost intra-African trade to foster sustained growth and development and facilitate integration of the continent into the global economy.[1] The small size of African economies both in terms of population and income makes

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integration appealing because it provides access to a larger export market and permits exploitation of economies of scale in production. Regional cooperation in trade also diminishes exposure to global shocks and reduces trade costs, particularly for the 16 landlocked countries on the continent. Furthermore, regional cooperation contributes to the goal of export diversification of African economies because the composition of intra-African trade is skewed toward manufactured goods compared to Africa's trade with the rest of the world, which is dominated by primary commodities.

Notwithstanding the high potential benefits of intra-African trade, and the vital role of regional integration in the achievement of Africa's development goals, very modest trade takes place among African countries. In 2017, intra-African exports accounted for about 17 percent of Africa's total trade and intra-African imports accounted for about 13 percent. These numbers are small relative to what is observed in regional groups in other parts of the world. They are also small relative to the potential of African economies. Africa's weak regional trade performance has been ascribed to factors ranging from the low level of diversification and lack of productive capacities to high trade barriers, infrastructural bottlenecks, and existence of multiple national currencies that lack convertibility (UNECA 2010). UNCTAD (2013) suggests that the level of intra-African trade is far below potential, notably because the African regional integration agenda is focused more on the elimination of trade barriers rather than on the development of supply capacities for trade. In the same vein, Geda and Seid (2015), and Seid (2015) note that the realization of the large potential for intra-African trade is hampered by lack of diversification, which reflects the fact that most African countries export a small number of primary commodities while their imports are predominantly manufactured goods (UNCTAD 2007; Limão and Venables 2001).

This paper examines the role of product concentration and similarities in the sectoral structure of production across African countries in understanding intra-African trade. Traditional trade theories, such as the Ricardian and Heckscher-Ohlin models, suggest that similarities in the sectoral structure of production between two countries should lead to less bilateral trade. However, the more recent trade theories suggest that such similarities in production structure should lead to more bilateral trade (Baxter and Kouparitsas 2006; Helpman and Krugman 1989). The main message from these models is that there is a fundamental difference in predictions of trade theories regarding the relationship between economic similarities between country pairs and bilateral trade. A widespread view in the discourse on intra-African trade is that African countries trade less among themselves because

they have similar production patterns. Yet we are not aware of any studies that have addressed this issue using a suitable econometric methodology applied to African data. To fill this gap, we use gravity-type models to examine the roles of product concentration and similarities in the production structures of African economies in explaining intra-African trade performance.

In a related paper Longo and Sekkat (2004) examined, among other factors, the role of similarities in living standards (or levels of development) between countries in explaining intra-African trade. However, the measure of economic similarity used in their paper was similarity in income per capita rather than similarity in production or industrial structures. Oramah and Abou-Lehaf (1998) also examined the extent to which the export structures of African countries match their import patterns and found that the potential for intra-African trade is modest. While Oramah and Abou-Lehaf (1998) focused on the correspondence of exports and imports of African countries our paper focuses on the effects of product concentration and similarities in the sectoral patterns of production on intra-African trade. Furthermore, Oramah and Abou-Lehaf (1998) estimated their gravity equations by ordinary least squares (OLS), which yields biased and inconsistent estimates in the presence of zero observations and heteroscedasticity. To circumvent these problems the present paper adopts the Pseudo Poisson Maximum Likelihood (PPML) estimation technique, which accounts for zero observations and heteroscedasticity.

The paper is organized as follows. Section 2 discusses Africa's trade performance and structure while Sect. 3 describes the estimation methodology and the data used in the study. Section 4 presents and discusses the regression results. Section 5 concludes the paper.

2 Africa's Trade Performance and Structure

African countries are heavily reliant on trade for development as evidenced by the fact that they have high trade ratios.[2] Over the past few decades there has been a significant increase in the value of Africa's global trade. For instance, the value of the continent's global exports increased from $16.1 billion in 1970 to $413.8 billion in 2017 and the value of its global imports increased from $14.5 billion to $534.3 billion over the same period. Interestingly, this increase in the value of the continent's trade has gone hand in hand with a decrease in its share of global trade from 4.4 percent in 1970 to 3 percent in 2017 (Table 1). There has also been a significant change in the destination of Africa's exports. In 1995 Europe was Africa's main trading partner, accounting

Table 1 Value and global share of Africa's merchandise trade

YEAR		1970	1980	1990	2000	2010	2013	2014	2015	2016	2017
Measure	Flow										
US Dollars at current prices in millions	Exports	16.129	121.378	104.877	147.905	521.435	602.322	553.130	389.783	355.425	413.836
	Imports	14.538	96.490	94.444	129.914	479.324	640.538	644.698	555.143	496.311	534.262
Percentage of total world	Exports	5.1	5.9	3.0	2.3	3.4	3.2	2.9	2.4	2.2	2.3
	Imports	4.4	4.6	2.6	2.0	3.1	3.4	3.4	3.3	3.1	3.0

Source UNCTADstat Database

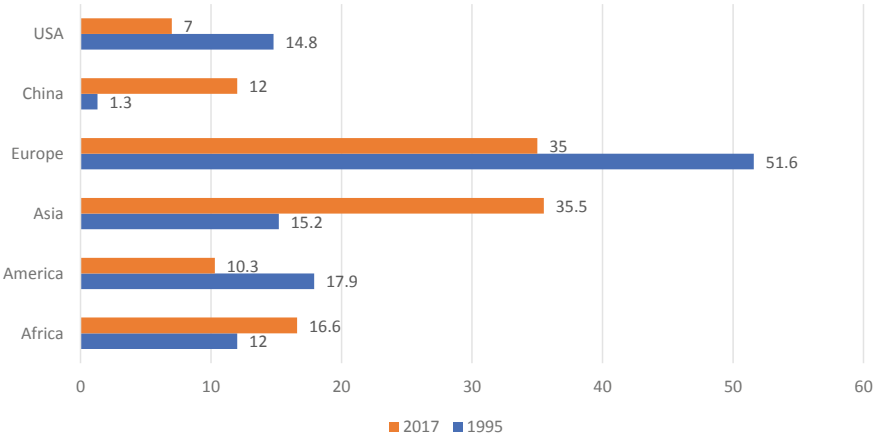

Fig. 1 Destination of Africa's exports, 1995 and 2017 (percentage) (*Source* compiled using data from UNCTADstat Database)

for about 52 percent of the continent's total trade, followed by America with 18 percent, and Asia with 15 percent (Fig. 1). Unlike the situation some decades ago, Asia is now Africa's most important trading partner, accounting for 35.5 percent of the continent's total trade, followed by Europe with 35 percent and Africa with 17 percent. The increase in Asia's role in Africa's trade is largely due to the rapid increase in China's engagement with Africa which has seen its share of Africa's total trade rise from 1.3 percent in 1995 to 12 percent in 2017.

Another interesting feature of Africa's global trade is the fact that its exports are highly concentrated on a few products, particularly when compared to the exports of other developing regions. Table 2 presents the product concentration and diversification indices of Africa's merchandise exports. Both indices lie between 0 and 1 and are constructed in such a way that values closer to 1 imply more product concentration and high deviation of a country's exports from the global pattern. The table shows that the product concentration index for Africa in 2017 was 0.24 compared to 0.09 for developing economies in America and 0.10 for developing economies in Asia. It is also interesting to note that the value of this index for Africa in 2017 was about the same as it was in 1995, indicating there has not been any significant progress made in reducing the product concentration of the continent's exports. A look at the export diversification index also shows that Africa's export structure differs significantly from the world pattern, which reflects the fact that African countries have very low levels of diversification.

Regarding intra-African trade, available data indicate that there has been an increase in its share of Africa's global exports from 12 percent in 1995

Table 2 Product concentration and diversification indices of Africa's merchandise exports

ECONOMY		Developing Africa	Developing America	Developing Asia	Africa excluding South Africa	Northern Africa	Sub-Saharan Africa
YEAR	MEASURE						
1995	Concentration Index	0.25	0.09	0.09	0.34	0.36	0.21
	Diversification Index	0.59	0.36	0.32	0.68	0.71	0.59
2005	Concentration Index	0.43	0.12	0.12	0.52	0.47	0.42
	Diversification Index	0.6	0.33	0.27	0.66	0.69	0.6
2013	Concentration Index	0.41	0.13	0.12	0.49	0.41	0.42
	Diversification Index	0.54	0.34	0.23	0.6	0.61	0.58
2014	Concentration Index	0.36	0.12	0.11	0.44	0.31	0.39
	Diversification Index	0.54	0.34	0.23	0.6	0.58	0.58
2015	Concentration Index	0.26	0.09	0.1	0.33	0.23	0.28
	Diversification Index	0.53	0.34	0.24	0.61	0.57	0.58
2016	Concentration Index	0.22	0.08	0.1	0.29	0.21	0.24
	Diversification Index	0.54	0.34	0.24	0.61	0.57	0.58
2017	Concentration Index	0.24	0.09	0.1	0.31	0.23	0.26
	Diversification Index	0.54	0.35	0.23	0.61	0.57	0.59

Note The product concentration index lies between 0 and 1, with higher values indicating a higher degree of export concentration. The diversification index measures the absolute deviation of a country's trade structure from the world pattern. It also lies between 0 and 1 and higher values indicate more deviation of a country's export structure from the global pattern
Source UNCTADstat Database

to about 17 percent in 2017. Nevertheless, intra-Africa trade is still quite low relative to the intra-group trade of other continents. For example, in 2017, the share of intra-group exports in total exports (of the group considered) was 66.7 percent in Europe, 53.1 percent in developing Asia, and 30.6 percent in developing countries in America (Table 3). The aggregate figures for Africa mask wide variations across the regional trade blocs on the continent. Among the eight regional economic communities recognized by the African Union, the Southern African Development Community (SADC) and the East African Community (EAC) had the highest percentage of intra-group trade in 2017, with about 20 percent and 19 percent respectively. The

Table 3 Intra-group exports (percentage of total group exports)

	1995	2005	2010	2013	2014	2015	2016	2017
Developing Africa	12.01	9.51	13.88	14.51	15.47	17.81	17.60	16.65
Developing America	20.50	18.66	19.98	19.61	18.31	17.20	16.25	16.59
Developing Asia	42.22	46.59	51.41	54.68	54.14	53.60	52.99	53.07
America (developed economies)	35.87	40.78	32.39	31.82	32.36	31.13	30.66	30.61
Europe	66.34	71.76	69.03	65.52	66.37	66.06	66.82	66.69
AMU (Arab Maghreb Union)	3.90	1.97	2.39	3.55	4.11	4.11	4.10	3.45
CEN-SAD (Community of Sahel-Saharan States)	7.44	6.32	6.03	7.18	7.03	8.22	8.73	8.26
COMESA (Common Market for Eastern and Southern Africa)	5.70	5.30	7.15	9.09	9.93	11.47	9.74	11.50
EAC (East African Community)	17.50	18.98	18.69	19.55	21.17	22.52	19.76	19.35
ECCAS (Economic Community of Central African States)	1.39	1.17	2.03	1.67	1.51	2.08	1.92	2.24
ECOWAS (Economic Community of West African States)	9.43	9.63	7.69	9.18	8.29	9.97	11.23	10.18
IGAD (Intergovernmental Authority on Development)	11.81	10.47	9.07	13.31	14.50	16.31	16.01	16.01
SADC (Southern African Development Community)	14.66	10.73	18.04	18.67	19.27	21.71	20.83	19.83

Source UNCTADstat Database

Arab Maghreb Union (AMU) is the regional economic community with the lowest intra-group trade in 2017 (about 3.5 percent).

An examination of intra-group imports also leads to the same conclusion that African countries trade less among themselves relative to the rest of the world. In 2017 intra-group imports in Africa was about 13 percent compared to 63 percent in Europe, 55 percent in developing countries in Asia, and 19

Table 4 Intra-group imports (percentage of total group imports)

	1995	2005	2010	2013	2014	2015	2016	2017
Developing Africa	10.76	13.66	14.66	14.38	13.68	13.40	12.95	12.93
Developing America	18.99	21.17	20.04	19.05	17.68	16.07	15.67	16.05
Developing Asia	37.92	51.43	52.74	53.55	54.27	54.94	52.49	55.18
America (developed economies)	27.60	23.18	20.41	20.84	21.20	19.34	18.72	18.70
Europe	64.88	66.23	62.82	62.92	63.16	63.13	63.29	62.84
AMU	3.62	2.99	2.86	3.45	3.27	2.65	2.51	2.33
CEN-SAD	5.59	6.91	5.98	6.65	5.87	5.62	5.44	5.47
COMESA	4.16	6.15	6.49	6.60	6.12	5.91	5.40	6.31
EAC	10.54	10.43	8.29	7.43	7.40	6.75	6.97	6.94
ECCAS	2.61	3.38	5.05	5.47	2.68	4.45	4.59	5.63
ECOWAS	8.40	12.50	9.41	11.30	9.73	9.11	8.88	8.68
IGAD	7.01	5.53	4.86	4.09	3.71	3.54	3.18	3.77
SADC	14.99	17.20	20.22	19.67	19.42	20.41	21.33	20.99

Source UNCTADstat Database

percent in developed countries in America (Table 4). Another approach to assessing the performance of African countries in regional trade is to compare the actual trade among African countries to potential trade derived from estimation of bilateral trade equations. By this measure, the extant literature also suggests that intra-African trade is low relative to potential (Geda and Seid 2015; UNCTAD 2013; Longo and Sekkat 2004).

UNCTAD (2013) underscores the importance of low supply capacities in explaining observed levels of intra-African trade. But Africa's low level of regional trade is also a consequence of the prevalence of high tariff and non-tariff barriers that impede trade. African exporters generally face higher levels of restrictions when trading within the continent than when trading with the rest of the world. In 2017, the average tariffs facing an African exporter in sub-Saharan African countries was 3.1 percent compared with 0.4 percent for those exporting to developed countries, 1.7 percent for those exporting to East Asia, 1.9 percent for those exporting to Latin America, and 2.6 percent for those exporting to West Asia and North Africa (Table 5).

With import tariff rates of 5.7 percent, South Asia is the only region where exporters in sub-Saharan Africa face higher levels of restrictiveness than at home. In general, countries in South Asia and sub-Saharan Africa had the highest tariff trade restrictiveness for imports in the period 2008–2017 (Fig. 2). In addition to the existence of high tariff and non-tariff barriers,

Table 5 Matrix of tariffs imposed on trade flows between regions in 2017 (%)

Importing Region	Developed Countries	East Asia	Latin America	South Asia	Sub-Saharan Africa	Transition Economies	W.Asia & N.Africa
Developed Countries	1.6	2.6	1.2	2.1	0.4	1.7	0.6
East Asia	4.9	2.7	5.4	3.2	1.7	3.8	1.8
Latin America	3.8	8.0	1.1	10.9	1.9	2.0	2.9
South Asia	10.7	10.4	17.8	6.8	5.7	8.1	9.2
Sub-Saharan Africa	7.4	11.6	9.0	8.3	3.1	8.6	5.4
Transition Economies	3.4	1.9	2.0	4.0	0.6	0.4	4.7
W.Asia & N.Africa	3.2	5.5	6.4	4.0	2.6	8.7	1.9

Source UNCTAD (2019)

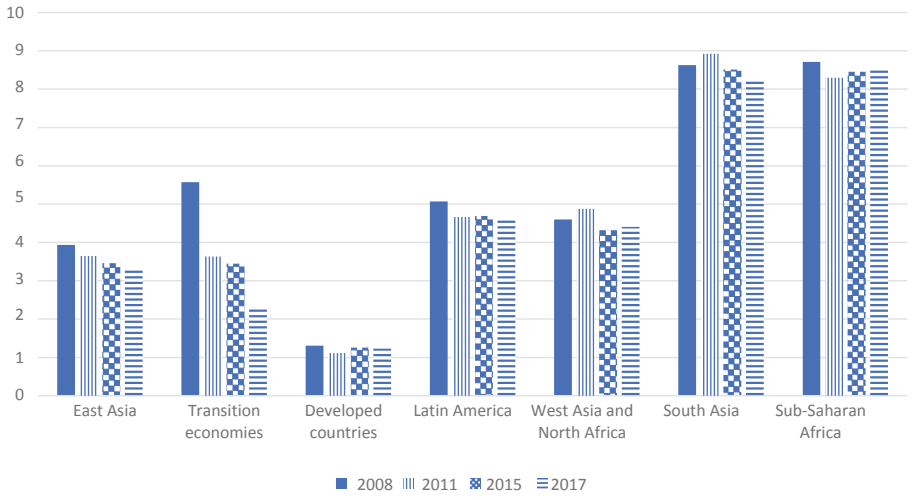

Fig. 2 Tariff trade restrictiveness index for imports, by region 2008–2017 (%) (*Source* computed by UNCTAD)

the other factors that have been suggested as explanations for the poor performance of African countries in intra-African trade include infrastructure bottlenecks, lack of diversification of African economies, the existence of multiple non-convertible national currencies, production structure similarities, threats to peace and security, and the lack of implementation of regional agreements (AfDB 2019; AFREXIMBANK 2018).

A striking feature of intra-Africa trade, which speaks to its potential for fostering development in African countries, is the observation that its composition is skewed toward manufactured goods and so is favorable to advancing the continent's quest for diversification and transformation. Using the Standard International Trade Classification (SITC), the UNCTAD Secretariat has grouped exports into five main product categories: All food items; Agricultural raw materials; Fuels; Manufactured goods; and Ores, metals, precious stones, and non-monetary gold. Table 6 presents the contributions of these product categories to Africa's exports to main trading partners in 1995 and 2017. It shows that in 1995 manufactured goods accounted for 52.3 percent of intra-African trade and in 2017 it accounted for 45.4 percent. This is interesting because it is quite different from the composition of Africa's trade with the rest of the world, which tends to be dominated by either "Fuels" or "Ores, Metals, Precious Stones and non-monetary Gold." For instance, in 2017,

Table 6 Shares of product categories in Africa's exports to main partners (%)

	Year	Africa	America	Asia	Europe	China	United States	World
All food items (SITC 0 + 1 + 22 + 4)	1995	18.98	4.34	15.40	18.12	4.49	4.03	15.16
	2017	20.83	8.69	10.68	15.26	4.22	9.52	13.61
Agricultural raw materials (SITC 2 less 22, 27 and 28)	1995	5.30	1.90	11.14	5.10	24.61	1.13	5.38
	2017	1.62	1.15	4.51	2.21	5.44	1.19	2.79
Fuels (SITC 3)	1995	19.22	65.34	23.36	37.75	20.91	67.37	38.30
	2017	21.35	55.73	43.25	39.13	55.07	52.15	38.92
Manufactured goods (SITC 5 to 8 less 667 and 68)	1995	52.48	16.46	22.40	23.36	21.53	15.30	25.80
	2017	45.35	22.85	11.13	28.27	4.34	24.38	24.28
Ores, metals, precious stones and non-monetary gold (SITC 27 + 28 + 68 + 667 + 971)	1995	4.01	11.97	27.69	15.68	28.46	12.16	15.36
	2017	10.85	11.59	30.43	15.14	30.92	12.76	20.40

Source Computed using data from UNCTADstat Database

fuels accounted for 55.7 percent of Africa's trade with the America continent, 43.3 percent of trade with Asia, and 39 percent of trade with Europe. In addition to "Fuels," the product category "Ores, Metals, Precious Stones, and non-monetary Gold" also plays an important role in Africa's trade with Asia, with the latter accounting for about 28 and 30 percent of the continent's trade with Asia in 1995 and 2017 respectively. The dominance of fuels and other primary commodities in Africa's external trade is also reflected in the continent's trade with individual countries. For example, in 2017, fuels accounted for 55 percent of the continent's trade with China and 52 percent of trade with the United States. In the same year, the share of manufactured goods in Africa's trade with China was 4.3 percent and for trade with the United States it was 24.4 percent. In sum, the current pattern of Africa's trade with external partners is not conducive to the development of manufacturing and needs to change for trade to have a catalytic effect on diversification and transformation of African economies.

3 Empirical Methodology and Data

This section adopts the gravity-model approach to investigate the relationship between product concentration and similarities in production or industrial structures, on the one hand, and intra-African trade, on the other hand. In the estimations, we use an augmented version of the standard gravity model as specified below:

$$\begin{aligned} log(X_{odt}) = {} & \alpha_0 + \alpha_t + \alpha_1 \log\left(\mathrm{GDP/Pop}_{ot}\right) \\ & + \alpha_2 \log\left(\mathrm{GDP/Pop}_{dt}\right) + \alpha_3 D_{odt} + \alpha_3 RTA_{odt} \\ & + \alpha_4 Concentration_{ot} + \alpha_5 Concentration_{dt} \\ & + \alpha_6 Similarity_{odt} + \alpha_7 \varepsilon_{odt} \end{aligned}$$

where $log(X_{odt})$ is the amount of exports from country o (origin/ exporter) to country d (destination/ importer) in year t. GDP/Pop represents the per capita GDP of a country. α_t is the time fixed effect. α_k are unknown parameters to be estimated. D_{odt} measures the distance between trading partners, be it geographical, social, or institutional (e.g. Shared Border, Common Colonizer, Shared Currency, etc.).[3] *RTA* is a dummy variable that takes value 1 if a country pair is part of a Regional Trade Agreement. *Concentration* is a variable measuring the degree of product concentration and *Similarity* is a measure of the extent to which the industrial structures of two countries are similar. Finally, ε_{odt} is the error term.

Table 7 List of countries in the sample

Algeria	Comoros	Lesotho	Namibia	Sudan
Angola	Djibouti	Liberia	Niger	Swaziland
Benin	Equatorial Guinea	Libya	Nigeria	Tanzania
Botswana	Eritrea	Madagascar	Rwanda	Togo
Burkina Faso	Ethiopia	Malawi	Senegal	Tunisia
Burundi	Gabon	Mali	Seychelles	Uganda
Cabo Verde	Ghana	Mauritania	Sierra Leone	Zambia
Cameroon	Guinea	Mauritius	Somalia	Zimbabwe
Central African Republic	Guinea-Bissau	Morocco	South Africa	
Chad	Kenya	Mozambique	South Sudan	

The intra-African trade data used in the estimations comes from the International Monetary Fund's Directory of Trade Statistics (IMF DOTS) database and includes 48 countries as reported in Table 7. The income per capita variable GDP/Pop is from the World Development Indicators (WDI) online database. The variables capturing distance (that is, Geographical Distance, Shared Border, Common Colonizer, Shared Currency, and RTA) are taken from the CEPII[4] distance database.

To measure production concentration and industrial similarity, we computed a Herfindahl–Hirschman Index (HHI) and an Industrial Similarity Index (ISI) respectively, using WDI data on sectoral value added as a percentage of GDP (Agriculture, Manufactures, Other industries and Services). The similarity index is built as in Baxter and Kouparitsas (2006) and Shea (1996). It can be expressed as:

$$ISI = \frac{\sum s_{on} s_{dn}}{\sum s_{on}^2 \sum s_{dn}^2} = \frac{\sum s_{on} s_{dn}}{HHI_{on} HHI_{dn}}$$

where s is the share of a particular sector, o stands for origin (exporter) and d stands for destination (importer); n is the number of sectors. Based on the definition of the ISI, there is clearly a link between the ISI and the product concentration indices. Given this link between the ISI and the concentration indices, it seems reasonable not to assess their effect on intra-African trade simultaneously in the same model, but to include them in different regressions. The sample used in the estimation covers the period 2000–2015. Tables 8 and 9 present the summary statistics and the correlation matrix respectively.

Table 8 Summary statistics

Variables	1 N	2 Mean	3 Std. Dev	4 Min	5 Max
Shared Border	34,592	0.0749	0.263	0	1
Common Colonizer	34,592	0.274	0.446	0	1
Shared Currency	34,592	0.0666	0.249	0	1
RTA	34,592	0.16	0.367	0	1
lnTrade	34,720	7.101	6.743	0	22.42
ln Dist (avg)	34,592	8.047	0.658	5.089	9.187
ln GDP/Pop	33,722	6.898	1.182	4.713	10.03
HHI	34,720	16.77	2.493	1.144	34.41
Manuf_va	26,693	0.11	0.0668	0.00237	0.366
Agri_va	29,729	0.245	0.162	0.00892	0.79
Services_va	29,545	0.484	0.131	0.133	0.915
Other_ind_va	26,509	0.164	0.144	0.00045	0.773
ISI	20,146	0.527	0.099	0.07943	0.864

Notes
Lntrade: logarithm of trade between country pairs
Ln GDP/Pop: logarithm of per capita GDP
ln Dist (avg): logarithm of the geographical distance between country pairs
Shared Border: dummy variable taking value 1 if a country pair shares a border, and 0 otherwise
Common Colonizer: dummy variable taking value 1 if a country pair was colonized by a same colonizer, and 0 otherwise
RTA: dummy variable taking value 1 if a country pair is part of a free trade area, and 0 otherwise
Shared Currency: dummy variable taking value 1 if a country pair uses a same currency, and 0 otherwise
agri_va: Agriculture value added as a percentage of GDP
manuf_va: Manufacture value added as a percentage of GDP
other_ind_va: Industrial but non-manufacture value added as a percentage of GDP
services_va: Services value added as a percentage of GDP
HHI: Herfindahl–Hirschman Index
ISI: Industrial Similarity Index for country pairs

A standard approach to estimating gravity models is to use the panel data fixed effects (FE) technique. We follow this practice by estimating the model with Pooled Ordinary Least Squares (POLS) with time FE.[5] By so doing, we address the omitted variable bias and the problem of unobserved heterogeneity associated with these types of models. We also estimate the model using the Poisson Pseudo-Maximum Likelihood (PPML) estimator, to account for heteroscedasticity, which is often present in trade data, and most importantly to account for zero trade flows (Santos Silva and Tenreyro 2006). The Tobit estimator is an alternative solution that has been proposed for dealing with the problem of zero trade flows (Martin and Pham 2008).

Table 9 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) lntrade	1.000																		
(2) ln GDP/Pop_o	0.148	1.000																	
(3) ln GDP/Pop_d	0.096	0.077	1.000																
(4) ln Dist (avg)	−0.315	0.110	0.110	1.000															
(5) Shared Border	0.281	−0.034	−0.034	−0.558	1.000														
(6) Common Colonizer	0.203	−0.026	−0.026	−0.153	0.109	1.000													
(7) RTA	0.324	−0.040	−0.040	−0.529	0.351	0.154	1.000												
(8) Shared Currency	0.109	−0.019	−0.019	−0.327	0.192	0.219	0.183	1.000											
(9) agri_va_o	−0.147	−0.758	−0.004	−0.122	0.022	−0.025	0.010	0.066	1.000										
(10) agri_va_d	−0.083	−0.004	−0.758	−0.122	0.022	−0.025	0.010	0.066	−0.020	1.000									
(11) manuf_va_o	0.136	0.228	−0.049	0.093	−0.037	0.029	0.057	0.019	−0.400	0.019	1.000								
(12) manuf_va_d	0.010	−0.049	0.228	0.093	−0.037	0.029	0.057	0.019	0.019	−0.400	−0.008	1.000							
(13) nonmanuf_va_o	−0.037	0.478	0.011	−0.031	0.012	−0.022	−0.037	0.041	−0.438	0.006	−0.318	−0.000	1.000						
(14) nonmanuf_va_d	−0.018	0.011	0.478	−0.031	0.012	−0.022	−0.037	0.041	0.006	−0.438	−0.000	−0.318	−0.019	1.000					
(15) services_va_o	0.129	0.316	0.022	0.134	−0.037	0.023	0.014	−0.110	−0.549	0.007	0.361	−0.023	−0.395	0.011	1.000				
(16) services_va_d	0.072	0.022	0.316	0.134	−0.037	0.023	0.014	−0.110	0.007	−0.549	−0.023	0.361	0.011	−0.395	−0.006	1.000			
(17) HHI_o	−0.082	0.031	0.014	0.088	−0.038	−0.045	−0.049	−0.016	0.041	0.004	−0.042	−0.008	0.077	0.020	−0.083	−0.037	1.000		
(18) HHI_d	−0.078	0.014	0.050	0.089	−0.028	−0.048	−0.043	−0.029	0.011	0.012	−0.012	0.001	0.016	0.083	−0.035	−0.067	0.780	1.000	

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(19) ISI	−0.000	−0.020	−0.020	−0.051	0.081	0.058	0.102	0.022	−0.058	−0.058	0.072	0.072	−0.338	−0.338	0.386	0.386	−0.097	−0.08	1

Notes
Lntrade: logarithm of trade between country pairs
Ln GDP/Pop_o: logarithm of the per capita GDP of the exporter (origin)
Ln GDP/Pop_d: logarithm of the per capita GDP of the importer (destination)
ln Dist (avg): logarithm of the geographical distance between country pairs
Shared Border: dummy variable taking value 1 if a country pair shares a border, and 0 otherwise
Common Colonizer: dummy variable taking value 1 if a country pair was colonized by a same colonizer, and 0 otherwise
RTA: dummy variable taking value 1 if a country pair is part of a free trade area, and 0 otherwise
Shared Currency: dummy variable taking value 1 if a country pair uses a same currency, and 0 otherwise
agri_va_o: Agriculture value added as a percentage of GDP of the exporter (origin)
agri_va_d: Agriculture value added as a percentage of GDP of the importer (destination)
manuf_va_o: Manufacture value added as a percentage of GDP of the exporter (origin)
manuf_va_d: Manufacture value added as a percentage of GDP of the importer (destination)
nonmanuf_va_o: Industrial but non-manufacture value added as a percentage of GDP of the exporter (origin)
nonmanuf_va_d: Industrial but non-manufacture value added as a percentage of GDP of the importer (destination)
services_va_o: Services value added as a percentage of GDP of the exporter (origin)
services_va_d: Services value added as a percentage of GDP of the importer (destination)
HHI_o: Herfindahl–Hirschman Index of the exporter (origin)
HHI_d: Herfindahl–Hirschman Index of the importer (destination)
ISI: Industrial Similarity Index for country pairs

As a robustness check, we also estimated the equations using the Tobit estimator. However, it is not our preferred estimator because the Tobit thresholds are unknown, and results are generally sensitive to the choice of a threshold.

4 Estimation Results

Product Concentration and Trade

Table 10 presents the OLS estimations of our gravity model with time fixed effects. In general, the standard variables used in gravity models have the expected signs, except for the dummy variable for sharing a common currency. As expected, countries' income per capita, has a positive effect on intra-African trade. The coefficient of the geographical distance variable [lnDist (avg)] also has a negative sign as expected. Furthermore, having a common colonizer, sharing a border, and being part of a free trade agreement have a positive effect on intra-African trade. It is worth noting that the variables *RTA* and *Shared Border* have the largest coefficients throughout all the estimations.

Regarding the key variables measuring product concentration, we find that both "*HHI, exporter*" and "*HHI, importer*" have a negative effect on trade in column (1), Table 10. This suggests that African countries trade less among themselves because their economies are not diversified. This result is statistically significant at the one percent level. This result makes sense given that in our sample, the share of manufacturing value added in GDP is on average 11 percent (Table 8), which is quite low.

In subsequent columns of Table 10, instead of the concentration index, we use as regressors each component used to compute *HHI*. Column (2) reports the results for the share of agriculture value added in GDP. It shows that the higher the share of agriculture in GDP, the lower is intra-African trade. Column (3) indicates that the higher the share of manufacturing value added in GDP, the more African countries trade among themselves. Column (4) reports the results for the share of the value added of "other industries" in GDP. As is the case with the agriculture sector, this variable has a negative effect on intra-African trade. Finally, as shown in column (5), the higher the share of value added in services the higher is intra-African trade.

In sum, Table 10 suggests that production concentration in African countries reduces intra-African trade. The result that the higher the share of agriculture in GDP the lower is intra-African trade is interesting given the importance of agriculture and "other industries" (including the extractive

Table 10 Intra-African trade, POLS (dependent variable: 1 + LnTrade), 2000–2015

Variables	(1)	(2)	(3)	(4)	(5)
ln GDP/Pop, exporter	0.906***	0.495***	0.749***	1.461***	0.789***
	(0.0296)	(0.0539)	(0.0381)	(0.0423)	(0.0352)
ln GDP/Pop, importer	0.570***	0.389***	0.464***	0.806***	0.504***
	(0.0296)	(0.0539)	(0.0381)	(0.0423)	(0.0352)
ln Dist (avg)	−1.683***	−1.805***	−1.839***	−2.062***	−1.996***
	(0.0697)	(0.0815)	(0.0927)	(0.0935)	(0.0830)
Shared Border	3.016***	2.525***	2.652***	2.357***	2.416***
	(0.152)	(0.170)	(0.190)	(0.191)	(0.171)
Common Colonizer	2.459***	2.469***	2.127***	1.991***	2.416***
	(0.0767)	(0.0863)	(0.0955)	(0.0959)	(0.0866)
RTA	3.167***	2.768***	2.767***	2.704***	2.574***
	(0.105)	(0.120)	(0.134)	(0.133)	(0.121)
Shared Currency	−1.048***	−0.852***	−0.409**	−0.142	−0.676***
	(0.139)	(0.159)	(0.192)	(0.191)	(0.159)
Agri_va, exporter		−4.129***			
		(0.376)			
Agri_va_importer		−1.877***			
		(0.376)			
Manuf_va, exporter			13.52***		
			(0.660)		
Manuf_va, importer			2.406***		
			(0.660)		
Other_ind_va, exporter				−7.824***	
				(0.334)	
Other_ind_va, importer				−4.811***	
				(0.334)	
Services_va, exporter					5.224***
					(0.310)
Services_va, importer					3.007***
					(0.310)
HHI, exporter	−0.111***				

(continued)

Table 10 (continued)

Variables	(1)	(2)	(3)	(4)	(5)
	(0.0257)				
HHI, importer	−0.111***				
	(0.0261)				
Time Fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	32.672	25.380	20.434	20.146	25.070
R-squared	0.219	0.227	0.245	0.254	0.232

Notes Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
LnTrade: logarithm of trade between country pairs
Ln GDP/Pop_o: logarithm of the per capita GDP of the exporter (origin)
Ln GDP/Pop_d: logarithm of the per capita GDP of the importer (destination)
ln Dist (avg): logarithm of the geographical distance between country pairs
Shared Border: dummy variable taking value 1 if a country pair shares a border, and 0 otherwise
Common Colonizer: dummy variable taking value 1 if a country pair was colonized by a same colonizer, and 0 otherwise
RTA: dummy variable taking value 1 if a country pair is part of a free trade area, and 0 otherwise
Shared Currency: dummy variable taking value 1 if a country pair uses a same currency, and 0 otherwise
agri_va_o: Agriculture value added as a percentage of GDP of the exporter (origin)
agri_va_d: Agriculture value added as a percentage of GDP of the importer (destination)
manuf_va_o: Manufacture value added as a percentage of GDP of the exporter (origin)
manuf_va_d: Manufacture value added as a percentage of GDP of the importer (destination)
nonmanuf_va_o: Industrial but non-manufacture value added as a percentage of GDP of the exporter (origin)
nonmanuf_va_d: Industrial but non-manufacture value added as a percentage of GDP of the importer (destination)
services_va_o: Services value added as a percentage of GDP of the exporter (origin)
services_va_d: Services value added as a percentage of GDP of the importer (destination)
HHI_o: Herfindahl-Hirschman Index of the exporter (origin)
HHI_d: Herfindahl-Hirschman Index of the importer (destination)

sector) in African economies. This implies that to boost intra-African trade, African countries have to undergo a process of structural transformation involving a shift in the structure and composition of output away from agriculture and toward manufacturing activities and services.

To check the robustness of these results, we estimated the equation using alternative estimation methods.[6] The results obtained using the PPML estimator (Table 11) are very similar to those discussed above. The key difference is that the coefficient of the variable *Common Colonizer* is now negative.

Table 11 Intra-African trade, PPML (dependent variable: Trade), 2000–2015

VARIABLES	(1)	(2)	(3)	(4)	(5)
ln GDP/Pop, exporter	0.822***	0.641***	0.762***	0.974***	0.681***
	(0.0301)	(0.0466)	(0.0331)	(0.0376)	(0.0271)
ln GDP/Pop, importer	0.337***	0.172***	0.266***	0.344***	0.248***
	(0.0346)	(0.0458)	(0.0369)	(0.0452)	(0.0293)
ln Dist (avg)	−0.291***	−0.210**	−0.127	−0.366***	−0.469***
	(0.0815)	(0.0880)	(0.0900)	(0.0875)	(0.0773)
Shared Border	1.433***	1.672***	1.629***	1.646***	1.642***
	(0.125)	(0.134)	(0.142)	(0.149)	(0.132)
Common Colonizer	−0.663***	−0.741***	−1.004***	−0.927***	−0.635***
	(0.0721)	(0.0738)	(0.0802)	(0.0802)	(0.0734)
RTA	2.096***	1.810***	1.964***	1.544***	1.377***
	(0.115)	(0.119)	(0.140)	(0.140)	(0.124)
Shared Currency	0.0914	0.0388	0.0243	−0.173	0.00193
	(0.127)	(0.129)	(0.152)	(0.131)	(0.113)
Agri_va, exporter		−1.685***			
		(0.556)			
Agri_va_importer		−1.330***			
		(0.448)			
Manuf_va, exporter			1.530***		
			(0.443)		
Manuf_va, importer			−0.0258		
			(0.564)		
Other_ind_va, exporter				−3.485***	
				(0.264)	
Other_ind_va, importer				−1.126***	
				(0.307)	
Services_va, exporter					3.712***
					(0.291)
Services_va, importer					1.759***
					(0.310)
HHI, exporter	−0.0632**				

(continued)

Table 11 (continued)

VARIABLES	(1)	(2)	(3)	(4)	(5)
	(0.0251)				
HHI, importer	0.05011***				
	(0.0289)				
Constant	9.423***	11.98***	9.106***	9.950***	9.851***
	(0.665)	(0.988)	(0.697)	(0.685)	(0.621)
Observations	32,672	25,380	20,434	20,146	25,070
R-squared	0.274	0.322	0.332	0.400	0.407

Notes Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
LnTrade: logarithm of trade between country pairs
Ln GDP/Pop_o: logarithm of the per capita GDP of the exporter (origin)
Ln GDP/Pop_d: logarithm of the per capita GDP of the importer (destination)
ln Dist (avg): logarithm of the geographical distance between country pairs
Shared Border: dummy variable taking value 1 if a country pair shares a border, and 0 otherwise
Common Colonizer: dummy variable taking value 1 if a country pair was colonized by a same colonizer, and 0 otherwise
RTA: dummy variable taking value 1 if a country pair is part of a free trade area, and 0 otherwise
Shared Currency: dummy variable taking value 1 if a country pair uses a same currency, and 0 otherwise
agri_va_o: Agriculture value added as a percentage of GDP of the exporter (origin)
agri_va_d: Agriculture value added as a percentage of GDP of the importer (destination)
manuf_va_o: Manufacture value added as a percentage of GDP of the exporter (origin)
manuf_va_d: Manufacture value added as a percentage of GDP of the importer (destination)
nonmanuf_va_o: Industrial but non-manufacture value added as a percentage of GDP of the exporter (origin)
nonmanuf_va_d: Industrial but non-manufacture value added as a percentage of GDP of the importer (destination)
services_va_o: Services value added as a percentage of GDP of the exporter (origin)
services_va_d: Services value added as a percentage of GDP of the importer (destination)
HHI_o: Herfindahl–Hirschman Index of the exporter (origin)
HHI_d: Herfindahl–Hirschman Index of the importer (destination)

Interestingly, distance variables such as *RTA* and *Shared Border* are still significant and of the expected sign. Concerning our concentration measures, a slight difference is observed in the variable capturing the role of the manufacturing sector: we note that "*Manuf_va, exporter*" has the expected sign and is statistically significant, while "*Manuf_va, importer*" has a negative sign and is insignificant. Similarly, the product concentration index for the exporter has the expected sign and is significant while the index for the importer does not have the expected sign.

Table 12 presents the results of the regression obtained using the Tobit estimator. The results are similar to those obtained using the OLS estimator with FE. For most of the standard gravity equation variables the results of the Tobit estimation are in general also similar to those of the PPML. However, there are differences in the results for some of the variables capturing product concentration. For example, in the PPML estimation, the results suggest that increases in manufacturing and services value added in the exporting country boost intra-African trade while the Tobit model suggests they reduce intra-African trade. Nevertheless, both the PPML and the Tobit estimators indicate that an increase in agricultural value added has a negative effect on intra-African trade. This is consistent with the widely held view that African countries should reduce dependence on agriculture and primary commodities to promote regional trade and lay the foundation for robust economic growth (UNCTAD 2013; Geda and Seid 2015).

Similarities of Industrial Structures and Trade

To investigate the impact of similarities in production or industrial structures on intra-African trade, we also estimated the basic equation using an index of industrial similarities. Table 13 presents the results of these estimations across different estimation techniques: POLS FE, PPML, and Tobit. Before discussing the impact of the Industrial Similarity Index (*ISI*) variable, capturing the role of similarities in production or industrial structure, let us look at the behavior of the standard gravity variables. The variables capturing income per capita, geographical distance, contiguity and trade agreements behave as expected throughout all estimations (and they are significant at one percent level). The variable *Common Colonizer* is significant and of the expected sign in four of the five specifications. Regarding the variable *Shared Currency*, it has the expected sign but is significant in only two of the five specifications.

The estimation results suggest that our main variable of interest, *ISI*, has a positive and strong statistically significant effect on intra-African trade. An increase in similarities of production or industrial structure between two pairs of countries increases intra-African trade and the results are robust across all estimation techniques used in the analyses. The result is interesting because it goes against the predictions of traditional trade theories and provides support for the "new trade theories" emphasizing the pivotal role of consumers "love for varieties" or "differentiated products" as a basis for trade (Helpman and Krugman 1989). The results also provide evidence against widely held beliefs that the reason for Africa's weak regional trade performance is because of

Table 12 Intra-African trade, Tobit (dependent variable: Trade), 2000–2015

VARIABLES	(1)	(2)	(3)	(4)	(5)
ln GDP/Pop, exporter	1.430***	1.088***	1.317***	2.152***	1.239***
	(0.0477)	(0.0791)	(0.0559)	(0.0617)	(0.0534)
ln GDP/Pop, importer	0.998***	0.932***	0.997***	1.354***	0.885***
	(0.0478)	(0.0792)	(0.0559)	(0.0618)	(0.0535)
ln Dist (avg)	−2.584***	−2.694***	−2.682***	−3.069***	−3.023***
	(0.116)	(0.128)	(0.142)	(0.142)	(0.129)
Shared Border	3.441***	2.623***	2.731***	2.400***	2.439***
	(0.244)	(0.261)	(0.287)	(0.287)	(0.261)
Common Colonizer	3.913***	3.699***	3.042***	2.887***	3.586***
	(0.127)	(0.135)	(0.147)	(0.147)	(0.135)
RTA	4.234***	3.588***	3.548***	3.228***	3.202***
	(0.171)	(0.184)	(0.202)	(0.200)	(0.186)
Shared Currency	−1.608***	−1.425***	−0.445	−0.188	−1.001***
	(0.228)	(0.247)	(0.289)	(0.286)	(0.247)
Agri_va, exporter	−0.273***				
	(0.0578)				
Agri_va_importer	−0.426***				
	(0.0591)				
Manuf_va, exporter		−3.910***			
		(0.586)			
Manuf_va, importer		−1.372**			
		(0.586)			
Other_ind_va, exporter			14.91***		
			(1.003)		
Other_ind_va, importer			−0.945		
			(1.022)		
Services_va, exporter				−11.45***	
				(0.519)	
Services_va, importer				−7.913***	
				(0.522)	
HHI, exporter					7.650***

(continued)

Table 12 (continued)

VARIABLES	(1)	(2)	(3)	(4)	(5)
					(0.493)
HHI, importer					5.257***
					(0.495)
Constant	16.47***	12.89***	8.407***	8.114***	7.346***
	(1.138)	(1.383)	(1.190)	(1.180)	(1.085)
Observations	32,672	25,380	20,434	20,146	25,070
R-squared	0.274	0.322	0.332	0.400	0.407

Notes Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
LnTrade: logarithm of trade between country pairs
Ln GDP/Pop_o: logarithm of the per capita GDP of the exporter (origin)
Ln GDP/Pop_d: logarithm of the per capita GDP of the importer (destination)
ln Dist (avg): logarithm of the geographical distance between country pairs
Shared Border: dummy variable taking value 1 if a country pair shares a border, and 0 otherwise
Common Colonizer: dummy variable taking value 1 if a country pair was colonized by a same colonizer, and 0 otherwise
RTA: dummy variable taking value 1 if a country pair is part of a free trade area, and 0 otherwise
Shared Currency: dummy variable taking value 1 if a country pair uses a same currency, and 0 otherwise
agri_va_o: Agriculture value added as a percentage of GDP of the exporter (origin)
agri_va_d: Agriculture value added as a percentage of GDP of the importer (destination)
manuf_va_o: Manufacture value added as a percentage of GDP of the exporter (origin)
manuf_va_d: Manufacture value added as a percentage of GDP of the importer (destination)
nonmanuf_va_o: Industrial but non-manufacture value added as a percentage of GDP of the exporter (origin)
nonmanuf_va_d: Industrial but non-manufacture value added as a percentage of GDP of the importer (destination)
services_va_o: Services value added as a percentage of GDP of the exporter (origin)
services_va_d: Services value added as a percentage of GDP of the importer (destination)
HHI_o: Herfindahl–Hirschman Index of the exporter (origin)
HHI_d: Herfindahl–Hirschman Index of the importer (destination)

the similarities in production or industrial structures across African countries (World Bank 1991). Trade, particularly in similar products, can take place between countries at low levels of development and with similar production structures if consumers have a "love for varieties" or "differentiated products."

Table 13 Estimation using the indices of industrial similarity, 2000–2015

Dependent variable VARIABLES	1 + ln Trade (1)	Trade (2)	Trade (3)	1 + ln Trade (4)	1 + ln Trade (5)
	POLS	PPML	Tobit	POLS	POLS
ln GDP/Pop, exporter	1.039***	0.752***	1.583***	1.070***	1.708***
	(0.0371)	(0.0324)	(0.0547)	(0.0344)	(0.0992)
ln GDP/Pop, importer	0.568***	0.196***	0.986***	1.291***	0.619***
	(0.0371)	(0.0388)	(0.0547)	(0.104)	(0.0329)
ln Dist (avg)	−1.737***	−0.181**	−2.622***	−2.035***	−2.454***
	(0.0926)	(0.0857)	(0.141)	(0.0927)	(0.0890)
Shared Border	2.228***	1.484***	2.122***	1.942***	1.750***
	(0.193)	(0.138)	(0.290)	(0.182)	(0.175)
Common Colonizer	1.968***	−0.991***	2.828***	2.083***	2.259***
	(0.0967)	(0.0776)	(0.148)	(0.0961)	(0.0923)
RTA	2.830***	1.783***	3.367***	2.258***	1.621***
	(0.134)	(0.121)	(0.201)	(0.135)	(0.130)
Shared Currency	0.231	0.0356	0.414	0.564***	0.417**
	(0.193)	(0.133)	(0.289)	(0.193)	(0.185)
ISI	9.285***	3.901***	15.78***	6.124***	5.354***
	(0.442)	(0.391)	(0.693)	(0.466)	(0.448)
Constant		8.248***	−0.549		
		(0.679)	(1.231)		
Fixed effects	Yes (Time)	No	No	Yes (Exporter)	Yes (Importer)
Observations	20,146	20,146	20,146	19,736	19,736
R-squared	0.244	0.362		0.350	0.401

Notes Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
LnTrade: logarithm of trade between country pairs
Ln GDP/Pop_o: logarithm of the per capita GDP of the exporter (origin)
Ln GDP/Pop_d: logarithm of the per capita GDP of the importer (destination)
ln Dist (avg): logarithm of the geographical distance between country pairs
Shared Border: dummy variable taking value 1 if a country pair shares a border, and 0 otherwise
Common Colonizer: dummy variable taking value 1 if a country pair was colonized by a same colonizer, and 0 otherwise
RTA: dummy variable taking value 1 if a country pair is part of a free trade area, and 0 otherwise
Shared Currency: dummy variable taking value 1 if a country pair uses a same currency, and 0 otherwise
ISI: Industrial Similarity Index for country pairs

5 Conclusion

Regional integration has been an important component of the economic development strategies of African countries since the 1960s. Given the small size of their domestic economies and low levels of income, regional cooperation is seen as an important mechanism to access export markets and exploit economies of scale in production. It is also expected to enhance the continent's integration into the global economy. The Lagos Plan of Action, the Abuja Treaty, the African Union's Agenda 2063, and the African Continental Free Trade Area Agreement launched in Kigali in March 2018 are some of the key initiatives adopted by African governments to promote economic development through regional integration.

Boosting intra-African trade has been the focus of Africa's integration agenda. However, there has been very limited progress made on this aspect of integration as evidenced by the very low shares of regional trade in Africa's global trade. This paper examined the factors responsible for the continent's weak regional trade performance with a focus on the roles of product concentration and similarities in the production or industrial structures of African economies. Using a gravity model and a variety of estimation techniques, we find that income per capita, regional trade agreements, and a shared border have a positive impact on intra-African trade while a higher distance between countries impedes intra-African trade. We also find some evidence that product concentration has a negative effect on intra-African trade. Furthermore, our results indicate that similarities in the production structures of African economies foster rather than impede intra-African trade. These findings lend support to the "new theories" of international trade and indicate that trade can still take place between countries at low levels of development and with similar production structures if consumers have a love for varieties or "differentiated products." The key implication of these findings is that Africa's weak regional trade performance is not so much a result of the similarities of production or industrial structures but has more to do with the low level of diversification of African economies. In this regard, there is the need for African governments to strengthen efforts to transform the production and export structures of their economies toward manufactured goods and modern services.

Notes

1. There are many regional trade arrangements in Africa, ranging from the Lagos Plan of Action and the Abuja Treaty to the African Union's Agenda 2063 and the African Continental Free Trade Area (AfCFTA) agreement signed by African Heads of State and Government in Kigali in March 2018.
2. For instance, in the period 2013–2017, the average ratio of merchandise trade to GDP in sub-Saharan Africa was about 55 percent.
3. These variables capture bilateral trade costs between trading partners *o* and *d* as discussed in the literature (Yotov et al. 2016).
4. CEPII stands for Centre d'Etudes Prospectives et d'Informations Internationales.
5. As noted by Piermatini and Yotov (2016), country pair FE, exporter-time and importer-time FE absorb explanatory variables (in our model, ln GDP/pop, HHI). That is why we do not use them. Time-invariant bilateral trade costs are proxied by bilateral distance variables, rather than country pair FE.
6. We also ran regressions with the Gini concentration index and obtained similar results.

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The Untapped Resource: Engaging Men in Supporting Women in Business in Uganda

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1 Introduction

Worldwide there is increasing acknowledgment of the importance of engaging men in the struggle for gender equality and women's empowerment (Sweetman 2013). The critical role of men and boys in addressing gender inequality was articulated in the 1995 Beijing Declaration (United Nations 1996) and other international fora (United Nations 2004). This article examines the ways in which men's involvement in initiatives targeting women's economic empowerment can change men's perceptions on women's productive and reproductive roles that inhibit women's economic autonomy and business activities. The key question to be answered in this article is: to what extent and in what ways does involving men in projects focused on increasing

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women's economic empowerment shift dynamics that inhibit women's success in business within the household, and increase women's power.

Involving men in gender equality initiatives is viewed as an important tactic for challenging negative ideas and modes of behavior associated with "being a man" (Sweetman 2013, 2). Evidence shows that, in spite of the massive campaigns and gender equality initiatives, systemic inequalities that privilege men's position at the expense of women in all spheres of life remain visible worldwide (Flood 2015). These inequalities are partly sustained by socio-cultural constructions of masculinity associated with being a man, the practices which men adopt, and the collective and institutional organization of men's lives and relations (Flood 2015; Heilman and Barker 2018). Realizing the socially recognized manhood of being a "real man" is not automatic but attained via meeting certain standards including being physically strong, brave, ambitious, self-sufficient, rational, an authoritative leader, a financial provider, a protector of his family, a husband and father (Kimmel et al. 2005; Heilman and Barker 2018; Kyiv 2018). These attributes are used to define men as dominant (what Connell terms as hegemonic masculinity) and women as subordinates, (Connell 1995, 2005) thereby reinforcing patriarchal power structures that advantages men over women (Heilman and Barker 2018). In this case, men are viewed as overall decision-makers and controllers of women as women play the feminine role of being in need of protection and patronage, and being compliant and delicate (Connell 1995; Kyiv 2018). Further, these attributes and expectations significantly shape men's ideas and actions as well as defining the gendered roles in production and reproduction, and gendered public and private spaces, with women relegated to the reproductive and private spaces as men engage in productive and public spaces (Kimmel et al. 2005; Heilman and Barker 2018).

In many African countries, and Uganda in particular, women have traditionally been discouraged to work outside the domestic sphere while men as breadwinners are expected to be part of the labor force in order to raise income to fulfill their role of household provisioning (Kyiv 2018). In reality, this hegemonic strategy is rarely fulfilled by men in their real lives (Kyiv 2018), although a remarkable proportion of men continue to assert enormous power over many aspects of women's lives including taking control over economic resources and decisions and labor force participation (Lenze and Klasen 2017). Consequently, they influence the social and economic progress of women. In this regard, Farre (2012); Barker and Schulte (2010); Levtov et al. (2018), believe that ignoring men in gender equality initiatives leaves these patriarchal structures largely in place, and potentially aggravates existing

gender discrimination, causing many initiatives aimed at fostering sustainable gender equality to fail. Some scholars attribute the persistent gender inequalities to the exclusive focus on women (Farre 2012) and failure to recognize the complex dynamics of women's relationships with men, especially couple relationships (Barker and Schulte 2010). Men/husbands have significant influence on women's movements, behaviors, and agency (Barker and Schulte 2010; Vyas et al. 2015; Ashfaq et al. 2018). Farre (2012) argues that for gender equality programmes to succeed in transforming gender relations and foster sustainable equality, they need to take into account the role of men.

Evidence from around the world shows that gender equality initiatives such as Women's Economic Empowerment and Women's Entrepreneurship Development interventions sometimes result in undesirable outcomes such as gender-based violence from husbands and male household members; hostility; male resentment; sabotage and wrestling for control of women's businesses; men's abdication of household responsibilities; stress; and less voice in marital relationships (Barker and Schulte 2010; Mitchell 2013; Mugabi 2014). Men fear that women's economic progress threatens male power in the household (Sweetman 2013; Mugabi 2014; Anderson 2017; Iregui et al. 2019). In patriarchal societies where male supremacy is the norm, men often serve as gatekeepers to the implementation of gender equality, with the capacity to either block women's access to resources or to assist them in accessing resources that are essential to their economic empowerment (International Labor Organization [ILO] n.d.).

Evidence from around the world (For example in Pakistan, Rwanda, Uganda, Vietnam) shows that involving men in projects aimed at women's empowerment and gender justice leads to a transformation of the gendered division of labor toward more shared roles and responsibilities, more equitable power and intimate relations in the household, healthier relationships, and new values about manhood and masculinities (Slegh et al. 2013; Sweetman 2013; Tu-Anh et al. 2013; Vu et al. 2015; Doyle et al. 2018; Pierotti et al. 2018). Further, work with men does not only benefit women but also men themselves, by freeing them from the gender norms that cause pain and conflict, enabling them to build solidarity and discover common interests and needs (Sweetman 2013). It also has been shown to lift the burden of being the main breadwinner of the household (ILO n.d.). Other studies, such as that by Vu et al. (2015) conducted in Vietnam, reveal that male involvement in women's entrepreneurship initiatives leads to more sales and profits, a higher number of start-ups, and has positive impacts on female decisions about important purchases. Involving men creates a better understanding and

recognition of the benefits of women's economic engagements for the family, and thus encourages men's active support for their wives' business (ILO n.d.).

While some scholars have viewed men's participation in gender equality initiatives as a pragmatic strategy for advancing the cause, other scholars caution against the tendency of male representation of female voices and interests which could silence female voices and work against the transformation of gender norms (Sweetman 2013).

There is increasing evidence on male involvement in gender equality interventions, although most of the research has centered around health-related issues including HIV/AIDS prevention, sexual and reproductive health, microfinance, and gender-based violence. Rigorous evaluations of men's involvement in women's economic empowerment, entrepreneurship, and business are few. This article fills this void by drawing on an action research project for supporting rural women in business in Uganda. The analysis draws primarily from the data collected from men about their perceptions about women's business activities and their productive and reproductive roles within the household. It illustrates the ways in which involving men in women's empowerment initiatives can indeed change gender norms that inhibit women's economic empowerment.

2 Methodology

The article draws on a two-year action research project focused on supporting business opportunities for rural women in Uganda. The project was part of a larger multi-country project involving Uganda, Kenya, and Zimbabwe implemented between 2016 and 2018. Consistent with the action research approach, the research design incorporated a comprehensive baseline study, an intervention, and an end-line study. The intervention focused on enhancing the entrepreneurial literacy of rural women in business. The end-line study was conducted to ascertain the outcomes of the implemented package of interventions.

Sampling Strategy and Sample Size

Study site selection: In Uganda, the study was conducted in three districts, which were purposively selected to ensure geographic and economic breadth: Soroti in the eastern region, Mukono in the central region, and Mbarara in the western region. According to the 2016/2017 Uganda National Household Survey, the proportion of the population living below the poverty line

is 42.7% in the eastern region, 22.7% in the central region, and 19.1% in the western region (Uganda Bureau of Statistics 2018). About two-thirds of the population in all three districts are dependent on subsistence production, with cattle keeping dominant in Mbarara, crop farming in Mukono, and a mixture of animal husbandry and crop farming in Soroti. The districts also vary in their degree of urbanization, with the district headquarters of Mbarara and Mukono ranking as the fifth and sixth largest cities in the country, respectively. The headquarters of Soroti district does not figure in the largest 20 towns. Within each of the districts, three sub-counties were selected based on the existence of a high concentration of women in business. While the study employed a mixed methods approach using quantitative and qualitative methods particularly with the baseline survey, this article draws on the qualitative data collected at both the baseline and endline using Focus Group Discussions (FGDs), In-depth Interviews (IDIs) and Key Informant Interviews (KIIs) guided by appropriate interview guides.

Selection of study participants and sample size: Data was collected from rural businesswomen, their spouses, government, and non-government officials involved in providing support to businesswomen. Sampling for the qualitative part of the study was purposive for all the categories of study participants. For the baseline survey, selection of business women was based on whether they were involved in production (especially value addition processes such as agro-processing), in either a male- or a female-dominated economic activity and trade. For the Baseline survey, 18 Focus Group Discussions (FGDs) (9 for men and 9 for women)[1] with a total of 167 participants (82 women; 85 men) and 23 key informant interviews (KIIs) with representatives of government institutions, district local governments, civil society organizations, and private institutions known to support and promote women business entrepreneurship were conducted: 10 at national level and 13 at district level.[2] These individuals were identified and selected through a comprehensive stakeholder mapping exercise conducted in each district. The men's FGD's comprised of men whose wives were businesswomen, though not necessarily the husbands of the women in the women's FGDs.

The intervention: From the baseline survey three clear areas of need emerged: increased entrepreneurial literacy, product development through value addition, and a more supportive household context. Thus, an intervention was designed with several components, namely: a mentoring programme for selected women (60)[3] supported by two mentors[4] in each of the three target districts; a two-day participatory and interactive training in business skills for the selected businesswomen who participated in the baseline survey;

radio talk-show sessions in each district; provision of UGX 200,000 (roughly US$53[5]) to 60 women selected from the 151 women—to apply some of the skills acquired during the training; and peer-learning meetings for women to share their experiences.

Men (spouses of the women and local leaders) participated in the first session of the training, which focused on the importance of women's economic empowerment. Fifty-six men (29 from Mukono, 24 from Soroti, and 3 from Mbarara) attended the meeting. Their involvement was important to helping them understand the project, the importance of women's economic empowerment to their household's well-being, and how to be supportive of their wives' efforts to improve their businesses. They were also encouraged to attend the mentoring and coaching sessions with their wives, which went on for three months.

The post-intervention or end-line study focused women and their spouses who participated in the mentoring programme, and key informant interviews (KIIs) with mentors. In each of the study districts 10 women and five men (spouses) were randomly selected using the lottery method to participate in the in-depth interviews. The remaining 10 women participated in the FGDs. All the mentors in the study districts, five of whom were men and one woman, participated in the key informant interviews. Overall, 45 interviews (30 women and 15 men), six KIIs, and three FGDs (30 women) were conducted.

3 Data Management and Analysis

All the IDIs, FGDs and most of the KIIs were voice recorded with consent from the study participants, and subsequently transcribed. The transcripts were coded and analyzed using the Atlas.ti software package. Key ethical considerations included obtaining clearance from the Uganda National Council for Science and Technology and the respective districts prior to commencement of data collection; ensuring participants consent, confidentiality and privacy; and adhering to the principles of doing no harm. Where verbatim quotes/voices are used, actual names are omitted instead we refer to the tool used, sex of the speaker, and study district.

4 Findings

The findings discussed here incorporate data from both the baseline and end-line studies in order to document changes in men's attitudes and behaviors as a result of their participation in the Supporting Rural Women in Business initiative. We begin with the findings about men's perceptions of women's business activities before the intervention, followed by a discussion of the changes in men's attitudes toward and engagement with their wives' businesses as a result of participating in the project.

5 Men's Attitudes About women's Involvement in Business Activities

The baseline study revealed that although women were enthusiastic about improving their economic status through engaging in business, they face multiple challenges that impede their progress. Some of the key challenges that women consistently referred to related to the men's negative attitudes toward women's economic autonomy, restricted mobility outside the home, limited spousal support which created difficulties in maintaining family life and work balance.

In Uganda, as in many African countries, women and men have distinct/defined roles and responsibilities in the home and the community including reproduction, production, and community related roles. These multiple roles compete with women's time and thus present challenges to women's participation in productive ventures such as businesses. Women in all three districts were frustrated by the limited support from their spouses and male abdication of their responsibilities for taking care of the families. They talked about how when women join business, men tend to abdicate their responsibilities of family provisioning, leaving women to shoulder all the family welfare expenses ranging from food provisioning, payment of children's school fees, paying medical bills, rent, and meeting the costs of other household expenditures. When men learn that their spouses are earning, they stop providing the family with basic necessities. Consequently, most of the money from the business is used up in such expenses leaving them with minimal resources to reinvest and grow their businesses.

> Men don't want to support their families, so all the money goes to children and the moment he knows that you sold cassava he stops supporting the home. As a mother you cannot look on as your children are not drinking tea with sugar

> or are seated at home. We don't save any money…but if the husband was supportive at least one would save something…**FGD Women Mukono**

Findings from the baseline FGDs with men confirmed women's perceptions of men's attitudes toward their business. Men in the study expressed support of their wives' business activities by emphasizing the ways that women's income alleviates financial pressures on them *with "the burden of looking after the family by the man is reduced…"* (FGD Men Soroti). Similar views were echoed by men in other districts. Men acknowledged the importance of women's involvement in business, particularly women's contribution to family welfare, framing their work in terms of sharing the responsibility in meeting household expenditures. However, while supportive of their wives earning extra income to support the family, many men were also apprehensive about how their wives' economic autonomy, if not contained, could undermine their position as heads of the household. The men in the FGDs associated women's movement and work outside the home with infidelity or adultery, an allegation that participants said men use to restrict their wives from engaging in business, hence supported women working only around the home. The men are particularly interested in women doing business around the home such as rearing chicken and pigs and planting vegetables, as they do not want to set the women free.

When women do move further from home to conduct their businesses, they reported surveillance and policing by their husbands. They described close monitoring of their phone calls to keep tabs on who they communicate with and what they communicate about. Women in Mbarara reported their experience:

> Men monitor closely women with phones to know what they are communicating with their customers. So one has to be careful how they use the phone, otherwise the husband may become suspicious and this can easily get you into trouble. When talking on the phone, you have to make sure that you do not fidget or move away from him when your husband finds you on the phone…**FGD Women Mbarara**

Women explained that their husbands are suspicious of their activities, suspecting them of using their time away to engage in extramarital affairs and secretly use the money they've earned to benefit the woman's nuclear family—supporting the woman's parents at the expense of her own family. As women in Soroti stated:

> Men say that when a woman starts doing business and gets money, the woman will take all the money earned from the business to develop only her parents and brothers and leave the man poor with no development at home…**FGD Women Soroti**

Men were also worried that their wives would neglect domestic responsibilities, especially child care. They associated doing business with coming home late and not having time to attend to the children. Furthermore, they felt that as heads of households they should control women's movements and make decisions on women's earnings. Husbands asserted that they remain decision-makers in the homes and decide on women's mobility as well as their engagements outside the home, as the man is "*the final decision maker in the home is the man; he decides how the money is to be spent and when to spend it*…" (FGD Men Soroti). Men in Mbarara district emphasized;

> Now, some women are independent and will not need approval from a man. But those that are in a union will discuss with the partner, and if they foresee that the business will be beneficial to the family, the husband will give the woman the go ahead. The man still has authority…**FGD Men Mbarara**

Some men, especially in Soroti, begrudged the independence and household influence women gained with greater economic autonomy. One man expressed his frustration with this change;

> You know traditionally women were not supposed to do any business, they were supposed to stay at home, cultivate food crops for home consumption and look after the children. Marriage life was very peaceful, women were very loyal to their husbands but now because men are also feeling the burden of looking after the family alone, we just allow our women to do business and support the family, that's when women have stopped respecting their husbands because they see themselves as the bread winners in the homes…**FGD Men Soroti**

Similar to women's economic autonomy as a threat to male authority in the home were expressed by men in other districts. Consequently, there were cases of men sabotaging their spouses' businesses as reported thus:

> A woman could be a diligent and hard worker but you find that such a woman is sabotaged by her husband, the man keeps taking away her money and the business cannot expand or grow… Men are still very controlling…**FGD Men Mbarara**

Women concurred with the men and reported negative beliefs around engagement in business especially outside the home, as this was associated with insubordination to men. They reported the tension that had developed in some of their households as their earning power increased, and they expressed their frustration with this situation wherein the more income they earned, the more their husbands expected them to cover the cost of household expenses. Some men also acknowledged this concern and talked about how many men had left the burden of family welfare to the women, taking up drinking alcohol and gambling in the trading centers, and only working to supervise the gardens managed by the women. Limited spousal support was a key challenge to women's participation in business. Women in the survey highlighted the consequences of these negative beliefs and attitudes, which they said contributed to women's low confidence and self-esteem**,** curtailed women's investment on land, and led to poor health among women.

Women in the FGDs and other stakeholders interviewed, stressed the importance of encouraging men to support their spouses in both sharing of roles in the household and provisioning of the household basic needs, rather than leaving the women to shoulder family welfare expenses. The need for women and men to work together as partners was seen as necessary to enable women to have more time and resources to reinvest in their business to facilitate expansion and growth. The study participants emphasized the importance of changing men's mindset and allaying men's fears associated with women's economic independence and working outside the home. They called for addressing the social norms that relegate women to the domestic sphere under the assumptions that women are only good for domestic work and reproduction, yet women's participation in business is good for the entire household. As one key informant said, to educate men, women, and girls about the changing world is to *"broaden their minds towards the diverse possibilities."*

6 The Significance of Engaging Men in Women's Economic Empowerment

Women in the baseline survey and key informants asserted the importance of sensitization and awareness-creation for the changing of societal attitudes toward women's economic autonomy and mobility, encouraging harmonious egalitarian family relations, and spousal support for women's business activities. One of the most striking changes stemming from men's participation in the project intervention (sensitization meeting and mentoring sessions) was

in their attitudes toward their wives' businesses. Several of the husbands in Soroti talked about how their minds have been opened to thinking about their wives as businesswomen. For example, one of the men said,

> I realized that women are very good business people; the wife just needs some support and freedom to do her business and to encourage her to always record all her transactions so that she can know where the losses have come from and the way forward…**IDI Man Soroti**

Another said,

> The training really changed me, because formally my mindset was that the woman is to produce and I am the one to market the products but now I realized that I need to support her in every aspect of her project and let her make her own decisions, manage her own business without interference…**IDI Man Soroti**

Men acknowledged how the training had made them appreciate the benefits of their wives' businesses and the importance of working together as *"joint planning and decision making is something very developmental…"* **IDI Man Soroti**

While men in the other districts were less likely to speak directly about changes in their attitudes, many talked about how they were more willing to be productively involved in their wives' business activities. Some, for example, talked about helping their wives with their business plans and record keeping. As one husband in Mukono said, *"I tried to assist with developing the business plan and keeping the record books up to date."* Others mentioned being more willing to provide financial assistance. A man in Mbarara said that the training made him more inclined to giving more support to his wife so that when representatives of development agencies came to visit the farm, they would be more likely to support her.

The women, too, reported significant changes in men's attitudes and behaviors since the programme started. Data from the interviews and focus group discussions with women suggest that the involvement of husbands in the *Supporting Rural Women in Business* project led them to become more productively involved in their business activities. Women talked about their husbands being more helpful, supportive, and respectful. For example, the women from Soroti vigorously affirmed;

> There are very many changes now, he feeds chicken, cleans the house for chicken, he feeds the piglets early in the morning when I go to the garden before going for his work…**IDI Woman Soroti**

Other women reported their husbands were happy with their businesses and helped to spray, grafting, prune, and weed the crops in the gardens. They reported increased sharing of roles in the home and joint decision-making on household and business expenditures, and investment, which was never the case before the programme. One woman in a Soroti focus group suggested that the change they see in their husbands stems from their economic contributions to the household including buying household items and paying children's school fees.

> Now our husbands have greatly changed, they now respect us women because they know we are now bread winners in the family. They are very humble and understanding. We also share every decision with men…**IDI Woman Soroti**

Another woman in Mbarara reiterated;

> My husband has no problem with my business because he can see its contribution to paying children's fees. As a result, he does some activities of maintaining and improving the plantation. So, he also participates in the business because there is a lot it contributes to the welfare of the family…**IDI Woman Mbarara**

This sense of husbands being more supportive and collaborative as a result of their involvement in the programme was echoed in other districts as well. The men were said to be more willing to contribute labor in their enterprises especially in areas that required lifting of heavy loads, keeping records, collecting literature about improving the business and marketing. The men also provide women with transport for meetings and buying raw materials for their cottage industries (wine production). The women saw their men being more responsible than they were before the programme. In addition to impacting how husbands view and participate in their wives' business activities, the data suggest that the project led to more financial accountability and trust between wives and husbands. The focus on record keeping in particular was said to have led to more accountability and sharing of revenues. A woman in the Mbarara focus group, for example, spoke about how the project changed how revenues from her business are allocated within the household:

> When I used to harvest the bananas for sale, I would give him the money because the plantation is for the whole family. But these days when we harvest

> and sell, he gives me part of the money to reinvest in the business. I think if you could continue sensitizing us together with our spouses, there will be great improvement in the homes…**FGD Women Mbarara**

An interviewee in Soroti also noted changes, not only in relation to decisions made about how revenues from her business are used, but also in decision-making about revenues earned by her husband:

> He doesn't give me pressure at all, because when we attended training, our husbands were advised to support us in our businesses, so whenever any of us has got some money, he or I buy household needs. He doesn't even ask for any coin from mem, I decide to give him. And whatever decision or plan we have, its joint. When he gets any money, he tells me, we discuss and decide how to spend it…**FGD Women Soroti**

The women said that it was important for their husbands to participate in the training because it remarkably changed their attitude toward their businesses and they started providing support to their businesses. They mentioned that continuous sensitization together with spouses adds much value to any programme for supporting women's empowerment. The women acknowledged the involvement of their spouses in the programme as beneficial and one way of building support and cooperation among spouses especially cooperation in handling family expenses.

The men's changed attitudes are further reflected in the concerns about their spouse's business. All the men interviewed were concerned about improvement and expansion of their spouse's businesses and identified some of the limitations to the expansion of their wives' businesses. These included limited capital, weather conditions that affected productivity, limited market for the products, identification and certification of their businesses, among others. A number of the men from the three study sites voiced the need for more capital to expand the spouses' businesses.

While men's attitudes changed and they were more supportive of their wives businesses, the language they use continues to reflect a patriarchal stance. Men were convinced that women needed their advice in order for their businesses to succeed, and there were lingering concerns about their wives becoming too independent and neglecting their domestic responsibilities. The loss of control is related mainly to the use of the income earned with claims that when a woman gets money, the proceeds benefit the woman's nuclear family—i.e. supporting the woman's parents at the expense of her own family. This was especially the case for men in Soroti district:

> I will advise her because sometimes, there are some women when they get the money, you lose control, you find that the money she gets is taken to her home to support her mother or the father. I have to sit with her and agree that the business is for developing our home, our children's future because if our homes are not handled properly, our children are going to lose control, people are going to laugh at us in future. I advise her that whatever we do should be for the development of our home…**IDI Man Soroti**

Another man from Soroti described his concern about his wife neglecting their children.

> I will advise her when she is doing her business, to remember her responsibilities as a mother at home because when she keeps coming late, the children will suffer at home…These young children also need the support of the mother at home because when they are not supported, they may do things or behave contrary to the family policies…**IDI Man Soroti**

Some men believed that their wives needed their support and that their expertise and advice was essential to the success of their wives' businesses. For example, when asked about the kind of advice he provides to his wife, a man in Mbarara described the things a business needs that, presumably, his wife could not provide on her own:

> Business needs is knowledge, money and travel in search for knowledge because you can't grow these tomatoes using only your own knowledge. It needs inputs, water, workers. …. If it is a woman alone, she cannot manage alone. This is where as a husband you need to add more money…**IDI Man Mbarara**

A husband in Soroti echoed this same sentiment, but acknowledged the importance of collaboration and encouragement as well:

> Me as a man, first, the best way I can support my wife's business is to guide her where she has gone wrong in her business. If she's operating at losses, I can advise her on the best way of reducing the cost of production so that profits can be realized. I cannot allow her to misuse the money by using capital to purchase what was not in the programme… Secondly, we shall do the work together, I encourage her to continue with her business…**IDI Man Soroti**

Nonetheless, the findings show that involving men in projects aimed at women's empowerment makes a significant difference in women's autonomy and income generation, both of which are essential to empowerment. The

need for spousal support was recognized and appreciated by all male participants. Specifically, the men noted how the project had "opened their minds" or increased their awareness to thinking more about their wives' businesses and need to increase their involvement and support. The women too spoke of their husbands being more supportive, helpful, and respectful. This is further reflected in men's concerns which were more inclined to the need to address factors that hinder their wives' business productivity and growth such as capital/finance, labor, and marketing rather than domestic-related concerns over infidelity and child care that were more prominent before the intervention.

7 Men's Insights on the Best Ways to Support Women in Business

Men were enthusiastic about supporting their spouses' businesses. They identified a number of ways they can support their spouses that ranged from provision of financial support, giving advice and encouragement, providing assistance in monitoring progress, marketing of products to supervision of workers as well as providing physical labor on the farms/firms. Men from Mbarara were quick to assert the importance of providing physical labor:

> I do what a man is supposed to do, I dig or open up the land for planting more coffee, like now we are expanding the acreage and have opened another two acres of land and have plans to buy more land for the expansion of the plantation. Harvesting coffee is such labor-intensive work where I put a lot of my energy to make sure that coffee is harvested on time before it falls on the ground. The workers can't remain focused and work hard if there is no one closely supervising them…**IDI Male Mbarara**
> For me, you see we cannot leave women to do work alone. Like now she has not been around. The first thing I supervise workers. Secondly, workers do not know how to mix drugs. So, we work as a family…**IDI Male Mbarara**

Most of the men acknowledged the financial constraints women faced to expand their business and pledged their support to this need. Men from Mukono in particular stressed financial contribution:

> Maybe finding a way that she can get more capital from me to expand her business. Am positive on this, and am ready to provide…**IDI Man Mukono**
> To mobilize for funds. Funds are very crucial in any business. I think that I have to mobilize for transport and transport the products, though at times you

> bounce and people just say they will buy another day. Am thinking of a 'Boda Boda'[a motorcycle]. It is cheaper in fuel consumption and maintenance. The market is there, but we don't satisfy it with our low production, that is why we need a motor bike which is cheaper compared to a car to ease on getting the raw materials and also on mobility to markets…**IDI Man Mukono**

Husbands also talked about the importance of providing encouragement to their wives. This view was based on the recognition that women's businesses contribute to household income and support to meeting household welfare expenses. This voice was particularly common among men from Soroti and Mbarara:

> Men should allow their women to get involved in business to increase household income. You are able to solve some financial problems in the household better than when you are one person struggling. Like now for school fees, madam also contributes from the farm and I also contribute from salary, when the salary delays, she's the one who meets household needs, buys salt, sugar and soap but before they would wait for me until I get salary, we would quarrel…**IDI Man Soroti**
>
> I also encourage men to allow their wives to be involved in business since the revenues are used to help and develop the entire family…**IDI Man Mbarara**

One man in Soroti emphasized the need for men to change their mindset about women's involvement in business and women's economic autonomy:

> Men should change their mindset from not allowing their women to participate in business to giving women freedom to do their own businesses without the men's interference and leave women to make their own decisions when it comes to their businesses…**IDI Man Soroti**

Avoiding taking control of decision-making was also emphasized in Mbarara, though this husband stopped short of calling for full women's autonomy:

> You don't need to decide. If you decide, you can make the business collapse... you will think you are making the right decision but when you are wrong. As a result you will destroy her business because it is easy to make wrong decisions. We all decide together. If you make all the decisions, you will be a dictator and the business will fail…**IDI Man Mbarara**

Overall, involvement of men in the project intervention yielded positive results particularly change in attitudes and increased support to women in business. The findings show that men's involvement in the project caused

the men to become more involved in their wives' businesses in various ways ranging from contributing human and financial resources to selection of inputs, application of pesticides and fertilizers, and marketing of the products as well as transportation. In addition, the project influenced a change in attitudes as were described by the men to have "opened their minds" to think more positively about their wives' business and provide more support than they were providing previously. The change in attitude was attributed to men's recognition of women's business acumen, and the contribution of women's business income to household welfare. The findings further show that men's involvement in the project led to more collaboration, trust, and financial accountability between spouses, facilitated by joint planning and record keeping. Women felt more supported and respected as entrepreneurs, and better able to make their businesses successful.

8 Discussion

This research clearly demonstrates the significance of incorporating spouses into projects aimed at increasing women's economic empowerment. Prior to the project intervention, women expressed frustration not just at the lack of spousal support, but the negative mens' attitudes and behaviors that prevented their businesses from thriving. While men acknowledged and appreciated women's contributions to family welfare, they feared that their wives' involvement in business, especially outside home, would result in loss of their power and control over women. Yet at the same time, when their wives contributed their income to the household, men were quick to use their own resources for non-household expenses. Similar findings have been reported by other scholars (for example Prime and Moss-Racusin 2009; Sweetman 2013). Prime and Moss-Racusin (2009), identified men's fear of loss of status and privilege as underpinning restrictions in married women's mobility, and yet found that men tended to abdicate their responsibilities of household provisioning to their income-generating spouses, draining women's capital for investment and expansion of their businesses thus undermining their economic empowerment.

While studies about the impact of involving men in women's empowerment initiatives are few, those that have been done have found similar results. Barker and Schulte (2010), for example, in their assessment of male involvement in a microcredit initiative for women in Rwanda, found that engaging husbands in such initiatives leads to more collaborative decision-making among couples, and men viewing their wives as equal partners in

income generation. Similarly, Doyle et al. (2014) found that involving men in the Bandebereho ("role model") intervention in Rwanda led to husbands having greater respect and value for their wives' opinions. These scholars, along with Slegh et al. (2013), Vu et al. (2015), and Doyle et al. (2018), have all found that involving men leads to increased sharing of domestic roles and responsibilities, reduced violence in the household, improved inter-personal or couple communication, shared household expenditures, husbands' provision of labor to the wives' enterprises, and assistance to women's access to markets and saving opportunities. Barker and Schulte (2010) suggest that engagement of men in gender equality initiatives provides women and men an opportunity to interact in spaces of shared power which encourages more collaborative decision-making in income-generating activities.

The findings from this research support the results of other studies showing that involving men in interventions for economic empowerment of women leads to transformation in attitudes and household gender dynamics. The voices of men and women in this project demonstrate how the intervention led to more collaboration and accountability within the households, and women feeling—and being—more respected as entrepreneurs and better able to make their businesses a success. After participating in the intervention, husbands were more willing to provide material, emotional and physical support to their wives' business activities, and talked about the importance of trusting their wives' business acumen and refraining from taking control of decisions.

This is not to suggest, however, that women's economic empowerment was fully achieved. The language used by the men even after the intervention continued to reflect a male-dominant position. There were still fears of losing dominance if women became the primary providers within the household, and a sense that women needed their assistance if they were to truly succeed. The patriarchal attitude of men being the heads of households and custodians of knowledge lingered. As Kimmel et al. (2005) note, these attitudes reflect inherent societal expectation about manhood, which are exceedingly difficult to dislodge. Nonetheless, the shift in men's attitudes and behavior was significant, and the women clearly noticed and appreciated it.

9 Conclusion

The findings from the intervention illustrate the need for involving men in programmes that empower women with the aim of getting a "buy-in" of the project from the men to sustain the benefits of the project. Male involvement can be promoted through sensitizing them about the importance of

empowering women and helping them understand the kinds of support they can offer to their spouses. Moreover, referring back to Barker and Schulte (2010), involving men in such projects creates an opportunity for them to interact in spaces of shared power. When men attended the initial training and then participated with their wives in the mentoring activities, they were indeed in such spaces. Indeed, one could argue that these spaces were tilted in favor of women's power. Given the imbalance of power at the start, involving men in such spaces provides them an opportunity to see that they will not become diminished if their wives succeed. Indeed, a balance of power within the household has the potential to benefit everyone.

Notes

1. 3 FGDs for men and 3 FGDs for women in each district.
2. 5 in Mbarara 4 in Mukono and 4 in Soroti districts.
3. At the end of the two days training, 20 women were purposively selected from each district for mentoring and coaching based on their level of commitment during the training with a leaning on women involved in agricultural production and representation of the sub-counties in the sample.
4. Included District Production and Commercial Officers, who are the local government officials in charge of working with farmers, traders and business people in the district.
5. Bank of Uganda Exchange rate as of 15 August 2018 – USD$1 = UGX3750.

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Aid for Trade and Sustainable Development in Least-Developed African Countries

Mete Han Yağmur, Murat Yülek, and Mahmut Sami Güngör

1 Introduction

The income level of a country is largely determined by its level of industrialization; and the "level of income" and "level of industrialization" are often used interchangeably (e.g., "industrialized countries" and "high-income countries"). Such classifications highlight the importance of the industrial sector in the overall welfare of a country. In least-developed countries (LDC), the industrial sector provides job opportunities that depart from the agricultural sector and lead the way to development. For emerging countries, productivity improvements and higher value-added production in the industrial sector serve as a way out of the middle-income trap.[1]

Despite the widespread consensus on the importance of the industrial sector, the topic of economic policies aiming to stimulate specific (set of) sectors has been controversial. On the one hand, mainstream economists argue that industrial policies should be general and should provide a level

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playing field among firms. Such policies include those stimulating accumulation of physical and human capital, enhancing macroeconomic stability, and improving legal and regulatory structures. On the other hand, industrial policy economists argue that while such general policies from mainstream economists fix government failures, they are not sufficient to fix market failures or to generate a high-growth environment (Cherif and Hasanov 2019). Hence, industrial economists argue that in order to develop an LDC to higher levels, governments should implement targeted policies, such as those coordinating complementary investments, regulating technology imports and foreign direct investments, and imposing mandatory worker-training programs.[2]

While industrial economic policies are often considered by mainstream economics to be too interventionist, both mainstream and industrial economists acknowledge the favorable effects of exports on welfare improvement. Since David Ricardo developed his theory of comparative advantage,[3] mainstreameconomic theory has favored exports based on welfare improvement effects, due to more efficient use of available resources.[4] Subsequently, endogenous growth theory and the "new trade theory" have considered the scale effects of production provided by export markets, as well as the diffusion of knowledge through exports. Additionally, industrial economists stress the importance of improving export capacity in order to develop an industrial sector. In this regard, Weiss (2005), Chang (2011), and others note that export orientation is one common ground in the development of East Asian countries.[5]

Furthermore, not only has interest in industrial policies recently begun to revive,[6] but the concepts of diversified industrial base and export capacity of less-developed countries have increasingly been placed on the agenda of international development institutions and policymakers with increasing importance. One illustrative example is the Aid for Trade (AfT) initiatives introduced in 2005 at the Sixth Ministerial Conference of the World Trade Organization (WTO) in Hong Kong. The primary objective of AfT is to support LDCs in handling various constraints in international trade in order to increase their integration into the global economy (Berrittella and Zhang 2014). As declared at 2005 WTO Conference: "Aid for Trade should aim to help developing countries, particularly LDCs, to build the supply-side capacity and trade-related infrastructure that they need, to assist them to implement and benefit from WTO Agreements, and more broadly to expand their trade" (WTO 2005, 11).

Given the recent developments in literature and policymaking, as well as the importance of developing the export capacity of LDCs, this chapter

mainly discusses the role of AfT in building up the export capacity and in diversifying the industrial base of the least-developed African countries. To prove this point, the next section summarizes the evolution of international trade theory and argues that both mainstream economics and industrial economics favor development of the export sector. The third section introduces AfT facilities and argues that a sufficient amount of well-structured AfT disbursements may support least-developed African countries' sustainable development. The fourth section presents the export and industrial structures of Sub-Saharan African (SSA) countries and argues that, in order to attain and sustain higher income levels, these countries should increase the share of manufactured products in their total exports. The last section lays out the conclusion.

2 International Trade Theory and Economic Growth

Classical and neoclassical international trade theories are founded on the nineteenth-century economist David Ricardo's comparative advantage theory. Considering labor to be the only factor of production, Ricardo suggests that countries should specialize in producing the goods that they are most efficient at producing (i.e., in which their labor productivity is highest). Later, Hecksher-Ohlin[7] expanded the Ricardian model by introducing capital as a second factor of production and showed that comparative advantage is determined by countries' relative abundance of factors of production and of the technology used to produce goods. In terms of the effect of comparative advantage on economic growth, due to efficient use of resources, international trade can generate effects akin to (a onetime) improvement in technology and can thus improve welfare; however, it does not create a long-term effect on economic growth.

One implication of Ricardo's theory concerns the type of goods that are subject to international trade. Since the theory indicates specialization in specific (types of) goods, it necessitates internationally traded goods to be inter-industry (i.e., they should be of different types). However, Grubel and Lloyd (1975) document that international trade among industrial nations is dominated by intra-industry (or similar) goods. Based on this empirical data, and recognizing that production in non-competitive set-ups is underestimated in the literature, Krugman (1979) develops a general equilibrium model in which production occurs under increasing returns to scale. In this "new trade theory" framework, international trade allows firms to extend their

market size; consequently, firms exploit the benefits of scale economies, and consumers enjoy having access (through trade) to different varieties of the same type of goods.

While the effect of international trade on economic growth is not explicitly analyzed in the new trade theory, endogenous growth models analyze the dynamic effects of international trade on growth. For instance, in Romer (1990) and in Grossman and Helpman (1989), technological improvement—and thus growth—is driven by intentional, fixed investment on research and development (R&D) activities. Since fixed investments can be more easily recovered in larger markets, extending the market size induces more R&D investments, and in turn, international trade generates greater economic growth.

In addition to intentional R&D investments, endogenous growth theory recognizes learning by doing as a source of technological progress. In this concept, Stokey (1988) develops a dynamic general equilibrium model in which economic growth is sustained by continuously introducing new products. In this model, better and higher-quality goods replace lower-quality goods in the production set over time. The driving force behind this process is knowledge accumulation, obtained through learning by doing. In terms of international trade and development, learning by doing arguments are adopted into the concept of diffusion of knowledge, where a direct flow of ideas, or a direct flow of goods in which ideas are embedded, stimulates economic growth.[8]

Finally, most recent studies on international trade and growth focus on firm-level data, which identifies some distinct features of firms engaged in international trade that distinguish them from other firms. For instance, Bernard and others (2007) note that of the 5.5 million companies in the USA in 2000, only 4 percent were exporters, and the top 10 percent of the exporting companies accounted for 96 percent of total US exports. Moreover, the authors find that compared to non-exporting firms, exporting firms employ more workers; ship more goods; and have higher value-added per worker, higher total factor productivity, more capital per worker, and higher skill per worker. Mayer and Ottaviano (2008) find similar results for European firms. Accordingly, globally engaged firms (multinational firms or exporters) are recognized as being more productive than their domestic counterparts (Criscuolo and others 2010).

However, results in the literature about the direction of causality are rather mixed. On the one hand, some scholars argue that more productive firms self-select into export markets and that exporting does not really contribute to firm productivity.[9] On the other hand, other scholars argue that knowledge

diffusion is a key driving force of technological progress and that international trade facilitates knowledge flow, either from competitors (horizontal spillover effect) or customers (vertical spillover effect).[10] In this field of research, an increasing number of studies find positive effects of exporting on firm productivity, especially for developing countries. For instance, Araújo and Salerno (2015) analyze Brazilian manufacturing firms and show that new exporters become more productive and larger than non-exporting firms. Likewise, Foster-McGregor and others (2014) provide some evidence for learning by exporting in manufacturing firms in 19 SSA countries. In addition, Cruz and others (2017) find that in the manufacturing sector in Mozambique, exporting firms are 17–21 percent more productive than non-exporting firms, after controlling for differences in observable characteristics.

This brief summary of the evolution of international trade theory reveals that mainstream economics has an affirmative approach to the export sector, based on its effect on household welfare and development.

Meanwhile, industrial economists promote the export sector as the way to develop a decent industrial sector and to maintain sustainable growth. For instance, Benhassine and Raballand (2009) note that openness to trade and investment (combined with a stable macroeconomic framework and a decent business environment) is necessary for private sector-led growth. Considering the East Asian Miracle, Weiss (2005) argues that while no single factor could explain the success of these countries' industrialization, "rapid manufactured export growth" was a key common variable among all of them. Furthermore, Cherif and Hasanov (2019) identify three key principles regarding the success of Asian miracles, all of them concerning export orientation. In this vein, Yülek (2016) compares industrialization in Turkey and in South Korea from the 1960s onward, when the two countries started to transform their economies from agrarian to industrial. The author argues that the main determinant of South Korea's greater industrialization over Turkey was South Korea's tendency to promote exports (together with import substitution) from the beginning of its industrialization. Turkey, in contrast, only maintained import substitution policies for two decades after it started its industrialization policies.

It is important to stress the key difference between mainstream and industrial policy economists regarding their perspectives on comparative advantage. While international trade theory since David Ricardo has considered comparative advantage to be determined by natural resources, industrial economists believe that as countries' resource endowments develop, their comparative advantage changes. Indeed, moving up the ladder of comparative advantage

to diversify the tradable sector, thereby upgrading the export structure, may be considered the essence of industrial policy (Weiss 2005).

This perspective has important implications for the sustainable development endeavors of least-developed African countries. Since the early 2000s, SSA countries have exhibited noteworthy average annual growth rates, at more than 2 percent. Nevertheless, structural changes hardly played a role in their growth, which was rather due to the rise in global commodity prices and China's corresponding investments in Africa to feed its natural resource needs (Rodrik 2016).[11] However, resource-based growth patterns are hardly sustainable, as they do not generate structural changes but rather require high capital investments and absorb little labor (Rodrik 2016). In his Nobel Prize lecture, Simon Kuznets defines the economic growth of a country as "long term rise in capacity to supply increasingly diverse economic goods to its population." According to this definition, resource-based income generation cannot even be considered as economic growth, as it entails industrialization and technological development.

Against this backdrop, in order to maintain sustained development, least-developed African countries should follow progressive industrial policies focused on generating higher value-added goods—that is, an initial upgrade from simple, labor-intensive goods to more capital-intensive goods should be followed by the production of higher value-added products, which requires additional R&D investments. In this line of argument, Yülek and Yağmur (2018) suggest that Africa should make use of the emergence of the fashion industry by capitalizing on the textile and clothing sector, in order to facilitate overall industrialization in SSA. This kind of industrialization strategy would allow SSA countries to diversify their industrial bases and export capacities. Such a gradual progress in the manufacturing sector is the main objective of AfT policies that aim to help LDCs' industrialization.

Within the context of the Millennium Development Goals (MDG) introduced by the United Nations, AfT aims to improve the living standards of the world's poorest people. One of the seventeen goals (Goal 8) of the MDG is "promoting inclusive and sustainable economic growth, employment and decent work for all." The targets of this goal include: "Increase Aid for Trade support for developing countries (particularly least-developed countries), including through the Enhanced Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries."

In order to clarify the association between sustainable development and AfT, the following section reviews AfT policies and their implementation in Africa.

3 Aid for Trade and Its Effectiveness

AfT is a subset of Official Development Assistance (ODA), which includes grants and loans issued by donor governments in order to support the economic development of developing countries. It consists of four categories: (i) trade policy and regulations, (ii) economic infrastructure, (iii) productive capacity, and (iv) trade-related adjustment (WTO and OECD 2017). Figure 1 shows ODA disbursements across regions in constant 2017 United States Dollar (USD). African countries are among the main recipients of these loans and grants.

Since the objective of ODA is to support the economic development of developing countries by facilitating trade capacity, providing higher shares of ODA disbursements to African countries serves this goal well. Indeed, the share of African countries in global trade is not proportional to their population: according to United Nations World Population Prospects 2017 and World Integrated Trade Solution,[12] the export share of African countries in global trade in 2017 was about 7.5 percent, while its population share was 16.6 percent. In contrast, in the same year, the export share of North America in global trade was about 16.5 percent, while its population share was only 4.8 percent.

Figure 2 depicts ODA distribution by sector in constant USD for the year 2017. The figure reveals that a substantial portion of ODA is devoted to

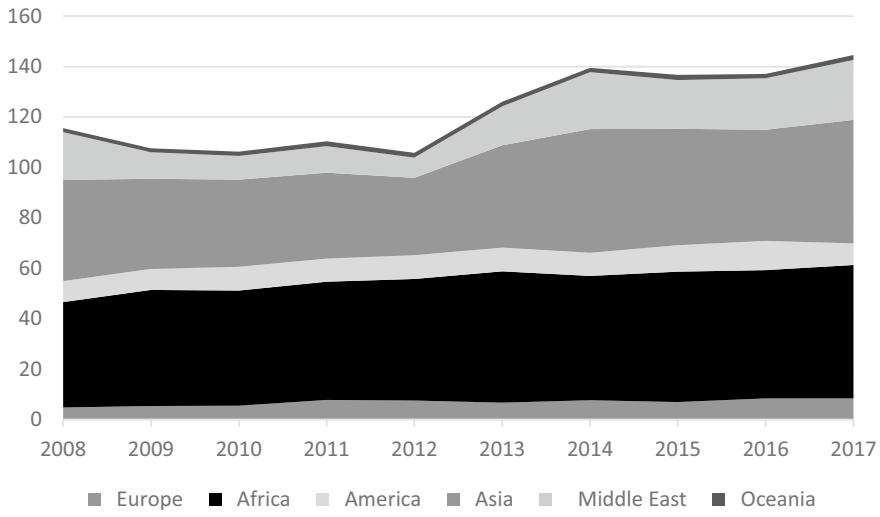

Fig. 1 ODA disbursements to regions, (Billion USD, constant 2017) (*Source* OECD Creditor Reporting System, 2019)

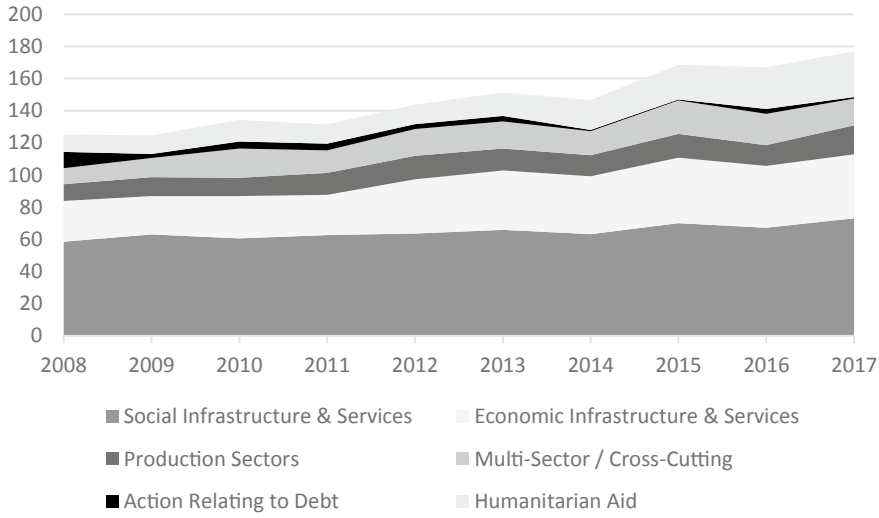

Fig. 2 ODA disbursements by sectors, world (Billion USD, constant 2017) (*Source* OECD Creditor Reporting System, 2019)

the "Social Infrastructure and Services" and "Economic Infrastructure and Services" categories. The reason for this allocation is that lack of infrastructure is one of the main obstacles to enhancing exports in developing countries, particularly in SSA countries (Cali and te Velde 2011).

Payoff of Aft programs is also well-documented. For instance, Cali and te Velde (2011) find that AfT generally decreases trading costs in both exports and imports; Martínez-Zarzoso and others (2017) find that countries with a lower export volume receive the maximal benefit from AfT in terms of increase in export volume. Furthermore, Berrittella and Zhang (2014) find that AfT programs promote recipient countries' trade relations with other developing countries, and also mitigate income inequality in recipient countries. In terms of AfT programs contributing to industrialization, Gnangnon (2019) shows that an increase in AfT flow from donors encourages recipient countries to diversify their export base.

Based on a detailed aid dataset for 40 donors and 170 trading partner countries, Helble and others (2012) find that a one percent raise in AfT (approximately USD 220 million in 2008) results in nearly USD 290 million of more exports from the recipient countries. Wang and Xu (2018) study the effect of AfT on quality of production and find that a 50 percent raise in AfT assistance in trade policy generates a 0.5–1 percent rise in the quality of exports to donor and other Organization for Economic Co-operation and Development (OECD) countries.

Figure 3 depicts the relationship between African countries' real per capita net ODA received and African countries' total exports to the world. Consistent with the literature and the aims of the ODA, an increase in real per capita net ODA is associated with a rise in total exports to the world. Furthermore, the magnitude of this positive effect is related to the level of per capita ODA. Specifically, the figure reveals that the marginal effect of per capita ODA is greater when it is above USD 40. Thus, in order to obtain a significant benefit from ODA on exports, the amount should be more than 40 dollars per person.

Studies in the literature regarding the effects of AfT on African economies are consistent with the evidence presented in Fig. 3. For instance, Lemi (2018) finds that AfT from OECD for economic infrastructure leads to increase in total trade between Africa and OECD countries. Likewise, Karingi and Leyaro (2009) find that AfT to Africa decreases cost of trading, encourages export diversification, and improves Africa's competitiveness in international trade. Thus, the literature indicates that AfT disbursements diversify the industrial base and facilitate the export capacity of recipient countries. Accordingly, both the quality effect and the product diversification impact of AfT help recipient countries to integrate more swiftly and effectively into the global economy. In this regard, AfT could be promoted as an industrial

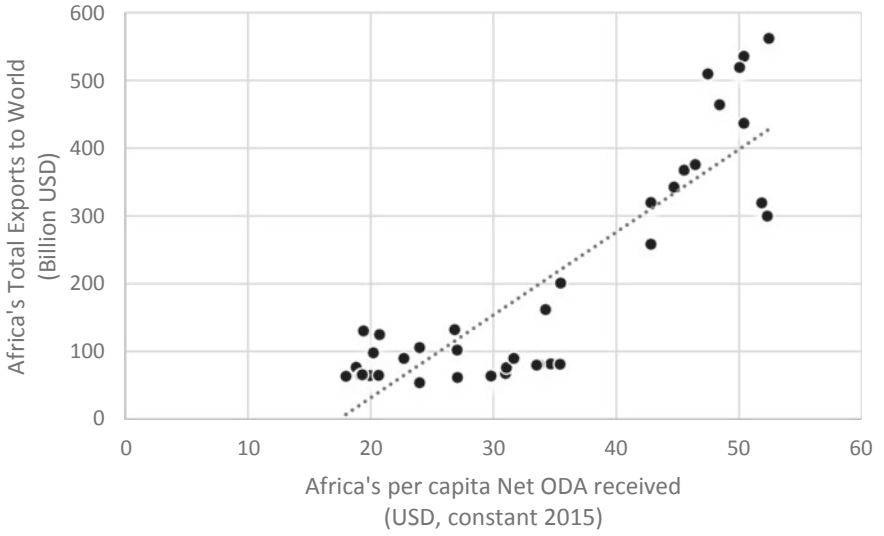

Fig. 3 Net per capita ODA received by African countries and their total exports to world (1980–2017) (*Source* Authors' own calculation based on Thomson Reuters Datastream, 2019)

policy tool, as it would help the development of LDCs—particularly African LDCs.

Nevertheless, the benefits of AfT in recipient countries should not be taken for granted. Both the size of AfT and the coordination of disbursements influence the effectiveness of AfT in decreasing trade costs and in facilitating the integration of developing countries into the global economy (Tadesse and others 2017). In this sense, Lemi (2018) shows that the effects of AfT from China to SSA countries are limited to only increasing the recipient country's export volume to China. Likewise, Pettersson and Johansson (2013) show that for SSA countries, AfT facilitates donor countries' exports to SSA and the recipient country's export of strategic materials. Therefore, in order to benefit from AfT—in terms of a flourishing industrial sector and promoting export diversification—the AfT should be carefully designed and utilized. In addition, due to insufficient availability, AfT should be distributed more selectively and competitively, in order to improve fiscal effectiveness and to guarantee some level of contribution to the process of development (Berrittella and Zhang 2014).

4 Export Structure and Industrial Base of SSA

Since the 1970s, global manufacturing has been shifting to newly industrializing countries: first to some East Asian countries, such as Hong Kong, South Korea, and Taiwan; and later to countries such as Mexico, Turkey, South Africa, India, and China. These countries' desire to strengthen their access to natural resources and expand their export markets boosted their interests in low-income countries. Such changes in world production structure also affected international trade patterns. Figure 4 shows the percentage share[13] of African countries' trading partners in Africa's total international trade. As the figure indicates, before 2000, African countries' primary trading partners were advanced economies, with the European Union (EU) countries comprising the highest share. In the early 1980s, advanced economies' share in Africa's total international trade was more than 65 percent, while developing countries' share in Africa's total international trade was approximately 15 percent. As a result of increasing economic integration between developing and low-income countries, the share of developing countries in Africa's total international trade has now reached over 50 percent, while the share of EU and other advanced economies in Africa's total trade has decreased to 30 percent and 42 percent, respectively.

The increase in developing countries' share in Africa's total international trade is dominated by China. Figure 5 shows the significant rise of China in Africa's total international trade as compared to the decline in the USA's share.

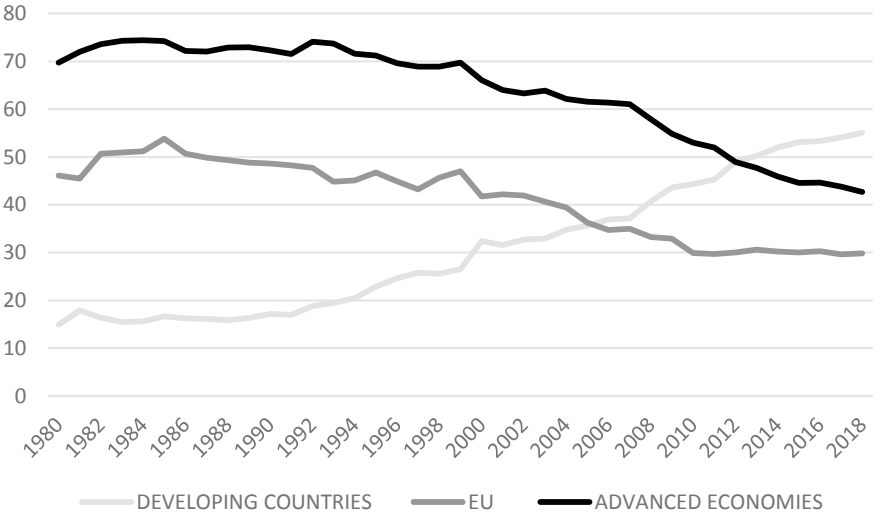

Fig. 4 Percentage share of African countries' trading partners in Africa's total trade (*Source* Authors' own calculation based on Thomson Reuters Datastream, 2019)

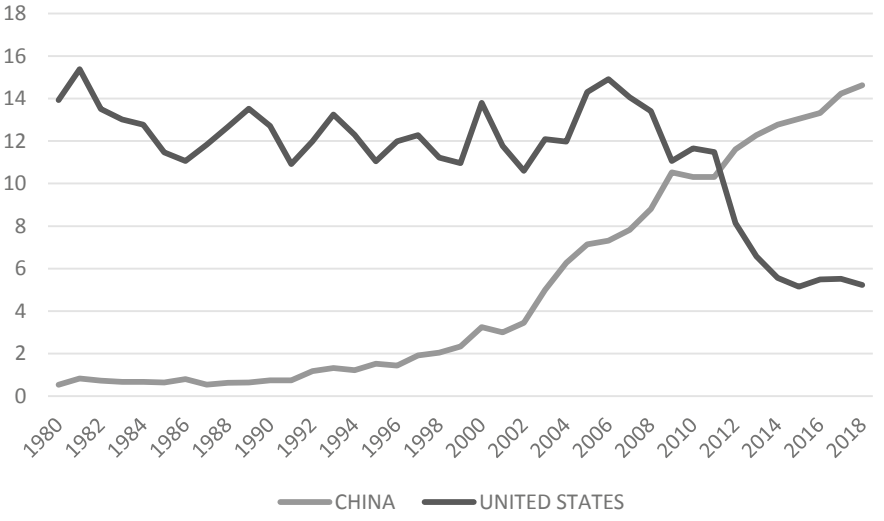

Fig. 5 Percentage share of China & USA in Africa's total international trade (*Source* Authors' own calculation and Thomson Reuters Datastream, 2019)

While the evolution in the share of Africa's trading partners aligns with the general trend in international trade, the effect of China's increasing role in African economies has been hotly debated. Some scholars argue that China's increased engagement will contribute to the development of African economies.[14] In contrast, some researchers argue that Africa's exports to China constitute mainly raw materials, and thus, trade with China contributes little to African economies in terms of productivity gains and structural transformation (Golub and Prasad 2018). Furthermore, the rise in cheap imports (particularly in manufacturing and textiles) from China and other Asian countries is considered a threat to the industrial development and the export diversification of SSA countries (Kohler and Khumalo 2017).

The export structure of SSA countries explains the reason for concern about their trading partners. Figure 6 depicts that in SSA countries, half of all exports consist of raw materials (or primary commodities), and the total share of consumer and capital goods hardly reaches 20 percent of total exports. This clearly demonstrates a lack of industrialization and is closely linked to low per capita income levels in SSA countries.

While this extensive dependency on raw materials in the export structure generates some income to the region, it increases overdependence on the price of raw materials. In turn, low value of raw materials exports results

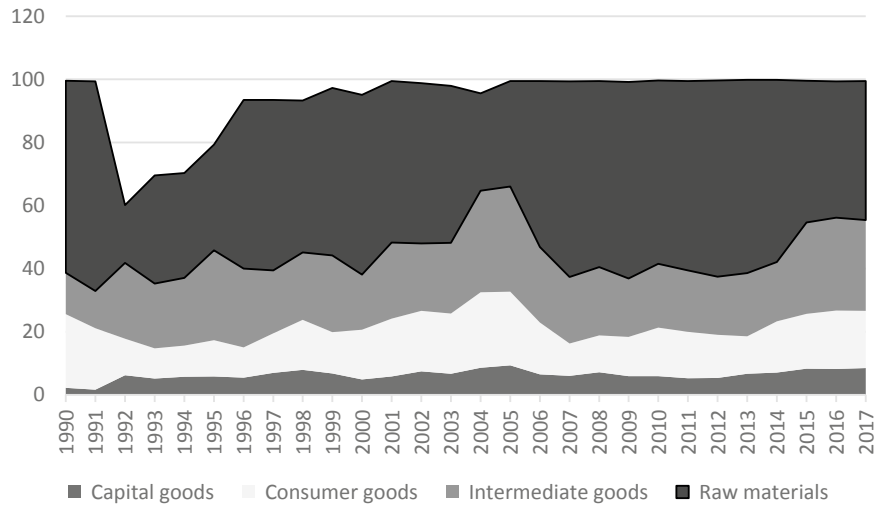

Fig. 6 Percentage of export product share in SSA (1990–2017) (*Source* World Integrated Trade Solution, 2017)

in a lack of capital saving that is necessary for economic growth and development. Consequently, despite its abundant natural resources, SSA remains the poorest region in the world (Bissoon 2017).

Figure 7 depicts the negative relationship between the share of manufactured goods and the share of raw materials in total exports of SSA countries for the period 1990–2017. In other words, SSA countries with a diversified industrial base can export more manufactured goods and subsequently have a lower share of raw materials in their total exports—showing encouraging progress in the process of industrializing SSA. Figure 8 depicts a positive relationship between share of raw materials in total export and gross domestic product (GDP) per capita in SSA for the years 1990–2017. Putting Figs. 7 and 8 together suggests that export of raw materials in SSA countries will remain the main source of income and that these countries are highly dependent on raw material exports.

Concerning the manufacturing sector in SSA countries, Fig. 9 shows the relationship between average GDP per capita and average manufacturing value added (MVA), involving certain regions and groups of countries with different income levels over the years 2000–2018. Overall, the figure depicts polarization between advanced economies and developing countries in terms of MVA: that is, countries that can produce manufactured goods with high value addition also have high per capita income levels. In contrast, African

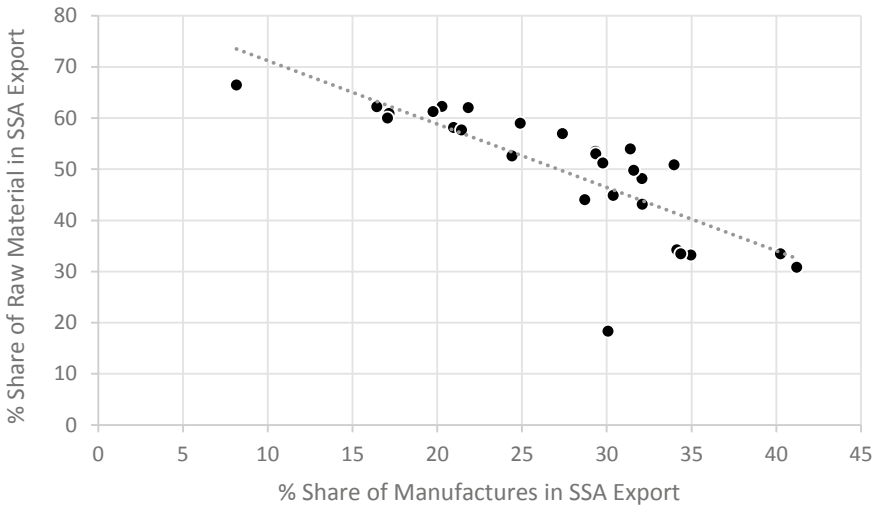

Fig. 7 Percentage share of raw material and manufactures in SSA export (1990–2017) (*Source* Authors' analysis based on data from World Integrated Trade Solution, 2017)

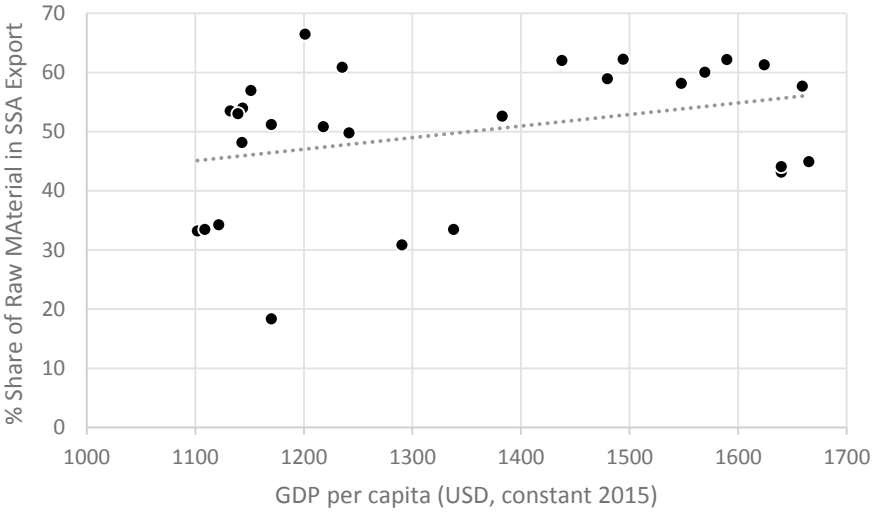

Fig. 8 Percentage share of raw materials in Total Export and GDP per capita in SSA (1990–2017) (*Source* Authors' own calculations based on data from World Integrated Trade Solution, 2017 and Thomson Reuters Datastream, 2019)

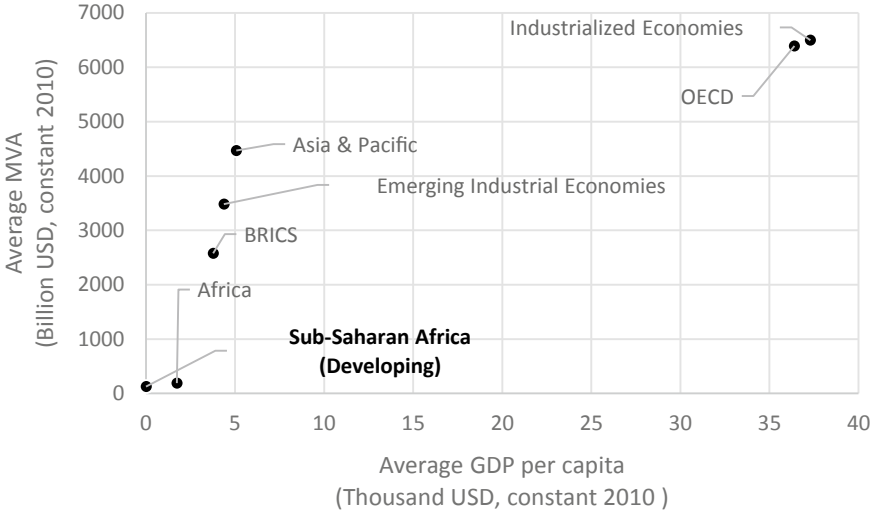

Fig. 9 Average MVA and average GDP per capita (2000–2018) (*Source* Authors' analysis based on United Nations Industrial Development Organization [UNIDO] database, 2019)

countries have low value added in the manufacturing sectors; consequently, their GDP per capita is also quite low.[15]

In addition to the extremely low level of MVA capacity of SSA countries, the share of manufactures in SSA countries' exports has been highly unstable, and a downward trend in the share of manufacturing in total exports is shown in Fig. 10. On average, the share of manufactures in SSA countries' total exports has remained below 30 percent for the 1990–2017 period.

All in all, the preceding figures and statements disclose two main facts about the manufacturing sector and export structure of SSA: (i) exporting raw material remains a main source of income generation in SSA; (ii) SSA's manufacturing value addition is very low and does not show progress in terms of enlarging its manufacturing base.

These facts lead us to make the following suggestions. First, in order to increase their national income and sustain their development, SSA countries should decrease their reliance on raw materials exports, enlarge their manufacturing capacity, and increase their MVA. However, due to several structural and sociopolitical factors, reaching these targets will not be an easy task. Related research has already articulated several of those factors. For example, taking the critical role of investment in the manufacturing industry, Lawrence (2005) notes the non-existence of a domestic capitalist class in African countries to motivate governments to plan and direct industrialization. Furthermore, Webersik and Wilson (2009) recognize financial

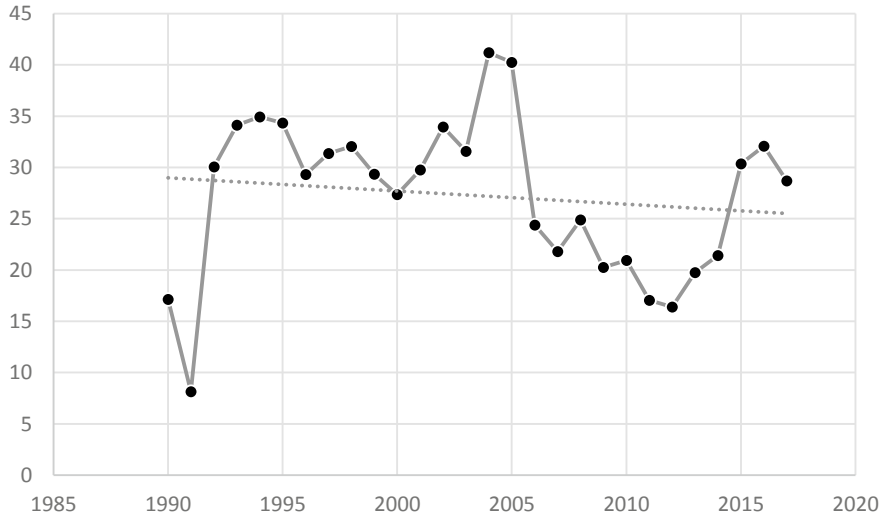

Fig. 10 Percentage share of manufactures in SSA exports (*Source* Authors' own analysis based on World Integrated Trade Solution, 2017)

deficiency as a major reason for poor development of the manufacturing sector in SSA.

Second, political instability is also considered as a negative impact on the export growth of SSA countries (Fosu 2003). Carbone and others (2016) find a close relationship between democratic progress/reforms and economic development in Africa, especially in the last two decades. While this recommendation is in line with industrial policies, they shouldn't be seen as a prerequisite.[16]

In the face of the ample problems contributing to the weakness of the manufacturing sector in SSA countries, AfT emerges as a beneficial industrial policy that could overcome those problems, irrespective of country- or region-specific challenges. Accordingly, more interest and weight should be directed to AfT programs in SSA in order to improve its industrial base and export capacity. In this sense, AfT could be used as a tool of industrial policy.

5 Conclusion

Industrialization is the primary determinant of a country's income level. Because SSA countries have a low industrial base, and export of primary products remains the main source of income generation, SSA is one of the lowest-income regions in the world. In order to elevate income levels and to maintain sustainable development, expanding the industrial base and the export capacity of SSA countries should be a priority for policymakers and international development institutions. Given the revival of interest in industrial policies among both academics and policymakers, policies in this field should be more extensively examined for SSA's development. While financial restrictions and unstable political environments in some countries may hinder implementation in the region, a well-structured industrial policy may help SSA's industrialization and consequently promote sustainable development.

To this end, this chapter suggests that AfT programs should be considered more thoroughly as a tool for industrializing SSA. This suggestion is based on the findings that, depending on their design and implementation, AfT programs tend to generate expected benefits in terms of expanding the industrial base and export capacity of the recipient country. Nevertheless, the benefits of AfT programs should not be taken for granted. For instance, Fig. 3 shows that an ODA disbursement of less than USD 40 per capita in Africa seems to limit the benefits in terms of increasing export volume. Therefore, more comprehensive research should be conducted on the disbursement

amount and the design of AfT programs in order to maximize the reward from AfT disbursements, particularly in least-developed African countries.

Notes

1. Yülek (2016 and 2018).
2. For detailed discussions on this, see Chang (2011) and Benhassine and Raballand (2009).
3. Ricardo, David. "The Principles of Political Economy and Taxation. Homewood, IL: Richard D. Irwin." (1963). (First published in 1817; third edition in 1821.)
4. While the adverse effects of free trade policies have also been noted, these arguments were developed around import strategies. The main argument against free trade has been about shielding domestic industries from unfair foreign competition and about protecting "infant industries" in developing countries.
5. The outstanding development of eight East Asian Countries (Japan, South Korea, Taiwan, Hong Kong, Singapore, Thailand, Malaysia, and Indonesia) from 1960 to 1990s is known as the East Asian Miracle. For a comprehensive study on the growth performance of these countries, see World Bank (1993).
6. See, for instance, Cherif and Hasanaov (2019).
7. Ohlin, Bertil. International and Interregional Trade. Harvard University Press, Cambridge, 1933.
8. See, for instance, Rivera-Batiz and Romer (1991) and Young (1991).
9. See, for instance, Wagner (2007).
10. See, for instance, Frankel and Romer (1999) and Alcalá and Ciccone (2004).
11. Africa's export structure and its industrial base is discussed in Sect. 4.
12. Available at: https://population.un.org/wpp/, https://wits.worldbank.org/CountryProfile/en/Country/WLD/Year/2017/TradeFlow/Export/Partner/by-region/Product/Total.
13. The share of country i is calculated as $\frac{X_{Ai}+M_{Ai}}{X_{Aw}+M_{Aw}}$, where X_{Ai} is export of African countries to country i, M_{Ai} is import of African countries from country i, X_{Aw} is export of African countries to the rest of the world, and M_{Aw} is import of African countries from the rest of the world.
14. See for instance, Asongu and Aminkeng (2013).
15. Emerging Industrial, Asia Pacific, and BRICS economies seem to have rather high manufacturing value added but per capita GDP below 5 thousand USD. However, note that all these group of countries constitute China and India, the two countries with the highest populations.
16. After all, neither South Korea nor China started their industrialization processes in perfectly democratic environments.

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Trade Credit Financing and Firm Growth: A Panel Study of Listed Firms in Africa

Stanley Kojo Dary, Haruna Issahaku, and Benjamin Musah Abu

1 Introduction

Firm growth is important for the growth of national economies, employment, and wealth creation (Amha et al. 2013). The growth of firms is affected by many factors; the impact of these factors varies with location. This chapter examines the effects of trade credit on firm growth in Africa. Trade credit arises when goods are purchased (or sold) and payment (or receipts of payment) is deferred to another period. A firm can supply trade credit to its customers (trade credit receivable) and/or receive trade credit from its suppliers (trade credit payable). Also, customers (buyers) can extend trade credit to suppliers when payment is made ahead of delivery of goods (prepayment/advance payment). In imperfect financial markets, trade credit can reduce the financing constraints faced by businesses and facilitate business activities (Huang et al. 2019). Particularly, Ferrando and Mulier (2013) argue that imperfections in financial markets and product markets can be reduced through trade credit payable and trade credit receivable, respectively. Trade credit can thus be an ingredient for growth of firms in African countries.

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In literature, various motives have been associated with the use of trade credit in interfirm trade: financing motives (Schwartz 1974; Emery 1984; Meltzer 1960), operation/transaction motive (Ferris 1981) and commercial motives (Nadiri 1969; Long et al. 1993; Smith 1987). Sales maximization is at the heart of these competing yet interrelated motives for use of trade credit. On the supply side, a firm extends trade credit to customers as a way of increasing sales (Yazdanfar and Öhman 2015). According to Yazdanfar and Öhman (2015, p. 337), "supplying trade credit seems to increase sales as more payment options attract more buyers." On the demand side, it has been argued that firms that have more growth opportunities are more likely to demand and receive trade credit from their suppliers (see e.g., Niskanen and Niskanen 2006; Cunat 2007). This is because suppliers and investors in general take into consideration the growth potential of firms in making investment decisions.

The empirical findings on the relationship between trade credit and firm growth are mixed. While some studies found positive relationship [e.g., Yazdanfar and Öhman (2015) in Sweden; Huang et al. (2019) in China; Niskanen and Niskanen (2006) in Finland; Xia (2016) in China before the 2007–2008 financial crisis; Ferrando and Mulier (2013) in European countries], other studies reported a negative relationship [e.g., García-Teruel and Martínez-Solano (2010) in Europe; Xia (2016) in China during the 2007–2008 financial crisis; Oh and Kim (2016) in China]. In Africa, limited empirical evidence exists that may inform trade credit policy and practice, and thus the relationship between trade credit financing and firm growth remains an empirical question. Using a panel of listed firms in 19 African countries from COMPUSTAT database for the period 1998–2016, this chapter answers the question: does trade credit financing spur growth of listed firms in African countries? The chapter contributes to the literature in various ways. First, it concentrates on Africa, which is characterized by high financial and product market imperfections. Most of the evidence is from developed regions of the world and those on developing regions are outside Africa. Second, most studies examine either the effects of trade credit receivable or trade credit payable on firm growth, but this chapter uses three measures of trade credit: total trade credit, trade credit receivable, and trade credit payable. Thus, this chapter adds to the few studies (e.g., Oh and Kim 2016; Ferrando and Mulier 2013; Huang et al. 2019) that adopts a methodological approach that deals with trade credit from the supply and demand side concurrently on firm growth. Third, our methodological approach deals with problems of non-separability and endogeneity inherent in trade credit-firm growth relationships.

The rest of the chapter is organized as follows. The theoretical underpinnings and literature review are presented in Sect. 2. In Sect. 3, the data description and research methods are presented. Section 4 presents and discusses the empirical results while Sect. 5 concludes the study.

2 Theoretical Underpinnings and Related Literature

Firm Growth

The link between firm growth and economic development is one of the fundamental reasons precipitating firm growth studies. Firm growth represents a precondition for economic growth (Amha et al. 2013). In terms of conceptualization, Gupta et al. (2013) conceptualized firm growth quantitatively on the basis of revenue generation, value addition, and expansion in the volume of business. Kruger (2004) considered a qualitative dimension in terms of market position, quality of product, and goodwill of customers. Amha et al. (2013) conceptualized firm growth on the basis of the difference in employment between two time periods.

Theoretically, Gupta et al. (2013) identified two schools of thought on firms' growth paths. One school of thought argues that the growth path of firms is linear, which implies that we can predict firm growth. The second school of thought argues that the growth path of firms cannot be predicted since the path assumes a nonlinear dimension. Empirically, the most notable study on the determinants of firm growth is the relationship between firm size and growth; the relationship is explained by the Gibrat's law. Gibrat (1931) proposed that at any point in time, the size of a firm is the product of a series of random growth rates in the history of the firm, which implies that a firm's growth does not depend on its size at the beginning of a period. Gibrat's law sparked a wave of empirical studies to test its validity. While some studies supported the Gibrat's law (e.g., Fulton et al. 1995; Chen et al. 1985), others have rejected it (e.g., Evans 1987; Dunne et al. 1989; Mateev and Anastasov 2010; Variyam and Kraybill 1992).

Several other studies have examined the effects of other variables on firm growth. Lorunka et al. (2011) have shown that in small-scale firms, amount of capital at startup, owner's gender and growth strategy of the firm are significant determinants of growth. Mateev and Anastasov (2010) observed that the financial structure, productivity, and age of a firm are significant predictors of growth. Chaston and Mangles (1997) noted that the likelihood of meeting

growth targets increases if a firm pursues a multiple policy strategy. Hermelo and Vassolo (2007) provide evidence that financial resources, investment in newer technology, and diversification by geographic markets are important determinants of growth. Evans (1987), Dunne et al. (1989), and Variyam and Kraybill (1992) have shown that a firm's age is a correlate of growth.

Trade Credit and Firm Growth

The role of finance in economic development is locked in controversy. While neoclassical economists argued that finance only has a negligible effect on growth (Hao and Hunter 1997), other economists (see McKinnon 1973; Shaw 1973; Goldsmith 1969) have demonstrated that finance has a significant effect on growth by arguing that the financial system eliminates moral hazards and adverse selection situations and boosting the mobilization and allocation of resources to entrepreneurs and productive firms. Demirguc-Kunt and Detragiache (1998), Levine and Zervos (1998), and Rajan and Zingales (1998) have provided empirical evidence that shows that finance positively impacts growth.

At the micro-level, a notable area in the world of finance for firms is trade credit. The importance of trade credit is recounted in the fact that about 90% of global merchandise trade is on trade credit basis (Barrot 2016). The literature has demonstrated that trade credit is rife in either economies with under-developed or weaker financial systems, liquidity shocks and financial constraints, or with firms exposed to financial market imperfections and financial constraints (Fisman and Love 2003; Beck et al. 2008; Chen et al. 2017; Ferrando and Mulier 2013; Oh and Kim 2016; Petersen and Rajan 1997). In this regard, trade credit and bank credit act as substitutes (Fisman and Love 2003; McMillan and Woodruff 1999). Therefore, if the financial system is well-developed, firms rely on external financing for growth (Demirguc-Kunt and Maksimovic 1998; Beck et al. 2008).

Numerous theories have been identified to explain the rationale for trade credit. These theories are classified broadly into financial, operational, and commercial theories. Financial theories propose that firms have an urge in evaluation and control of credit risks than traditional financial institutions. For example, the financial position of customers is revealed through suppliers' information on quantities and frequency of orders (García-Teruel and Martínez-Solano 2010). Firms who have easy and cheap financial access to financial institutions use it to obtain credit, produce and extend trade credit to financially constrained firms (Petersen and Rajan 1997; Mian and Smith 1992; Yazdanfar and Öhman 2015).

The operational theory argues that trade credit eliminates uncertainties over maintaining cash balances to meet payments for deliveries, which promotes operating and cost efficiencies (Ferris 1981) and providing more flexibility in operations (Emery 1987). Bougheas et al. (2009) noted that trade credit presents the platform to manage inventory. Trade credit is also extended to reduce transaction costs (Petersen and Rajan 1997) and promote sales growth (Hyndman and Serio 2010; Blazenko and Vandezande 2003). Commercial theories postulate that trade credit is extended because firms aim to achieve certain commercial objectives. Cheng and Pike (2003) and Cunat (2007) identified that trade credit helps a firm to maintain its customer base by enhancing long-term relationships. In line with this, Ferrando and Mulier (2013) noted that trade credit is used to satisfy the needs of customers in temporary distress. Trade credit is a means of insurance against market shocks (Cunat 2007; Bams et al. 2016). For example, Boissay and Gropp (2007) noted that a firm that experiences liquidity shock uses trade credit to pass the risk to its suppliers.

Empirically, Ferrando and Mulier (2013) found that both accounts payable and receivable positively influences firm performance. They further found that while trade credit generally promotes firm growth, the impact is disproportionally higher for small firms. Fisman and Love (2003) found that trade credit induces higher rates of growth of industries in economies that have under-developed financial institutions. Ferrando and Mulier (2013) reported a positive effect of trade credit on firm growth and indicated that firms rely on trade credit to manage growth. Allen et al. (2019) observed that trade credit boosts firm performance while Huang et al. (2019) reported a positive effect of trade credit on sustainable firm growth. Oh and Kim (2016) found a strong relationship between firm growth and trade credit in private firms than in state enterprises in China. Yazdanfar and Öhman (2015) found that trade credit positively impacts sales growth.

3 Research Methods

Data Description

The firm-level data used in the chapter are drawn from COMPUSTAT and covers a 19-year period: 1998–2016. The COMPUSTAT database contains financial information of listed firms from 19 African countries for the period under consideration. From the African sub-sample, firms that do not engage in trade credit are dropped. Also, observations with negative or zero trade

Table 1 Distribution of observations across industrial sectors

S/N	Industry	Two-digit SIC code	Observations
1.	Agriculture, Forestry and Fishing	01–09	98
2.	Mining	10–14	334
3.	Construction	15–17	221
4.	Manufacturing	20–39	3095
5.	Transportation, Communications, Electric, Gas and Sanitary Services	40–49	710
6.	Wholesale Trade	50–51	484
7.	Retail Trade	52–59	609
8.	Finance, Insurance and Real Estate	60–67	75
9.	Services	70–89	864
10.	Public Administration	90–99	218
Total			6708

Source Standard and Poor Compustat Services (2017)

receivables, trade payable, sales (revenue), and assets are removed from the sample. Furthermore, all duplicate observations are identified and removed. The sample contains 6708 listed firms distributed across 19 African countries and 10 industrial sectors (see Table 1). Finally, all firm-year observations with missing values are dropped from the sample. Macro-level data are included to control for the business environment within which the firms operate. The data, which cover inflation rate, corporate tax rate, and national income are obtained from World Bank's World Development Indicators (WDI) database. This is matched with the firm-level data in terms of country of firms' operations and year for the analysis. After merging the COMPUSTAT and WDI data, the sample used in the econometric analysis varies from 2619 to 4790 depending on the type of analysis.

Variables

The model variables are presented in Table 2. In literature, common proxies used for firm growth include sales growth, asset growth, and employment growth (Oh and Kim 2016; Rahaman 2011; Ferrando and Mulier 2013; Dary and James 2019). In this chapter, the dependent variable, firm growth is proxied by sales growth (Sgrowth), calculated as current total sales (t) minus lagged total sales $(t-1)$ over lagged total sales $(t-1)$. Asset growth (Agrowth), measured as current total assets (t) minus lagged total assets $(t-1)$ over lagged total assets $(t-1)$, is used as an alternative measure of firm growth for robustness.

Table 2 Description and measurement of variables

Variable	Description	Measurement
Sgrowth	Sales growth	Current total sales (t) minus lagged total sales ($t - 1$) over lagged total sales ($t - 1$)
Agrowth	Assets growth	Current total assets (t) minus lagged total assets ($t - 1$) over lagged total assets ($t - 1$)
TTC	Total trade credit	Trade credit receivable plus trade credit payable scaled by total assets
AR	Trade credit receivable	Trade receivable scaled by total assets
AP	Trade credit payable	Accounts payable scaled by total assets
LnSize	Firm size	Natural logarithm of total assets
CFlow	Cashflow	Income before extraordinary items plus depreciation and amortization scaled by total assets
STFinance	Short-term finance	Ratio of current liabilities to total assets
FinanCost	Financing cost	Interest and related expenses over total liabilities minus accounts payable
Finventrs	Finished goods inventory	Ratio of finished goods inventories to total assets
Competiv	Competitive scope	1 = international firm and 0 = both domestic and international firm
Turnover	Turnover	Total sales minus trade receivable scaled by total assets
GPMargin	Gross profit margin	Revenue minus cost of goods sold divided by total sales
Mrkshare	Market share	Sales revenue of firm over industry sales revenue multiplied by 100
Inflation	Inflation rate	Annual inflation rate of country
CorpTax	Corporate tax rate	Corporate tax rate of country

(continued)

Table 2 (continued)

Variable	Description	Measurement
LnGDP	Gross domestic product	Natural logarithm of GDP of country
INDSECT	Industrial sector of firm's activity	Dummy for ten industrial sectors using two-digit SIC codes (see Table 1 for SIC codes)
SUBREG	Sub-region of Africa	Dummy for West Africa, East Africa, North Africa, Central Africa and Southern Africa
Time	Years	Dummies for years 1998–2016

The key independent variable, trade credit financing is measured as total trade credit (TTC). Total trade credit is trade credit receivable plus trade credit payable scaled by total assets. This definition and measurement have been employed in previous studies (see Ferrando and Mulier 2013; Huang et al. 2019). According to Ferrando and Mulier (2013, p. 3045), "it is not just the accounts payables or just the accounts receivable that matter, but the sum of the two, which works as a credit channel of trade." Segregating the trade credit financing into trade credit receivable (AR) and trade credit payable (AP), AR is calculated as trade receivable scaled by total assets and AP is accounts payable scaled by total assets. These are the widely used measures of trade credit demand and trade credit supply, respectively, in empirical studies (see e.g., Petersen and Rajan 1997; García-Teruel and Martínez-Solano 2010; Alarcón 2011; Oh and Kim 2016; Dary and James 2019). Following the financing, transaction, and commercial motives for firms engaging in trade credit financing, it is hypothesized that trade credit financing will have a positive effect on firm growth in Africa.

A number of firm-level variables are included as controls. The size of a firm may influence its growth (Oh and Kim 2016; Rahaman 2011; Jang and Park 2011); albeit the direction of effect cannot be determined a priori. While smaller firms should have more growth opportunities and should grow faster than larger firms, conversely, larger firms have more resources to invest in growth opportunities. The Gibrat's law (Gibrat 1931) which states that the growth rate of a firm is independent of its size has been widely tested in the empirical literature with mixed results [see for instance Santarelli et al. (2006) for an overview of the empirical literature on Gibrat's law]. Yasuda (2005) found a negative relationship in Japan while Yazdanfar and Öhman (2015) confirmed a positive relationship in Sweden. Gross profit margin and cashflow are included as measures of internal fund availability. According to

Hermelo and Vassolo (2007), profitability enhances a firm's capacity to access external financial resources since profitable firms are considered by investors as healthy firms. Besides, profits are a source of internal financing for firms to invest in growth opportunities (Hermelo and Vassolo 2007; Jang and Park 2011). Empirically, Jang and Park (2011) found a positive relationship between profitability and firm growth.

In line with Long et al. (1993) and García-Teruel and Martínez-Sola (2010), Turnover is measured as total sales minus trade receivable over total assets. As indicated by Long et al. (1993), lower turnover implies that the production time for the products is longer and thus the goods may be high-quality goods. The demand for such goods may be higher. Market share, an indicator of firms' competitiveness and market power (Kwenda and Holden 2014), can enhance firm growth. Since having larger market share puts firms in a competitive position both with customers and suppliers, it is expected that firms with larger market share will grow faster.

For the macro-level control variables, natural logarithm of per capita GDP (an indicator of the size of a country's economy), inflation rate, and corporate tax rate are included. It is expected that firm growth will be higher in larger economies, since growth opportunities will be more prevalent. The effect of inflation on firm growth is ambiguous (see e.g., Blakely and Sti 1991). Under inflation, a firm growth can be enhanced if its product prices can more than offset the increase in its inputs cost. Since higher inflation rates are undesirable, it is expected that firm growth will be higher in countries with low and stable rate of inflation. Higher corporate tax rate may curtail the ability of firms to invest in growth opportunities using internally generated funds. Fisman and Svensson (2007) found a negative association between tax rate and firm growth in Uganda.

The business environment may differ across the regions of Africa and thus may have differential impacts on firm growth. To that extent, the chapter controls for West African, East African, North African, Central African, and Southern African regions in the econometric models. Finally, industry dummies (10 industries) and year dummies (1998–2016) are included in the models to control for industry and time effects on firm growth.

Estimation Strategy

Firms finance their growth through various sources, implying the funding mode can determine firm growth. On the other hand, growth can influence the funding strategy of firms. In this regard, it is expected that firm growth and trade credit will be simultaneously determined. Bearing this relationship

in mind, we model the relationship between trade credit and firm growth in the following structural equations:

$$Growth_{it} = \alpha_0 + \alpha_1 Trade\,Credit_{it} + X_{it}^{'}\alpha + \mu_{it} \quad (1)$$

$$Trade\,Credit_{it} = \beta_0 + \beta_1 Growth_{it} + Z_{it}^{'}\beta + \vartheta_{it} \quad (2)$$

where $Growth_{it}$ is firm growth as measured by sales growth and asset growth; $Trade\,Credit_{it}$ as measured by total trade credit, trade credit payable (demand) and trade credit receivable (supply); $X_{it}^{'}$ and $Z_{it}^{'}$ are vectors of firm-level and country-level variables hypothesized to influence firm growth and trade credit respectively. μ_{it} and ϑ_{it} are composite error terms comprising time effect, fixed effect, and stochastic error. Equation one models firm growth as a function of trade credit and firm level and macroeconomic variables. Equation two models the effect of firm growth on trade credit while controlling for firm and country-specific variables.

Apart from the simultaneity problem, the error terms of the two equations are correlated, implying that the two equations are non-separable. In order to handle this twin problem, we opt for the three stage least squares (3SLS) estimation strategy advanced by Zellner and Theil (1962). This strategy is employed because unlike OLS and single equation instrumental variable methods, it is able to deal with endogeneity and non-separability at the same time by allowing the inclusion of endogenous regressors and permitting cross correlations in the error terms. In this framework, all dependent variables are treated as endogenous while all right-hand side variables except otherwise indicated are treated as exogenous and used as instruments. The 3SLS is more efficient than 2SLS when there are intercorrelations among the error terms. The larger the intercorrelations among the error terms the greater this advantage (Belsley 1988). Relative to 2SLS, 3SLS provides an estimate of the cross equation correlations in the disturbances and for that matter produces more efficient results when the cross correlations are not zero. For the sake of robustness, we have provided estimates for both 3SLS and 2SLS.

4 Results and Discussion

Descriptive Analysis

Table 3 presents descriptive statistics of trade credit and firm growth across industries. Manufacturing firms dominate the sample, constituting about

Table 3 Trade credit and firm growth by industry

S/N	Industry	2-digit SIC code	Obs	AR	AP	TTC	Sgrowth	Agrowth
a	**All industries**		**6708**	**0.171**	**0.144**	**0.316**	**0.887**	**0.847**
b	**Sub-Industries**							
1.	Agriculture, Forestry and Fishing	01–09	98	0.129	0.090	0.220	2.366	2.156
2.	Mining	10–14	334	0.104	0.087	0.191	1.133	0.290
3.	Construction	15–17	221	0.333	0.179	0.512	0.288	0.372
4.	Manufacturing	20–39	3095	0.144	0.122	0.266	0.902	0.858
5.	Transportation, Communications, Electric, Gas & Sanitary Services	40–49	710	0.145	0.116	0.262	0.226	0.246
6.	Wholesale Trade	50–51	484	0.262	0.275	0.537	0.685	0.623
7.	Retail Trade	52–59	609	0.230	0.253	0.482	1.564	1.425
8.	Finance, Insurance and Real Estate	60–67	75	0.131	0.165	0.296	0.642	1.533
9.	Services	70–89	864	0.201	0.118	0.319	0.783	0.871
10.	Public Administration	90–99	218	0.140	0.137	0.277	1.350	1.928

Note AR is trade credit receivable, AP is trade credit payable, TTC is total trade credit, Sgrowth is sales growth, Agrowth is asset growth and Obs is observations

46.14% of the sample. On average, firms extend about 17.1% of their total assets as trade credit to their customers while trade credit received from suppliers constitutes about 14.4% of total assets. This finding suggests that, on average, firms are net suppliers of trade credit. The top trade credit suppliers are firms in the construction, wholesale and retail industries. The top trade credit receiving firms are in the retail and wholesale industries. Trade credit financing (total trade credit) constitutes about 31.6% of firms' total assets. The wholesale, construction, and retail industries are the top industries in relation to trade credit financing. These findings show that trade credit is a major source of short-term finance for firms in Africa, a region characterized by high financial market imperfections.

The average sales and assets growth rates for the period under consideration are relatively high. The agriculture, forestry and fishing industry (236.6%), retail trade industry (156.4%), and public administration industry (135%) are driving the high average sales growth (88.7%). The average asset growth is 84.7%, with agriculture, forestry and fishing (215.6%), public administration (192.8%), and finance, insurance and real estate (152.3%) being the leading industries. These high sales and asset growth rates may be attributable to mergers and acquisitions, capital investments, and expansion of services in both domestic and international markets. The descriptive statistics of independent variables used in the econometric models are presented in Table 4. The average inflation and corporate tax rates are high, 30.33 and 20.08%, respectively. This may adversely affect firm growth, unless firms are able to innovate around them. The average firm in the sample is large, holding about 103.358 billion dollars in total assets.

Empirical Results: 2SLS and 3SLS Regressions

In Table 5, we present results of the effect of trade credit financing on firm growth. The main results are the 3SLS results, the 2SLS results are presented for robustness. The models are well fitted as shown by the significance of the *F*-Statistics. From the 3SLS (model 1) and 2SLS (model 3) estimations, trade credit financing (TTC) is positively and significantly related to firm growth at the 1% level. However, the marginal effects of TTC from the 3SLS results are higher than the 2SLS results. The results suggest that the use of trade credit financing enhances the growth of firms in Africa. Thus, trade credit financing creates opportunities for firms to expand their operations and serves as a route for boosting sales and thus growth. This finding is consistent with findings from other empirical studies. Among Chinese listed firms, Huang et al. (2019) employed a 2SLS instrumental variable estimation procedure and

Table 4 Descriptive statistics of independent variables

Variable	Obs	Mean	Standard deviation	Minimum	Maximum
TTC	6708	0.316	0.233	0.002	1.464
AR	6708	0.171	0.142	0.000	0.884
AP	6708	0.145	0.139	3.60e-06	1.378
CFlow	5773	0.136	0.104	0.001	2.463
STFinan	6708	0.356	0.193	0.005	2.445
FinanCost	6070	0.064	0.187	0	12.733
Size	6708	103,358	2,849,060	3.477	1.91e + 08
Turnover	6708	1.088	0.894	0.003	17.107
GPMargin	6442	0.371	0.398	−8.462	25.489
Finventrs	6453	0.065	0.102	0	0.668
Competiv	6708	0.945	0.229	0	1
Mrktshare	6708	0.061	0.747	4.98e-09	44.846
GDP	6708	2.41e + 11	1.45e + 11	527.962	4.64e + 11
Inflation	6592	30.325	58.151	−2.410	302.308
CorpTax	4594	20.081	6.100	1.600	33.200

Note TTC is total trade credit, AR is trade credit receivable, AP is trade credit payable, CFlow is cashflow, STFinan is short-term finance, FinanCost is financing cost, Size is firm size, Turnover is sales turnover, GPMargin is gross profit margin, Finventrs is finished goods inventory, Competiv is competitive scope, Mrkshare is market share, GDP is gross domestic product, Inflation is inflation rate, CorpTax is corporate tax rate and Obs is observations. For the econometric models, natural log of firm size (LnSize) and GDP (LnGDP) are used

found that trade credit financing positively influences sustainable growth of firms. In eight European countries, Ferrando and Mulier (2013) established that trade credit financing significantly contributes to firm growth.

Among the control variables, firm size, inflation and country size are significant in the 3SLS and 2SLS results. The results imply that firm growth is lower in countries with higher inflation rates. Also, firms in larger countries experience lower growth, suggesting that there are more growth opportunities for firms in lower income countries relative to higher income countries. Furthermore, the results suggest that growth is higher among larger firms, and thus rejects Gibrat's law. Additionally, cashflow (positive effect), market share (positive effect), and sales turnover (negative effect) have significant effect on firm growth in the 3SLS estimation. Firms in East Africa and Central Africa experience lower growth rates relative to firms in Southern Africa. The business environment in Southern African countries may be friendlier for firm growth.

Having found trade credit financing to be significant and positively associated with firm growth, we test separately, if its components, trade credit receivable and trade credit payable are important in explaining firm growth

Table 5 Effects of total trade credit on sales growth (2SLS and 3SLS results)

Variables	3SLS		2SLS
	(1) Sgrowth	(2) TTC	(3) Sgrowth
Sgrowth		0.003	
		(0.017)	
TTC	1.158***		0.206***
	(0.248)		(0.065)
CFlow	0.830***	−0.052	−0.121
	(0.261)	(0.035)	(0.255)
STFinan		0.535***	
		(0.019)	
FinanCost		0.114***	
		(0.026)	
Turnover	−0.114***	0.041***	0.014
	(0.037)	(0.004)	(0.019)
GPMargin	−0.110	−0.090***	0.062
	(0.127)	(0.015)	(0.076)
lnSize	0.061***	−0.023***	0.020***
	(0.011)	(0.001)	(0.007)
Finventrs		−0.134***	
		(0.027)	
Competiv		0.065***	
		(0.014)	
Mrktshare	0.132***	0.002	0.123
	(0.025)	(0.004)	(0.11)
lnGDP	−0.107***	0.005*	0.061**
	(0.02)	(0.003)	(0.025)
Inflation	−0.000***		(5.91e-05**)
	(4.12e-05)		(2.49e-05)
CorpTax	0.001		0.000
	(0.001)		(0.001)
West Africa	−0.018	−0.110***	−0.025
	(0.072)	(0.008)	(0.059)
East Africa	−0.502***	−0.038***	0.164**
	(0.081)	(0.014)	(0.075)
North Africa	0.023	−0.121***	0.123**
	(0.075)	(0.008)	(0.050)
Central Africa	−0.962*	0.165***	0.166
	(0.509)	(0.063)	(0.149)

(continued)

Table 5 (continued)

Variables	3SLS		2SLS
	(1) Sgrowth	(2) TTC	(3) Sgrowth
Constant	0.572	0.117	−1.766**
	(0.594)	(0.072)	(0.750)
Diagnostics			
Observations	3882	3882	2619
R-squared	0.098	0.576	0.048
F-statistic	13.10***	128.78***	4.10***
Hansen *J* statistic			5.426
Hansen *J* statistic (*p* value)			0.143
Time dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes

Note Sgrowth is sales growth, TTC is total trade credit, CFlow is cashflow, STFinan is short-term finance, FinanCost is financing cost, Turnover is sales turnover, GPMargin is gross profit margin, lnSize is natural logarithm of firm size, Finventrs is finished goods inventory, Competiv is competitive scope, Mrkshare is market share, lnGDP is natural logarithm of gross domestic product, Inflation is inflation rate, and CorpTax is corporate tax rate. Standard errors in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

and the direction of effect. Again, the estimation is via 3SLS and 2SLS methods. The results are presented in Table 6. The results (models 3 and 6) show that trade credit receivable positively and significantly influences firm growth, consistent with Yazdanfar and Öhman's (2015) finding in Sweden. Trade credit payable also has positive and significant effect on firm growth (models 1 and 5), consistent with findings by Fisman and Love (2003) and Xia (2016). However, Oh and Kim (2016) found an inverse relationship between firm growth opportunities and trade credit payable and trade credit receivable among Chinese listed firms.

Robustness Checks

As robustness check, asset growth, another measure of firm growth, is employed. The estimated results are reported in Tables 7 and 8. From Table 7, the effect of trade credit financing on asset growth is positive and significant at the 1% level, consistent with the earlier results reported in Table 5. However, the marginal effects are smaller compared to the models with sales growth. The 3SLS results show that turnover and corporate tax rate have significant negative effect on asset growth, while firm size, market share, and country size are significantly and positively related to asset growth. Again, when trade credit financing is segregated into trade credit receivable and trade

Table 6 Effects of trade credit receivable, trade credit payable on sales growth (2SLS and 3SLS Results)

Variables	3SLS		3SLS		2SLS	2SLS
	(1) Sgrowth	(2) AP	(3) Sgrowth	(4) AR	(5) Sgrowth	(6) Sgrowth
Sgrowth		−0.000		0.003		
		(0.010)		(0.013)		
AP	1.887***				0.278***	
	(0.414)				(0.106)	
AR			2.794***			0.227***
			(0.611)			(0.063)
CFlow	0.879***	−0.054***	0.744***	0.004	−0.02	0.092
	(0.263)	(0.021)	(0.264)	(0.027)	(0.212)	(0.132)
STFinan		0.321***		0.214***		
		(0.011)		(0.015)		
FinanCost		0.076***		0.038*		
		(0.015)		(0.020)		
Turnover	−0.156***	0.047***	−0.044	−0.006*	0.037*	0.006
	(0.044)	(0.002)	(0.031)	(0.003)	(0.022)	(0.011)
GPMargin	−0.154	−0.033***	−0.056	−0.058***	0.096	−0.166***
	(0.125)	(0.009)	(0.134)	(0.012)	(0.081)	(0.041)
lnSize	0.0421***	−0.004***	0.088***	−0.019***	0.020**	0.026***
	(0.010)	(0.001)	(0.016)	(0.001)	(0.020)	(0.007)
Finventrs		−0.016		−0.110***		
		(0.016)		(0.020)		
Competiv		0.026***		0.044***		
		(0.008)		(0.010)		
Mrktshare	0.135***	−5.42e-05	0.128***	0.0021	0.100	0.072
	(0.025)	(0.002)	(0.026)	(0.003)	(0.120)	(0.077)
lnGDP	−0.102***	0	−0.114***	0.005**	0.143***	0.024
	(0.020)	(0.002)	(0.021)	(0.002)	(0.039)	(0.017)
Inflation	−0.000***		−0.000***		7.08e-06	−3.23e-05
	(4.12e-05)		(4.21e-05)		(4.41e-05)	(2.14e-05)
CorpTax	0.001		0.001		−0.002	0.000
	(0.001)		(0.001)		(0.001)	(0.001)
West Africa	−0.029	−0.061***	−0.013	−0.049***	−0.03	−0.056

(continued)

Table 6 (continued)

Variables	3SLS		3SLS		2SLS	2SLS
	(1) Sgrowth	(2) AP	(3) Sgrowth	(4) AR	(5) Sgrowth	(6) Sgrowth
	(0.072)	(0.005)	(0.073)	(0.006)	(0.058)	(0.050)
East Africa	−0.507***	−0.021**	−0.497***	−0.018	0.367***	0.026
	(0.080)	(0.008)	(0.082)	(0.011)	(0.101)	(0.051)
North Africa	−0.036	−0.043***	0.094	−0.0772***	0.184***	0.073**
	(0.075)	(0.005)	(0.080)	(0.006)	(0.057)	(0.035)
Central Africa	−0.872*	0.056	−1.083**	0.108**	0.328**	0.116
	(0.507)	(0.037)	(0.523)	(0.048)	(0.153)	(0.111)
Constant	0.715	0.012	0.365	0.097*	−3.827***	−0.772
	(0.587)	(0.042)	(0.620)	(0.055)	(1.087)	(0.502)
Diagnostics						
Observations	3882	3882	3882	3882	2796	4605
R-squared	0.097	0.580	0.058	0.354	0.069	0.048
F-statistic	13.04***	130.75***	12.55***	52.08***	3.27***	5.52***
Hansen *J* statistic					1.859	0.015
Hansen *J* statistic (*p* value)					0.395	0.901
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note Sgrowth is sales growth, AP is trade credit payable, AR is trade credit receivable, CFlow is cashflow, STFinan is short-term finance, FinanCost is financing cost, Turnover is sales turnover, GPMargin is gross profit margin, lnSize is natural logarithm of firm size, Finventrs is finished goods inventory, Competiv is competitive scope, Mrkshare is market share,, lnGDP is natural logarithm of gross domestic product, Inflation is inflation rate, and CorpTax is corporate tax rate. Standard errors in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

credit payable, both have a significant positive effect on asset growth (see models 1, 3, 5, and 6, Table 8). These results are similar to those reported in Table 6, where firm growth is measured by sales growth, albeit, their marginal effects are now generally smaller. The results are thus robust to different measures of firm growth.

Table 7 Effect of total trade credit on asset growth (2SLS and 3SLS results)

Variables	3SLS		2SLS
	(1) Agrowth	(2) TTC	(3) Agrowth
Agrowth		−0.769	
		(0.527)	
TTC	0.348***		0.176***
	(0.124)		(0.055)
CFlow	0.085	−0.117	−0.126
	(0.105)	(0.092)	(0.142)
STFinan		0.651***	
		(0.096)	
FinanCost		0.050**	
		(0.020)	
Turnover	−0.062***	0.014	−0.044***
	(0.018)	(0.027)	(0.012)
GPMargin	−0.006	−0.02	−0.017
	(0.024)	(0.021)	(0.011)
lnSize	0.042***	0.003	0.0142**
	(0.006)	(0.021)	(0.0058)
Finventrs		−0.161**	
		(0.077)	
Competiv		0.075	
		(0.115)	
Mrktshare	0.082***	0.067	0.125
	(0.012)	(0.044)	(0.079)
lnGDP	0.076***	0.063	0.055***
	(0.010)	(0.040)	(0.021)
Inflation	−8.58e-06		−4.05e-05
	(1.47e-05)		(2.48e-05)
CorpTax	−0.001***		4.09e-05
	(0.000)		(0.001)
West Africa	−0.082**	−0.159***	−0.041
	(0.034)	(0.055)	(0.049)
East Africa	0.102***	0.025	0.104*
	(0.040)	(0.048)	(0.061)
North Africa	0.088**	−0.033	0.036
	(0.035)	(0.056)	(0.04)
Central Africa	0.152	0.290	0.189**
	(0.229)	(0.207)	(0.092)

(continued)

Table 7 (continued)

Variables	3SLS		2SLS
	(1) Agrowth	(2) TTC	(3) Agrowth
Constant	−2.190***	−1.493	−1.390**
	(0.286)	(1.244)	(0.587)
Diagnostics			
Observations	4790	4790	3449
R-squared	0.061	−4.789	0.052
F-statistic	8.17***	14.66***	4.50***
Hansen *J* statistic			3.517
Hansen *J* (*p* value)			0.172
Time dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes

Note Agrowth is asset growth, TTC is total trade credit, CFlow is cashflow, STFinan is short-term finance, FinanCost is financing cost, Turnover is sales turnover, GPMargin is gross profit margin, lnSize is natural logarithm of firm size, Finventrs is finished goods inventory, Competiv is competitive scope, Mrkshare is market share, lnGDP is natural logarithm of gross domestic product, Inflation is inflation rate, and CorpTax is corporate tax rate. Standard errors in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

5 Conclusion and Policy Implications

Globally, trade credit is an important element of interfirm trade among non-financial firms. The motives underlying trade credit supply are captured broadly as transaction, financing, and commercial motives. Collectively, the goal is to increase sales. This suggests a nexus between trade credit supply and firm growth. In the face of limited empirical evidence in Africa to guide trade credit policy and practice, this chapter examines the effect of trade credit financing on firm growth in Africa. It employs a panel of publicly listed firms in 19 African countries for the period 1998–2016. The data are sourced from COMPUSTAT and World Development Indicators of the World Bank. Due to endogeneity concerns, the chapter employed 3SLS estimation procedure, with 2SLS estimation procedure included for robustness. Trade credit financing is found to have a statistically and economically significant positive impact on firm growth in Africa. The findings are robust to different measures of firm growth and trade credit financing and its components.

The findings of the study imply that firms that rely on trade credit as an alternative source of financing or making sales can hope to experience growth. With firm survival being very low in Africa due to lack of financing among other constraints, it is refreshing that trade credit can help reverse this trend. The results further imply that if African firms can remove bottlenecks that

Table 8 Effects of trade credit receivable, trade credit payable on asset growth (2SLS and 3SLS results)

Variables	3SLS		3SLS		2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
	Agrowth	AP	Agrowth	AR	Agrowth	Agrowth
Agrowth		−0.324		−0.448		
		(0.231)		(0.313)		
AP	0.557***				0.321***	
	(0.205)				(0.072)	
AR			0.860***			0.210***
			(0.305)			(0.070)
CFlow	0.079	−0.065	0.088	−0.052	−0.131	−0.172
	(0.105)	(0.040)	(0.105)	(0.054)	(0.167)	(0.161)
STFinan		0.367***		0.280***		
		(0.042)		(0.057)		
FinanCost		0.025**		0.024*		
		(0.010)		(0.014)		
Turnover	−0.072***	0.032***	−0.045***	−0.018	−0.036***	−0.017
	(0.021)	(0.012)	(0.014)	(0.016)	(0.014)	(0.012)
GPMargin	−0.008	−0.008	−0.004	−0.013	−0.009	−0.011
	(0.024)	(0.009)	(0.025)	(0.013)	(0.011)	(0.011)
lnSize	0.036***	0.007	0.050***	−0.003	0.004	0.007
	(0.005)	(0.009)	(0.008)	(0.012)	(0.005)	(0.005)
Finventrs		−0.014		−0.155***		
		(0.035)		(0.051)		
Competiv		0.027		0.056		

Variables	3SLS (1) Agrowth	(2) AP	3SLS (3) Agrowth	(4) AR	2SLS (5) Agrowth	2SLS (6) Agrowth
		(0.051)		(0.069)		
Mrktshare	0.083***	0.026	0.080***	0.041	0.017	0.011
	(0.012)	(0.019)	(0.012)	(0.026)	(0.029)	(0.030)
lnGDP	0.077***	0.024	0.074***	0.039	0.064***	0.061***
	(0.010)	(0.017)	(0.010)	(0.024)	(0.021)	(0.020)
West Africa	−0.081**	−0.082***	−0.082**	−0.078**	0.026	0.029
	(0.034)	(0.024)	(0.034)	(0.033)	(0.042)	(0.042)
East Africa	0.101**	0.005	0.104***	0.020	0.177***	0.169***
	(0.040)	(0.021)	(0.040)	(0.029)	(0.063)	(0.062)
North Africa	0.076**	−0.006	0.108***	−0.026	0.048	0.057
	(0.035)	(0.024)	(0.037)	(0.03)	(0.042)	(0.043)
Central Africa	0.173	0.117	0.123	0.171	0.163*	0.164*
	(0.229)	(0.091)	(0.231)	(0.123)	(0.097)	(0.095)
	(0.104)	(0.049)	(0.104)	(0.067)		
Inflation	−7.56e-06		−1.18e-05		−3.22e-05	−2.96e-05
	(1.53e-05)		(1.56e-05)		(2.09e-05)	(2.09e-05)
CorpTax	−0.001***		−0.001***		−0.000	−0.000
	(0.000)		(0.000)		(0.001)	(0.001)
Constant	−2.143***	−0.658	−2.247***	−0.851	−1.605***	−1.547***

(continued)

Table 8 (continued)

Variables	3SLS (1) Agrowth	(2) AP	3SLS (3) Agrowth	(4) AR	2SLS (5) Agrowth	2SLS (6) Agrowth
	(0.284)	(0.544)	(0.292)	(0.737)	(0.580)	(0.582)
Diagnostics						
Observations	4790	4790	4790	4790	3143	3143
R-squared	0.058	−2.184	0.051	−4.349	0.036	0.035
F-statistic	8.07***	21.91***	7.97***	9.39***	3.95***	3.45***
Hansen *J* statistic					1.242	1.025
Hansen *J p* value					0.265	0.311
Time dummies	Yes	Yes	Yes	Yes	Yes	yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	yes

Note Agrowth is asset growth, AP is trade credit payable, AR is trade credit receivable, CFlow is cashflow, STFinan is short-term finance, FinanCost is financing cost, Turnover is sales turnover, GPMargin is gross profit margin, lnSize is natural logarithm of firm size, Finventrs is finished goods inventory, Competiv is competitive scope, Mrkshare is market share, lnGDP is natural logarithm of gross domestic product, Inflation is inflation rate, and CorpTax is corporate tax rate. Standard errors in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

make trade credit cumbersome, this could facilitate trade credit and for that matter increase trade credit volumes, and this could lead to firm growth and hence economic development.

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"Flying Geese" or False Promises: Assessing the Viability of Foreign Direct Investment-Driven Industrialization in Nigeria's Shoe Manufacturing Industry

Aisha C. Udochi

1 Introduction

In the context of health and ecology, things that grow unchecked are often considered parasitic or cancerous—Jenny Odell (2019)

Since the mid-2000s, Nigeria's 6% annual economic growth has provided analysts with hope for sustained growth. (Dada 2018; Brookings). The recent success, however, belies Nigeria's disappointing economic history following independence in 1960. The country failed to leverage its significant economic advantages to emerge as a postcolonial power on the African continent (Ogunde 2020). Even today, Nigeria's positive gross domestic product is an oil slick veneer disguising increasing social, economic, and geographic inequality rooted in its history.

In 1970, more than 40% of Nigeria's exports were unrelated to its vast petroleum reserves. Since that time, oil exports have continued to grow, claiming 90% of the nation's export revenue by the 1990s (Sun 2017). Oil powered Nigeria's economy. Due to the enclave and capital-intensive nature of the oil industry, its potential to spur broader national economic growth failed to propagate technological progress, human capital development, and job creation. Revenue from the oil sector reliably supplies 80% of

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the national budget, making Nigeria appear ostensibly functional. However, state management of its oil industry and its budgetary reliance on oil discourages an environment of industrial development outside of federal government control.

Nigeria's creation of new employment opportunities chronically fails to keep pace with its population growth. Unemployment is an estimated 87 million people, or about 44% of Nigeria's population, living on less than $1.90 a day.[1] Today, Nigeria's population is approximately 200 million, annually growing at 2.7–3.2%. By 2050, demographers anticipate Nigeria's population to be 410 million.[2] Nigeria's population is young. Sixty-two percent of the population is younger than 25 years; 83% are under 40 (Ogbeide et al. 2015). Only 2.75% of the population 65 years or older.

As a macroeconomic indicator, youth unemployment, defined as those between the ages of 15 and 24, actively seeking paid employment, underlies an important narrative of "jobless growth" and "growth without development." Nigerian youth appear to suffer the most for its oil-driven economy and the pedagogical fixation on GDP growth that justifies it. As a result, this largest component of the population suffers from disillusion and disaffection. The employment crisis spawns the question of *how* Nigeria should develop.

Many business analysts and economists believe that industrialization is fundamental to Nigeria's economic growth and that manufacturing can pave the way. Furthermore, "the way" can be depicted as a V formation following the flying geese theory (FGT) of development. FGT focuses on three dimensions: the intra-industry dimension, the interindustry dimension, and the international division of labor dimension.[3] Specifically, FGT dictates that lesser developed economies with lower wage costs can industrialize via knowledge and technology transfer from the foreign direct investment (FDI) of economically advanced countries.

FGT describes the movement of manufacturers from country to country, as well as the process of industrial upgrading from crude to complex products within each country. In this economic transformation, knowledge and technology transfer occurs through emulative learning facilitated by multinationals (MNCs) and government activities. Although it is not automatic, knowledge and technology transfer is nonetheless a potent mediator for development.[4]

In the World Bank policy working paper, *Applying the Growth Identification and Facilitation Framework (GIFF): The Case of Nigeria*, Justin Yifu Lin and Volker Treichel (2011) operationalize the key insights of FGT to develop a methodology for identifying sectors in which a host country may have a latent comparative advantage for reducing constraints to facilitate private

firms' entry into those industries. GIFF identified the following industries in Nigeria: food processing, light manufacturing, suitcases, shoes, car parts, and petrochemicals. GIFF also prescribed targeted government interventions—(i) macroeconomic policies that create a more favorable environment for private investment; and (ii) sectoral policies, such as banking consolidation exercises that directly boost growth in the economy.

This strategy of investment promotion is historically funded by remittances and FDI. In particular, FDI provides the blueprint for production structures that indigenous entrepreneurs and enterprises can eventually adapt to take over parts of the value chain within an industry. For this reason, the comparator country to both reference and emulate is critical. Based on factor endowments, demography, and income levels, GIFF selected Vietnam, Indonesia, India, and China as comparators with Nigeria.

With Chinese direct investment in Africa exhibiting considerable growth since 2015 and reaching unprecedented levels across West Africa in 2019, Chinese industrialists running private small, medium, and large enterprises were identified as "leading geese." The capture and utilization of Chinese investment to enhance national development have increasingly gained importance. How well the Nigerian government engages its citizenry and private Chinese stakeholders to achieve mutually beneficial outcomes remains unclear.

To measure the impact of the Chinese investment within a particular business sector, this paper provides a preliminary assessment of associated knowledge and technology transfer mechanisms within the shoe manufacturing industry. The author conducted field research in August and September 2019 to discern any gaps and to be able to address questions for FGT as a catch-up strategy for Nigerian development. The literature review served to contextualize underdevelopment, entrepreneurship, and FDI in Nigeria. The fieldwork was an ethnographic study comprised of semi-structured interviews. Carried out in Lagos and Aba, Nigeria, this investigation assessed entrepreneurial opportunities derived from the transformation of knowledge and technology into wealth-creating innovations. Specifically, the author investigated a well-established Chinese-owned flip-flop manufacturing plant in Lagos and a technical and vocational education training exchange program that sent shoemakers from Aba to Chengdu, China.

2 Literature Review

Contextualizing Nigeria's Underdevelopment Trends

At the dawn of independence from colonial rule, many analysts forecasted positive economic prospects for Africa. The continent's major economies rested on a modest foundation, usually in mining or farming, which could be expanded and used to leverage rapid industrialization (Moss 2011). Government policies emphasized to select industrial sectors left behind by European colonizers, buoyed by optimism garnered from being newly independent.

Africa's growth in the immediate "post-independence" era was modestly positive, with income per capita rising about 2.6% per year during the 1960s (Moss 2011). Thandika Mkandawire, Chair of African Development at the London School of Economics, points out that if one takes a growth rate of 6% over more than a decade as a measure of successful development performance, then from 1967 to 1980, 10 countries on the continent managed to enjoy such growth. Among such countries was Nigeria. However, Nigeria's domestic savings, which averaged 21.5% from independence to 1980, fueled most growth during this period (Mbeki 2009).

Most African leaders took a structuralist approach during this early period. They attempted and failed to remedy economic ills with imports. Few countries successfully made the transition beyond a skeleton of the inherited colonial economy in the post-independence 1960s' "big push" for African industrialization.

Chinua Achebe, a Nigerian scholar and author of *Things Fall Apart*, reflects the prevailing consensus that Nigeria was not one of these fortunate few. In his memoir, *There Was a Country* (2012), Achebe describes how the civil war between 1967 and 1970 and its series of coups fostered a culture of in-group/out-group bias and godfatherism that continues to plague the nation's development.[5]

By the 1970s, most African countries' economic strategies were unsustainable. Economic growth slowed, debts mounted, and capital fled the continent. Many African economies turned to international finance institutions (IFIs), heralding in an era of structural adjustment where loans dictated policy changes. Often referred to as Africa's "lost decade," the 1980s saw average incomes decline by 1% per year, and the continent's average growth rate slowed to 0.9% per year (Moss 2011).

The 1990s offered little improvement. Income per capita lost 0.4% per year. The World Bank observed [In *Can Africa Claim the 21st Century?*] that despite gains in the second half of the 1990s, average income per capita was

lower than at the end of the 1960s. Average growth in Africa returned to 2.6% annually between 2000 and 2008.

The number of Nigerians living below the poverty line increased from 19 million in 1970 to 90 million in 2000. Massive economic inequality emerged (Mbeki 2009). Nigeria had a real GDP per capita growth rate of −0.38% in 2019 as compared to 22.18% in 1970 (World Bank). A steep rise in youth unemployment between 2009 and 2019 from 9.49 to 19.58% placed a tremendous burden on Nigeria's young, growing population (Federal Reserve Economic Data date?).

In 2020, 60 years after the initial "big-push," the development path of choice for Africa remains industrialization. This time, however, industrialization is inspired by China's meteoric economic rise since 1979 as well as the Chinese Communist Party's (CCP) promise to be a development partner to the Global South.[6]

History of Chinese Foreign Direct Investment in Nigeria

Despite Nigeria's chronic underdevelopment and recurrent political strife, China has invested since the 1960s in Nigeria's light manufacturing sector (i.e., production, processing, assembly, or smelting) primarily through subsidiaries of domestic Chinese companies. Initially, ethnic Chinese nationals from Shanghai and Hong Kong managed the Nigerian production of textiles, shoes, bread and biscuits, plastic bags, steel, and ceramics for the Nigerian domestic (Brautigam et al. 2018). More vertically integrated than its African counterparts, Chinese operations soon dominated the production of enamelware, plastic sandals, and building materials.

Chinese investors viewed Nigeria's market as underserved. The Chinese industrialists engaged in long-term planning and relied upon reduced input costs and local knowledge to return healthy profits. Many of the Chinese operators in Nigeria were previously involved in trade, and this experience was invaluable in starting and managing factories. As Irene Sun (2017) noted, Chinese factories in Nigeria leveraged "pure" capitalism. They were responsive to Nigerian consumer needs and targeted ever-lower price points to access mass markets.

Auto Parts Industry

Over two decades ago, Deborah Brautigam, Director of Johns Hopkins University's China Africa Research Initiative (CARI), documented the

contact between Nnewi Nigerian manufacturers and ethnic Chinese traders and manufacturers. In 1997, she found that Chinese-branded automobile parts undercut original manufacturer parts by more than 50%. China's "Super Filter" sold for ₦200, while original "Bolus" and "Dorian" oil filters sold for ₦550. Such practices continue to the present but are evident in numerous industry sectors. A 2006 study of Nnewi manufacturers found that 75% of the firms ranked the "Asian challenge" as "very severe" and accused Asian exporters of "dumping" (Brautigam 2007).

Brautigam found that the openness of Nigerian entrepreneurs enabled the diffusion of local knowledge transfer to Chinese companies. For example, Brautigam's 2004 fieldwork observed Nnewi firms hosting an average of four foreign technical staff members, many of whom were from China. Some companies also sent Nigerian workers to Shenzhen, China, for on-the-job training in Chinese factories. In 2016 Brautigam updated her analysis of knowledge and technology transfer in light manufacturing between China and Nigeria. She found that joint ventures were effective in encouraging knowledge and technology transfer. For example, the Nigerian-owned Innoson Vehicle Manufacturing company held a 55% stake in a tire and tube company located in Wuxi, China. However, in the context of an agglomerated auto parts industry, this isolated case represented a minuscule opportunity for knowledge and technology transfer by Chinese FDI to Nigeria's light manufacturing industry (Chen et al. 2016).

Textile Industry

In 1955, northern Nigerian government officials, working with the British textile firm David Whitehead & Sons, began planning the first large textile manufacturing mill in Nigeria. Kaduna Textiles Limited (KTL), which began production in 1957 (Maiwada and Renne 2013). KTL was an immediate success. With direct British investment, other textile firms soon established operations in the country. In 1964, Hong Kong-based CHA Textiles established United Nigeria Textile, PLC (UNTL) in Kaduna state. It became Nigeria's largest company.[7] Textile manufacturing continued its expansion even during the oil boom of the 1970s.

Beyond factory jobs, the textile industry generated additional employment in initial processing, distributors who sold the finished cloth, domestic cotton growing, and suppliers meeting a demand for factory machinery components. At its height, the industry directly employed one million workers. Its value chain accounted for several million ancillary jobs and constituted

the second-largest employer after the government (Sun 2017). After Egypt, Nigeria became the second-largest textile producer in Africa.

The textile industry sustained its growth despite Nigerian political turmoil and abrupt shifts in industrial policy. However, government implementation of a structural adjustment program in 1986 deregulated the naira and made imports of spare parts and modern weaving equipment prohibitively expensive. At the same time, changes in international textile trade agreements and the liberalization of local textile manufacturing eroded Nigeria's international bargaining power (Sun 2017).

Chinese textiles swamped the Nigerian market, offering greater variety and lower prices (Akinrinade and Ogen 2008). By 1997, the large KTL and UNTL factories were barely functioning, operating with obsolete equipment, lacking capital to obtain spare parts, and struggling with irregular electrical service. In 2007, both iconic mills and over 170 indigenous textile-related companies closed. According to the Director General of the Nigerian Textile, Garment, and Tailoring Employers' Association, over half a million textile workers lost their jobs. Over two million other textile-related jobs evaporated (Akinrinade and Ogen 2008).

By 2010, Chinese wholesalers had edged Nigerian traders importing cloth from China out of the market by Chinese wholesalers. Chinese industrialists became dominant in nearly every facet of the industry because, as Ian Taylor noted, "it is virtually impossible even for the most efficient Nigerian textile manufacturers to compete with Chinese products" (Maiwada and Renne 2013).[8] A 2018 study found no Chinese textile or garment factories remaining in Nigeria (Brautigam et al. 2018). Although consumers benefitted from lower-priced Chinese textiles of reasonable quality, the hollowing out and cannibalized market share of the domestic textile industry resulted in high unemployment levels. In 2013, the former governor of the Central Bank of Nigeria warned, "China takes from us primary goods and sells us manufactured ones. This was also the essence of colonialism." Agubamah writes, "The relationship between Nigeria and China is not a Win–Win situation as being claimed by China but rather Win-Lose situation as reality shows" (Adunbi and Stein 2019, 195).

Footwear Industry

Indigenous firms in southeastern Nigeria have historically dominated the Nigerian footwear industry. The Nigerian footwear industry's unique attribute is a widely recognized apprenticeship system locally termed *imuahia*. It is referred to in the literature as the Igbo apprenticeship system

(IAS) indigenous to southeast Nigeria. The training gained prominence in the country's eastern region at the end of the civil war in 1970 funded by pooling the meager war settlement payments of £20 (Nigerian pounds) issued by the federal government to bank account holders from secessionist southeast Nigeria.

Thus, imu-ahia's intended function was to prevent poverty by mass-scaling opportunities for everyone or forming agglomerations instead of building conglomerates. Rather than pursue market accumulation and dominance, business owners or *Ogas* (term of respect for boss) aim to achieve an inclusive market that they could grow by dividing their share. Typically this materializes as business owners provide younger boys with housing and meals in exchange for apprenticeships, learning through immersive emulative practice. Apprenticeships lasted from five to eight years. More mature knowledge is required for three to four additional years. Upon graduating, business owners typically paid a lump sum to their apprentices to create their own business. Ndubisi Ekekwe, a professor and specialist in technological innovation, terms this communal approach to economics as "Igbo Umunneoma" (meaning good brethren) economics.

These horizontal spillovers of knowledge in the form of skilled labor moving or starting their businesses account for why Nafziger observed in his 1968 study that the scale of production within Nigeria's footwear industry was skewed. Large-scale operations (employing 100 people or more) numbered only two in the industry. Compared to the transgenerational knowledge possessed by Chinese industrialists who migrated to Nigeria, there was limited—if not nonexistent—transgenerational knowledge regarding managing and organizing labor for large-scale industrial production. On the other hand, micro-sized enterprises, defined as businesses employing one to five people, were in abundance, especially in the east.

The footwear market currently is highly polarized. The privately owned Chinese flip-flop factory, identified in a case study by Sun, dominates the industry. Meanwhile, other producers are indigenous micro-scale operations collectively occupying only a small fraction of the total market share. In 2014, shoe manufacturing in Nigeria's economy was valued at N700 billion (or about $1.93 billion in 2014). Although textile production is nearly obsolete, apparel and footwear comprised the second-largest contributor to Nigeria's manufacturing sector (21% of all manufactured products). Of that subsector, footwear comprises 40%. All players compete against the 90.89% of shoe imports from China.[9]

Largely absent from the preceding narrative is a proactive and benevolent government mediation between FDI and the local economy. Since

the country's independence, the federal government structure has struggled to achieve positive long-term socioeconomic impact for all regions while simultaneously advancing the local community. For this reason, the Abia state government stands out for its local engagement and proactivity around industrial development.

Since 2015, the state administration has actively promoted the retail of local production across the country. In 2016, an e-commerce website was launched to promote "Made-in-Aba" goods. In 2017, the governor published the minutes from a meeting with a local shoemakers' union, where he promised to protect the shoemakers from increasing competition from Chinese investors. Intending to improve local competitiveness through "improved and upgraded processes and systems," the government arranged a vocational exchange sponsored by Sichuan China's provincial government. The program sent 30 leather wares manufacturers to Chengdu for a skills training initiative focused on automated shoemaking, a topic decided by the Abia state government.

These stylized facts underscore the argument that Chinese investment and the implementation of Chinese business models in Nigeria's light manufacturing sector introduces a reason for pause over any catalyzing potential toward industrialization. In doing so, an alternative set of questions arises, questions that more deeply probe assumptions undergirding the validity of a Chinese-led FG paradigm in Nigeria.

3 Methodology

The literature review prompted three key questions relevant to the flying geese hypothesis and its applicability to Nigeria: (1) Are Nigerian state actors mediating between foreign and indigenous players to cultivate long-term and mutually beneficial economic relationships? (2) Does industrialization via a "flying geese" theory necessarily lead to increased local entrepreneurship within shoe manufacturing? (3) Are factory jobs a foundation of broad-based prosperity for "the average Nigerian"?

This study examines knowledge and technology transfer to address these questions, looking for potential outcomes of a private Chinese firm and a public Sino-Nigerian technical and vocational education and training (TVET) partnership within Nigeria's shoe manufacturing industry. Indigenous entrepreneurship growth within the industry or structural changes to indigenous businesses would indicate meaningful Sino-Nigerian linkages.

During August and September 2019, the author traveled to Nigeria to assess the nature of Chinese direct investment in Lagos and the Chinese partnership in technical and vocational education and training (TVET) undertaken in 2018 for shoemakers in Aba.

This field research took the form of an ethnographic survey comprised of a 90 minutes semi-structured interview of the General Manager of the factory and the Head of Human Resources. In Aba, the author conducted individual interviews, each 20 minutes in length, with seven TVET participants. All names have been withheld to protect the privacy of study participants.

Before the interviews, the author conducted site visits to Ikorodu Industrial Estate, where the Chinese factory is located, and to the Ariaria International Market, where most shoemakers in Aba house their production.

4 Field Findings

Fieldwork found that knowledge and technology transfer in handcrafted shoe production via a local apprenticeship model has more effectively grown indigenous entrepreneurship and created more economic opportunities for Nigerians than a decades-old private Chinese direct investment in Lagos or the public partnership between Abian and Sichuan state governments TVET for Aba.

Private Chinese FDI, Lagos

The factory in the Industrial Estate of Ikorodu, Lagos, is an exemplar of capital-intensive mass production that has found operational and financial success in Nigeria since its establishment in 1962. The factory traces its origins to Mainland China, founded before the People's Republic of China. The company expanded to the British colony of Hong Kong and from there to another (then former) British colony, Nigeria. Today, the company is a conglomerate, producing steel, plastics, and footwear, each made in a different factory within Nigeria. Surviving most locally owned enterprises, this private Chinese enterprise withstood Nigeria's three military regime changes, a civil war, and tumultuous economic downturns since the nation gained independence. Today, the factory's ₦500-naira flip-flop (roughly US$1.39) is the cheapest on the market and ubiquitous throughout Nigeria.

The factory sits off an unpaved road prone to flooding and best navigated by *okada* (a local motorcycle taxi). In addition to its signature of

white and blue motif, the factory is distinct for its massive silver machinery, which accounts for its immense size. Pothole-filled roads lined the factory's perimeter, but on the factory's premises, one quickly notes a contrast. A sea of okadas, neatly parked in rows, flanked the main gate. Around them stood several young men filling out employment applications. The atmosphere behind the blue gates was utterly different from that of the outside world. The factory grounds were orderly, calm, and designed in a traditional Chinese architectural style. The cleanliness of the compound and the myriad of staff that included groundskeepers, security guards, and cooks, signaled the company invested heavily in creating and maintaining an ecosystem for its shoe production, which won the statewide Best Kept Industrial Premises Competition in 2018. The author observed the award hanging alongside others in the Office of Human Resources. The start-up costs and scale of production alone distinguish this factory. It is a physical representation of an unattainably high barrier for any ambitious Nigerian entrepreneur to compete in the sector.

In a 90-minutes interview within the factory compound, the author obtained a history of the firm and data on its operations, challenges, and knowledge transfer. While permitted to tour the compound's interior and exterior, company policy prevented access to factory floors. Mr. Monday, a Nigerian, serves as the Head of Human Resources (HR). Mr. Hillary, the Chinese General Manager, was hired six years ago following a successful career as a middle school teacher in Shaanxi Province. During the interview, the managers explained that Nigeria's business environment remains volatile and poses a formidable challenge due to unpredictable and often precarious macroeconomic conditions.

As a result, the flip-flop factory does not engage in any formal knowledge transfer with the local community or its employees. Instead, the company reinvests any productivity surplus back into the operations of the company. Low-skilled factory employment, combined with extreme poverty, does not prepare the hires to be later-day factory owners in the industry. Although the firm's presence and business activities have not sparked greater entry of local entrepreneurs into shoe manufacturing, as predicted by FGT, the company plays a primary role within the local market in providing stable employment and wages to the locals.

The factory employs about 3000 workers (including factory-floor workers, janitors, security personnel, and cooks) and 50 managerial staff. As a stable employer, working at the factory is highly prized. Mr. Monday explained that what differentiates the firm as an employer within the local labor market is a corporate culture of transparency, sacrifice, discipline, and integrity at

the managerial level. In his 20 years of working at the factory, Mr. Monday has never received a late payment, in stark contrast to local enterprises. Over 100 employees have worked at the factory for 10, 20, or even 30 years. He highlighted that stable management and operations have been a cornerstone of the firm's sustainability.

The factory operates from 7 a.m. to 6 p.m., with occasional shifts during the night and, until recently, even on Saturdays. For years, the factory has been powered entirely by a costly generator that allows the factory to operate their machines at night.[10] The company manages its margins using a single product design.

The factory floor is divided into five to six departments, each performing a specialized and designated task. Employees train in only one task. Given the limited skills required for performing a single, repetitive task, the company hires the "lowest cadre of workers,"[11] who are committed to working hard and abiding by company regulations.

The company's production relies primarily upon rubber, locally sourced from Ogun state and neighboring countries like Benin. All other inputs, such as the Y-shaped strap of the shoe, are imported alongside machinery that molds, cuts, and bonds the rubber within seconds. Imported materials subject the factory to import duties and price fluctuations. Distribution relies on informal networks of Nigerian buyers. Located in Lagos, a major consumer market, provides the factory easy, direct access to local distributors who will hawk shoes on the expressways and markets.

When identifying economic constraints to business, Mr. Monday emphasized limited road infrastructure, multiple tax districts, levies and tolls, port access, cheap imported substitutes, and distribution obstacles. Nigeria's complex and often tumultuous business environment limits potential new entrants and competitors in the market. In response to knowledge and technology transfer questions, Mr. Hillary admitted that such transfer is not happening. Mr. Monday explained that while Nigeria has regulations requiring local understudies to share foreign expertise and knowledge, the regulations are unenforced. Despite being near the Lagos State Polytechnic Ikorodu, management does not support employees wishing to attend.

Mr. Hillary reasoned that, "It is not up to employers and employees to enforce technology transfer." In contrast, he referenced China's developmental programs with multinationals, which enforces knowledge and technology transfer as an example of deliberate state adherence to the practice. Mr. Hillary agreed with Mr. Monday that the onus for knowledge transfer is on the state.

Fig. 1 Road to Ikorodu Industrial Estate (Lagos state), where private Chinese flip-flop factory is located

Ultimately, becoming an industrialist in shoe manufacturing on an extensive, capital-intensive scale remains inaccessible to the local population, even to those who have been employed by a successful shoe factory for decades. The transgenerational knowledge of organizing and operating a factory, the high capital start-up costs, and the economic uncertainty that comes with leaving stable employment neutralize any entry point into industrial shoe production for the average Nigerian factory hire.

The stark contrast between Nigerian shoemakers and Chinese industrialists became evermore explicit upon visiting the largest production site for shoemakers in the country located in Aba, in Abia state (Figs. 1, 2, 3, and 4).

Public Chinese Vocational Exchange Training Program, Aba

Aba is an 11-hour drive east of Lagos.[12] Conservative estimates to place the number of independent shoemakers in Aba between 16,000 and 30,000.

Fig. 2 Blockaded and partially submerged roads required a detour through open-air market to reach Ikorodu Industrial Estate (Lagos state)

Fig. 3 Private Chinese flip-flop factory production site, Ikorodu Industrial Estate (Lagos state)

Fig. 4 Flip-flop produced by Chinese factory (Lagos state)

The majority of these shoemakers operate independent micro-enterprises (employing 1–9 people) out of the Ariaria International Market. Teeming with life, the market is an active and convenient locus for shoe suppliers, manufacturers, and distributors to converge. However, Ariaria is prone to flooding and subject to unreliable electricity. The market is loud and densely populated, lined by narrow mud paths, and shaded only in part from the sun and rain by rusted tin corrugated roofs. There, shoemakers engage in artisanal production using handicraft rather than industrial techniques. Retail prices start at ₦500 ($1.39).

In January 2018, 30 shoemakers from Aba spent a month in Chengdu, Sichuan Province, to study automated shoe production techniques in a Chinese industrial factory. Because the operations tour was conducted in Chinese, the program relied on a single physical translator and on participants' phone translation apps to ask one-on-one questions. Participants rotated through three departments, with the bulk of skills training focusing on operating automated machines.

The participants returned from Chengdu in February 2018. When asked in November 2018, an Abia state government official stated that no plans were yet formalized to assess the trip's benefits. This investigator's field

research into the TVET program provides a window into public–private partnerships' efficacy as a knowledge transfer mechanism.

With a translator, the author conducted separate 20-minute interviews with seven of the 30 program participants. Discussions included the trip to China, the program's nature, and the resulting changes to their preexisting business model. Through semi-structured interviews, interviewees expressed their viewpoints on the vocational exchange program's learning outcomes and its impact on their shoe production and business prospects. They also provided insights into the domestic market and the extremely volatile conditions of Nigeria's business environment and uncertain economy (Table 1).

Only one interviewee was female. The oldest was in his late fifties. Six of the shoemakers had learned the trade as a means of subsistence. All seven were micro-enterprises that employed fewer than seven people. Two of the participants held university degrees.

During the trip to Chengdu, the Abia state government provided ₦100,000 naira (or about $277.78 USD) to each of the 30 participants. Most participants used the funds for their living expenses and gifts for family members. However, before leaving China, one participant, Chiamaka, managed to acquire pointed women's heels, which were hitherto unavailable in Aba—but no practical option existed for ordering from China's supplier to expand her product offering.

All participants expressed a high degree of satisfaction with the program, explaining how it was eye-opening for them. They learned about business formalization, design making, product finishing, and the efficiency of machines. One participant mentioned that he learned how shoes could be sold online and about the value of branding, which led him to register his business upon returning to Nigeria. Another participant said that he had begun adding hardeners to adhesives to improve his bond, a technique he learned in China. Strikingly, all participants attributed to the experience increased confidence in operating the machines, despite not having used any machine since returning to Aba.

Eighteen months after the trip to China, only one of the seven interviewees, Promise, had made a structural change to his business. This suggests that the interviewed cohort experienced limited effectiveness in transferring entrepreneurial activities since returning from the advanced training program in China.

After returning from China, Promise moved out of a workspace that he shared with 10 others in Ariaria International Market and into a private workplace. He also purchased an industrial sewing machine using his savings. As a

result of the private workspace and his capital investment, he said he increased his monthly output by 50 pairs of shoes.

Three participants still do not brand their shoes, and six of the seven interviewed shoemakers still produce low-priced footwear. The outlier, Chiamaka, represents a niche segment of Aba-based shoemakers who target a medium to high price point starting at ₦15,000 ($41.55) a pair. They leverage their handicraft production to supply bespoke shoes that compete with Italian and Canadian imports in quality and affordability.

Overall, the vocational exchange program has had a limited impact on engendering productive outcomes in monetary creation's purely economic sense (i.e., capital accumulation). While the program facilitated knowledge exchange and increased exposure to industry advancements, participants remarked that, as a result of the program, they are now keenly aware of how disadvantaged Nigeria is to compete globally. This is emblematic of how little participants have tangibly implemented knowledge acquired from the trip. This lack of implementation traces back to capital constraints, inaccessibility to inputs (not available for purchase in Nigeria), and an inability to use or continually practice on the automation machines they learned about in China.

The typical story was that many shoemakers learn the trade due to a passion for crafts and a need to have "something doing"—honest work to provide for and sustain oneself. One participant described shoemaking as a "last hope" for many people. Because employment opportunities are few and far between, having "something doing" gives people a way to earn money to survive.

Chiamaka represents an oft-overlooked segment of artisans producing bespoke shoes struggling to meet the domestic demand for "non-inferior" shoes.[13] Many of these artisans have university degrees but cannot find work in their respective fields of study. They opted for leather smithing and fabric weaving bespoke shoes instead. By honing their competitive advantages in craftsmanship and creativity, these Nigerian shoemakers avoid direct competition with Chinese and Euro-North American products. The shoes supersede expectations in attention to detail, quality, and craftsmanship, yet struggle to shed the connotation of inferiority linked to Nigerian-made shoes. Despite the accessible price, middle- and upper-class consumers still prefer purchasing imported shoes from Italy and Canada to start at ₦75,000 ($207.47).

What emerged in these discussions is that an indigenous apprenticeship model (and the Internet) educates and equips shoemakers more than Chinese investment or vocational exchange. Six of the seven served as apprentices in handicraft shoe production and have since become masters employing

Table 1 Technical vocational training exchange to China: Participants' descriptive summary statistics, September 2019

Participant	Gender	Industry entry for subsistence	Years in industry	University degree	Producing low-priced shoe	Served/ing as apprentice	Trains apprentices	Structural changes to business after China
Chidubem	Male	Yes	31	No	Yes	Yes	Yes	No
Chiamaka	Female	Yes	5	Yes	No	No	Yes	No
Elder Uche	Male	Yes	37	No	Yes	Yes	Yes	No
Emeka	Male	Yes	8	No	Yes	Yes	Yes	No
Promise	Male	Yes	15	No	Yes	Yes	Yes	Yes
Nwachukwu	Male	Yes	30	No	Yes	Yes	Yes	No
Onyema	Male	No	3	Yes	N/A*	Yes	N/A**	No

apprentices. Most participants reported being trained by a master for 3–4 years in an apprenticeship, during which time they learned how to hand-cobble a shoe from scratch. In contrast, Chiamaka, the youngest interviewee, learned by watching online videos about shoe folding. She began this as a means of earning money for school fees while at the university. She was alternatively considering joining her friends in prostitution as a means of surviving.

All participants produce between 50 and 100 leather sandals each week. These shoes distinguish themselves from the industrially mass-produced flip-flops from Lagos in two ways. They are primarily handcrafted leather products. The attention to detail is notable, and their designs are varied. If the craftsmen can find a buyer, these low-priced sandals retail for ₦400 (US$1.11) a pair in Lagos and between ₦1000 and ₦2000 in other regional cities (Figs. 5 and 6).

Fig. 5 Shoemakers in Ariaria Market (Aba, Abia state) work in close proximity, yet operate independently, producing a wide variety of designs by hand

Fig. 6 Aba shoemakers use brand names to differentiate their products to wholesale buyers

5 Summary and Conclusion

> *Nigeria's pathetic attempt to crush the idiosyncrasies rather than celebrate them is one of the fundamental reasons the country has not developed as it should and has emerged a laughingstock*—Chinua Achebe (2012)

This research is part of an ongoing development debate between prevailing neoliberal prescriptions that emulate capital stock structures of advanced economies and endogenously focused growth strategies that take a human-centric approach to development. The project contributes field research to the discourse and sociocultural and historically sensitive analysis of the "flying geese" paradigm within Nigeria's shoe manufacturing sector. This investigation challenges the notion that Chinese investment, be it private or public, is a reliable vector for knowledge and technology transfer and thus a model for structural transformation within Nigeria's shoe manufacturing industry.

Within Nigeria's footwear sector, Chinese investment in and knowledge of large-scale industrial shoe production has not catalyzed broader industrialization. In Lagos, the decades-old private direct investment did not cultivate linkages within the local community despite a polytechnic institute minutes

from the factory. Interviews with upper management showed little interest in knowledge transfer, preferring to focus on production efficiency, and navigating Nigeria's unpredictable and unforgiving macroeconomic environment.

From Aba, on the TVET to Chengdu, the curriculum and knowledge leakage upon participants' return to Nigeria demonstrated that the Nigerian business model was incongruent with the advanced automation techniques introduced in the program. Ultimately, only one of the interviewed program participants made a structural change to his business, resulting in monthly output growth. The vocational exchange with a Chinese firm did not increase the number of local shoe entrepreneurs or an industrial upgrade to mimic the Chinese production structure. Compared to the Chinese industrialist, the shoemaker from Aba faces substantial barriers to entry due to Nigerian market imperfections, poor infrastructure, and burdensome taxation. While Chinese industrialists can overcome these barriers, savings in foreign currency, access to foreign markets for capital, and transgenerational knowledge in large-scale factory operation, the Abian voiced ongoing concerns about expansion due to capital, production, and operational constraints.

Faced with substantial barriers in advancing local business initiatives, the Aba-based shoemakers who participated in the author's interviews all had studied handicraft shoe production. All but one received his/her training by way of the indigenous apprenticeship system. Their handicraft mode of production is vastly more accessible. It presents a realistic and inclusive starting point for Nigeria's industrialization strategy and offers a greater possibility to scale through linkages among independent artisans while creating jobs through self-employment. This reality fundamentally challenges the notion that Chinese investment will lead to structural transformation in the footwear sector.

Through interviews with shoemakers participating in the TVET trip, the researcher found that Nigerian shoemakers' participation in an indigenous apprenticeship system turned out to be responsible for the large population of shoemakers within the industrial town, Aba. The skilled Nigerian shoemakers interviewed exhibited more "flying geese"-like attributes than their Chinese counterparts. Nigerian shoemakers transfer trade knowledge that economically empowers new entrants into subsistence entrepreneurship but with greater earning potential than factory employment. On-the-ground realities undermine the imagined course of progress, wherein foreign investment imports development. This examination exposes a possibility to reimagine domestic industrialization to include Nigeria's plentiful skilled indigenous artisans.

Nigeria has an opportunity to harness a respected and well-understood tradition of skilled craftwork by focusing on handcrafted goods that are batch-sized and labor-intensive.[14] Small capital investments are required to source higher-quality bonding glue and manual sewing machines or brand presses that bypass electricity-powered machines. The higher associated capital and rental costs will focus on quality products rather than manufacturing output. In so doing, Nigerian artisans can avoid direct competition with Chinese goods and focus instead on increasing economic complexity (i.e., branding, quality, and innovation).

This examination advocates urgency in exploring these domestic and regional means of sustainable development through labor-intensive industrialization approaches. Complementary research on collaborative applications with data science in the artisanal economy is needed to provide a broader perspective of a domestic leatherworks value chain and its potential as a avenue for wealth creating opportunities in Nigeria.

Notes

1. In 2018, Nigeria was named the "poverty capital" of the world, outstripping India with the largest proportion of people living in extreme poverty.
2. For perspective, the population of the entire African continent in 1990 was an estimated 527 million (Okonjo et al. 1996).
3. The FGT was first conceptualized by Kaname Akamatsu, presented as the wild-geese-flying pattern (*gankō keitai*) of industrial development in his paper, "A Historical Pattern of Economic Growth in Developing Countries," to explain Japan's meteoric industrialization after World War II between 1946 and 1954. See: Akamatsu K. (1962): "A historical pattern of economic growth in developing countries" *Journal of Developing Economies* 1(1): 3–25, March–August.
4. Wealth-creating innovations in the form of industrial upgrade, managerial skills acquisition, and access to export markets constitute knowledge and technology transfer.
5. Some scholars and specialists have termed Nigeria's civil war, also referred to as the Biafra War, a genocide. Dan Jacobs, author of *The Brutality of Nations* (1987), details the United Nation's assistance quashing secession through the mass starvation of two million people (predominately children) in Southeast Nigeria.
6. For Nigeria, this means that economic policy will allocate national resources toward labor-intensive export-oriented industries and foreign direct investment (FDI) promotion, in line with the Commitment to Investment Act of 1995.
7. The United Nigeria Textile, Plc, employed over 20,000 workers and had an integrated mill capacity of 33,000 spindles, including 360 modern

rotor spindles and 2300 looms. Akinrinade, et al., "Globalization and De-Industrialization: South-South Neo-Liberalism and the Collapse of the Nigerian Textile Industry" (2008): 163.

8. In 2005 the Multi Fibre Agreement (1974), introduced to protect developing countries' nascent textile industries, with local quotas on imports being introduced, was phased out under the auspices of the World Trade Organization's General Agreement on Tariffs and Trade (GATT). Notably, some countries, including the United States, maintain some quota restrictions.
9. The Growth Lab at Harvard University [Where did Nigeria import Footwear from in 2017?].
10. As of August 24, 2019, company policy ended work on Saturdays.
11. Those seeking laborer jobs on the factory floor are normally illiterate, with subsistence on precarious footing.
12. Travel time by road is protracted due to poor or no road infrastructure. In *The Guardian* newspaper on September 6, 2019, traditional rulers described roads as "death-traps."
13. "Noninferior" refers to the economic term for a normal good which will increase in its demand as consumers' incomes increase. This is in contrast to inferior goods where demand decreases when consumer income rises.
14. A tradition that dates back to the ancient kingdoms of Nri and Benin.

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Chinese Foreign Direct Investment in Africa: Its Motivations, Determinants, and Impact on the African Economies

Kevin Honglin Zhang

1 Introduction

China has emerged as an important source of foreign direct investment (FDI) in Africa in the twenty-first century (MOFCOM 2018). The rapid increase of Chinese investment in the continent and its growing impact on African economies have generated considerable controversy in Africa and the West. Popular and elite opinion in Africa about China's FDI has largely been positive, but the Western reaction has often been negative.[1] The West's main concerns/myths over the Chinese investment include its motivation, true size, its focus on natural resources, less local employment, and its disregard for quality institutions or good governance.[2] While these issues are important, related research is limited (Chen et al. 2018, 2020). This chapter attempts to answer the questions around these issues using the most recent available data and information in order to reveal a more balanced picture. These questions include:

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I. How much of China's FDI is in Africa?
II. What drives the Chinese investment in the continent?
III. Are Chinese firms attracted to natural resources only?
IV. How does the Chinese investment affect the African economy?
V. Is China a new colonist as more Chinese move to Africa for work?

The main results from our analyses can be summarized as follows. First, China's share of the global FDI stock in Africa is small relative to that of traditional investors from the West, though its flows have grown rapidly in recent years. Second, China's FDI patterns in resource-rich countries are similar to the Western FDI. Contrary to common perceptions, Chinese FDI has few projects in natural resource sectors. The largest portion of Chinese projects is in construction and infrastructure, with a significant number of investments in manufacturing as well. Third, China's FDI tends to be more profit-driven, just like investors from the West. Fourth, the contributions of China's FDI to the African economy tend to be obvious in terms of building up infrastructure and manufacturing capacity and providing suitable technology, as well as adding capital stock, jobs, and training.

The rest of the chapter is organized as follows. The next section analyzes the trend of China's FDI in the world as well as Africa and identifies the main driving forces behind FDI in Africa, focusing on China's motives and African location attractions. In Sect. 3, we use comparative analyses to investigate the scale of China's FDI in Africa and its sectoral distribution. Section 4 offers an assessment of the impact of China's FDI on African economies, focusing on benefits to infrastructure development and manufacturing ability, as well as costs and possible negative effects. The last section presents policy implications for Africa.

2 Motivations for China's Investment in Africa

The history of China's FDI is short but spectacular. Virtually nonexistent on the eve of the economic reforms beginning in 1978, FDI remained insignificant through 2000. But by 2008 the annual FDI flows had grown to around $56 billion, then doubled to more than $100 billion in 2013, and even reached approximately $200 billion in 2016, as shown in Fig. 1. Although the flows fell to $143 billion in 2018, the FDI stock rose to approximately $1980 billion by the end of 2018 (MOFCOM 2019). In 2018, China's FDI

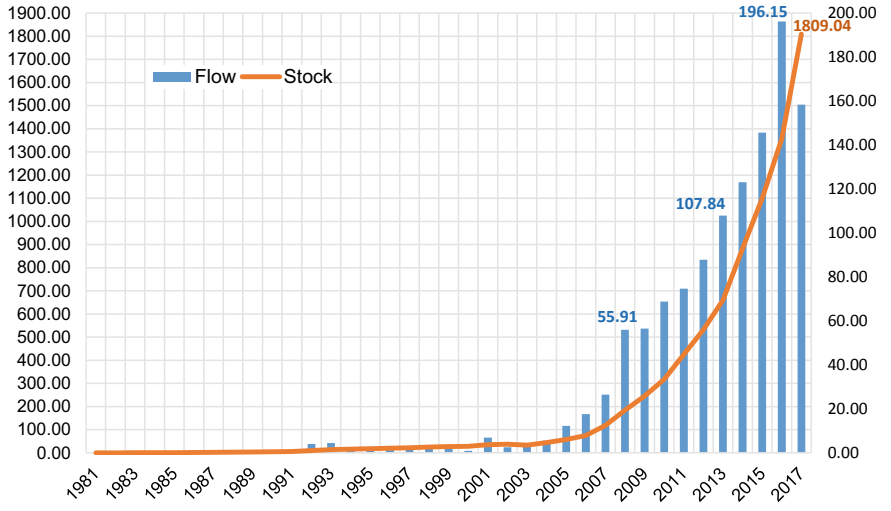

Fig. 1 China's FDI flows in 1981–2017 (billions of US dollar) (*Notes* FDI stock is measured by the left vertical axis, and the right vertical axis for FDI flows *Source* UNCTAD STAT Database UNCTAD [2019] and MOFCOM [2018])

flow and stock were the 2nd and the 3rd largest in the world, respectively (UNCDAD 2019).

Emerging as the largest trading nation and the second-largest economy in the world, China now is Africa's largest trading partner and top investor.[3] China considers Africa not only as an important source of energy and other crucial natural resources required for its growing economy; but also as an expanding market for Chinese products, especially manufactured goods. China's FDI in Africa is running parallel to its overall outward investment trend, but with larger fluctuations in flows, as shown in Fig. 2. Starting with only $0.07 billion in 2003, FDI flows rose rapidly and reached a record high of $5.5 billion in 2008. The following year saw a big drop to $1.4 billion, and then fluctuated to $4.1 billion eventually in 2017. China's FDI stock increased 88 times in 14 years (2003–2017), from $0.5 billion to $43.4 billion (MOFCOM 2018).[4] In the same period, China's trade with Africa increased more than 20-fold, supplanting the US as the continent's largest trading partner in 2010. In addition, about one million Chinese live in Africa, up from only a few thousand 15 years ago (Dollar 2019)

The surge of China's FDI in Africa is an outcome of the interaction between Africa's location advantages and China's rise as an economic power (Zhang, 2009). China is resource-scarce relative to its population. China possesses a small share of global resources such as arable land, renewable

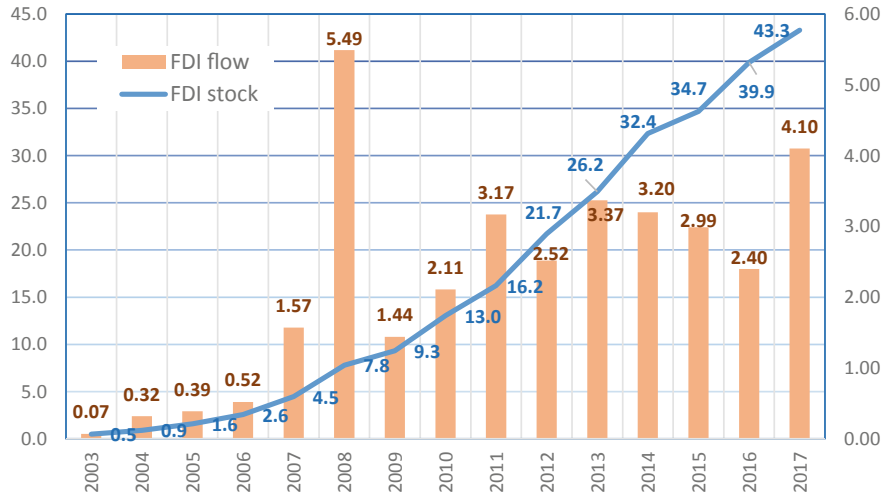

Fig. 2 China's FDI flow and stock in Africa: 2003–2017 (billions of US dollars) (*Notes* FDI stock is measured by the left vertical axis, and the right vertical axis for FDI flows *Source* UNCTAD STAT Database [UNCTAD] 2019 and MOFCOM [2018])

water, petroleum, and metals. By contrast, the African continent is resource-rich compared to its population. Africa has abundant natural resources, which is most attractive to foreign investors including China. Africa's known mineral wealth places it among the world's richest continents. Its large share of the world's mineral resources includes coal, petroleum (more than 10% of global oil reserves), natural gas (7.5% of global natural gas reserves), uranium, radium, low-cost thorium, iron ores, chromium, cobalt, copper, lead, zinc, tin, bauxite, titanium, antimony, gold, platinum, tantalum, germanium, lithium, phosphates, and diamonds (UNCTAD 2019).

The other attraction of Africa to China is its potential and growing market. As of 2018, Aggregate GDP of Africa was $2.36 trillion and 1.27 billion people live in 54 countries in the continent (UNCTAD 2019). In 2013, Africa was the world's fastest-growing continent at 5.6% a year, and the world's second-fastest-growing economy in 2017 at 3.4% (World Bank 2019). The World Bank (2013) projected that Africa's GDP would rise by an average of over 6% a year in the 2013–2023 period and most African countries would reach "middle income" status (defined as at least $1000 per person a year) by 2025 if current growth rates continue.

The rapid growth of the Chinese economy leads to rising demand for outward investment and strong capability to invest in Africa. Figures 3 and 4 present GDP per capita and GDP of China and Africa for the 1978–2018 period. Being lower than Africa until 1998, China's per capita income

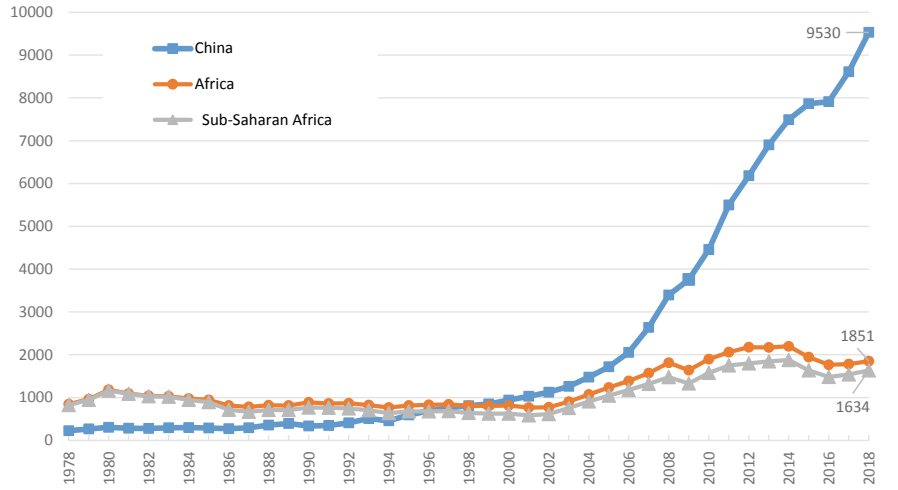

Fig. 3 GDP per capita of China and Africa: 1978–2018 (US dollar) 2019 (*Source* UNCTAD STAT Database [UNCTAD] and World Bank [2019])

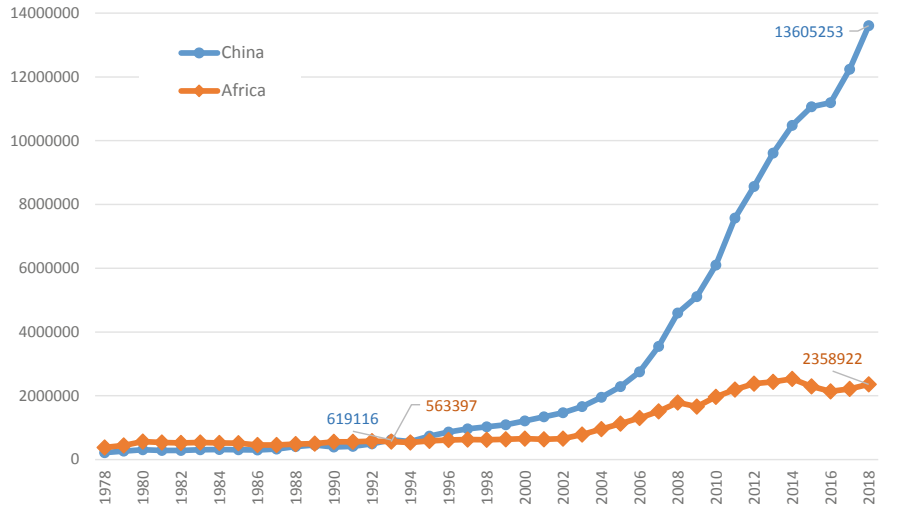

Fig. 4 GDP of China and Africa: 1978–2018 (Millions of US dollar) (*Source* UNCTAD STAT Database [UNCTAD] [2019] and World Bank [2019])

grew more than 11 times in 1998–2018, from $809 to $9530, resulting in more than five times higher per capita GDP than Africa by the end of 2018 (UNCTAD 2019). The income gap indicates not only China's higher development level compared to Africa, but also, technological advantages of Chinese firms investing in Africa (Zhang 2006, 2010, 2015). The same growth pattern of GDP is shown in Fig. 4. China's GDP grew 62 times in

40 years, from $218.5 billion in 1978 to $13,605.2 billion in 2018. The large economic size in terms of GDP suggests a large amount of investment that China could make in Africa. As a global investor, China has some additional advantages: availability of finance, strong capability of infrastructure construction, and manufacturing skills, which are especially helpful for Chinese firms to invest in Africa (OECD 2008).

Like FDI from the West, Chinese investment in Africa is largely motivated by resource-seeking and market-seeking.[5] Given China's relative natural resource scarcity, natural resource-abundant countries in Africa have been especially attractive to China. The resources sought after by Chinese firms in Africa include: oil in Algeria, Angola, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Kenya, Libya, Namibia, Nigeria, and Sudan; copper in Republic of Congo, Zambia and Democratic Republic of Congo; chrome in South Africa and Zimbabwe; iron ore in Gabon, and fisheries in Ghana and Morocco (OECD 2008). These countries host many of China's large FDI projects, and these FDI deals in the natural resources sector are often accompanied by the Chinese investment in infrastructure projects (Sauvant and Noland 2015). Furthermore, ports, electricity plants, roads, and railroads constructed by Chinese contractors may provide better transport, logistics, and utility services which can be useful for local economic development as well as other foreign enterprises' operations (including other Chinese firms) in Africa.

Viewing Africa as an expanding market for goods and services in an optimistic perspective, Chinese construction and manufacturing firms have engaged actively in the continent (Landry 2019). For instance, China's construction business has been successful in winning construction contracts in Africa (Gutman et al. 2015). This may reflect Chinese firms' comparative advantage over others in access to easy and cheap financial sources and availability of production capacity (Dollar 2019). These advantages allow Chinese firms to overcome the high risks commonly perceived by foreign investors for infrastructure development projects in Africa (Fayissa et al. 2010).

Table 1 presents the top five sectors of Chinese investment in Africa by the end of 2017. The construction sector received the largest amount of China's FDI (about 30%, followed by mining (22.5%), financial services (14%), manufacturing (13%), and leasing and business services (5%). Considering that about half of total FDI received in Africa goes to natural resource extractions in many countries, China's FDI in Africa is not particularly biased toward resource exploitations in international comparison. A large portion of China's investment in the services sector has been in construction due to China's long engagement in investing in infrastructure projects in Africa.

Table 1 Top 5 Sectors of China's FDI stock in Africa and world by the end of 2017

Africa		World	
Sectors	Share (%)	Sectors	Share (%)
Construction	29.8	Leasing and business services	34.1
Mining	22.5	Wholesale and retail trade	12.5
Financial services	14.0	Info. trans., soft-IT services	12.1
Manufacturing	13.2	Financial services	11.2
Leasing and business services	5.3	Mining	8.7
Subtotal	84.8	Subtotal	78.6
Others	15.2	Others	21.4
Total	100.0	Total	100.00

Source UNCTAD STAT Database (UNCTAD 2019) and MOFCOM (2018)

3 The Size and Sectoral Patterns

Global Position of China and Its FDI Determinants

Although its FDI in Africa has accelerated in recent years, China has so far remained a relatively small investor in Africa, far from matching those of traditional investor countries from Europe and North America. Figure 5 presents China's shares in total FDI *flows* and *stock* received in Africa in 2003–2017.[6] The average of China's share in total FDI flows into Africa in the period was only 3.1%, with 1.6% for 2003–2007, and 6.1% in 2008–2017. The largest amount of China's FDI flows in 2008 and 2017 (as shown in Fig. 2) account for less than 10% of total foreign investment in Africa,

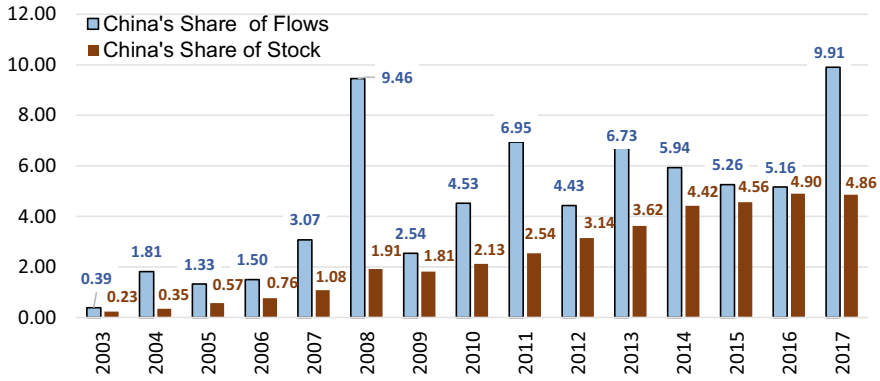

Fig. 5 China's shares of world FDI Flows and Stock in Africa: 2003–2017 (%) (*Source* UNCTAD STAT Database [UNCTAD] [2019] and MOFCOM [2018])

considering that total FDI fell due to the global financial crisis in 2008. As a latecomer, China's share in total FDI *stock* in Africa is even smaller: less than 1% before 2007 and merely 4.89% by the end of 2017.

Although recent data is not available, the information on sources of FDI *stock* in Africa by 2006 may suggest a basic pattern (OECD, 2008). China's FDI stock in Africa in 2006 accounted for 0.76% of total FDI stock in Africa. The West, with traditional ties to Africa, has occupied prime positions as foreign investors. The top investor in Africa remained the United Kingdom with *FDI stock* share of 16.6%, followed by the US with a 9.2% share and France with a 7.7% share. Figure 6 shows FDI flows from China and the US to Africa in 2003–2017. Excluding three unusual years (2015–2017), the average of the U.S. FDI flows to Africa in 2003–2014 was $4.6 billion, more than double of China's FDI ($2.0 billion).

Africa is far from a leading destination for FDI from China and the rest of the world. Africa's share is dwarfed by Chinese investment in other Asian states (over half of FDI), followed by Latin America and Europe.[7] Figure 7 presents Africa's shares in both China's FDI and world FDI flows in 2003–2017. Two points are obvious: First, while Africa receives small portions of FDI flows from China and the rest of the world, its share of Chinese FDI flows is slightly greater than that of world FDI flows in 2003–2017 (3.53% vs. 3.24%). Second, in terms of FDI stock, China is similar to investors from other countries in allocating their funds in Africa, as shown in Fig. 8.[8]

In 2018, the entire African continent received FDI inflows worth $45.9 billion (a mere 3.5% of world FDI flows), and FDI stock of $894.7 billion

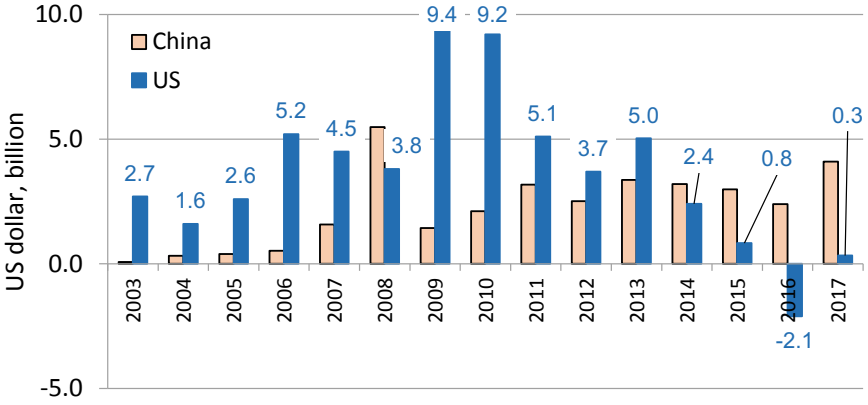

Fig. 6 FDI flows of China and U.S.: 2003–2017 (billions of US dollars) (*Source* UNCTAD STAT Database [UNCTAD] [2019] and MOFCOM [2018])

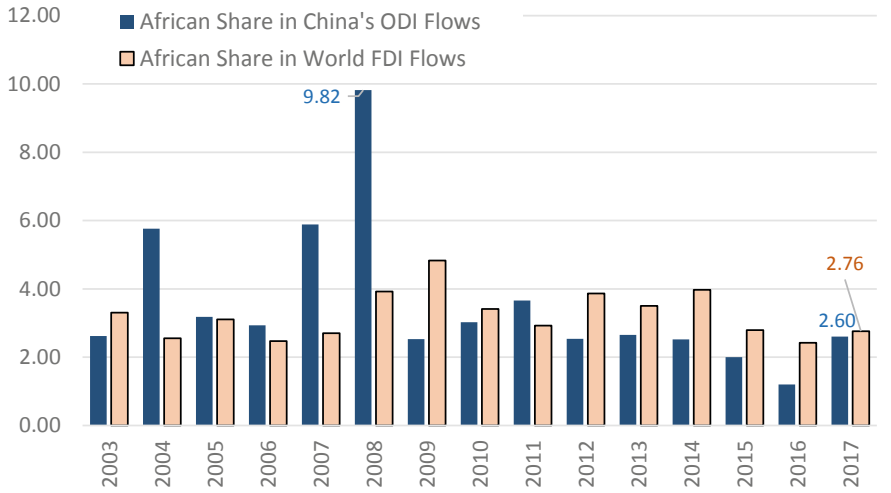

Fig. 7 African share of FDI flows from China and World in 2017 (%) (*Source* UNCTAD STAT Database [UNCTAD] [2019] and MOFCOM [2018])

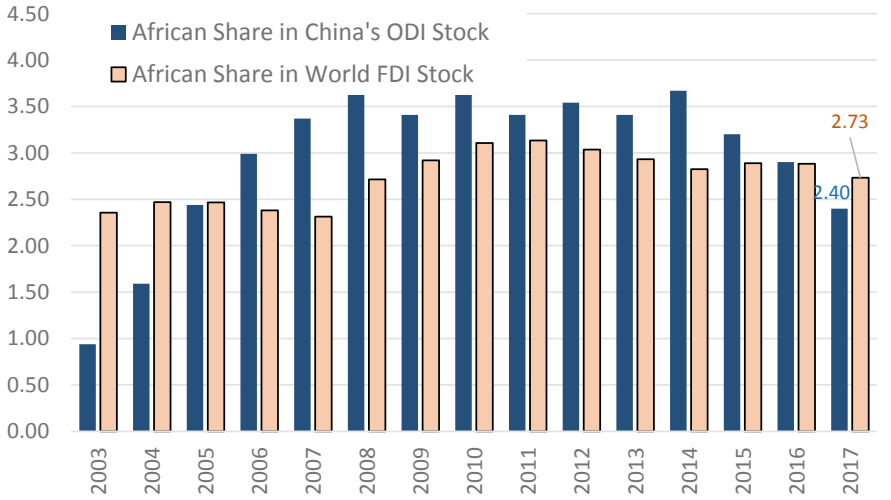

Fig. 8 African share of FDI stock from China and world in 2017 (%) (*Source* UNCTAD STAT Database [UNCTAD] [2019] and MOFCOM [2018])

(2.8% of world FDI stock) (UNCTAD 2019). Several reasons may be identified for this seemingly spectacular failure of African countries to attract foreign investors. Low income and poor infrastructure seem to be obvious problems for most African countries to attract FDI, as shown in Fig. 9. While gross returns on investment could be high in Africa, the effect is more than counterbalanced by high taxes and significant uncertainties.[9] Other factors

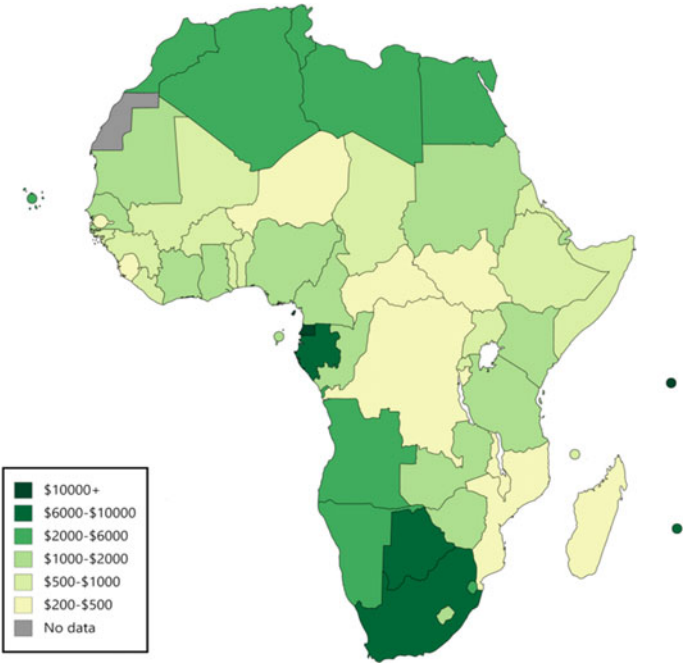

Fig. 9 Nominal GDP per capita by country in Africa in 2017 (*Source* UNCTAD STAT Database [UNCTAD] [2019] and World Bank [2019])

holding back FDI include the perceived sustainability of national economic policies, poor quality of public services, and closed trade regimes (Odenthal 2001; Landry 2019).

China's FDI in Africa is highly diversified, reaching 52 out of 60 countries/regions in the continent by the end of 2017 (MOFCOM 2018). The top countries hosting the largest China's FDI are either resource-rich or market-large countries, including South Africa, Congo, DR, Zambia, Nigeria, Angola, Ethiopia, and Algeria. As shown in Fig. 10, the top ten recipients account for 65% of total Chinese investment stock ($28.1 billion out of $43.3 billion) in 2017, with South Africa leading at 17% ($7.47 billion). While the top ten are dominant recipients in terms of FDI stock, their share has been decreasing, as Chinese FDI flows have diversified in recent years (MOFCOM 2018).

Sectoral Pattern of China's FDI

The sectoral composition of China's FDI in Africa has evolved from manufacturing and natural resources to construction and infrastructure since the

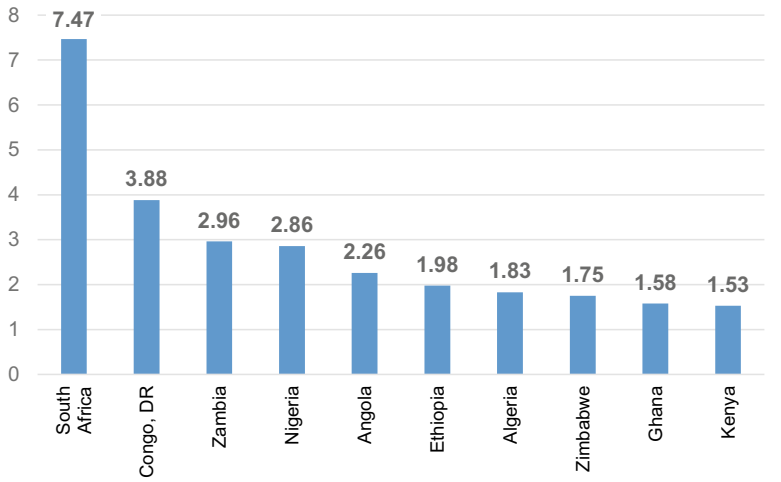

Fig. 10 Top 10 recipients of China's FDI stock by 2017 (billions of US dollars) (*Source* MOFCOM 2018)

late 1970s. During 1979–2000 the manufacturing sector received the largest amount of China's investment flows (46%), followed by resource extraction (28%), services (18%), and agriculture (7%) (OECD 2008). In 2001–2008, the largest amount of investment went to natural resources, and then the following decade until 2017 witnessed a large portion of China's FDI in construction due to more infrastructure projects in Africa. Figures 10 and 11 display the sectoral distribution of FDI stock by the end of 2017. Construction and infrastructure received about $12.9 billion (30% of total stock), followed by mining ($9.8 billion and 22%), financial services ($6.1 billion and 14%), and manufacturing ($5.7 billion and 13%).

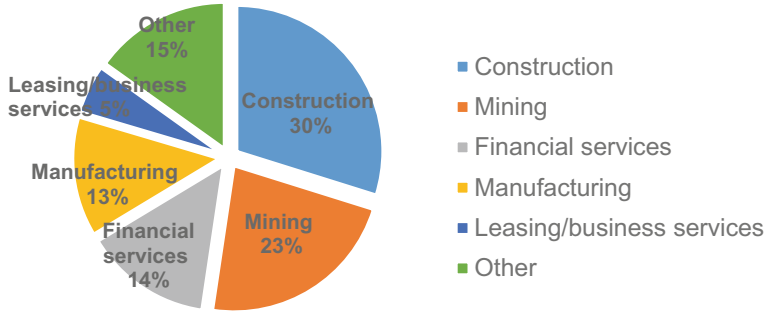

Fig. 11 China's FDI stock in Africa by Sector Share in 2017 (%) (*Source* MOFCOM 2018)

Considering that more than half of FDI from developed countries goes to natural resource exploitation in many African countries, China has been attracted to the sector as well. Oil is particularly important since China seeks both greater supply and greater diversity of suppliers for rapid domestic demand growth. This highlights the longer-term energy security value of African oil. In addition, Africa has been an important supplier of several key minerals in the world market, which are demanded largely by China as economic inputs (Chen and Tang 2014). Cumulative Chinese FDI in oil in Africa, however, has remained less than 10% of such developed-country firm investment, typically on the fringes of Africa's oil landscape (OECD 2008; Chen et al. 2020).

While natural resources are clearly a primary economic interest of Chinese investors, China's FDI in Africa has not been particularly skewed toward the sector in international comparison, as indicated in Table 2. Market-seeking is also a prominent motivation for Chinese firms investing in Africa, especially in the construction sector and the manufacturing sector, as indicated in Figs. 11 and 12. For countries like DRC that lack the resources and

Table 2 Top 5 sectors of China's FDI stock in Africa and other regions by 2017

Sectors	Africa	Asia	Europe	Latin America	North America	Oceania	Total
Construction	29.8						1.9
Mining	22.5	7.0	20.3	2.3	16.9	53.6	8.7
Financial services	14.0	12.3	16.0	6.5	12.2	6.8	11.2
Manufacturing	13.2	6.4	20.8		22.4	4.7	7.8
Leasing/business services	5.3	44.8	9.6	19.8	14.7	7.5	34.1
Wholesale/retail trade		13.5	4.7	15.4			12.5
Information Transmission, Software and IT Services				48.2	7.6		12.1
Real Estate						10.6	3.0
Top five share (%)	84.8	84.0	71.4	92.2	73.8	83.2	78.6
Top five stock ($ billion)	36.7	956.9	90.1	356.5	64.3	34.8	1202.7
Total stock share (%)	2.4	63.0	6.1	21.4	4.8	2.3	100.0
Total stock ($ billion)	43.3	1139.3	110.9	386.9	86.9	41.8	1809.0

Source UNCTAD STAT Database (UNCTAD 2019) and MOFCOM (2018)

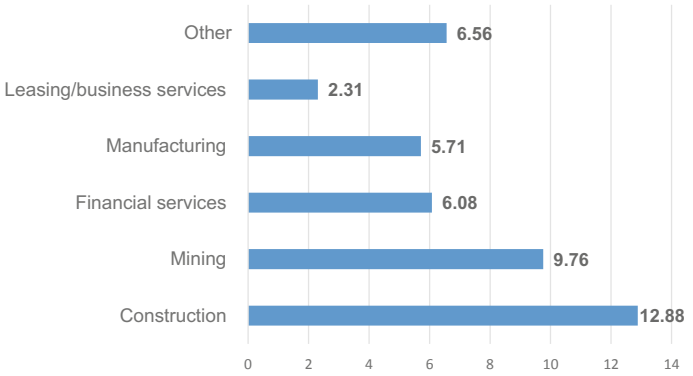

Fig. 12 China's FDI stock by sector in 2017 (billions of US dollar) (*Source* MOFCOM 2018)

the governance to build the urgently needed infrastructure themselves, such investment can have a dramatic multiplier effect on the economy (Dollar 2016).

4 Impact on Africa

There is a widely shared view that FDI accelerates host countries' growth by augmenting domestic investment, helping technology transfer, increasing competition in the host country's domestic market, promoting exports and foreign exchange earnings, and imparting other positive externalities (spillovers) to the economy at large (UNCTAD 2006). On the other hand, it is suggested that FDI may repatriate funds almost to the same amount as it brings in, transfer technologies that are inappropriate for the host country's factor proportions, "kill" indigenous enterprise through an intense competition—especially due to the strong economic power of multinational corporations (MNCs), fail to increase exports if primary reason for investment is to target the host country's market, cause distortions in the host country's policies so as to benefit the foreign investors, and create distortions in the host country's social and economic structures by infusing inappropriate social and cultural norms and behavior patterns (Zhang 2004). The above mixed theoretical predictions reflect conflicts between host countries and MNCs as shown in Table 3.

While potentials for FDI to promote host country economic growth exist, the benefits do not automatically accrue. Whether or not a host country could benefit from FDI depends on its absorptive capability, which is determined

Table 3 Conflicts between FDI Host Countries and Multinational Corporations (MNCs)

Host-country preferences	MNC preferences
Objective: To promote economic growth so as to maximize national welfare	Objective: To enhance their global competitiveness so as to maximize profits
Obtaining advanced and suitable technology	Transferring old technology only
More exports by MNC affiliates	More sales in host-country markets
Joint venture or majority joint venture	Wholly-MNC-owned structure
More local contents and intensive forward and backward linkages	More imports from parent companies with transfer pricing practice
Developing *dynamic* location advantages for industry-upgrading via moving up on MNCs' global value chains	Organizing the global value chains based on *static* location advantages of different host countries
More MNC-profits for re-investing locally	Repatriating more profits back home
More greenfield-investment projects	More projects through mergers & acquisitions
More FDI in desirable sectors such as in manufacturing, infrastructure, and agriculture	More FDI in profitable sectors such as banking, insurance, and other services
More "big bang" up-front capital injection	Gradually phased paid-in capital

Source Zhang (2004)

by local infrastructure, human capital, and industrial base (Zhang 2006). For instance, by plugging into global value chains through FDI, a developing country may become suppliers of labor-intensive products and components without gaining and upgrading its industrial capabilities. Host country's firms may even have production capabilities downgraded in the global production system controlled by MNCs (UNCTAD 2006). The magnitude and extent of technological benefits from MNCs thus depend on the host country's absorptive capability that is needed to acquire and work with the technology.

The economic impact of China's FDI on Africa is difficult to determine, in part because its presence is relatively recent, and a valid assessment would take several years. Moreover, Africa consists of 53 individual countries, with different histories, development models, and political regimes. African countries also differ greatly in their dependence on China's FDI. Some tentative assessments, however, are still useful based on available information. Overall, the Chinese investment seems to be welcomed in Africa (Zhang, 2021).[10] In the Africa–China context and relative to other investors, three special contributions from China's FDI to Africa may be identified: more investment in infrastructures, suitable technology that may not be most advanced

but workable and effective in Africa, and promoting local exports through complementarities with Africa–China trade.

First, Chinese investment in infrastructure projects in Africa has been enabling the provision of basic services such as water supply, transport, communications, and power supply at relatively low cost (Foster and Briceno-Garmendia 2009; Gutman et al. 2015). All these services are fundamental for African countries' economic growth and poverty reduction. Like many low-income developing countries, Africa has serious infrastructure deficiencies. In the past few years Africa has received about $30 billion annually in external finance for infrastructure and China provided about one-sixth of this amount, mainly on transportation and power (Farrell 2016; Dollar 2019).

Second, technology associated with China's FDI tends to be labor-intensive relative to that of developed countries, and hence may be easier and more suitable to transfer to local economies—given African countries' factor proportions and their development gap with China.[11] More generally, Africa can learn important lessons from China's experiences in opening and modernizing the economy (Zhang 2006; Chen and Landry 2016). For example, China can provide an opportunity for Africa to participate in the global value chain, especially in labor-intensive manufactures such as textiles and the apparel sector (Zhang 2010, 2015).

Third, Chinese investment seems to enhance local firms' exports through complementarities with Africa–China trade created by FDI (Zhang 2006; Davies 2013). The rising share of Africa's exports to China in total exports is driven by China's resource-seeking investment in Africa, reflecting the increasing demand for resources within China. Similarly, China's growing share in Africa's total imports is linked to China's market-seeking investment in Africa, especially in the manufacturing sector which requires intermediate inputs and capital goods from China (Schiere et al. 2011).

It is worth noting a recent study conducted by Weisbrod and Whalley (2011) on the role of China's FDI in Africa's economic growth. In the three years before the global financial crisis, the average GDP growth in sub-Saharan Africa was around 6%. This period also saw significant Chinese FDI flowing into the continent. Weisbrod and Whalley use growth-accounting methods to assess what portion of this growth can be attributed to Chinese FDI. Although for some countries and years the effects were negligible, and some countries even saw total GDP growth increase by 0.5% point between 2002 and 2009 due to Chinese FDI alone. The contribution of Chinese FDI to sub-Saharan Africa's growth also expanded from having significant growth effects in a relatively small group of core countries (Nigeria, Niger, Sudan,

Zambia and, to a lesser extent, DRC) in the years preceding the global financial crisis (2005–2007) to producing noticeable growth effects in a big group of sub-Saharan African countries during the crisis in 2008–2009 (Weisbrod and Whalley 2011). These results suggest that a significant portion of growth in sub-Saharan Africa in recent years can be attributed to Chinese inward investment.

While host country governments in Africa generally welcome the Chinese investment, some criticisms have been raised in the US and Europe (Chen et al. 2018; Landry 2019).[12] One criticism is the so-called "debt-trap diplomacy": China offers excessive infrastructure loan and FDI to African countries, with the intention of extracting economic or political concessions from the debtor countries when they become unable to honor their debt (Hurley et al. 2018).[13] China has characterized its FDI in Africa as a win–win for its aspirations to become a global power and African economies' desire to fund infrastructure. It has certainly filled the vacuum created by a shrinking American presence in Africa, but China would have to face accusations of imperialist behavior when its debt plans go wrong.

African nations in dire need of boosting their infrastructure development, economic growth, and global competitiveness, have increasingly looked to China for FDI and loans. Some African countries could also let Chinese investment become a full replacement for Western FDI on the grounds that Western investment comes with too many conditions (Dollar 2016). Aside from multilateral financial institutions, currently China is the only country that has shown interest in financing Africa's enormous infrastructure deficit, especially in power and transport. Of course, China needs Africa's natural resources and markets to fuel its own growth. Yet, such large borrowing has come under scrutiny in recent years, with critics noting it could encourage dependency, entrap nations in debt, and push debt limits to unsustainable levels (Hurley et al. 2018).

Another criticism is less job creation for local workers because Chinese firms in Africa employ mainly their own nationals (French 2014). This argument may not be an accurate description of Chinese business practices. According to Brautigam (2015), in a small group of oil-rich countries (Algeria, Equatorial Guinea, and Angola) with expensive construction sectors, governments do allow Chinese construction firms to import their own workers from China, due to shortage of domestic skilled labor.[14] But elsewhere in Africa, the majority of employees at Chinese firms are local hires (Brautigam 2015). Hong Kong-based academics (Sautman and Yan 2015) surveyed 400 Chinese companies operating in over 40 African countries. They found that while management and senior technical positions

tended to remain Chinese, more than 80% of workers are local. Some companies had localized as much as 99% of their workforces (Sautman and Yan 2015).[15]

5 Concluding Remarks

The objective of this chapter is to investigate China's FDI in Africa as it pertains to motivations of such investment, China's global position, sectoral patterns, and more importantly the impact on African economies. We arrive at five main conclusions. First, although China's FDI in Africa has increased dramatically since 2000, it still has a long way to rival OECD member countries. Second, China's FDI is jointly driven by Africa's abundant natural resources and potential market size, and China's comparative advantages in accessing large funds for FDI, capability in funding infrastructure projects, and suitable technology in manufacturing. Third, while similar to the Western FDI in terms of investing in natural resources sector, Chinese investment tends to have more projects in infrastructure and manufacturing sectors. Fourth, many African countries seem to have positive attitude toward Chinese FDI due to investing in infrastructure sector, transferring suitable technology, and promoting local exports. Fifth, the negative effects may stem from possible debt trap and less employment created by Chinese investment.

Several policy implications emerge for Africa. First, African countries may improve their investment climate by establishing special economic zones (SEZs) and providing necessary infrastructure. While most African countries have made considerable efforts over the past decades in liberalizing their FDI regulations and offering incentives to foreign investors, some specific progresses in SEZs and infrastructure should be made in order to attract FDI in targeted industries. Second, African countries may encourage more Chinese FDI in labor-intensive manufacturing activities through industrial parks. With rising wages in China and other developing economies in Asia and Latin America, many African countries relatively are attractive to FDI in labor-intensive manufacturing. Industrial parks with targeted incentive policies on this kind of FDI could not only promote host country industrialization in the long run, but also create jobs in the short run. Third, African governments may encourage export-oriented FDI through export processing zones (EPZs). EPZs have been a good way to stimulating exports in developing countries with abundant cheap labor. FDI may help host countries get into international production networks and overcome difficulties (such as short of capital) in establishing EPZs. Fourth, African governments may

enhance technology transfers from foreign firms operating in their countries. The ways to do so including promoting spillover effects of FDI through local content requirements, and backward and forward linkages between domestic economies and FDI activities.

Notes

1. A recent report (Dollar 2016) cited some headlines that portray China's FDI as follows: "Into Africa: China's Wild Rush"; "China in Africa: Investment or Exploitation?"; and "(Hillary) Clinton warns against 'new colonialism' in Africa".
2. Brautigam (2009, 2015) discusses several myths that persist in the West about China's FDI in Africa, including that China is in Africa only to extract natural resources; China's FDI is enormous; Chinese firms only employ Chinese workers; China's FDI is a vehicle for securing oil and mining rights; and China has its eyes on African land and perhaps even a plan to send Chinese peasants to Africa to grow food and ship it back to China.
3. Since 1949 when the People's Republic of China was established, Sino-African relationships have evolved from being highly influenced by ideological and political considerations to being increasingly driven by economic motivations (OECD 2008). In the 1950s and 1960s, China provided support to liberation movements in many African countries, and after their independence, benefited from the numerical advantage of African countries in the United Nations General Assembly to push China's political agenda. Africa's importance to China, however, declined in the 1980s and 1990s while China turned its focus to economic development. In the new century, there has been a great revival of China's relationship with Africa, mainly through economic links (Brautigam et al. 2018).
4. One milestone for the Sino-Africa relationship was the first summit of the Forum on China–Africa Cooperation (FOCAC) which took place in Beijing in 2000. The forum has become an important platform for promoting China's FDI in Africa. In the following FOCAC summits, China announced more assistance package to Africa, including a development fund to support China's FDI projects in Africa (MOFCOM 2018).
5. China's contemporary relationship with Africahas been driven by a strong commercial impulse and an economic rationale. Most of the Chinese investment is profit-driven and succeeds on its own commercial merits, rather than as a state-directed foreign policy tool (UNCTAD 2006; Chen et al. 2018).
6. A note on the data of China's FDI in Africa is worth mentioning. Some scholars believe that comprehensive and reliable data of FDI are generally difficult to acquire, particularly in capital flows. Given areas of low regulation, black markets, routing of investment through Hong Kong or overseas tax shelters,

speed and volume of private transactions, and transparency issues, much of the data are suggestive rather than authoritative (Dollar 2016).

7. Official Chinese figures cite $46.3 billion in cumulative Chinese FDI into Africa by the end of 2017, which appears to underestimate Chinese FDI at least by half. It should be noted that China is not alone in having difficulties tracking FDI into Africa (Dollar 2019). But even doubling the figure, the African share is not quite significant.
8. China's expansion into Africa does not seem particularly outstanding. Though China's pragmatic approach to economic relationships with Africa, based on the principle of "no interference in internal affairs," has allowed Chinese enterprises to expand business in certain African countries from which firms from the West have had to withdraw due to concerns regarding human rights violations, weak governance, and corruption, China's overall investment in Africa is far much smaller than that of traditional investors from western countries and the US (Davies 2013; Farrell 2016; Landry 2019).
9. As for the uncertainties or risk factors, three of them may be particularly pertinent: macroeconomic instability; loss of assets due to non-enforceability of contracts; and physical destruction caused by armed conflicts (UNCTAD 2006; OECD 2008).
10. In the Pew Global Attitudes survey for 2015, African respondents had a significantly more positive view of China (70% with a favorable view) than respondents in other regions such as Europe (41%), Asia (57%), or Latin America (57%). This likely reflects the positive impact of China's engagement on African growth (Dollar 2016).
11. In the early 2000s, the Chinese telecom firm Huawei established its West African training school in the Nigerian capital, Abuja. Ever since, it has been honing the skills of local engineers who are rolling out the cell phone networks that underpin Africa's telecommunications revolution. Chinese factories in Nigeria employing Nigerians and producing building materials, light bulbs, ceramics, and steel from salvaged ships (Brautigam 2015).
12. In addition to the myths, other criticisms include poor implementation of social and environmental safeguards in China's investment projects; and lack of harmonization with international efforts to tackle human rights abuses, corruption, and repressive regimes (Brautigam 2009).
13. Hurley et al. (2018) identified Eight nations that will find themselves vulnerable to above-average debt: Djibouti, Kyrgyzstan, Laos, the Maldives, Mongolia, Montenegro, Pakistan, and Tajikistan.
14. John Hopkins SAIS (2019) provides figures for Chinese workers in Africa. The total number of Chinese workers in Africa was 46,800 in 2001, 82,000 in 2005, 221,604 in 2010, 263.659 in 2015 (the highest), and 201,057 in 2018. The countries with the most Chinese workers in 2018 were Algeria (61,491), Angola (25,567), and Nigeria (11,088). There were modest numbers of Chinese workers in countries where Chinese investment and infrastructure projects are

extensive, such as Ethiopia (14,078 workers in 2014 and fell to 9112 in 2018), DRC (7668 in 2018), and Sudan (5234 in 2018).

15. According to Sautman and Yan (2015), nearly 4800 Ethiopians were employed by the Chinese firm that built Ethiopia's urban light rail project. Another 4000 Ethiopians worked at Huajian, a Chinese shoe factory close to the capital of Addis Ababa. In both cases, some local workers were even sent to China for management training.

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Trade and African Continental Free Trade Area

What Can Trade Tell Us About Economic Transformation? Composition of Trade and Structural Transformation in African Countries

Mina Baliamoune-Lutz and Abdoul' Ganiou Mijiyawa

1 Introduction

The *2011 Economic Report on Africa* (United Nations Economic Commission for Africa, and the African Union Commission, ECA and AUC 2011) notes that "[m]eaningful economic transformation remains a major development challenge in Africa despite increased GDP growth over the last decade." The same report concludes that transforming African economies from low-income agrarian economies to high-income industrialized ones remains a major development challenge. Furthermore, the lack of structural economic transformation in many African countries has been identified as one of the main reasons for the lack of formal employment opportunities and for growth volatility.

Along the same vein, in its inaugural flagship publication, the 2014 African Transformation Report, the African Center for Economic Transformation (ACET) argues that while the recent high economic growth in Africa is

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welcome, it will not by itself be sufficient to sustain development on the continent. The report argues that in order to ensure growth is sustainable and contributes to improving the lives of most people, African countries need to vigorously promote economic transformation.

Indeed, data from the last four decades show that most African countries have experienced high volatility in GDP growth rates. However, African economies in general experienced reasonably strong GDP growth rates in the postindependence period in the 1960s and 1970s—a period of state-led import substituting policies—before the macroeconomic crises of the 1980s and the stagnation for a good part of the 1990s wiped out some of the economic gains of the previous two decades. In the 1980s and 1990s, Africa (with few exceptions) experienced deindustrialization as manufacturing production shifted out of the continent and the African shares of world manufacturing production and world manufactured exports declined in 2005 relative to 1980 from 0.4 to 0.3%, and from 0.3 to 0.2%, respectively (United Nations Industrial Development Organization, UNIDO 2009). Even when achieving strong growth, most African countries have experienced slow structural transformation in production and exports. This is clearly evident when comparing African performance with the structural transformation achieved by a group of eight earlier transformers (ACET 2014).[1] As Figs. 1, 2, 3, 4, 5 and 6 show, African countries have lower productivity in

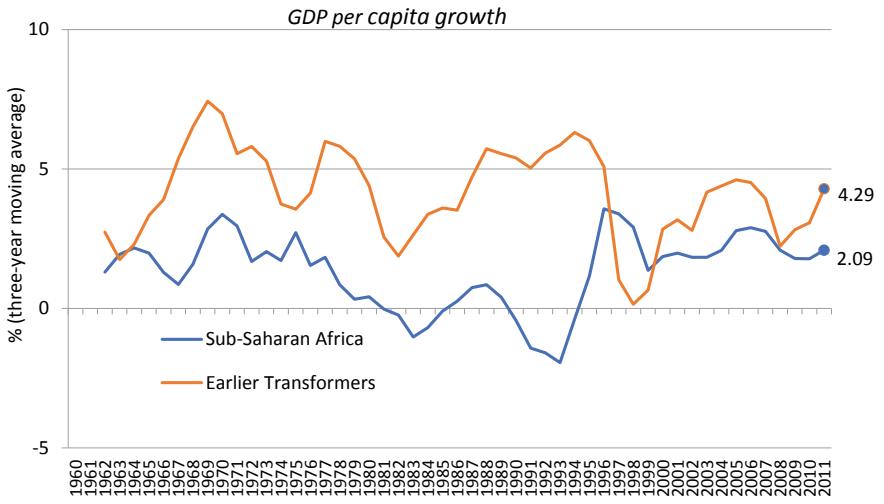

Fig. 1 Indicators of growth and structural transformation in sub-Saharan African countries and earlier transformers (*Source* Adapted from ACET [2014]): GDP per capita growth

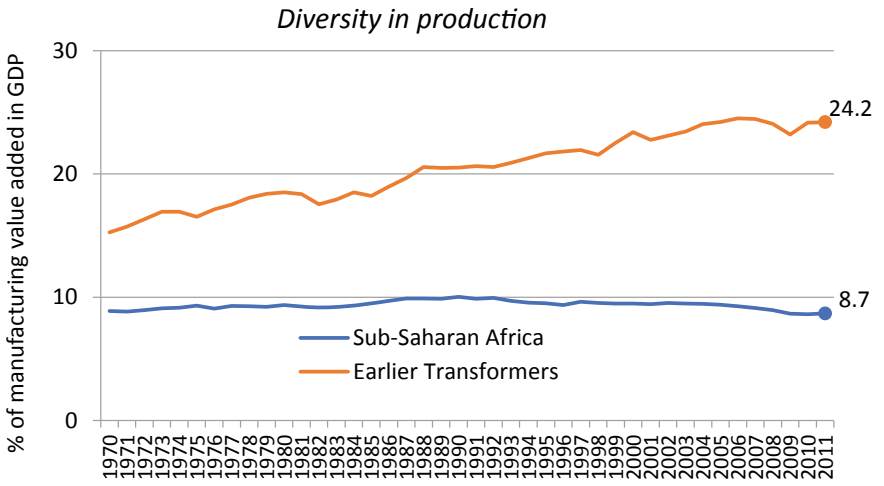

Fig. 2 Indicators of growth, structural transformation in sub-Saharan African Countries, earlier transformers (*Source* Adapted from ACET [2014]): Diversity in production

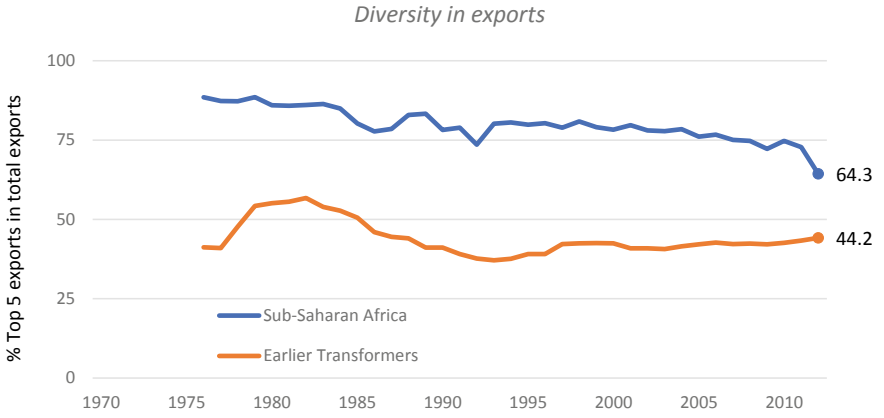

Fig. 3 Indicators of growth and structural transformation in sub-Saharan African Countries and earlier transformers (*Source* Adapted from ACET [2014]): Diversity in exports

manufacturing and agriculture and lower export competitiveness and exhibit much less diversity in production and exports.

Measures of structural transformation as well as its drivers tend to involve assessing the extent of production and export sophistication. The importance of trade composition and sophistication in the process of economic transformation has been emphasized in many existing studies (Havrylyshyn 1985; Amsden 1986; Baliamoune-Lutz 2011, 2019; Hausmann et al. 2007; Klinger

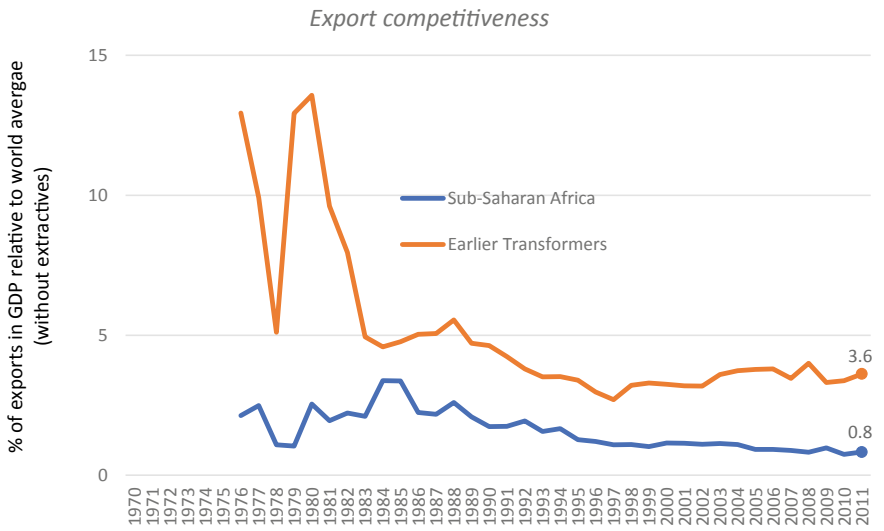

Fig. 4 Indicators of growth and structural transformation in sub-Saharan African countries and earlier transformers (*Source* Adapted from ACET [2014]): Export competitiveness

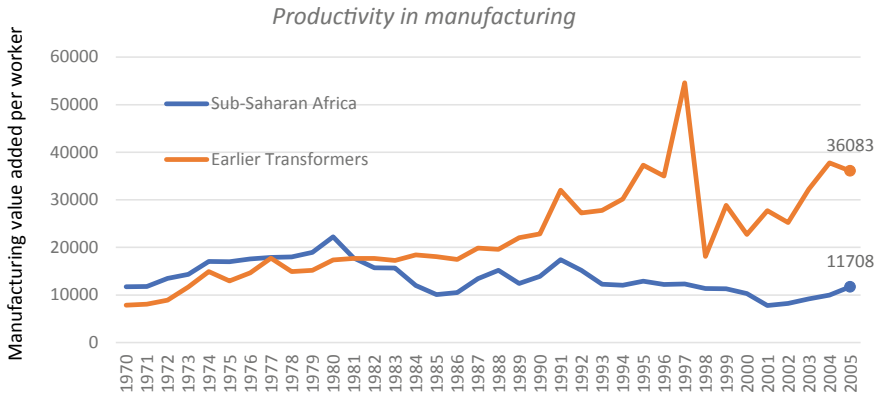

Fig. 5 Indicators of growth and structural transformation in sub-Saharan African countries and earlier transformers (*Source* Adapted from ACET [2014]): Productivity in manufacturing

2009), with more recent work focusing on the potential gains of South–South trade compared to South–North trade.

In this chapter, we use 1990–2010 disaggregated import and export panel data for 21 African countries that were studied in ACET's work on economic transformation in Africa and develop new trade "category intensity" indexes (TCII), which are then used in empirical estimations to investigate the role

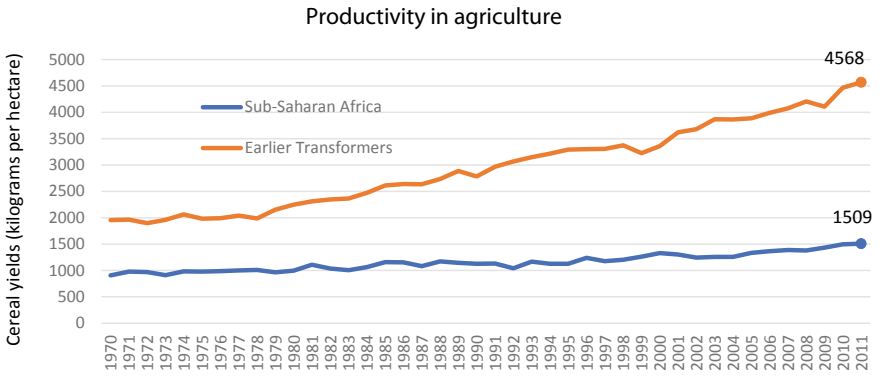

Fig. 6 Indicators of growth and structural transformation in sub-Saharan African countries and earlier transformers (*Source* Adapted from ACET [2014]): Productivity in agriculture

of trade in specific product categories in explaining structural transformation. More specifically, we use the trade "category intensity" indexes as our variable of primary focus to shed light on these two questions:

1. Can the type of imports (capital goods versus other goods) predict structural transformation?
2. Can the type of exports (manufacturing versus primary commodities) predict structural transformation?

Our indicator of structural transformation is ACET's African Transformation Index. We use fixed-effects and Arellano-Bond dynamic panel GMM estimators and, in addition to the TCII on the right-hand side, we control for several other relevant variables, including institutional quality, natural resource dependence, human capital, financial development, inward foreign direct investment, and income per capita. We find that the import of capital and semi-capital goods can be a good predictor of structural transformation while concentration of exports in primary commodities and food and agricultural products seems to result in weak structural transformation. The empirical results also suggest that the composition of imports (import of capital goods) matters more for explaining structural transformation in natural resource-dependent countries. Surprisingly, we did not find any support for the effects of manufactures exports on structural transformation.

The rest of the chapter is organized as follows. The next section proposes an overview of literature on the importance of structural transformation and its drivers. Section 3 focuses on the empirical analysis, while the results are discussed in Sect. 4. Section 5 concludes the chapter.

2 Structural Transformation: An Overview of Literature

Structural Transformation in the Process of Economic Development

Hausmann et al. (2007), Hidalgo et al. (2007), Hidalgo (2009), and Hidalgo and Hausmann (2009), among others, have emphasized the importance of structural transformation in economic growth and development. These studies argue that different products have different consequences for development.[2] Hausmann et al. (2007) show that the specific set of products that a country exports has important consequences for the country's development. Empirically, they find that, after controlling for initial income per capita and other factors, the sophistication of a country's export basket is a good predictor of future growth. This implies that development is a process that involves not only the production of more of the same set of products, but also the introduction of new ones. Consequently, sustained growth involves the accumulation of more complex sets of capabilities.

In the African context, Page (2012) argues that Africa must industrialize; otherwise the continent cannot sustain high growth rates that it experienced recently. Along the same line, in its inaugural flagship report, the 2014 African Transformation Report, ACET notes that while the recent high economic growth in Africa is welcome; it will not by itself sustain development on the continent. To ensure that growth is sustainable and plays a significant role in improving the lives of most people, African countries need to vigorously promote economic transformation.

Drivers of Structural Transformation

Two main schools of thought related to international trade exist in the literature on the drivers of structural transformation. On the one hand, there is the school of thought which analyzes the drivers of structural transformation based on the concept of product space, and on the other hand, the school of thought that considers that where a country exports matters for its structural transformation. Both schools of thought highlight the importance of the category of goods produced and traded for structural transformation, which is consistent with the arguments of our chapter.

Drivers of Structural Transformation from the Perspective of Product Space

Product space is a network of products with varying degrees of linkage between them. It is one of the recent tools developed to analyze countries' structural transformation and has been introduced in the literature by Hausmann and Klinger (2006, 2007) and Hidalgo et al. (2007). These studies show that countries tend to focus on goods that are "near" to one another in the product space, and therefore a country's ability to move to new export sectors depends on how connected its existing export package is in this space. Some countries are concentrated in highly peripheral activities in the product space, such as producing oil or cotton. These sectors are poorly connected, as few countries are able to move from them to other products. But production in other countries is concentrated in more central activities in the product space, such as forestry or packaged food. These sectors are well connected, which means that the countries concerned are more able to move from these activities to a wide range of other activities.

Thus, product space reveals a country's current productive structure; how easy or difficult can its structural transformation be, given its current productive structure. It also identifies the products that, given a country's current productive structure, could be most easily added to the country's export basket. One of the conclusions from the product space analysis is that, the more a country produces a core of densely interconnected products (most of which are highly sophisticated and include hundreds of different varieties of chemicals and machinery, for example), the easier the country's structural transformation will be. On the other hand, the more a country produces poorly connected products—located in the periphery of the product space—(most of which are unsophisticated and primary products) the more difficult the country's structural transformation will be.

Product space has been used to analyze the potential and challenges of structural transformation in African countries. For instance, Abdon and Felipe (2011) use the concept of product space to analyze the evolution of sub-Saharan Africa's (SSA) productive structure and discuss the opportunities for growth and diversification for four African countries: Ethiopia, Mozambique, Nigeria, and Senegal. The authors find that the majority of SSA countries are trapped in the export of unsophisticated, highly standard products that are poorly connected in the product space; this makes the process of structural transformation of the region particularly difficult. The products that are *nearby* to those they already export have the same characteristics. Therefore, shifting to these products will do little to improve SSA's growth

prospects. The chapter concludes that to jump-start and sustain growth, SSA governments must implement policies and provide public inputs that will encourage the private sector to invest in new and more sophisticated activities

Hidalgo (2011) also uses the product space tools to explore Southern and East Africa's industrial opportunities by focusing on five countries: Kenya, Mozambique, Rwanda, Tanzania, and Zambia. The results suggest that the most natural avenue for future product diversification for these five Southern and East African nations resides in the agricultural sector, since all of these nations appear to have productive structures that are pre-adapted to the production of many agricultural products that none of them are currently exporting. The chapter also examines the potential benefits of further regional integration by pulling together the productive structure of these five countries. This exercise shows that the products that become more accessible in the combined economy are once again predominantly agricultural. The author concludes that these results suggest that while diversification into all sectors should remain an important long-term goal of the region, the path toward increased diversification in the near future may well lie in a more empowered and diverse agricultural sector.

As for Hausmann and Klinger (2008), they apply the product space tool to South Africa's data, and explore the country's export performance over the past 50 years. They conclude that a lagging process of structural transformation is part of the explanation for South Africa's stagnant exports per capita. Slow structural transformation in South Africa is found to be a consequence of the peripheral nature of the country's productive capabilities.

Badibanga et al. (2009) compare the dynamics of structural transformation of African to Asian countries. More specifically, they develop a metric of structural transformation that captures the dynamics of an economy's transformation. They apply their measure of dynamic structural transformation to four-digit-level SITC trade data of China, Malaysia, and Ghana over the period 1962–2000. The results show that two important factors characterize the rapid transformation of the Chinese economy: the high proximity of its export basket to three main industrial clusters—capital goods, consumer durable goods, and intermediate inputs—and the increase in the values of the new goods belonging to those three clusters. Malaysia exhibits a similar but more modest pattern. In contrast, the structure of the Ghanaian economy appears unchanged over the entire 1962–2000 period. Ghana's economy is dominated by primary goods clusters, and the values of the goods in those clusters have remained relatively low, suggesting that its structural transformation is much more difficult.

The Importance of Export Destination for Structural Transformation

As noted earlier, the destination of exports has also been highlighted as an important factor for structural transformation. Here the discussions are based on two trade theories. The Heckscher-Ohlin (HO) model of trade predicts that a country will specialize in those activities that most intensively use its relatively abundant factors. Therefore, according to this model, the South (i.e., developing countries) is expected to specialize in those goods that are intensive in its abundant factors: land and labor. The North (i.e., developed countries), in turn, would specialize in goods intensive in its abundant factors: human and physical capital. As a result, South–North trade would confine developing countries to a specialization in unsophisticated products, which would have fewer learning-by-doing productivity-enhancing benefits than those exported by the North to the South (Stokey 1991).

The HO model has little to say on the composition of South–South or North–North trade, when factor endowments are similar across countries. However, given that across the world, significant volumes of trade are observed between countries with similar factor endowments, alternative models that could explain such flows have emerged. First, was Linder's hypothesis (Linder 1961) that trade was determined by similarity in demand structures. According to this hypothesis, countries with similar levels of income per capita would trade more with one another, and therefore one would expect North–North and South–South trade to flourish given similar demand structures among Southern countries. After correcting for the methodological shortcomings of earlier studies, it has been found that countries with similar levels of per capita GDP trade with one another more. This has been shown at the international level (Hallak 2006), among Organization for Economic Cooperation and Development (OECD) countries (McPherson et al. 2000) and among developing countries (McPherson et al. 2001).

While the HO model suggests that South–North trade will be confined to goods low in both human and physical capital, the alternative trade models based on Linder's hypothesis, predict that South–South trade allows for trade in a broader variety of sectors. According to these models, South–South trade would not necessarily be confined to the raw materials and simple labor-intensive manufactures that the HO model would expect to dominate South–North trade but could also include more "sophisticated" products. In other words, these models hold out the possibility of South–South trade

taking place in more sophisticated sectors than would be the case under South–North trade.

Empirical findings on the effects of South–South trade on structural transformation are mixed. In the 1980s, several empirical studies have examined the difference in skill composition between South–South and South–North trade, often seeking to test the HO predictions and evaluate the development potential of South–South trade. Most of these studies found that exports from the least developed countries (LDCs) to the countries of the South had greater skill content than exports from LDCs to the North (Amsden 1976, 1980; Richards 1983). This finding gives empirical justification for a model that states that greater learning effects and technological spillovers arise from South–South trade (Amsden 1986). Havrylyshyn (1985) also finds that while trade flows from the South to the North conform to HO predictions, exports from LDCs to other LDCs contain relatively more physical and human capital than exports to industrial countries. These studies suggest that South–South trade can contribute to structural transformation.

Klinger (2009) also analyzes the composition of South–South as opposed to South–North trade in recent years, applying emerging methodologies and highly disaggregated trade data to consider whether the South as a market provides developing countries with greater opportunities to transform their productive structures and move to more sophisticated export sectors than the Northern market does. The results show that for a group of developing countries, primarily in Africa, Latin America, and Central Asia, exports within the South are more sophisticated and better connected in the product space than exports to the North, whereas the opposite is true for the faster growing economies of Asia and Eastern Europe (excluding the Commonwealth of Independent States).

Along the same lines, Baliamoune-Lutz (2011) explores the growth effects of Africa's trade with China, distinguishing between the effect of imports and the effect of exports, and controlling for the role of export concentration. Using Arellano-Bond GMM estimations with panel data over the period 1995–2008, the author finds four important results. First, there is no empirical evidence that exports to China enhance growth unconditionally. Second, the results suggest that export concentration enhances the growth effects of exporting to China, implying that countries which export one major commodity to China benefit more (in terms of growth) than do countries that have more diversified exports. Third, contrary to the widely held view that increasing imports from China would have a negative effect, the empirical results show that the share of China in a country's total imports has a robust positive effect on growth. Finally, the evidence suggests that there is an

inverted-U relationship between exports to developed countries and growth in Africa. Baliamoune-Lutz (2011) concludes that overall, the results seem to provide support for the hypothesis of *growth by destination;* i.e., that where a country exports matters for the exporting country's growth and development. In a more recent study, Baliamoune-Lutz (2019) finds that exporting to developed countries enhances export sophistication in the exporting developing country but there are diminishing returns to this impact.

On the other hand, other studies have found that South–South trade is less sophisticated and more concentrated in raw materials than South–North trade is (Organization for Economic Cooperation and Development, OECD 2006). The United Nations Conference on Trade and Development (UNCTAD 2005) performed a detailed examination of trade flows between 1995 and 2005 and found that in the dynamism of South–South trade, primary commodities have played a more important role than in South–North trade, and the most dynamic manufactured product categories in South–South trade tend to be less skill and technology-intensive than those in South–North trade. This is largely due to the emergence of China, which significantly increased its raw material imports from Africa (South–South trade) and its manufactured exports to the United States of America and Europe (South–North trade).

Our study complements the existing literature by providing further evidence on the drivers of structural transformation in the African context. More specifically, our chapter makes three main contributions. It is the first study that utilizes a new indicator, the African Transformation Index, developed by ACET to investigate the drivers of structural transformation. Second, our chapter uses panel data, which allows identifying factors that on average, contribute to structural transformation in Africa. Third, in addition to our variables of interest, our approach allows controlling for the effects of other factors, including policy-related factors. Indeed, besides trade-related variables—i.e., composition of exports and imports—which are our variables of primary interest, we also control for the effects of institutional variables that could also affect structural transformation in Africa.

3 Empirical Analysis

For the empirical analysis, the ACET's African Transformation Index (ATI) is our proxy variable for measuring structural transformation. The ATI assesses the performance of countries on five attributes of transformation and aggregates them in an overall index. It is a composite index of the following

five elements: Diversification, Export competitiveness, Productivity, Technology upgrading, and Human economic well-being. According to ACET, the five elements are considered for constructing the ATI, based on the premise that for their transformation, African economies need to diversify their production, make their exports competitive, increase the productivity of farms, firms, and government offices, and upgrade the technology they use throughout the economy—all to improve human well-being. The overall ATI is constructed by combining subindexes related to the five aforementioned elements of economic transformation. The ATI ranges between 0 and 100,with a higher score indicating better performance.[3] It aims at comparing the performance of all SSA countries, but due to the lack of data, only 21 countries are represented (see the list of the countries in the appendix).[4] ACET aims at covering more countries with more recent data, but this is not yet done.

We use 1990–2010 disaggregated import and export (annual) panel data for the 21 African countries that were covered in ACET's work on economic transformation and develop new trade "category intensity" indexes (TCII) which are then used in empirical estimations to investigate the role of trade in specific product categories in explaining structural transformation. The TCII is derived as follows. We classify the top five categories (by value) of imports/exports either as capital goods, semi-capital goods, manufactures, primary commodity, or food and agricultural products. This yields five categories and we refer to the % share of each category in total imports/exports as *trade category intensity index*, with a higher share (index value) implying higher intensity.

We use the TCII as our right-hand side (RHS) variable of primary interest to shed light on two questions. First, we assess whether the type of imports (capital goods versus other goods) predicts structural transformation. Second, we examine whether the type of exports (manufacturing versus primary commodities and food and agricultural products) can help predict structural transformation.

The methodology we use in the empirical analysis consists of performing fixed-effects and Arellano-Bond dynamic panel GMM estimations. In addition to TCII variables on the right-hand side, we also control for a number of relevant variables, including institutional quality (rule of law), agriculture (share in GDP), industry (share in GDP), human capital, financial development, inward foreign direct investment, and income per capita.

Table 1 shows summarized descriptive statistics for relevant variables while Table 2 reports correlations among the main variables. We observe that the mean value for our indicator of structural transformation is rather low (0.29)

Table 1 Descriptive statistics of the main variables

Variable Name	Obs	Mean	Std. Dev	Min	Max
ACET ATI	441	0.29	0.15	0.08	0.74
GDP per capita, PPP (constant 2011 international $)	441	3638	4608	401	20463
Agriculture, value added (% of GDP)	435	27.93	14.26	2.03	67.25
Industry, value added (% of GDP)	434	25.41	11.71	6.42	64.28
Broad Money (% of GDP)	441	28.84	17.14	7.60	102.21
Foreign direct investment, net inflows (% of GDP)	439	2.04	2.68	−8.59	13.57
% share of Manufactures in total Exports	347	10.86	8.69	0.05	63.02
% share of Primary Commodity in total Exports	347	33.60	29.86	0.09	99.67
% share of Food and Agriculture in total Exports	347	39.42	29.43	0.01	98.38
% share of Capital Goods in total Imports	346	35.33	7.74	16.24	57.58
% share of Semi-Capital Goods in total Imports	346	15.92	6.11	6.86	54.86

Source Authors' calculation based on data from two online databases: *UNCTAD Comtrade* for manufactures, primary commodity, food and agriculture, capital goods, and semi-capital goods exports and the *World Development Indicators* (2015) for the remaining variables

and the maximum value is 0.74 (reached by Mauritius). In addition, we note (from the raw data) that large disparities exist among countries in the shares of primary commodities, food and agricultural products, and manufactures in exports, as well as in the relative import shares of capital and semi-capital goods.

The correlation coefficients reported in Table 2 indicate a strong positive linear correlation of the ATI with GDP per capita, financial development (broad money), share of manufactures in exports, human capital (tertiary school enrollments), and measures of institutional quality. On the other hand, the correlations of ATI with exports of primary commodities, food and agricultural products are negative but much weaker in magnitude. The association of the ATI and imports of capital and semi-capital goods is also low and is positive in the case of semi-capital goods imports and negative in the case of capital goods.

Table 2 Correlations analysis

	GDP per capita	ACET ATI	Agriculture	Industry	Broad money	FDI	Manufactures exports	Raw materials exports	Food and agricultural exports	Capital goods imports	Semi-capital imports	School, tertiary	Corruption	Government effectiveness	Regulatory quality	Rule of law
GDP per capita	0.56															
Agriculture (% GDP)	−0.74	−0.77														
Industry (% GDP)	0.30	0.76	0.67													
Broad money (% GDP)	0.76	0.47	− 0.49	0.11												
FDI (% GDP)	− 0.03	− 0.09	− 0.10	0.10	0.02											
Manufactures exports	0.64	0.26	− 0.42	0.09	0.37	− 0.18										
Raw materials exports	− 0.11	0.37	− 0.36	0.70	− 0.18	0.21	− 0.28									
Food and agricultural exports	− 0.48	− 0.61	0.73	− 0.72	− 0.34	− 0.21	− 0.25	− 0.72								
Capital goods imports	− 0.17	0.34	− 0.03	0.41	− 0.12	0.04	− 0.24	0.36	− 0.16							
Semi-capital imports	0.17	0.12	− 0.16	0.01	0.26	0.22	− 0.05	− 0.07	− 0.19	− 0.17						

	GDP per capita	ACET ATI	Agriculture	Industry	Broad money	FDI	Manufactures exports	Raw materials exports	Food and agricultural exports	Capital goods imports	Semi-capital imports	School, tertiary	Corruption	Government effectiveness	Regulatory quality	Rule of law
School, tertiary	0.69	0.66	− 0.62	0.38	0.72	0.02	0.33	0.14	− 0.51	0.00	0.02					
Corruption	0.53	0.39	− 0.52	0.13	0.57	0.09	0.28	− 0.11	− 0.27	− 0.18	0.37	0.39				
Government effectiveness	0.68	0.49	− 0.64	0.21	0.66	0.07	0.42	− 0.06	− 0.36	− 0.12	0.26	0.53	0.81			
Regulatory quality	0.64	0.54	−0.68	0.33	0.54	0.13	0.32	0.03	− 0.37	− 0.05	0.22	0.51	0.66	0.85		
Rule of law	0.62	0.51	−0.60	0.23	0.64	0.14	0.38	− 0.06	− 0.37	− 0.17	0.38	0.44	0.80	0.86	0.78	
Voice and account	0.60	0.41	−0.60	0.17	0.63	0.11	0.40	− 0.05	− 0.38	− 0.22	0.33	0.45	0.74	0.82	0.76	0.87

Source Authors' calculation based on data from two online databases: *UNCTAD Comtrade* for manufactures, primary commodity, food and agriculture, capital goods, and semi-capital goods exports and the *World Development Indicators* (2015) for the remaining variables

4 Econometric Results

Table 3 reports the results associated with the fixed-effects estimations. The statistical evidence suggests that higher shares of raw materials (i.e., primary commodities) and food and agricultural products in exports are associated with lower structural transformation. Surprisingly, the results indicate that the share of manufactures in exports is negatively associated with structural transformation. On the other hand, imports of capital and semi-capital goods

Table 3 Results of fixed-effects model

Dependent variable: ATI	(1)	(2)
GDP per capita	0.0001	0.0003
	(0.000)	(0.000)
Agriculture (% GDP)	0.032	0.031
	(0.038)	(0.032)
Industry (% GDP)	0.237***	0.124***
	(0.046)	(0.032)
Broad Money (% GDP)	0.180***	0.146***
	(0.031)	(0.028)
Foreign Direct Investment (% GDP)	−0.022	0.035
	(0.065)	(0.063)
Manufacturing, share of merchandise exports	−0.143***	−0.125***
	(0.034)	(0.036)
Primary Commodity, share of merchandise exports	−0.100***	−0.094***
	(0.020)	(0.021)
Food and Agricultural products, share of merchandise exports	−0.114***	−0.125***
	(0.019)	(0.020)
Capital Goods, share of merchandise imports	0.013	−0.012
	(0.032)	(0.032)
Semi-Capital Goods, share of merchandise imports	−0.013	−0.012
	(0.035)	(0.033)
Rule of Law		0.74**
		(0.45)
Obs	328	328
R-sq: within	0.37	0.31
between Overall	0.60	0.64
	0.60	0.62
Hausman test: Chi2 (*p* value)	69.74	57.32
	(0.00)	(0.00)

Note Values in the parenthesis are standard errors. A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level

Source Authors' calculation based on data from two online databases: *UNCTAD Comtrade* for manufactures, primary commodity, food and agriculture, capital goods, and semi-capital goods exports and the *World Development Indicators* (2015) for the remaining variables

do not seem to have a significant effect on the indicator of structural transformation. However, we need to take into consideration the possibility of endogeneity of some of the RHS variables. We try to address the issue of endogeneity by estimating Arellano-Bond's generalized method of moments (A-B GMM) equations, where we treat all the RHS variables, except the rule of law, as endogenous.

Table 4 shows results from the A-B GMM estimations. The statistically significant coefficients on the imports of capital and semi-capital goods suggest that these variables exert a positive impact on structural transformation. Similarly, the statistical evidence also suggests that a greater share of industry in output, a more developed financial sector, and stronger rule of law lead to more structural transformation. On the other hand, higher concentration of exports on primary commodities and food and agricultural products seems to lead to lower structural transformation levels. Surprisingly, again we find that exporting more manufactures (as a share of merchandise exports) leads to lower levels of structural transformation. We investigated the presence of nonlinearity in the relationship between manufactures exports and structural transformation, but the results do not show evidence of nonlinearity. In alternative estimations (results not shown but available upon request), we omitted the variable industry from the RHS but the coefficient on the variable "Manufactures Exports" remained statistically nonsignificant. In addition, we fail to find support for a significant effect of human capital (tertiary school enrollment) on structural transformation.

In column (7) of Table 4, we include the interplay of capital goods import with the share of raw materials in exports and the share of manufactures in exports. We obtain evidence supporting a positive effect from the interplay of capital goods imports and primary commodity exports, suggesting that the composition of imports may contribute to predicting structural transformation more in the case of primary commodity exporting countries. Perhaps importing more capital goods may help those economies move into processing/manufacturing or improve other aspects of structural transformation. During the years of commodity price increases in the 2000s, high prices may have helped countries accumulate foreign exchange and use it to fund imports of capital goods needed for upgrading their production systems.

Table 4 A-B Dynamic model results dependent variable: ATI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ATI_lag	0.795***	0.778***	0.686***	0.693***	0.684***	0.692***	0.671***
	(0.022)	(0.023)	(0.028)	(0.028)	(0.029)	(0.028)	(0.021)
GDP per capita	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Agriculture (% GDP)	−0.003	−0.003	−0.003				
	(0.019)	(0.018)	(0.018)				
Industry (% GDP)	0.038**	0.033**	0.052**	0.049**	0.050**	0.049**	0.038**
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Broad Money (% GDP)	0.045***	0.043***	0.071***	0.070***	0.069***	0.070***	0.063***
	(0.01)	(0.013)	(0.011)	(0.014)	(0.014)	(0.014)	(0.014)
Foreign direct investment (% GDP)	0.005	−0.008	0.032	−0.043*	−0.036	−0.043	−0.033
	(0.02)	(0.02)	(0.03)	(0.026)	(0.026)	(0.026)	(0.028)
Manufacturing, share of merchandise exports	0.012	0.003	−0.030**	−0.034**	−0.006	−0.034**	0.012
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.014)	(0.01)
Primary commodity, share of merchandise exports	0.007		−0.026***	−0.025***	−0.024***	−0.025***	−0.021***
	(0.004)		(0.008)	(0.009)	(0.008)	(0.008)	(0.006)
Food and agriculture, share of merchandise exports		−0.019***	−0.033***	−0.030***	−0.027***	−0.030***	−0.028***
		(0.005)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Capital goods, share of merchandise imports	0.040***	0.039***	0.024*	0.029**	0.033**	0.029**	0.023**
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.01)
Semi-capital goods, share of merchandise imports	0.039***	0.034**	0.039**	0.042**	0.048***	0.042**	0.037**
	(0.014)	(0.015)	(0.017)	(0.016)	(0.017)	(0.016)	(0.01)
Rule of Law				0.951**	1.449**	0.95**	0.82**
				(0.35)	(0.57)	(0.45)	(0.27)
(Manufacturing, share of merchandise exports)_squared					−0.005		
					(0.005)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tertiary School Enrollment						0.023	
						(0.04)	
(Primary Commodity, share of merchandise exports) X (Capital Goods, share of merchandise imports)							0.032***
							(0.001)
(Primary Commodity, share of merchandise exports) X (Manufacturing, share of merchandise exports)							−0.005
							(0.03)
Obs	293	293	293	281	281	281	281

Note Values in the parenthesis are standard errors. A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level. Sargan test and A-B second-order autocorrelation test results are omitted to conserve space but may obtained from the authors

Source Authors' calculation based on data from two online databases: *UNCTAD Comtrade* for manufactures, primary commodity, food and agriculture, capital goods, and semi-capital goods exports) and the *World Development Indicators* (2015) for the remaining variables

5 Conclusion

In recent years, many African countries have reversed the trend of low or negative growth rates and some countries have experienced remarkably high growth rates. However, significant GDP growth cannot be sustained in the absence of economic diversification, enhanced export competitiveness, technological upgrading, productivity increases, and availability of formal employment opportunities for women and men. Indeed, a country's economic transformation requires these processes of structural transformation to be in place along with institutions and policies that advance and support economic transformation (ACET 2014).

In this chapter, we examined the impacts of exporting manufactures, primary commodities, and food and agricultural products, as well as importing capital and semi-capital goods on structural transformation in a group of 21 sub-Saharan African (SSA) countries. The empirical results suggest that the import of capital and semi-capital goods can be a good predictor of structural transformation while concentration of exports in primary commodities and food and agricultural products seems to predict weak structural transformation. Additionally, the statistical evidence suggests that the import of capital goods has a stronger positive influence in primary commodity-dependent economies.

To the extent that importing capital goods allows countries to upgrade production systems and potentially move into manufacturing (processing), the relative size of capital goods imports may be positively correlated with the level of structural transformation. This is an important finding in the context of increasing trade tension between China and the United States of America. Indeed, trade tensions may raise the relative price of machinery and equipment (International Monetary Fund 2019), which will negatively affect SSA countries' efforts for structural transformation.

The finding that the share of manufactures in total exports does not seem to be a significant predictor of structural transformation may appear puzzling. A possible explanation or at least speculation, however, could be the low level of manufactures exports in most countries in the covered sample, or that the level of product sophistication is very low (Abdon and Felipe 2011; Hidalgo et al. 2007) and data on manufacturing may reflect mainly processing of primary products rather than sophisticated manufacturing. We intend to investigate this in future research.

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Appendix

See Table 5.

Table 5 List of countries

Benin	Ethiopia	Malawi	Senegal
Botswana	Gabon	Mauritius	South Africa
Burkina Faso	Ghana	Mozambique	Tanzania
Burundi	Kenya	Nigeria	Uganda
Cameroon	Madagascar	Rwanda	Zambia
Cote d'Ivoire			

Notes

1. The eight comparator countries include Brazil, Chile, Indonesia, Malaysia, Singapore, South Korea, Thailand, and Vietnam.
2. This claim is not new in the literature. The importance of industrialization, for example, was highlighted by Kaldor (1967). The novel and significant contribution of the recent literature are related to the methods of analysis.
3. ACET's ATI ranges between 0 and 100. However, for convenient econometric analysis we have changed the scale to a 0–1 range.
4. For further discussions on the ATI, see ACET (2014).

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Tax Structure, Competitiveness of Firms, and International Trade in Africa: Lessons from WAEMU and CEMAC for CFTA

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1 Introduction

In Africa, the CFTA agreement was signed in March 2018 with the ultimate aim of forming a single market. Potentially, this new trade agreement is expected to increase welfare, economic growth, and job opportunities in Africa. The purpose of the CFTA deal is extremely relevant for the region. Most African economies export primary commodities to countries mainly located in other continents. The share of intercontinental exports in total African exports is only 18%. The CFTA aims at changing that by forming a single African market, and the UNCTAD estimates that eliminating tariffs among African countries can increase continental trade by a third, and raise African GDP by 1% over time (The Economist 2018b).

Achievements of the deal will depend on the timely completion of required policy adjustments and negotiations in member countries. Through this process, improving the structure and coordination of taxes, especially the ones affecting firms, will be essential for the success of the union. In free-trade areas, the competitiveness of firms, which is partially determined by tax regimes, is crucial for desired outcomes. Given the importance of firms for sustainable development, coordinated tax structures should support firms in

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their contributions to higher economic growth and trade. At the same time, they should make sure firms pay their tax obligations to improve tax revenues.

Coordination of taxes in the free-trade area involves different steps. One major reason for low intercontinental trade in Africa is the existence of high tariffs. For the success of a free-trade area, these taxes should be eliminated. However, this will not be an easy step to take because some countries in the region struggle to raise enough tax revenues in the absence of international taxes. In addition to high trade taxes, an even bigger problem is that trade standards, licenses, and tax policies are tremendously different across African countries.

Given the importance of harmonization of taxes for the success of the newly formed CFTA, in this chapter, the tax structure of the member countries and possible impacts of taxes on their economic growth and the competitiveness will be investigated. While doing so, lessons from Africa's current economic organizations on tax coordination can be helpful to identify challenges in the negotiation process for the future success of the CFTA. The chapter considers not only corporate income taxes (CIT), but also labor, international, and consumption taxes, all of which can have an important impact on activities of firms and their competitiveness in free-trade areas.

For lessons about forming a free-trade region and the importance of taxation in this process, the focus will be on two of the decades-old economic unions: Central African Economic and Monetary Community (CEMAC) and West African Economic and Monetary Union (WAEMU), where tax treaties were signed in the 1990s to coordinate their tax policies as well as to converge tax rates toward certain targets. Based on these treaties, the member countries of these unions have attempted to improve the structure and coordination of taxes in the region by introducing tax policies that could lead to higher efficiency and fewer distortions in their markets. However, despite all these good intentions, their tax policies continue to be de facto uncoordinated and a source of several inefficiencies across the region, while revenue collection is relatively low. There are negative implications associated with distortionary investment codes and tax incentives within individual countries. Relatively high labor and international taxes are perceived as imposing significant restrictions on firm investment, production, and job creation decisions in these two regions. All these experiences are extremely important for the success of the newly formed CFTA.

2 Background

There are currently 17 economic and trade blocs in Africa, such as Economic Community of West African States (ECOWAS), the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC), Central African Economic and Monetary Community (CEMAC), Western African Economic and Monetary Union (WAEMU), and the East African Community (EAC). Almost all African countries take part in more than one regional agreement. However, intraregional trade is still extremely low because the regional-trade deals look good on paper, but mostly not followed by member countries. While the share of intraregional trade in Africa was around 12% of their total trade in 2015, the rate was 52% among Asian countries, 22% among Americas' developing countries, and 65% in Europe (The Economist 2016). In terms of trade volume, African countries trade twice as much with Europe or Asia as they do with each other; 82% of exports from African countries, mostly consisting of commodities, go to other continents (The Economist 2017).

There are several reasons for low intraregional trade. While an average tariff rate for intraregional trade in Africa is 8.7%, it is only 2.5% for Africa's overseas trade (The Economist 2016). In addition to high tariffs, African countries face serious shortages in infrastructures, which increase transportation costs twice the world's average and significantly lower efficiency. Another reason for low regional trade is that trade agreements affect each African country differently because they have different levels of development, resources, and size of population. Manufacturing is mostly limited in major economies of the region, such as Kenya, Nigeria, and South Africa. Economies heavily depending on small agricultural producers, such as Ethiopia, fear not being able to compete with major economies because there is no specific mechanism to help them increase the share of industrial production. Thus, despite trade agreements they still mostly prefer restricting intraregional trade to protect their economies instead of making sacrifices to increase it. The limited availability of suitable products that can be traded within Africa, such as manufactured goods and some services, is another important restriction. Product differentiation in most African countries is narrow and industrial production is limited. Exporting producers, such as Nigeria and Angola, mostly focus on supplying high-income or middle-income industrialized countries instead of their neighbors. Differences in the level of the competitiveness of countries due to diverse tax policies constitute another obstacle for higher trade. Discrepancies in tax rates significantly determine profitability and competitiveness of firms. When tax rates are

significantly different in member countries of trade blocs, it cannot be easy to convince domestic firms while negotiating to remove trade protections.

To overcome these listed problems, during one of the sessions of the Assembly of Heads of State and Government of the African Union in 2012, the participating countries decided to establish the CFTA by 2017 to promote intra-African trade through seven clusters: "trade policy, trade facilitation, productive capacity, trade-related infrastructure, trade finance, trade information, and factor market integration" (African Union 2015). The CFTA initially aimed at bringing together 55 African countries with more than one billion people to form a single African market for goods and services, and for free movement of businesses and investments. The objectives also included harmonization and coordination of trade liberalization and facilitation regimes and instruments, and enhancing competitiveness.

An agreement was finally signed by 44 countries on March 21, 2018 in Kigali, Rwanda. The list of these countries is given in Table 1. The agreement is expected to merge Africa's markets, promote industrialization, and create jobs. United Nations Economic Commission for Africa (2015) predicts that CFTA can double intraregional trade to US$35 billion which can make Africa the world's largest free-trade area. In this process, trade policies, regulations, and institutions are expected to align and enhance efficiency, productivity, and introduce economies of scale, diversification, and structural transformation. The process requires separate negotiations on details of tariff reduction, competition, convergence of tax policies, investment, and intellectual property rights. If everything goes as expected, all these improvements can ultimately benefit consumers, producers, and governments and lower poverty through higher economic growth and more inclusive wealth.

Despite all these expected positive outcomes, 11 African countries, producing 37% of the continent's GDP, have not signed the agreement yet (The Economist 2018a). These countries include two major economies of the region, namely South Africa and Nigeria, because their governments feared losing tariff revenues and control over their industrial policy. The remaining 9 countries are Botswana, Burundi, Eritrea, Guinea-Bissau, Lesotho, Namibia, Sierra Leone, Tanzania, and Zambia. The main concern of these countries is that such a deal without initial preparation can hurt domestic producers and damage domestic industries and cause unemployment to rise. In many African countries, such as in Nigeria, some domestic firms enjoy long-standing import restrictions to protect them from foreign competition. Such protected firms' pressure on policymakers to delay their involvement in the trade agreement. However, given that such large economies are expected to gain more from higher interregional trade as their companies expand

Table 1 CFTA: trade and income indicators (averages 2000–2017)

	Exports to Africa/exports World	Imports from Africa/Imports from World	Total Africa/Total world	Trade (% of GDP)	GDP per capita (current US$; 2017)
Algeria	2.36	2.00	2.12	65.41	4123.4
Angola	2.65	9.57	4.37	110.29	4170.3
Benin	37.70	22.74	26.25	58.91	829.8
Burkina Faso	28.42	32.14	30.19	46.40	670.7
Cabo Verde	3.92	2.56	2.62	99.42	3209.7
Cameroon	14.27	22.99	18.81	51.30	1446.7
Central African Rep	10.75	17.20	14.73	38.78	418.4
Chad	1.87	21.36	7.61	80.55	669.9
Comoros	7.39	16.59	15.51	59.93	797.3
Congo, D.R	15.12	46.98	30.68	61.46	457.8
Congo, Rep	13.90	35.13	21.78	138.74	1658.0
Côte d'Ivoire	30.87	28.31	29.77	79.12	1662.4
Djibouti	38.65	4.18	11.45	97.12	1927.6
Egypt	6.58	2.97	4.03	47.91	2412.7
Equatorial Guinea	3.67	14.55	5.57	166.48	9850.0
Ethiopia	25.06	3.64	7.67	40.35	767.6
Gabon	4.58	9.13	6.00	84.11	7220.7
Gambia	53.91	19.09	24.42	68.77	483.0
Ghana	29.56	14.89	21.38	88.70	1641.5
Guinea	8.77	13.46	11.53	74.77	825.3
Kenya	39.20	9.04	19.29	53.19	1507.8
Liberia	2.66	15.27	5.96	152.08	456.1
Libya	1.46	3.55	2.12	97.32	7998.0
Madagascar	6.56	10.36	8.89	69.32	449.7
Malawi	29.46	50.43	43.02	60.46	338.5
Mali	58.30	48.17	51.52	58.81	824.5
Mauritania	9.48	6.51	7.58	100.93	1136.8
Mauritius	13.62	12.77	12.75	114.89	10547.2
Morocco	5.69	3.88	4.49	73.10	3007.2
Mozambique	24.14	37.42	32.34	85.19	415.7
Niger	29.68	23.90	25.53	53.05	378.1
Rwanda	54.86	33.25	37.74	40.93	748.4
São Tomé&Príncipe	12.06	20.82	20.20	…	1913.0
Senegal	42.50	18.46	25.65	70.63	1033.1
Seychelles	3.18	11.23	8.50	188.68	15504.5

(continued)

Table 1 (continued)

	Exports to Africa/exports World	Imports from Africa/Imports from World	Total Africa/Total world	Trade (% of GDP)	GDP per capita (current US$; 2017)
Somalia	6.57	34.67	27.51	74.96	499.8
South Sudan	…	29.33	8.08	72.44	…
Sudan	2.61	2.74	2.50	31.85	2898.5
Togo	62.85	16.47	33.01	97.72	617.2
Tunisia	5.55	3.58	4.40	96.39	3490.8
Uganda	42.44	24.72	29.64	44.30	604.0
Zimbabwe	62.67	70.88	65.66	77.95	1079.6
Min	**1.46**	**2.00**	**2.12**	**31.85**	**338.48**
Max	**62.85**	**81.80**	**74.14**	**188.68**	**15,504.46**
Average	**22.30**	**23.92**	**21.50**	**80.37**	**2623.47**

Source IMF's Direction of Trade Statistics. World Bank's World Development Indicators
Note In addition to these 42 countries, Eswatini and Western Sahara have signed the CFTA

regionally, it is expected that the major economies will also join the CFTA agreement as they prepare their domestic markets.

The agreement on the CFTA is essential to solve the chronic economic problems of Africa, but, based on earlier experiences it will not be easy to implement the objectives. Increasing intraregional trade requires upgrading infrastructure, changing industrial policies, and converging tax regimes. The following sections of the chapter will focus on the importance of tax coordination for the effective functioning of free-trade agreements. Countries will need to lower international taxes and align consumption and corporate taxes and find substitute tax revenues. The first section presents lessons in the coordination of tax policies from two economic unions in Africa (CEMAC and WAEMU). Subsequently, in light of these lessons, current tax policies of the CFTA members are evaluated.

3 Coordination of Taxes in Trade Areas: Lessons from CEMAC and WAEMU

In this section, the CEMAC and WAEMU are investigated in terms of their tax policies, trade, and competitiveness of firms. Since the 1980s these blocs have aimed at increasing intraregional trade but could not be successful mainly due to problems in coordination of tax policies. Lessons from these two regions on their attempts to harmonize tax policies to increase the

competitiveness of firms in the international arena can be helpful for the CFTA deal. When tax issues and their impacts on the competitiveness of firms are analyzed in a smaller region, challenges can be better identified while forming a larger trade area. The focus is on CIT, payroll taxes, consumption taxes, and foreign trade taxes, all of which can significantly affect the activities of firms. It should be noted that the experience of the WAEMU is more encouraging in terms of tax harmonization and can be a better example for the CFTA.

a. **WAEUMU**

The WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo) share a common currency and have a customs union. Right after its establishment and throughout the 1980s and 1990s, a plan was introduced to coordinate taxes as part of the economic union (Bayraktar and Moreno-Dodson 2019). The main aim was to reduce distortions to intraregional trade and mobilize their domestic tax revenues. The treaty required the coordination of tax rates and its bases, and also mandated the share of tax revenues in GDP to be at least 17%. It also included adjustments for the convergence of the tax revenue structure to increase trade. The WAEMU members were expected to shift their tax revenue sources from international trade to domestic taxes to guarantee the good functioning of the common market.

The WAEMU countries decided on VAT and excise tax directives in 1998 and directives on capital income taxation in 2009 (Bayraktar and Moreno-Dodson 2019). The countries introduced common external tariffs to form the customs union in 2000. After years of efforts, tax coordination has been partially successful. Mansour and Rota-Graziosi (2013) indicate that in 2012 over 80% of tax revenues among the WAEMU countries were from taxes that are subject to the union directives and regulations.

While the structure of the tax coordination in the WAEMU, in theory, can be considered one of the most advanced in the world, tax coordination is not effective in many areas in practice. Especially, different investment codes of the member countries have been commonly used to grant tax incentives to companies investing in their individual countries. This has caused a negative effect on the coordination of corporate taxes and increased tax competition in an uncoordinated way (Bayraktar and Moreno-Dodson 2019).

Coordination of corporate tax rates for common markets has been essential to raise the competitiveness of firms for larger intraregional trade. In the WAEMU, a common definition of the corporate tax base and the range of a

single rate (25–30%) were introduced as early as 2008 (Mansour and Rota-Graziosi 2013). There are many tax exceptions for investments in the member countries. For example, capital gains on business assets are tax-exempt if the capital gains are reinvested in a WAEMU country.

Despite all these well-intended coordination attempts, the share of intraregional trade has not been changed much since the 1990s. While the share of total trade in GDP has been increasing in the region over the years, the share of intraregional trade in total trade has been only 10%. One of the reasons for low intraregional trade in the WAEMU has been the low competitiveness of firms which are supported by many exceptions given by government agents. The member countries mostly use investment codes to provide firms with special tax regimes on their investments in areas such as mining, petroleum, and free-trade zones. Special tax regimes can be highly discretionary because they are established by executive branches without any permission of the legislation group (Bayraktar and Moreno-Dodson 2019). A tax treaty on CIT allowed enormous flexibility to the member countries to compete through tax bases and statutory tax rates. This fact led to a practice where most member countries do not observe single corporate tax rates and tax bases and apply different CIT rates based on economic activities of corporations.

In addition to harmonization of corporate taxes, the lowering and coordination of international taxes are expected to raise intraregional trade through higher production and competitiveness. Throughout the years, starting in 1996, the member countries have lifted many quantitative restrictions on trade within and outside the union and significantly cut tariffs (Mansour and Rota-Graziosi 2013). However, such measures could not increase intraregional trade to desired amounts due to high transportation costs, administrative delays, roadblocks, and racketeering (Egoume and Nayo 2011; Goretti and Weisfeld 2008; Geourjon and Mansour 2013). Another issue is that, despite slightly declining trends in foreign trade taxes and increasing trade openness, the members could not be successful in shifting the tax revenue weight from international taxes to domestic taxes (Baunsgaard and Keen 2010; Keen and Mansour 2010). In the region, revenues generated by international taxes are still relatively high.

Another important tax item that can determine the competitiveness of domestic firms is consumption taxes. If the level of consumption taxes changes significantly across countries, consumers may prefer shopping in foreign countries or may increase the possibility of smuggling goods across the border. At the same time, because indirect domestic taxes are expected to replace international taxes to promote international trade, it is important to have converged consumption taxes. In the WAEMU region, VAT revenues

have been increasing. However, there are still concerns regarding the negative effect of VAT on investment activities (Ebril et al. 2001). Responding to complaints from firms and consumers, the member countries have introduced special investment codes offering VAT tax holidays in their individual economies so that inputs of an investment project can be exempted from VAT during firms' initial development and expansion periods. Changing tax rates, tax bases, items facing exemptions, and tax refunds from time to time have lowered the effectiveness and efficiency of VAT significantly in the region (Bayraktar and Moreno-Dodson 2019). Starting in the early 2000s, the member countries have expanded their VAT exemptions in a way to cover some additional consumption goods and services, and inputs used in the production of exempt goods such as building equipment, pesticides, and animal feeds. Some member states have started to ask for even lower VAT rates to compete with North African countries in the tourism sector. Following such complaints and to prevent further exemptions, in 2009 the VAT rates dropped within the union. Today, the contribution of VAT to tax revenues in the region is around 6% of GDP and still limited.

Based on the assessment of tax rates, tax structures and impacts of taxation on the competitiveness of firms in the WAEMU, several policy recommendations are possible for the CFTA: (a) Trade liberalization requires lower tariffs and fees. (b) Declining international tax revenues requires to find substitute tax revenues, such as higher consumption taxes. (c) CITs are important determinants of the competitiveness of companies in international markets. Such taxes should not be discretionary in favor of larger firms. Tax incentives should also benefit smaller companies to increase international trade further. (d) Lack of transparency in the tax system can lower the competitiveness of companies in the international arena. Concerns on possible corruption issues in the process of granting investment incentives and codes to companies should be investigated. (e) High labor taxes can lower the competitiveness of firms in international markets. Thus, they need to be balanced well with CITs.

b. **CEMAC**

After several unsuccessful attempts, the CEMAC (Cameroon, the Central African Republic, Chad, the Republic of Congo, Gabon, and Equatorial Guinea) was finally established in 1994 with increasing regionalization initiatives in Africa as a whole. The aim was the replacement and improvement of the customs union. A treaty was signed in 1999 to converge national economic policies, to coordinate sectoral policies, and to ultimately create a

single market. The Monetary and the Economic Union have been CEMAC's main components. While the monetary union is already established, the economic union is still weak. The CEMAC's 1999 Treaty established a three-step plan to create a common market and an economic union by 2015 (Bayraktar and Moreno-Dodson 2018). These steps consisted of (1) harmonization of national and economic legislations between 1999 and 2004; (2) establishment of free movement of products, services, people, and capital between 2005 and 2009; (3) consolidation and evaluation of the achieved outcomes between 2010 and 2015. Currently, the progress of the economic union falls behind the plan despite the existence of comprehensive common legislations. The implementations of these legislations on the national level have been slower than expected. Officially, the CEMAC region became a free-trade region in 2000. But in practice, many trade barriers still exist, leading to a low level of intraregional trade.

The member countries had several attempts to improve the structure and coordination of taxes in the region to increase productivity and investment and achieve the goal of a common market. But, the process has been extremely slow-moving so far. The economic union has introduced: (1) a common external tariff; (2) removal of customs tariffs on intraregional trade; (3) harmonization of indirect taxation; and (4) replacement of quantitative import barriers by temporary import surcharges (Martijn and Tsangarides 2007). While harmonizing consumption taxes, the aim was to prevent the countries from using taxes for protection purposes and to improve government tax revenues. The CEMAC has also applied common external tax rates (Keen and Mansour 2010). With the agreement on common tariff rates, the share of international taxes has started to decline. Currently, the contribution of customs tariffs to tax revenues is low around 20%. However, the trade could not progress as expected due to burdensome border procedures and restrictions, many exemptions in individual countries, and a weak transportation infrastructure. Intraregional trade increased from 5% in 2002 to 12% in 2003, but in the following years, it dropped to 8% on average. It was only 7.2% in 2016. Instead of taking measures to increase economic integration, the members tend to protect their markets, similar to the mistakes made in the WAEMU region and engage in some administrative delays, roadblocks, and racketeering, which were expected to be illegal (Goretti and Weisfeld 2008). When such problems are coupled with poor transportation conditions, the low quality of trade support services and security problems, intraregional trade could not progress (Martijn and Tsangarides 2007).

The members introduced common VAT rates in 1999 (Doe 2006). The aim of the common rules was the sharing of tax burdens between producers

and consumers. They initially tried to lower market distortions. However, in practice, it did not work as expected. Changing tax rates, tax bases, items facing exemptions, and tax refunds from time to time at the national level reduced the effectiveness of VAT significantly in the region. Unfortunately, the member countries could not replace declining trade taxes with domestic sales and value-added taxes, and the share of domestic indirect taxes is still low.

Effective and statuary CIT rates are still high between 30 and 35%. These rates are much higher than the rates collected in the WAEMU region. High CIT rates negatively affect the efficiency of producers. The CEMAC countries use investment codes to provide some firms with tax exceptions on their investments. While some CEMAC countries have general investment incentives, the remaining ones have more sector-targeted rules. Special tax regimes are generally introduced through sectoral tax codes and laws, such as mining and oil. Tax incentives and codes can be highly discretionary because they are established by executive branches of governments without the permission of legislation groups and provided through contractual agreements involving modified tax laws.

Despite several coordination attempts, studies in the literature indicate that tax policies in the CEMAC region are still mostly diverse and uncoordinated, and many inefficiencies and tax collection issues continue in practice (Bayraktar and Moreno-Dodson 2018). The current tax structure in the region creates unfair tax competition among member countries. Despite the fact that the ultimate aim of the organization is to form a common market, such distortionary treatments cause more fragmentation in the region and put significant restrictions on firms' competitiveness and investment and production decisions. The members are still in need of tax policies that can support higher efficiency and fewer distortions in their markets. They should take the necessary steps to harmonize their tax policies to achieve regional cooperation and integration. In this process, the governments also need to increase their non-oil tax bases which can be achieved only through diversification of their economy. Similar to the WAEMU countries, the CEMAC members need to coordinate tax rates, tax bases, and the tax revenue structure to the extent that is necessary for a well-functioning common market. The CEMAC countries now heavily depend on taxes from corporations. To accomplish the economic union they are expected to shift their tax revenue sources, especially toward consumption taxes.

It should also be noted that in addition to concerns on tax coordination, one of the major problems of firms in the region has been the dominance of informal sectors. For formal firms, which pay high taxes, it is hard to compete

with informal firms which do not necessarily pay any taxes. In 2016, 76.5% of firms in the region reported that they had to compete against informal firms (Bayraktar and Moreno-Dodson 2018). As a comparison, this rate was 67.4% in SSA and 53.4% in the world.

Overall, the CEMAC countries, when compared to the WAEMU, could not make enough progress toward converging taxes to increase the competitiveness of firms. Nevertheless, experiences of the member countries still can be valuable for the success of the CFTA: (a) Governments need to find new ways of increasing total tax revenues. (b) The tax system should not heavily depend on income taxes. High CIT rates and labor taxes significantly lower the competitiveness of firms. (c) Shifting tax bases from corporate incomes to consumption can be helpful to ease the pressure on firms. (d) Large informal sectors make it difficult for governments to increase tax revenues and the competitiveness of firms. (e) Tax incentives should be transparent and well rationalized to prevent distortions in markets which may lower the competitiveness and effectiveness of firms.

4 Trade and Tax Structure in the CFTA

The tax structure in a country is important for producers and significantly determines their competitiveness in trade. Tax rates, such as CIT and payroll taxes, are high on average in many countries in the CFTA. Nevertheless, while some large firms enjoy lower taxes due to tax incentives, high taxes appear as obstacles especially to medium- and small-size firms and lower their competitiveness. Firms facing higher taxes cannot easily compete in a free-trade area without necessary adjustments and harmonization in tax regimes.

Before investigating the general tax structure of CFTA countries, it can be informative to study their major trade indicators. Table 1 shows basic information on trade and income per capita for the countries that signed the CFTA agreement. The income range of the countries (real GDP per capita) was between US$339 (Malawi) and US$15,505 (Seychelles) in 2017. The average income per capita in the region was US$2623 in the same year. However, the level of real GDP per capita in many countries is lower than US$1000, which places them into the low-income group. Without necessary adjustments and protections, such diverse income levels can create important problems in a free-trade area because lower income countries may not contribute to international trade with their weak markets and face significant losses. Differences in per capita income are reflected in diverse but mostly

low economic growth rates (country-level data are available upon request). The average growth rate was only 2% between 2000 and 2017.

The ultimate aim of the CFTA is to form a common market for Africa's trade. In this process, the level of intraregional trade is expected to rise. However, the current level of intraregional trade is extremely low. Column 1 of Table 1 shows the share of each country's exports to other African countries in their total exports. Zimbabwe and Togo have the highest share; 62% of these countries' exports go to other African countries. Cabo Verde, Chad, Libya, and Seychelles have the lowest shares. In these countries, the share of exports to other African countries is less than 4% of their total exports. The region's average was only 22.3%.

Column 2 in Table 1 presents the share of each country's imports from other African countries in their total imports. Similar to exports data, the range of the share of intraregional imports is large. While 71% of Zimbabwe's imports were from other African countries, it was around 2% in Algeria, Egypt, Ethiopia, and Morocco, indicating these countries do not import almost any goods and services from other African countries.

The low level of intraregional trade can be better comprehended after studying the share of each country's trade (exports plus imports) with other African countries as reported in column 3. 66% of Zimbabwe's total trade on average were with other African countries (the highest share in the group). The average for the whole group was only 21%. North African countries tend to have lowest intraregional trade.

In Table 1, the trade openness of countries is calculated by the share of total exports and imports in GDP. The average was 80% between 2000 and 2017. Based on these data, Cabo Verde, Congo, Djibouti, Guinea, Libya, Liberia, Mauritania, and Mozambique are the most open countries with the share higher than 100% of GDP. On the other hand, Sudan, Kenya, Cameroon, and Ethiopia have a low trade openness indicator. These calculations indicate that contributions of some African countries to intraregional trade are not only low, but also their overall trade openness is extremely limited. This fact is expected to increase complexity while forming a common free-trade area. Not only the member countries are expected to adjust their production to supply more to other members, but they should also increase their trade with the rest of the world.

Tables 2 and 3 give general information on the tax structure of the CFTA countries. While Table 2 reports average taxes paid by corporations between 2002 and 2017, Table 3 presents the average share of different types of taxes in percent of GDP.

Table 2 CFTA: corporate taxes (averages 2002–2017; % of profit)

	Total tax rate	Profit tax	Labor tax		Total tax rate	Profit tax	Labor tax
Algeria	72.06	7.61	30.70	Libya	32.60	22.10	10.30
Angola	51.30	24.09	9.00	Madagascar	41.27	18.99	20.30
Benin	63.51	12.94	28.01	Malawi	32.31	23.88	6.10
Burkina Faso	43.56	16.65	21.91	Mali	50.03	11.63	33.57
Cabo Verde	42.46	19.45	18.15	Mauritania	69.79	0.00	8.99
Cameroon	51.24	31.26	18.30	Mauritius	24.60	10.60	7.81
Chad	70.13	31.30	26.79	Morocco	50.25	26.66	22.04
Congo	60.31	1.32	31.99	Mozambique	36.61	30.57	4.50
Côte d'Ivoire	50.78	9.26	21.39	Niger	45.59	18.85	20.43
Djibouti	37.80	17.70	17.70	Rwanda	35.26	25.64	5.54
Egypt	44.75	14.61	25.57	São Tomé	42.50	24.13	6.80
Equatorial G	54.02	27.62	25.40	Senegal	45.84	16.01	23.83
Eswatini	36.32	27.31	4.67	Seychelles	36.22	20.52	12.13
Ethiopia	32.69	25.81	5.04	South Sudan	29.69	7.59	19.20
Gabon	45.39	18.91	24.94	Sudan	41.06	13.79	19.20
Ghana	33.16	18.62	14.44	Togo	50.26	10.36	26.26
Guinea	69.38	1.26	25.96	Tunisia	61.73	14.83	25.10
Kenya	43.79	31.33	4.70	Uganda	34.24	22.19	11.30
Liberia	40.19	15.22	5.40	Zimbabwe	36.36	17.06	5.22
Min	**14.86**	**0.00**	**0.00**				
Max	**72.06**	**31.33**	**33.57**				
Average	**42.94**	**17.77**	**15.50**				

Source World Bank's Doing Business Database
Note Some CFTA countries are excluded due to lack of data

According to Table 2, the range of the share of taxes paid by corporations in percent of profits (effective corporate taxes) is between 15% and 72% in the CFTA between 2002 and 2017. The average effective tax rate in the region was 34%. While firms pay relatively low effective taxes in Ethiopia, Malawi, and Mauritius, companies in Algeria, Benin, Chad, Guinea, Mauritania, and Tunisia pay higher taxes. This observation indicates that, in terms of tax obligations, the competitiveness of firms is different across countries.

When the focus is only on effective CIT, the range was between 0% (in Mauritania) and 31% (in Kenya). The average for the CFTA was 18% between 2002 and 2017. It is expected that, when borders are opened for free trade, it will be difficult for firms paying higher CIT to compete with

Table 3 CFTA: shares of taxes and share of informal sector (averages 2000–2016; in % of GDP)

			Indirect taxes			
	Total taxes (%)	Total direct taxes (%)	Total indirect taxes (%)	Taxes on goods and services (%)	Taxes on international trade (%)	Size and development of the shadow economy (2004–2015) (%)
Max	40.2	16.5	30.2	12.6	23.0	60.6
Min	1.3	0.9	1.2	0.1	0.3	22.6
Average	15.7	5.3	9.4	5.6	3.7	38.9
Median	13.6	4.2	8.7	5.7	2.1	38.6

Source ICTD Government Revenue Dataset. The source of the last column is Medina and Schneider (2018)

firms paying relatively lower taxes. Tax adjustments are essential to harmonize taxes to increase firms' competitiveness in the region. Based on earlier experiences of the CEMAC and the WAEMU, instead of making necessary adjustments, many countries tend to reduce the effective tax burden on firms in a discretionary manner. In such cases, mostly larger firms can obtain and use tax incentives more easily due to their connections to the political network. Unfortunately, governments generally do not provide tax incentives to small and/or young companies. Given that such firms are the engine of growth to increase employment and international trade, discriminations among firms can have serious consequences. Rationalizing tax incentives can benefit smaller companies and increase international trade further. In this process, transparency is essential. A transparent process requires open negotiations between government agents and individual companies. In a transparent process, companies should benefit from tax incentives based on their contributions to investment, international trade, and job creation.

Differences across countries are also observed in payroll taxes (labor taxes and contributions in percent of profits in Table 2). The range of this tax is between 4.5% (in Mozambique) and 34% (in Mali). The average was 15.5% in the region. Companies are expected to pay a high share of their profits as payroll taxes, even higher than CITs in most cases. A relatively high share of such regressive taxes can damage the incentives of companies to invest more and create new jobs. If governments balance taxation on labor versus profits, this can increase production and contributions of companies to international trade. High effective CIT might be good for the progressivity of the tax system, but when high CIT rates are combined with high labor taxes, which are considered regressive, they make the business environment less than

ideal for investment. They also lower the potential domestic mobilization of resources and cause distortions across countries (Klemm and Van Parys 2012). High tax rates may also limit foreign investments which are considered important for businesses and job creation in low-income countries (Van Parys and James 2010). As an additional note, if the process of harmonization of taxes involves tax simplification, this can improve the efficiency of firms considerably and increase tax revenues with declining corruption (Awasthi and Bayraktar 2015).

The share of taxes in GDP changes considerably across CFTA countries. For example, while the tax rate in GDP was 38.7% in Angola, it was only 1.3% in Somalia (country-level data are available upon request). Table 3 presents that the average rate for the region was 16% between 2000 and 2016. Countries collecting low taxes can face more serious issues while harmonizing taxes in the region because they will be in need of making a major revision in their tax systems (Bayraktar et al. 2016).

When the classification of taxes is investigated in Table 3, it can be seen that the share of direct taxes on average is lower than the share of indirect taxes. While the average share of direct taxes in GDP is 4.3% in the region, the share of indirect taxes is 9.4%. In order to harmonize the tax systems in the free-trade area, as countries reduce CITs, they will need to find new sources of indirect taxes to compensate for lost tax revenues from corporations.

Indirect taxes are expected to increase with tax coordination. However, a major challenge is that one component of indirect taxes (i.e., taxes on international trade) will decline with dropping tariff rates in the free-trade area. The average share of international taxes in the region is high at 3.7% of GDP and constitutes almost half of indirect taxes. This fact significantly affects the member countries' ability to compete outside the region in international markets. Another issue is that import and export tax structures of the members are complex and involve many costly exemptions and tax fees. This fact creates incentives for tax avoidance and evasion. The CFTA members should aim at simplifying their external trade taxes to minimize possible negative effects of such problems.

With declining international taxes, it will be difficult for countries to find new sources for higher indirect taxes, especially in the presence of large informal sectors. Unfortunately, the share of total tax revenues in GDP is already low in many countries. They should try to collect relatively higher taxes. Current tax incentives which lower tax bases and may prevent tax coordination in the region, should be rationalized and, if not, eliminated. Low tax revenues prevent governments to allocate enough funds to finance much

needed public spending, especially on infrastructure (Bayraktar and Moreno-Dodson, 2015). Thus, rationalizing tax incentives should support higher revenue collection, less discretionary tax policy, easier tax administration, and eventually a larger fiscal space to finance productive investments.

As presented in Table 3, the average share of consumption taxes (taxes on goods and services) in GDP is close to 5.6% and it needs to get higher as a new source of tax revenues for governments with trade liberalization. But, these necessary adjustments need to be completed in a harmonized way to prevent firms to be negatively affected by higher regional free trade.

The share of the informal economy can have a tremendous effect on the competitiveness of firms. The last column of Table 3 reports that the share of the shadow economy ranges between 22 and 60% of GDP in the CFTA region. While it is extremely high in Zimbabwe, Gabon, and the Central African Republic with a 50% or higher shares, it is relatively low in Algeria and Mauritius with around 22% (country-level data are available request). When informal sectors are large, tax-paying formal firms try to compete with a large group of informal firms which do not pay any taxes. Therefore, free trade may be relatively more burdensome for formal firms operating in countries with large informal sectors. Another disadvantage of large informal sectors is low total tax revenues. As governments lose revenues from international taxes with higher free trade, it will be more difficult to find substitute tax resources in the presence of large informal sectors.

In summary, the findings support that tax structures and trade openness are extremely diverse in the CFTA region. This fact complicates the process of tax coordination and is expected to slow down the completion of the free-trade mechanism. However, it is still doable if the member economies cooperate effectively during this bothersome process.

5 Conclusion and Policy Implications

The CFTA organization is significant for all its members, but especially for countries with smaller economies, because regional integration helps them access to larger markets and greater competition to improve their efficiency and the involvement of foreign capital and technology (Jenkins et al. 2000). To accomplish this aim, common markets are expected to truly function which can be true when tax distortions are scrapped. Tax reforms in the member countries and tax harmonization among the members should be handled together.

Tax harmonization involves the following two essential actions: the establishment of transparent tax bases and convergence in the tax rates (Petersen 2009). Both steps are helpful for the simplification of administration and regional trade because they are expected to remove border controls and reduce waiting times for trade. Tax coordination guarantees uniformity of the region to a certain extent and minimizes practices involving tax competition caused by diverged tax structures. This process is not expected to be easy and lessons from other regions in Africa, such as from the WAEMU and the CEMAC, can be beneficial.

An important lesson from the CEMAC and WAEMU regions is that the CFTA member countries need to speed up the process in some areas. For example, according to the current plan, CFTA countries aim at eliminating tariffs on 90% of products over ten years. This target is not ambitious enough because the tariff rates are already low in smaller free-trade areas in the continent. The main issue in the region is on the nontariff barriers, such as diverse domestic tax rates or divergent standards for goods and high transportation costs. On the other hand, the trade agreement should give members more time to adjust industrial and tax policies to form a solid foundation for the organization and to give a helping hand to their industries, as demanded by Nigeria and South Africa.

It is important to lower tariff rates, but the important point is that governments should find new tax resources. Higher indirect taxes can be one solution. Harmonization of such taxes needs to be considered in the process of tax coordination.

The size of the informal sectors is extremely large in some countries. Without restricting such sectors, firms cannot compete in international areas and governments cannot raise enough tax revenues to support their expenses. Large informal sectors can significantly slow down the formation of common markets.

Without any tax harmonization involving CITs, firms paying higher taxes cannot compete in the international arena with the ones paying lower corporate taxes. The resistance of firms to free-trade adjustments will be stiff in the absence of favorable tax policies because firms' survival probability will be low in highly competitive international markets.

In addition to tax harmonization, in light of earlier experiences, one big obstacle that the CFTA countries need to overcome is to increase product differentiation and produce goods that can be demanded and traded within the Africa region. Export capacity of countries needs to be extended. Almost 4/5 of Africa's current exports go to other regions of the world and mostly consist of raw materials and commodities. On the other hand, even though

its level is still low, more than half of intraregional trade in Africa is in manufactured products. Thus, it is expected that increasing intraregional trade can improve industrialization.

Rich African countries may contribute more to integration funds to upgrade infrastructure in the region to increase the export capacity which will benefit them as well. The organization is expected to keep good data and should hold members accountable for nontariff barriers. A common currency can also help.

One key issue is that outcomes of the efforts remain poor in the absence of sincere commitments from the members. Continuously weak outcomes can easily discourage member countries and cooperation attempts may decline over time. The monitoring may become insufficient to effectively implement the directives and decisions. At some point, the whole process may become completely inactive. Thus, the process needs to be closely monitored to prevent the occurrence of unexpected outcomes so that the process can continue smoothly.

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An Assessment of the Potential Challenges of the African Continental Free Trade Agreement on Nigeria's Textile Industry

Adaora Osondu-Oti

1 Introduction

Economic and political integration was at the heart of the founding of the Organization of African Unity (OAU) in 1963 (European Council on Foreign Relations 2018). Regional integration arrangements in Africa emanated from the recognition that the small size of a typical African country places a considerable constraint on rapid and self-sustained economic development (Oyejide 2000). Thus, a group of African leaders came together after independence and embraced regional integration as an important component of their development strategies, primarily driven by the economic rationale of overcoming the developmental constraints of small and isolated economies (United Nations Economic Commission for Africa 2019). The OAU's early phase of integration was enshrined in the Lagos Plan of Action (LPA) adopted by the Heads of States in 1980 (De Melo and Tsikata 2014). The LPA-proposed framework was to divide the continent into Regional Economic Communities (RECs) that would constitute a united economy called the African Economic Community. The United Nations Economic Commission for Africa (UNECA) supported three regional integration arrangements; the Economic Community of West African States (ECOWAS) for West Africa,

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which was established in 1975 predating the LPA; the Preferential Trade Area (PTA) covering East and Southern Africa, which was the precursor of the Common Market for Eastern and Southern Africa (COMESA); and the Economic Community of Central African States (ECCAS) for Central Africa (Hartzenberg 2011). The establishment of the Arab Maghreb Union (AMU) in 1989 completed the continental coverage. Regional Economic Communities were created with the intent to integrate regional economies and establish free trade areas (FTAs) as the building blocks for the achievement of the continental economic community (Ihua et al. 2018).

However, in reality, not much was achieved in the form of integration of the continent during the 1980s (Nwaodu and Ijeoma 2018). The first wave of integration failed not only for economic reasons but also because the leaders of post-independence African States were reluctant to encourage the emergence of a supranational authority necessary to deepen cooperation, coordinate and manage the affairs of the hoped-for African union (De Melo 2015). As noted by De Melo (2015) great diversity within the regional integration arrangements (RIAs) translated into different interests that strengthened countries' insistence on the respect for the sovereignty and territorial integrity of each State and the inalienable right to independent existence as written in the Organization of African Unity Charter.

The formation of the African Union (AU) in 2002 stimulated the interest in fast-tracking Africa's regional integration agenda. Among the objectives of the AU outlined in Article 3 of the Constitutive Act was to accelerate the political and socio-economic integration of the continent and promote sustainable development at the economic, social, and cultural levels as well as the integration of African economies (Ihua et al. 2018). The Observatory on Regional Integration in Africa identified five key pillars derived from treaties and protocols of the AU and the Regional Economic Communities. These key pillars include trade and market integration, macroeconomic policy convergence; free movement of persons; peace, security, stability and governance, and harmonization of sectoral policies. In January 2012, the eighteenth ordinary session of the Assembly of the African Union held in Addis Ababa, Ethiopia endorsed the action plan for boosting intra-African trade and the fast-tracking of the African Continental Free Trade Area (AfCFTA). On 21 March 2018 at an Extraordinary Summit of the African Union (AU) in Kigali, representatives, and Heads of State from 44 African countries launched the AfCFTA. Nigeria signed the agreement in July 2019.

In the initial stage of the launch, Nigeria was skeptical about the gains from the continental free trade agreement for its people and economy. Trade unions and trade-related associations have raised concerns and doubts about

the potential benefits of AfCFTA for Nigeria's economy and industrial development (Ihua et al. 2018). This is because other free trade agreements entered into by Nigeria such as the World Trade Organisation (WTO), Economic Community of West African States (ECOWAS) liberalization scheme, and the US Africa Growth and Opportunity Act (AGOA) have not yielded the expected benefits. Nigeria's industries such as textiles have been confronted with greater challenges due to trade liberalization. Participation in AfCFTA implies that member countries must commit to removing tariffs on 90% of all goods, and the remaining 10% (identified as "sensitive items") to be phased out later as tariff-free (Boyo 2018). AfCFTA's trade liberalization, and particularly, the 90 % tariff removal is an area of concern for Nigeria.

Thus, this chapter assesses the potential challenges of the African Continental Free Trade Agreement on Nigeria's textile industry. The next section provides research methodology followed by an overview of the AfCFTA, including historical development. A clarification of the concept of regional integration is provided under the theoretical framework. This is followed by an examination of Nigeria and the challenges of trade liberalization before AfCFTA, an overview of the current state of the Nigerian textile industry, and the analysis of the potential challenges of AfCFTA on Nigeria's textile industry. The section that followed is the conclusion and recommendations.

Research Methodology

This chapter uses a qualitative case study and documentary research approaches. A qualitative case study is a research methodology that helps in the exploration of a phenomenon within some particular context through various data sources to reveal multiple facets of the phenomenon (Baxter and Jack 2008). Two major textile companies in Nigeria are used as case studies: Sunflag Textile Manufacturing Company and the United Nigeria Textile Company, both located in the country's major commercial city, Lagos. While a qualitative case study method involves a range of empirical data collection tools used to answer the research question (s), the main tool employed in this chapter is personal interviews with the two textile companies' senior staff as well as economic experts and individuals working with trade-related organizations such as the Manufacturers Association of Nigeria and the Association of Textile Manufacturers. Some of the interview questions (see Appendix 1) used to collect data include: how can you assess the state of Nigeria's textile industry? Has trade liberalization affected the textile industry in any way? What are the potential challenges of the African Continental Free Trade Agreement for Nigeria's textile industry?

Data obtained from various sources were content analyzed. Respondents' views and accounts were taken into consideration and literature was used to contextualize and interpret collected data. Documentary research is also used here to consolidate the primary data and to create a larger narrative using multiple documents on the challenges of free trade for Nigeria. Documentary research is related to content analysis research, which involves systematic reading and analysis of the body of relevant texts.

Africa Continental Free Trade Area (AfCFTA): Historical Development

At the formation of the Organisation for African Unity in 1963, the concept of "regionalism" gained traction as African countries embraced regional integration as an important component in their development strategies (Mishra 2018). The continent's path to African integration has been marked by a series of major initiatives and political decisions to accelerate it and to integrate variables of new imperatives in international economic relations. The first wave of Regional Integration Arrangement (RIAs) took place along "Regional Economic Communities" (RECs) such as the Economic Community of West African States (ECOWAS), Preferential Trade Area (PTA) for the Common Market for Eastern and Southern Africa (COMESA), Economic Community of Central African States (ECCAS), and Arab Maghreb Union (UMA) (Mishra 2018).

These RECs were to be the "building blocks" of the hoped-for African Union in the immediate post-colonial era (De Melo 2015) but failed successful implementation for various reasons. Some of these reasons are poor infrastructure developments, maintenance and connectivity, and conflicts and security issues in sub-regions (United Nations Economic Commission for Africa 2019), as well as the lack of political will of States. The failure of the first wave to reach the desired target ushered in the second wave of regional integration arrangements (RIAs) with the signing of the Abuja Treaty of 1991. The Abuja Treaty is arguably the most important agreement as regards economic, social, and political collaboration, coordination, and convergence in Africa as it lays out the future of the continent with the establishment of an African Economic Community. The Treaty aimed to establish an African Economic Community (AEC) gradually by the end of six successive phases. The process is set to cover a period of 34 years from 1994 to 2028. Table 1 enumerated the six phases.

Africa Union is working to implement the third phase of the Abuja Treaty. African leaders adopted a decision to establish a Continental Free Trade Area

Table 1 Six Phases towards an African Economic Community (AEC)

Phases	Years	Aims
First	1994–1999	Strengthen existing RECs and establish new RECs in regions where they did not exist previously, stabilize tariff barriers, non-tariff barriers, customs duty, and internal taxes in each REC
Second	1999–2007	Harmonize custom duties and strengthen sector integration
Third	2007–2017	Establish a Free Trade Area (FTA) and customs union in each REC
Fourth	2017–2019	Coordinate and harmonize tariff and non-tariff systems leading to a continental customs union, common sector policies, and harmonize monetary, financial, and fiscal policies
Fifth	2019–2023	Free movement of persons and right of residence and establishment of African common market and pan-African economic and monetary union
Sixth	2023–2028	Establish African Central Bank, Pan-African Parliament, and develop African multinational enterprises

Source Mishra, Abhishek (2018). "The African Continental Free Trade Area and its Implications for India-Africa Trade", accessed March 5, 2020 https://www.orfonline.org/research/the-african-continental-free-trade-area-and-its-implications-for-india-africa-trade/

at the 18th Ordinary Session of the Assembly of Heads of State and Government of the African Union in 2012 and the agreement was presented for signature in 2018. At the moment, only Eritrea is yet to sign the consolidated text of the AfCFTA. As stated in Article 3 of the Consolidated Text of the agreement establishing AfCFTA, the general objectives of the AfCFTA are to create a single market for goods, services, facilitated by movement of persons to deepen the economic integration of the African continent and in accordance with the Pan African Vision of "An integrated, prosperous and peaceful Africa" enshrined in Agenda 2063; and to create a liberalized market for goods and services through successive rounds of negotiations among others. To fulfill and realize the objectives set out in Article 3, Article 4 stated that State parties shall progressively eliminate tariffs and non-tariff barriers to trade in goods; progressively liberalize trade in services; cooperate on investment, intellectual property rights, and competition policy; cooperate on all trade-related areas; cooperate on customs matters and the implementation of trade facilitation measures; establish a mechanism for the settlement of disputes concerning their rights and obligations, and establish and maintain an institutional framework for the implementation and administration of the AfCFTA.

The operational phase of the AfCFTA was launched during the 12th Extraordinary Session of the Assembly on the AfCFTA in Niamey in July 2019 and is governed by five operational instruments, including the rules of origin; the online negotiating forum; the monitoring and elimination of non-tariff barriers; a digital payments system and the African trade observatory. Countries have agreed that 90% of tariffs on trade in goods will be eliminated. Of the remaining 10%, 7% may be designated as sensitive and 3% of the tariff lines can be excluded from liberalization (Viljoen 2019). Significant progress has also been made in the rules of origin negotiations in AfCFTA (Viljoen 2019).Rules of origin are a "passport" enabling goods to circulate duty-free within a free trade area (FTA) as long as these goods qualify as originating within the FTA. The rules define the criteria that must be met for a product to be considered as having its origin in an exporting country within the FTA and qualify for preferential treatment (zero import tariffs) inside the FTA. In AfCFTA, the criteria for determining the origin of a product are contained in Annex 2 to the Agreement to cover products either as wholly obtained or substantial transformation in a State party to the agreement.[1]

The take-off of AfCFTA was initially scheduled for July 2020 but due to the COVID-19 pandemic, the take-off has been shifted to January 2021. When AfCFTA takes off and all member nations ratify the agreement, Africa will become a single market with a population of 1.2 billion and a combined GDP of about $2.2 trillion. Thus, AfCFTA is set to become the world's largest trade agreement since the formation of the WTO.

Regional Integration: Theoretical Framework

Nearly all regions of the world have at least one organization, which aims at establishing a free trade area among its members (Heinonen 2006). Regional integration refers to the process of States coming together formally to cooperate in certain areas common to them. It is the process by which two or more nation-states agree to cooperate and work closely together to achieve common goals. This cooperation usually begins with economic integration and ends with political integration (McCormick 1999). There is a midpoint between economic and political integration, which is the achievement of a single market. A single market is a point at which the economies of the cooperating States become so integrated that all barriers to movements of labor, goods, and capital are removed (McCormick 1999). At this point, the integrating States set a common external tariff on goods from other countries, which is called a customs union, and a further step in the process of economic integration is the adoption of a common currency, with monetary

policy regulated by a single central bank. Political integration occurs when the cooperating States are so integrated that they share the same social and foreign policies and common political institutions (McCormick 1999).

Thus, economic integration is a process whose goal was considered the establishment of a political union. History has shown that States across the globe enter into regional agreements for economic purposes (Mwithiga 2015). According to Heinonen (2006), economic cooperation between countries can occur at three levels: coordination, harmonization, and integration. Coordination is the lowest level of economic cooperation. It usually involves the voluntary alignment of national policies and investments in certain sectors of the economy. Harmonization is a higher level of cooperation, and it usually involves the harmonization of national legislation or the adoption of common legislation. Integration is the highest level of economic cooperation. In a regionally integrated market, some of the traditional decision-making powers of nation-states are handed over to the regional level, and regional rules and decisions supersede national legislation.

Various theories were developed in an attempt to explain regional integration processes and outcomes. Laursen (2008) noted that the theories of integration were mainly developed to explain European integration because Europe was the region of the world where regional integration started in the early 1950s with the establishment of the European Coal and Steel Community (ECSC) in 1952. Key debates in regional integration theory have taken place between variants of intergovernmentalism, neofunctionalism, and post-functionalism integration theories (Schimmelfennig 2018).

Intergovernmentalism assumes national governments to be the key actors in regional integration. According to the theory of intergovernmentalism, governments use regional integration to maximize their national security and economic interests in the context of regional interdependence. Integration outcomes result from intergovernmental bargaining and reflect regional preference and power constellations. Governments delegate authority to regional organizations to secure their bargaining outcomes but remain in control of regional organizations and the integration process (Schimmelfennig 2018). Neofunctionalism disputes that governments can control the integration process. Transnational corporations and interest groups, as well as supranational actors, are empowered by the integration process and shape it in their interests.[2] Neofunctionalism posits that in the advent of free trade, other actors (non-state actors such as multinational corporations) take advantage of the liberalization and it is often difficult for governments to manage such actors.

Post-functionalism has challenged the theoretical debate on regional integration by neofunctionalists. In contrast to neofunctionalism, post-functionalism assumes a backlash mechanism of integration (Schimmelfennig 2018). As regional integration progresses, national sovereignty is undermined, which in turn creates economic and cultural losers who are sometimes mobilized by integration-skeptic parties to organize pressure groups to challenge integration advocates. Thus, identity-based and populist mass politicization can constrain regional integration and may even cause disintegration (Schimmelfennig 2018). Regardless of the theoretical approaches of intergovernmentalism, neofunctionalism, and post-functionalism to regional integration, one point of convergence is that each of the variants explains regional integration in some form.

Nigeria and the Challenges of Free Trade Before AfCFTA

One of the organizations that champion free trade that Nigeria is a member of is the World Trade Organisation (WTO). The WTO is the only global international organization dealing with the rules of trade between nations. The primary purpose of the WTO is to open trade for the benefit of all. The General Agreement on Tariff and Trade (GATT) produced the trade rules agreed upon by nations, and the WTO is an institutional body that ensures that trade flows as smoothly, predictably, and freely as possible. Article XXIV of GATT allows countries to grant special treatment to one another by establishing a customs union or free trade association provided that duties and other trade restrictions would be eliminated substantially on all trade among participants; and that the elimination of internal barriers occurs within a reasonable length of time (usually within 10 years).

Article I of the GATT provides for the Most-Favoured-Nation (MFN) treatment and requires members to accord the most favorable tariff and regulatory treatment given to the product of any member at the time of import or export of "like products" of all other members. To join the WTO, a country has to align its economic and trade policies with its rules and negotiate its terms of entry with the WTO membership. Nigeria ratified the WTO Agreement in December 1994 and became a founding member of the WTO in January 1995. The expectation was that Nigeria would take advantage of its membership of the WTO to impact positively on its national economies through, for instance, an increase in the volume of trade and foreign direct investment inflow from other member countries, particularly developed economies.

However, Nigeria's accession and liberalization of trade in accordance with WTO rules have had its negative effects. Manufacturers and trade union groups have called for further negotiation of the WTO rules under the GATT treaty to protect the local industry and the Nigerian economy from massive dumping of foreign goods. For example, the organized private sector (OPS) comprising the Manufacturers Association of Nigeria (MAN), the Nigerian Association of Chamber of Commerce, Industry, Mines and Agriculture (NACCIMA), and the Nigerian Employers Consultative Association (NECA) have often raised an alarm on the challenges of the liberalization policy and full adoption of WTO treaty, that has made the Nigerian economy vulnerable to the pressures of imported goods that could otherwise be produced locally (Nnabuihe et al. 2014).

As a member of the Economic Community of West African States (ECOWAS), Nigeria has also been confronted with the challenge of free trade and market integration since the adoption of the ECOWAS Trade Liberalization Scheme (ETLS) in 1979. Article (3) of the Revised Treaty of ECOWAS stipulates the removal of trade barriers and harmonization of trade policies for the establishment of an FTA, a Customs Union, a Common Market, and an eventual culmination into a Monetary and Economic Union in West Africa. While Nigeria was a founding member of ECOWAS, its neighbors have exploited the liberalization scheme to the disadvantage of Nigeria. According to the World Bank, an astonishing N750 billion ($5 billion) worth of assorted goods are smuggled into Nigeria through the Benin Republic alone every year (NBF News 2011).

Taking advantage of Nigeria's larger population, economy, and natural resource wealth, "Benin adopted a strategy centered on being 'entrepôt state,' that is, serving as a trading hub, importing goods, and re-exporting them legally but most often illegally to Nigeria" (Golub et al. 2019). Re-exports are a major contributor to government revenues in the Gambia and Benin because imported goods destined for re-export generally pay duties when entering their countries before being smuggled out (Golub 2012), but it creates a loss of customs revenue for Nigeria as it is done unofficially. About 80% of imports into Benin are destined for Nigeria (Landry and Colette 2019). For instance, data obtained by the Guardian from the Thailand Rice Export Association indicates that the Benin Republic has consistently been the largest importer of rice from Thailand from 2017 to May 2019.[3] These tons of rice are repacked and smuggled into Nigerian cities through porous land borders.[4] In October 2019, Nigeria closed its land borders to trade in goods among West African members despite the ECOWAS trade liberalization scheme. The government of Muhammadu Buhari explained that it

wants to put an end to smuggling and strengthen sectors undermined by the influx of foreign goods. Market openness has not been favorable to a country like Nigeria that is battling internal issues including corruption and bad governance that have contributed to the maldevelopment of the country.[5]

Nigeria is also one of the Sub-Saharan African (SSA) countries participating in the African Growth and Opportunity Act (AGOA), but with little gains. AGOA was signed into law by President Clinton in May 2000 to expand the USA' trade and investment with SSA, to stimulate economic growth, to encourage economic integration, and to facilitate SSA's integration into the global economy. The AGOA is set to expire in 2025. In terms of promoting exports to the USA, AGOA has measured success (Schneidman 2019), but Nigeria's benefit is still minimal. Countries such as South Africa have benefited significantly as its auto exports to the USA under AGOA have created tens of thousands of jobs in that country (Office of the US Trade Representative 2009). Apparel-producing countries such as Lesotho, Ethiopia, Mauritius, eSwatini, and Kenya have also created jobs in addition to labels of Made in Mauritius, Made in Lesotho, and Made in Kenya (Office of the US Trade Representative 2019).

Although according to the office of the US Trade Representative, Nigeria remains the top AGOA supplier to the USA, its export is mainly primary products. As of 2018, Nigeria exported $5.8 billion worth of commodities to the USA, mostly crude oil, while South Africa exported $2.4 billion, mostly vehicles and parts, fruits, and nuts.[6] Countries like Kenya, Lesotho, Ethiopia, Madagascar, Ethiopia, and Mauritania dominated the market for apparel exports. For example, Kenya exported $470 million worth of goods mostly apparel, macadamia nuts, cut flowers; Lesotho exported $319.6 million worth of goods mostly apparel; Madagascar exported $193 million worth of goods mostly apparel; Ethiopia exported $159 million worth of goods mostly apparel and footwear, and Mauritius exported $156 million worth of goods mostly apparel.[7] According to the US Department for Economic and Regional Affairs (2017), there is a low volume recorded in Nigeria's non-oil export (Adekoya 2018). Under AGOA and other trade agreements entered into by Nigeria, Nigeria qualifies for textile and apparel preferences but the unfavorable business environment is the bane for producers of textiles.

Nigerian Textile Industry: An Overview

Nigerian textile industry existed before Western incursion and colonialism in Africa. As noted by Murtala et al. (2017), the communities in the upper and lower Niger River were famous for the production of a variety of textiles

that embodied artistry and aesthetic appeal. With the advent of colonialism, "pre-colonial commerce were truncated, and as a result, stifled much textile industrial growth destroying the regional trade and markets for textiles and other manufactured goods" (Murtala et al. 2017). However, Kano Trading Company developed the first textile mills in 1952, and with the end of colonial rule, the country saw the establishment of more textile industries in both the northern and southern parts of the country. The establishment of the textile industry was "viewed as part of the Federal policy of promoting Import-Substitution Industrialisation from the 1960s to the 1970s (Murtala et al. 2017)." In 1964, for example, United Nigerian Textiles Limited was established. Toward the end of the 1960s, other Companies like Afprint, Enpee, Asaba Textiles, and Aswani Textiles came into existence.

As of the mid-1980s, about 175 textile companies were operating in the country.[8] The industry was once the largest employer of labor after the Federal Government[9] and served a large domestic market as well as export markets within the region and to the EU (US International Trade Commission 2009). Direct employment rose to 250,000 among the 175 large, medium, and small textile factories in the 1980s (Murtala et al. 2017). From the mid-1990s, the industry began to gradually collapse and by the year 2000, it contracted significantly. For example, in 1996, the industry employed some 137,000 workers, but by 2000, the workforce had shrunk to 83,000 and further declined to 24,000 in 2008 (United Nations Industrial Development Organisation 2009). The general decline of the textile industry is attributed to the final phase-out of quotas in the major markets such as the end of the Multi Fibre Agreement in 2005, the competing textile products from China as well as smuggling from neighboring countries. Although Nigeria prohibits imports of ethnic printed fabric and used clothing, these items are allegedly smuggled into the country in large quantities (Murtala et al. 2017).

Also, epileptic power and water supply problems resulting in high costs of diesel for production contributed to the decline of the sector. According to the US International Trade Commission report (2009), textile manufacturers in Nigeria face high electricity costs, unreliable supply, or power outages. Diesel used for backup generators is very expensive just as the fuel oil used for steam generation. In a survey of business environment obstacles faced by enterprises in Nigeria, 76% of firms identified electricity as a major constraint[10] that has impacted on their strength to compete successfully with products from other countries. Industry sources indicated that it has become difficult to be cost-competitive in the production of yarn, fabric, and finished apparel compared with large Asian suppliers, such as China,

India, and Bangladesh, particularly following an increase in Asia's exports to Africa after the phase-out of quotas in the US and EU markets in 2005 (US International Trade Commission 2009). In a nutshell, the textile industry in Nigeria is currently struggling to survive.

The Potential Challenges of AfCFTA for Nigeria's Textile industry

The African Continental Free Trade Area (AfCFTA) was designed to solve the problem of the low levels of intra-African trade. For example, in 2017, the exports and imports between African countries represented only 16.6% of Africa's total exports (Odijie 2019). This figure is low compared with exports within other regions: 68.1% in Europe, 59.4% in Asia, and 55.0% in America (Odijie 2019). Trade among African countries, also faces high barriers, with the average protection rate estimated at 8.7% (Mevel and Karingi 2012). Thus, AfCFTA's trade liberalization is expected to lower trade costs and allow consumers to access a greater variety of products at lower prices, and also allow firms to access a large continental market and gain from economies of scale. The United Nations Economic Commission for Africa (2019)estimated that AfCFTA has the potential both to boost intra-African trade by 52.3% by eliminating import duties, and doubling trade when non-tariff barriers are addressed.[11] Witha combined GDP of $6.7 trillion US dollars in purchasing power parity, business, and consumer spending at $4 trillion US dollars, over 400 companies with revenues of over US $ 1 billion, 60% of the world's arable land, and vast strategic ores and minerals (Mangeni 2019) underneath its soil, Africa has a lot to gain through broader market expansion. For example, Africa for the first time has the opportunity to trade as one block and tap the untapped large market of 1.2 million people.[12]

Nevertheless, there are potential challenges. For example, scholars have pointed to the issues of significant tariff revenue loss [for governments] and an uneven distribution of costs and benefits (Saygili et al. 2018). A research paper by UNCTAD (2018) concedes that the elimination of all tariffs between African countries would reduce the trading States' treasury by up to $4.1bn annually, although it can also create an annual welfare gain of $16.1bn in the long run (Saygili et al. 2018) if well managed. African countries have a diversity of development and economic configurations, which means that the impact of AfCFTA will vary.

In 2018, when AfCFTA was presented for signature, the President of the Manufacturers Association of Nigeria, Frank Jacobs raised concern on the

Agreement's removal of tariffs on 90% of all goods and services arguing that the balance of 10% of goods protected by the tariff, was certainly not adequate to revive and sustain Nigeria's manufacturing sector (Boyo 2018). Thus, free trade area could deprive States of the policy space to select and protect specific sectors (Odijie 2019). It could create numerous coordination problems when States use their "sensitive products" to pursue industrialization (Odijie 2019). While there are arguments from some quarters that Nigeria has a lot to gain from AfCFTA especially through increasing access to its goods and services to a wider African market,[13] there is also fear that trade liberalization would lead to unfair competition for jobs and same goods that countries produce (BBC News 2019). Local manufacturers will have to compete with goods, often cheaper, from external markets. A single market is a very competitive environment for businessmen. While efficient companies can benefit from economies of scale, inefficient companies most often suffer a loss of market share and may have to close down. Nigeria's textile industry has been battling with the challenges that come with the adoption of a single market in the ECOWAS. Nigeria's textile sector has become the major pawn in the slump in the manufacturing industry (Murtala et al. 2017). Its market is increasingly being overtaken by cheap Chinese textiles.

The data gathered from a study of two major remaining textile industries in Nigeria shows that Nigeria's textile industry is on the verge of total collapse. For instance, Nigeria's "Sunflag" Textile Manufacturing Company established in 1961 used to be one of the largest textile companies in the whole of West Africa with world-class manufacturing facilities but the Company has become a shadow of itself today. In an interaction with Mr Adesina, a staff of the Company, he narrated the industry's ordeal:

> When the Chinese started coming into the Nigerian market, Chinese businessmen could sell a container for 2 million Naira that a Nigerian importer usually sells at 10 million Naira. This became a very big disadvantage for textile manufacturers in Nigeria as Nigerian textile marketers/consumers go for Chinese goods. Sunflag's production that was initially put at 1 million linear meters went down to 300 thousand and even lesser sometimes.[14]

Also, the Human Resource Manager of the United Nigerian Textile Company shared the Company's challenges. According to Mr Adebayo, in the 1980s, the Company has about 80% production but currently, it has gone down to only 30%.[15] Capacity utilization of the industry is estimated at less than 20% with companies employing barely 18,000 workers from the 250,000 employed previously (Murtala et al. 2017). In an interview with the Director-General Nigerian Textile and Garment Industries Association, he

noted that the capacity of Nigerian textile companies was up to 1.5 billion linear meters in the 1980s but today it is only producing 250 million linear meters with 80% of the market taking over by foreign fabrics, mainly from China.[16] Also, the smuggling of used clothing from neighboring States such as the Benin Republic due to porous borders has become Nigeria's nightmare. In 2010, the World Bank estimated that 2 billion worth of textiles is squirreled into Nigeria every year[17] through informal trade activities. As of the mid-1980s, there were over 170 members of the Association of Nigerian Textile Manufacturers but today there are less than 20 (only 10 textile manufacturing firms with the remaining manufacturing products such as threads).[18] In a study conducted on the "potential benefits of AfCFTA for Nigeria," which targeted the representatives from the Nigerian Association of Chambers of Commerce, Industry, Mines, and Agriculture (NACCIMA), Manufacturers Association of Nigeria (MAN), Nigerian Labour Congress (NLC), Nigerian Association of Small Scale Industrialists (NASSI), National Association of Small and Medium Enterprises (NASME), there were mixed feelings on the potentials of AfCFTA for Nigeria (Ihua et al. 2018).

While some believe AfCFTA could bring with it a better business environment and help in the promotion of local businesses, others affirm that the hostile nature of Nigeria's business environment especially poor infrastructure and lack of government support are bound to hinder expected gains. In an interaction with a Professor of Economics at Afe Babalola University, Nigeria, he noted that countries such as South Africa and Kenya with larger manufacturing bases, and better road networks, railway, and ports are most likely to gain from intra-Africa trade.[19] Internal factors such as inadequate power supply have played significant roles in the closure of many textile industries in Nigeria (US International Trade Commission 2009) although trade liberalization is also a major contributing factor.[20]

In Nigeria, basic physical infrastructure deficits severely compromise the country's prospects for economic growth and human development. According to the Executive Secretary Federal Capital Development Authority (FCDA), Umar Gambo Jibrin cited in Ajimotokan and Orizu (2019), $3 trillion is needed to solve Nigeria's infrastructure deficit and engender development in the next 30 years. Lack of access to capital to support the sector and to procure new types of machinery for quality production is another hindrance to the sustainability of the manufacturing sector.[21] Thus, it would be difficult for Nigeria's struggling textile sector to compete successfully with other major textile manufacturers in Africa such as Ethiopia, Kenya, Lesotho, Madagascar, Mauritius, South Africa, Swaziland, Tanzania, and Zambia. These countries, known as Group 1 countries, accounted for the vast majority of

total SSA countries' exports of both textile and apparel inputs (94%) and apparel (95%) in 2007 (US International Trade Commission 2009). While six of the Group 1 countries (Kenya, Lesotho, Madagascar, Mauritius, South Africa, and Swaziland) were among the top 10 SSA apparel exporters, the remaining three of the Group 1 countries—Tanzania, Zambia, and Nigeria were among the top 10 SSA cotton producers.

Although Nigeria was placed in the Group 1 category as a major producer of cotton, the challenges facing the textile industry are enormous as explained earlier. Besides the infrastructure constraint, SSA apparel manufacturers have faced increased competition in local markets from imports of apparel from Asian countries and imports of used clothing, and thus supply a shrinking share of their own local and regional markets. In some African textile-producing countries, some textile companies are owned by the Chinese, who used the opportunity created by the AGOA to set up manufacturing companies in Africa and began to export to the USA. According to Rotunno et al. (2012), alarge share of AGOA exports was Chinese exports aimed for the USA but transshipped through AGOA countries, with little assembly work done in Africa (Rotunno et al. 2012).A key feature of the AGOA preferences was the absence of rules of origin (ROOs), which are usually imposed under trade agreements to avoid transshipment. This "loophole" in AGOA rules of origin provided an opportunity for Chinese exporters to merely transship their products via "screwdriver plants" avoiding quotas and benefitting from AGOA preferences (Rotunno et al. 2012). For example, Chinese and Taiwanese producers formed the bulk of a textile "diaspora" in Lesotho, Madagascar, and Kenya (Rotunno et al. 2012).[22] Being the largest market in Africa, Nigeria's market can become a target for Chinese companies in Africa when AfCFTA takes off in January 2021.

In a study conducted by Ihua et al. (2018), 53% of sampled businesses in Nigeria were skeptical that AfCFTA's provisions would be strong enough to discourage dumping or smuggling of substandard products into Nigeria. The October 2019 closure of Nigeria's land borders was due to the smuggling of goods from neighboring States under the guise of the ECOWAS liberalization scheme. To save its economy from distress, Nigeria has to close its borders, regardless of the trade liberalization scheme. Experts believe that the step (border closure) taken by Nigeria is a breach of the protocol on the free movement of goods, services, and people established by the Economic Community of West African States (ECOWAS) (Unah 2019), but the Nigerian government has maintained that its decision was right and it is in its national interests. Economic security is paramount and as a result, Nigeria's trade policy has become protective. Nigeria was once accused by the

Ghanaian President John Mahama of being a "protectionist bully," acting as a barrier to regional trade and development (Karaki and Verhaeghe 2017) but protectionism seems to be Nigeria's "economic survival" strategy in an "aggressive" influx of foreign goods. Thus, defying regional and international trade treaties, Nigeria's border closure demonstrates the implementation gap that continues to exist between the texts of regional or international trade agreements and the actual measures that some African governments adopt (Landry and Colette 2019). To a large extent, there is a consensus (as gathered from the staff of the two textile companies studied and trade experts) that the potential consequences of Africa's free trade regime are dire for Nigeria and that the country's implementation of AfCFTA will add to the current problems of its textile industry. Thus, it may be difficult for Nigeria to keep to the terms of the AfCFTA agreement. As noted by Campbell (2019), the recent Nigeria's border closure episode highlights how difficult it is to establish a real rather than aspirational Africa-wide free trade regime (Campbell 2019).

2 Conclusion and Recommendations

Preceding Nigeria's signing of AfCFTA in July 2019, the Nigerian public particularly trade-unions have raised concerns on the potential challenges of AfCFTA on Nigeria's economic development. This stems from the fact that the country has been involved in various multilateral and regional agreements such as WTO, ECOWAS et cetera with little benefits. For example, Nigeria's manufacturing industry, particularly textile, is finding it difficult to cope with market openness that has resulted in the influx of cheap goods from China, smuggling of goods from neighboring States, and closure of some firms due to inability to either compete with foreign goods or to operate under several internal constraints. As the largest market in Africa, Nigeria is a possible target market by other African countries, and its huge infrastructural deficit can work against the country's benefits. At the moment, Nigeria's textile sector has lost over 90% of firms in a single (competitive) market environment. Thus, for Nigeria's textile manufacturers, the country's implementation of the AfCFTA (when it commences in January 2021) could be disastrous. Given the current state of Nigeria's textile industry, AfCFTA can open the door to de-industrialization, rather than industrialization. Thus, to avoid a complete loss to the country, the chapter recommends that Nigeria should as a matter of urgency address its infrastructure deficit, provide credit support to the remaining struggling firms and attend to its porous land borders to avoid

other textile producing countries in Africa and "external" actors (particularly China) from grabbing the opportunities of this "new" Agreement to the detriment of Nigeria.

Appendix 1

Interview Questions

Research Topic: An Assessment of the Potential Challenges of the African Continental Free Trade Agreement on Nigeria's Textile Industry
Firms Studied: Sunflag Textile Manufacturing Company and the United Nigeria Textile Company, Lagos, Nigeria
Name of Interviewer: Adaora Osondu-Oti
Other Organisations where Experts/Staff were Interviewed:

(a) Nigerian Textile and Garment Industries Association
(b) Afe Babalola University, Ado-Ekiti, Nigeria
(c) Sunflag Textile Manufacturing Company, Nigeria
(d) United Nigerian Textile Company

Questions

1. How can you assess the state of Nigeria's textile industry before Nigeria's membership in WTO in 1995?
2. How can you assess the current state of Nigeria's textile industry?
3. Is trade liberalisation a threat to Nigeria's textile industry?
4. With particular reference to your firm, in what ways have trade liberalisation affected the country's textile industry?
5. Is the African Continental Free Trade Agreement going to pose a threat to Nigeria's textile industry?
6. What are the potential challenges of the African Continental Free Trade Agreement for Nigeria's textile industry?

Notes

1. Rules of origin ensure the preferential market access negotiated is granted to goods wholly produced or "substantially transformed" in an FTA member state

and not somewhere else and simply transshipped through a member state (trade reflection). See Viljoen, Willemien. "Rules of origin, tariffs and the AfCFTA," (2018) accessed March 10, 2020 https://www.tralac.org/blog/article/14063-rules-of-origin-tariffs-and-the-afcfta.html.

2. See Schimmelfenning, Frank. Integration creates a variety of "spillovers" and path-dependencies that push integration beyond the intergovernmental bargain and control.
3. See Ibirogba, Femi (2019), "Benin tops 184 countries importing rice from Thailand", when compared with the most populous country in the world, Benin Republic imported nearly two million metric tons of rice in 2017 (1,814,014), while China imported 1,204,911. Benin Republic has consistently been the largest, fueling the argument that the country has done great damage to Nigeria's economy through smuggling. Accessed May 1, 2020 https://guardian.ng/features/benin-tops-184-countries-importing-rice-from-thailand/.
4. Benin Republic has consistently been the largest, fueling the argument that the country has done great damage to Nigeria's economy through smuggling. See Ibirogba, Femi (2019), "Benin tops 184 countries importing rice from Thailand." Accessed May 1, 2020 https://guardian.ng/features/benin-tops-184-countries-importing-rice-from-thailand/.
5. Author's Personal Communication with Dr. Aiyegbusi, a Lecturer in the Department of Economics, Afe Babalola University, Ado-Ekiti, November 8, 2019.
6. Ibid.
7. Ibid.
8. Author's Personal Communication with Mr. Olanrewaju, Director-General, Nigerian Textile and Garment Industries Association, December 18, 2019.
9. Ibid.
10. Inadequate power supply in Nigeria results in higher costs of manufacturing including textile production. As noted by Oseghale (2019) power supply accounts of 45% of the production costs in Nigeria.
11. Cited in African Continental Free Trade Area: Questions and Answers, accessed June 20, 2020 https://www.uneca.org/publications/african-continental-free-trade-area-questions-answers.
12. Personal Communication with Dr. Aiyegbusi, Lecturer in the Department of Economics, Afe Babalola University, November 8, 2019.
13. Scholars and trade experts agree that Nigeria can benefit immensely from AfCFTA because its manufacturers can now penetrate Africa's market without much or no less restriction. The opening of new firms with increased market expansion can also create jobs for Nigeria's large population. See BBC News. "Nigeria signs African free trade Area Agreement" accessed April 3, 2020 https://www.bbc.com/news/world-africa-48899701; See also Ihua, B; Ike-Muonso, M., Taiwo O & Mba-Kalu, S. "An Independent Study".
14. Personal Communication with Mr. Adesina, a staff of the Sunflag Textile Manufacturing Company, December 20, 2019.

15. Personal Communication with Mr Adebayo, Human Resource Manager of the United Nigerian Textile Company, December 20, 2019.
16. Personal Communication with Mr Olanrewaju, Director-General, Nigeria Textile and Garment Industries Association, December 18, 2019.
17. Cited in The Economist. "Smuggling in Nigeria: Blurred lines," accessed April 30, 2020 https://www.economist.com/middle-east-and-africa/2016/04/28/blurred-lines.
18. Personal Communication with Mr.Olanrewaju……, December 18, 2019.
19. Personal Communication with Dr. Aiyegbusi……..., November 8, 2019.
20. Personal Communication with Mr. Olanrewaju……..., December 18, 2019.
21. Personal Communication with Mr. Olanrewaju……, December 18, 2019.
22. The fact that Chinese firms formed the bulk of textile manufacturers in countries such as Lesotho when AGOA kicked off is a source of concern. There is the fear that China might take over African markets when AfCFTA takes off in January 2021 especially at a time when many African countries are battling with infrastructure decay in addition to government neglect of the textile sector, as seen in Nigeria.

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A Political Economy Assessment of the AfCFTA

Peter Draper, Habtamu Edjigu, and Andreas Freytag

1 Introduction

The member countries of the African Union (AU) have ambitious plans as expressed in their Agenda 2063, which was agreed upon on the fiftieth anniversary of the Organization of African Unity (OAU). Among these long-run plans is a continental customs union. As a first step, the AU initiated the formation of a continental free trade area in 2017 and built the African Continental Free Trade Area (AfCFTA) in March 2018. The AfCFTA became effective in April 2019 when it was ratified by 22 countries. In March 2020, the Secretariat started its work. However, there is still much need for compromise and decisions, especially with respect to details such as the list of goods

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to be excluded from liberalization schedules, trade in services, and rules of origin.[1]

The primary objective of the AfCFTA is to boost intra-African trade flows, ideally leading to a doubling of these flows by 2022, as well as further industrialization in Africa. This objective has to be seen against the background of a recent African deindustrialization process.[2] A secondary objective is to harmonize African trade arrangements and institutions in order to allow trade flows to be governed more effectively and to reduce trade distortions. This objective is reflected in the eventual goal of establishing a single African common market, and continental customs union, encompassing 55 countries. The AfCFTA is thus a stepping stone toward achieving the African Union's Agenda 2063 blueprint for African development.

Whereas the economic impact of the AfCFTA has been subject of a growing number of studies, the political economy has often been neglected. Such neglect may lead to political solutions, which are not viable or sustainable. It is of particular importance to analyze the interests of different actors within and outside of Africa to better understand potential failures and successes of trade liberalization agenda set by the AfCFTA.

This chapter uses Public Choice theory to assess the motives and incentives of these different actors, which often translate into influence on the policymakers within the AfCFTA. Of course, these incentives must be assessed against the background of an economic or welfare analysis. With the knowledge about the political economy of the AfCFTA, policymakers can better judge their options with respect to Agenda 2063.

The rest of the chapter is organized as follows. In the section that follows, we briefly introduce the African free trade agreement as a part of the African Agenda 2063. The next section introduces the basic theoretical political economy considerations as basis for a somewhat more detailed analysis, conducted in the following section. The final section provides policy recommendations.

2 Agenda 2063 and the AfCFTA: The Plan

The AfCFTA can only be properly understood if it is seen against the background of the general aspiration of the African Union as expressed in Agenda 2063. The agenda advocates for "a shared framework for inclusive growth and sustainable development for Africa to be realized in the next fifty years."[3] The Agenda 2063 comprises of seven aspirations, namely: (1) a prosperous

Africa, (2) an integrated continent, (3) good governance, (4) peace and security, (5) cultural identity and common values, (6) bottom-up approach, and (7) Africa as a global player. This is a comprehensive development program, which seems to be based on and tries to learn from past experiences.[4]

In 2013, the AU decided on an agenda which contains a number of the so-called flagship projects, among them the AfCFTA.[5] The AfCFTA is rather ambitious[6] and will be negotiated in two phases. The first phase contains provisions about trade in goods and services, and movements of capital and persons. Whereas the negotiations of trade in goods are relatively advanced—with tariff concessions, rules of origin (RoO), and tariff remedies still outstanding at the time of writing[7]—the service sector still needs to be negotiated. The second phase covers even more complex trade relevant policies, namely, competition policies, intellectual property rights (IPR), and investment, which will be dealt with after the first phase is finished.[8]

The AfCFTA is not an international organization in itself.[9] It is an agreement that gives rise to organizational structures. Its adoption and implementation happen at the member state level, and through the AU structures. Its organizational framework consists of four bodies, namely, the General Assembly of the AU, the Council of Ministers (of the State Parties, not the whole AU), the Committee of Senior Trade Officials (again of the State Parties), and the Secretariat, which was launched in March 2020. There is also a dispute settlement mechanism (DSM), which is based on the DSM of the World Trade Organization (WTO). The whole agreement is modelled on the WTO agreements (Erasmus 2018b).

It is important to note that most members of the AU are also members in Regional Economic Communities (RECs). The relation between the AfCFTA and RECs is not yet clear (Erasmus 2018a). For some countries the whole agreement is new, as not all AU members are WTO members.[10,11]

In sum, the political economy of African integration is very complex. There are a number of potential problems waiting for the negotiators. Most importantly, observers note the issues of the exceptions from free trade, tariff remedies, and the definition of RoOs.[12] One may well add the administrative challenges, particularly at the border, which then must be associated with social issues such as informal cross-border trade (ICBD), as well as the unclear relation between the RECs and the AfCFTA.

3 The Political Economy of the AfCFTA: A Theoretical Primer

Trade integration such as the AfCFTA changes relative prices for the integrating countries. Goods from the inside of the integrating area will become relatively cheaper, those from the outside relatively more expensive. This of course has an impact on trade flows. Therefore, to judge the effects of trade integration both from an economic and a political economy perspective respectively, it is important to understand the underlying structure of trade among the members of an FTA. In this chapter, we argue theoretically, and in Chapter 4 we discuss the empirical picture.

The Economics of Free Trade Agreements

The general literature on economic integration and in particular regional free trade[13] shows positive effects for the member states of an FTA. Trade creation takes place within the FTA, which is welfare enhancing. On the negative side, trade diversion takes place as trade with non-members, who had comparative advantage under equal treatment, moves to members enjoying preferences. In addition, trade is deflected, as members of an FTA may have different degrees of protection for their imports. External traders will pick the country with the lowest trade barriers for their goods and services as entrance into the FTA. Therefore, the FTA has to agree on RoO. In Customs Unions with a uniform external tariff, RoO are unnecessary.

In addition to a simple shift effect, i.e., welfare in general is higher, economic integration enhances competition and thereby fosters structural changes. This leads to both a better allocation of factors of production and productivity-enhancing innovations. It creates new jobs with high productivity and provides chances mostly for well-educated people. However, it threatens relatively unproductive jobs and thus endangers other people. In order to benefit the whole population, it, therefore, must be accompanied by targeted social and education policies. Yet these policies are difficult to implement in poor, institutionally weak developing countries—notably Africa.

The empirical literature on FTAs and Customs Unions supports these general results, and proceeds to demonstrate how these positive effects are the smaller the more a country or region is already integrated into the world economy. It reveals that tariffs are often less relevant than non-tariff barriers (NTB), which today form the majority of trade measures.

Political Economy of FTAs

The modern empirical literature sheds light on the fact that the benefits from regional integration are not distributed evenly between industries, factors of production within an industry or consumers. This fact justifies a political economy analysis, which in principle applies economic reasoning to all actors in society including policymakers. Instead of assuming that policymakers act as "benevolent dictators," the political economy approach assumes that they follow their own interests under constraints and may be influenced by lobby groups.

A political economy analysis connects these different actors' interests with those of policymakers who—other than textbook analysis suggests—are also at least partly driven by own utility considerations, such as to enforce ideologies, enjoy personal power or meet other policy objectives.[14] In democracies, politicians maximize their so-described utility subject to the budget constraint (re-)election. Similarly, political economy models[15] have a special view on bureaucrats who instead of maximizing welfare, rather maximize their budgets. As long as the AfCFTA is an FTA and not a Customs Union, the problem might be small, as its "bureau," the Secretariat will remain restricted.

Policies are not exclusively directed at economic welfare, but also influenced by vested interests who are investing resources in rent-seeking activities. Buchanan (1987) speaks of "policy as exchange" between politicians and voters in general. Olson (1965) shows that small groups of producers are better equipped to express their interests than consumers, because they (1) solve the free-rider problem related to lobbying resulting in say protectionism better than large consumer groups, and (2) their opportunity costs to invest into rent-seeking are much smaller than for consumers. It is also shown that for the same reason declining industries receive more governmental support than growing and successful industries.[16] This is welfare diminishing and often hurts taxpayers, workers, and consumers.[17] We have to keep this in mind when analyzing the different actors' perspectives and prospects.

The Potential Actors

These actors comprise, first, domestic businesses in AU member countries who have partly already successfully introduced exceptions to the full reduction of tariffs. Such remaining barriers may constitute barriers to achieving the objectives mentioned above. Needless to say, that business actors may have

very different—often contradicting—interests. The easiest form to acknowledge this is to distinguish import competing industries from exporting industries. Whereas the latter are interested in free trade, the former are advocating governmental support, thereby mainly citing the alleged advantages for the whole society through their support. However, in times of global value chains (GVCs) it is not easy anymore to make this distinction, since well-integrated firms import goods to process and export them. Their trade interests are very much dependent on the type of products—for inputs they normally prefer zero tariffs. As African companies are only weakly integrated into GVCs,[18] we can probably identify sectors that mainly either export or import and, therefore, might clearly benefit and lose from the AfCFTA respectively. In the African context, we should look at agriculture, commodities and some Heckscher-Ohlin industries such as textiles and steel.

In addition to a traditional view on businesses, we must consider informal businesses in the context of the AfCFTA. They do much of the cross-border trade within Africa; the share of ICBD is estimated to be approximately 50–60% of all intra-African trade.[19] Traders in the East African Community (EAC) and the Common Market for East and Southern Africa (COMESA) benefit a lot from simplified trade regimes (STR) that account for their limited resources. Their concerns also play a role in the political economy context.[20]

In addition to private actors, governments in Sub-Saharan Africa, being dependent on import tariff revenues as a major source of public revenues, may have interests to maintain distorting tariffs. Therefore, the trade analysis of the AfCFTA must not neglect an assessment of fiscal policies and strategies. One can already see the connections to what is called policy space in the agreement on the AfCFTA and also in the documents describing the Agenda 2063.

In addition, although trade has a generally positive impact on the welfare of participating countries, the benefits do not accrue equally to all members of society. There are losers and winners of structural change with a political focus on the losers. Therefore, social aspects of the AfCFTA like inclusiveness, education policies, and social help must be considered. If such aspects are neglected, substantial opposition toward trade opening could build up. Empirical evidence shows that this often leads to counterproductive policy measures, not helping the vulnerable groups at all.

A group not being represented well in the trade policy exchange is consumers, especially poor consumers. Trade barriers especially for food, beverages, and textiles make the most vulnerable consumers worse off. These goods are characterized by an extremely low-price elasticity of demand,

implying that poor people are particularly hurt by tariff-induced price increases and other means of protection. Despite much political lip service, governments have often neglected their interest with respect to open markets and a competitive provision of basic goods and services.

Next to domestic actors, one must consider the interests of foreign governments and multinational businesses, mainly in the West. On the one hand, Western governments have an interest in African development, especially against the background of rising migration and global insecurity (apart from humanitarian motives). Thus, they should fully support African integration into the global division of labor, for which the AfCFTA is considered an important step. On the other hand, Western companies often benefit from cheap imports of commodities and seem to have a limited interest in African companies moving up in cross-border value chains. Therefore, they lobby for tariff escalation (in Europe or the US, for instance) and sometimes "artificially" high product standards.

A final group of stakeholders is the so-called development community, consisting of official development agencies and non-governmental organizations (NGOs) in OECD countries. Traditionally skeptical with respect to international trade, these actors have increasingly acknowledged that trade may be beneficial, although with a bias toward exports, neglecting the importance of imports for affordable consumption and productivity growth. Their input has become increasingly important, although it may or may not be helpful for governments to develop appropriate policy strategies.

These theoretical considerations are of course speculative. For instance, not every politician pursues policies only to maintain voters' support, not every bureaucrat maximizes her budget, not every company attempts to politically reduce competition via trade protection, and not every NGO tries to impose their preferences or ideologies on people in developing countries. But the theory helps to understand certain developments, which would be incomprehensible without the conceptual tools of political economy. We now apply it to the AfCFTA.

4 Winners and Losers from the AfCFTA? Empirically Informed Considerations

Sources of the Analysis

Since the AfCFTA was agreed upon only just two years ago, there is no base for a convincing empirical study that tests the foregoing considerations.

However, some studies on the potential welfare effects of the AfCFTA as well as data about trade flows, investment activities, and fiscal revenues, are available, and these shed light on the political economy associated with the agreement.

These studies comprise three groups. First, there are computational general equilibrium (CGE) models, which disaggregate the welfare results. Second, there are studies assessing both the legal texts and the state of negotiations with a view to the likelihood of a successful outcome. A third set deals with the fiscal effects of liberalization in Africa, without a special reference to the AfCFTA. Nevertheless, they are useful as they indicate the general effects of trade liberalization on fiscal positions. Together these studies allow us to consider the potential welfare effects of the AfCFTA on the actors introduced in Sect. 3, which will also define their bargaining position in the rest of the first phase, as well as the second phase, of negotiations. Before we turn to the empirical literature, we first take a short look at trade patterns in Africa, which helps understanding potential gains and losses through the AfCFTA.

Intra-African Trade Today

Overall Performance and Issues Arising

Over the past two decades, the level of intra-African trade has increased by 342%, rising from US$31.7 billion in 2000 to US$135.8 billion in 2017 (see Fig. 1). The positive growth, on average, reflects an increase in trade volumes

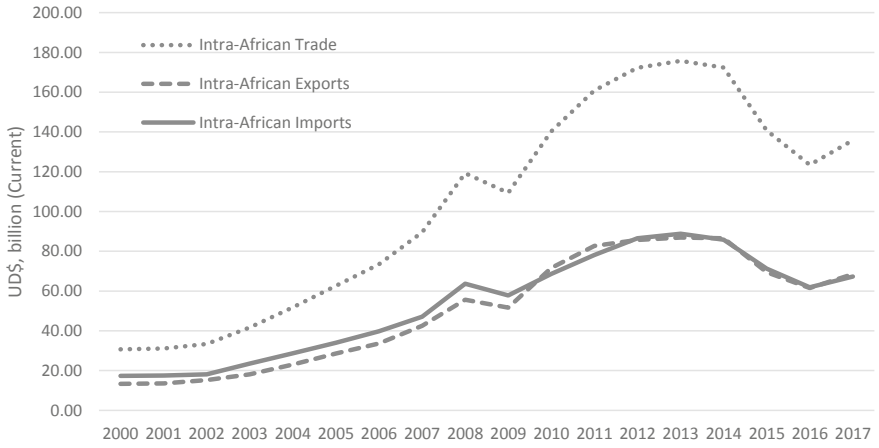

Fig. 1 Intra-Africa Trade, 2000–2017 (*Source* UNCTADstat database)

and prices. From Fig. 1, it can also be observed that the region experienced a decline in trade values in the years 2008–2009, and 2014–2016, owing to the global recession and the fall in world commodity prices, respectively.

In addition to the expansion in the level of intra-African trade, there has also been an increase in the share of intra-African trade in total trade. Figure 2 shows that the share of intra-African exports in total African exports rose from 10 to 17% during the period 2000–2017. The share in intra-African imports, however, experienced a slight decline over the same period owing mainly to a faster rate of growth in African imports from the rest of the world rather than a slowdown in intra-African imports per se.

However, in comparison to other regions, the share of intraregional trade in Africa remains very low. Figure 3 shows that the average share of intrare-

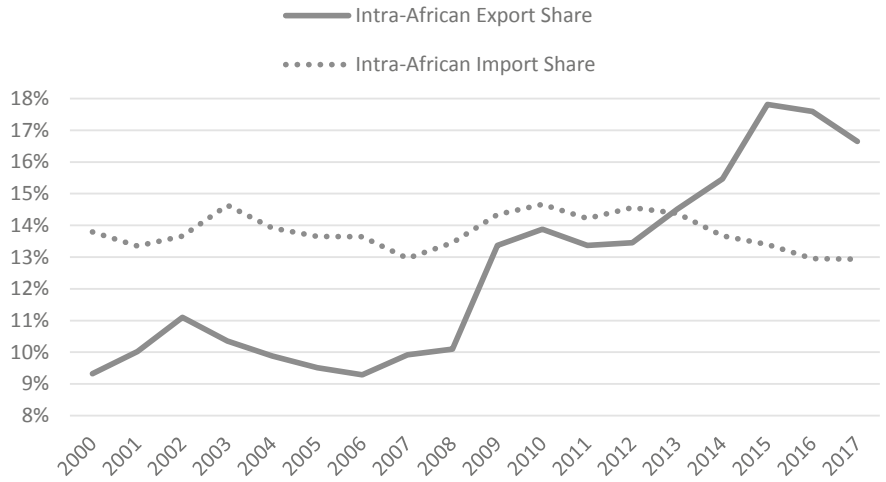

Fig. 2 Intra-African export and import (as share of total African exports and imports), 2000–2017 (*Source* UNCTADstat database)

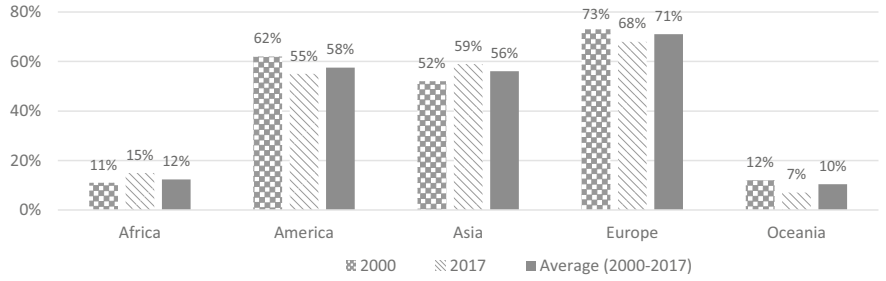

Fig. 3 Intra-regional trade (as a percentage of total trade), 2000–2017 (*Source* UNCTADstat database)

gional trade was 12% of total trade in the period from 2000 to 2017, whereas intraregional trade in Asia, North America, and Europe was 56, 58, and 71%, respectively. Intra-African trade is only higher than intra-Oceania trade.

Furthermore, Africa remains a marginal participant in world trade. Africa contributed to only 2% of global trade over the period 2000–2004. This composition has shown a trivial enhancement wherein it increased to only 3% of world trade during the period 2005–2017. On the other hand, the share of Asian trade in global trade has shown a significant improvement, from 28% in the period 2000–2004 to 37% in the period 2011–2017 (see Fig. 4).

There could be several factors holding intra-African trade below its potential. One is that African exporters inside the continent often face relatively high tariffs vis-à-vis other African markets[21] with an average protection rate of 8.5% compared to 2.5% when they export to markets outside the continent. Moreover, non-tariff barriers such as inefficient custom procedures, excessive documentation, and poor infrastructure have hampered trade in the region.

Figure 5a, b draw from the 2017 Doing Business reports on the time and cost (excluding tariffs) associated with exporting and importing processes, including documentary compliance, border compliance, and domestic transport across regions.[22] Trade across borders in Sub-Saharan Africa (SSA) countries costs 42% more than in East Asia and the Pacific (EAP), 26% more than in South Asia (SA), and 20% more than in Latin America and the Caribbean (LAC). On average, exporting in SSA takes about seven days and costs US$968, which is three days and US$283 more than in EAP, five

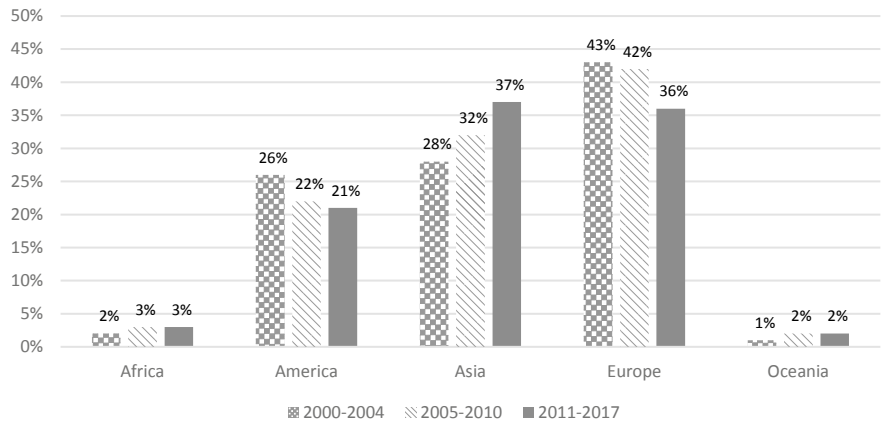

Fig. 4 Share of regions in world trade, 2000–2017 (*Source* UNCTADstat database)

days and US$519 more than in Europe, and Central Asia (ECA), two days and US$134 more than in LAC.

Intra-Group Trade in African Economic Communities (RECs)

Even though intra-African trade is low compared to other regions, the share of trade within the regional economic communities (RECs) is relatively high. Figure 6 illustrates that 85% of the trade of Southern African Development Community (SADC) members is internal; 70% in ECOWAS' case; and 68%

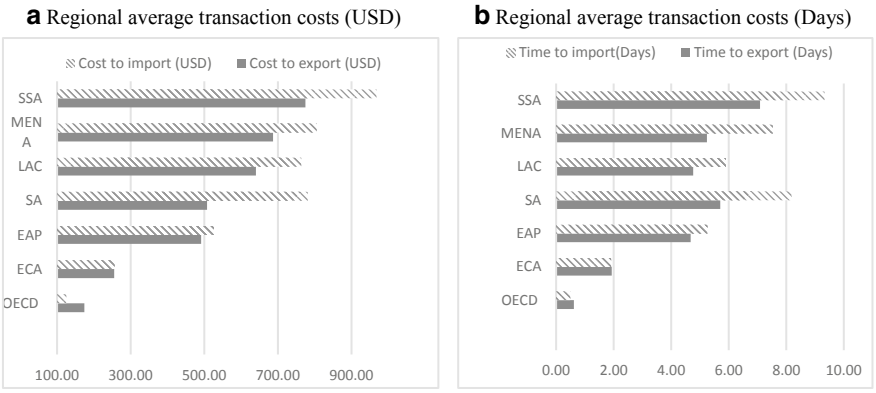

Fig. 5 The costs of crossing borders 2016 (*Source* World Bank 2019)

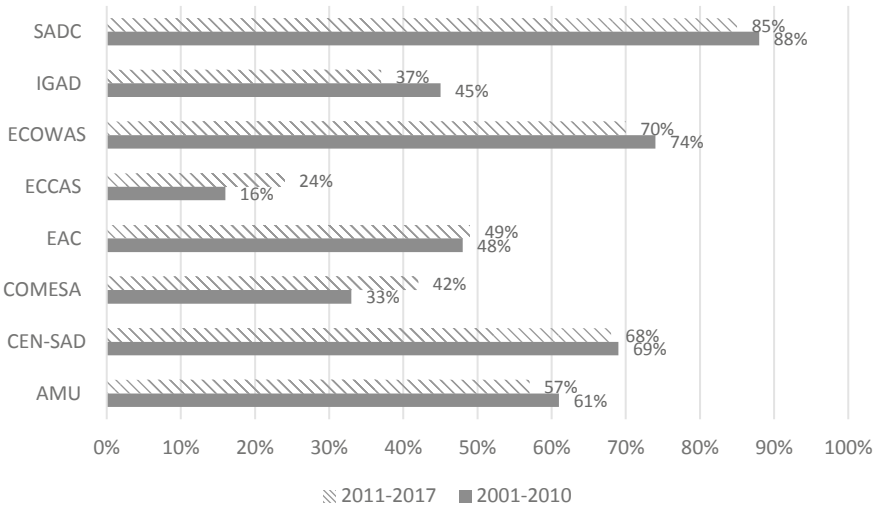

Fig. 6 Share of RECs in African trade (*Source* UN COMTRADE database)

Table 1 Top ten exporters (Millions of USD), average (2000–2017)

Country	Export to the rest of SSA	Export to the World	Percentage African share of world exports (%)
South Africa	16,990.78	90,974.80	19
Nigeria	4831.71	59,522.83	8
Angola	1670.41	37,785.80	4
Kenya	1223.61	4028.62	30
Cote d'Ivoire	1130.43	8120.40	14
Egypt	919.20	21,128.48	4
Mozambique	871.45	3186.76	27
Namibia	832.39	2722.77	31
Swaziland	734.19	1297.82	57
Zambia	655.50	4133.64	16

Source UN COMTRADE database

in the Community of Sahel-Saharan States (CEN-SAD). The experience of RECs in undertaking a significant portion of their trade in the region within their own regional trading blocs may confirm the presumption that trade liberalization facilitates trade creation as well as trade diversion from other African countries. It may also support the argument of many gravity models that trade takes place predominantly between neighboring countries.

Examining intra-Africa trade participation at the country level shows that there is significant heterogeneity in the importance of intra-African trade among countries in the region. In the period from 2000 to 2017, Kenya, Mozambique, Namibia, and Swaziland exported at least 25% of their goods to other African countries (see Table 1).

Similarly, Table 2 shows that Botswana, Namibia, Zambia, and Zimbabwe imported at least 50% of their gross imports from other African countries. The top importer from other African countries in terms of the value of imports include: South Africa, Botswana, Namibia, Mozambique, Zimbabwe, Zambia, Cote D'Ivoire, Mali, Ghana, Nigeria, and Angola.

Composition of Intra-Africa Trade

One of the key features of intra-African trade is that it is more diversified, and with higher technology content, than Africa's trade with the rest of the world. The latter remains heavily oriented toward raw materials, which accounted for 45% of total exports in 2017 (see Fig. 7a). By contrast, intra-African trade comprises higher value-added products, with consumer goods and capital goods accounting for 32 and 16% respectively. The share of raw materials

Table 2 Top ten Importers (Millions of USD), average (2000–2017)

Country	Import from the rest of SSA	Import from the World	Percentage African share of world imports (%)
South Africa	9766.659	66,601.72	15
Botswana	2482.907	3255.06	76
Namibia	2044.063	3113.50	66
Mozambique	2026.597	5095.27	40
Zimbabwe	2012.236	2764.92	73
Zambia	1943.469	3020.87	64
Cote d'Ivoire	1569.58	5818.16	27
Ghana	1544.108	9488.04	16
Nigeria	1495.884	29,626.22	5
Angola	1353.251	12,729.19	11

Source UN COMTRADE database

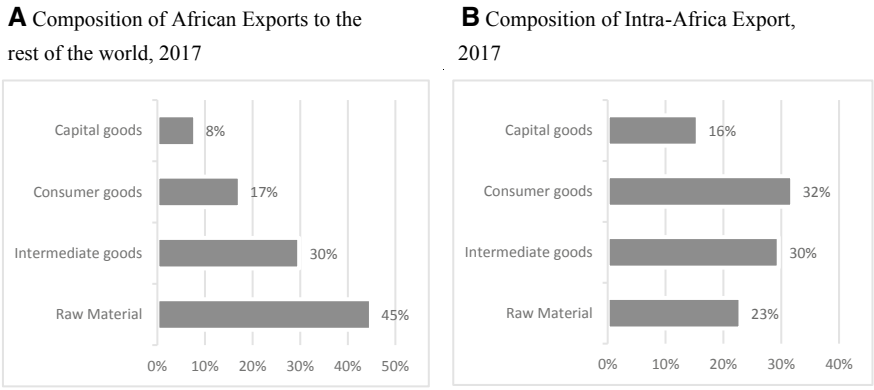

Fig. 7 Composition of African trade (*Source* UN COMTRADE)

in intra-African trade is 23%, almost half the share of raw materials in the region's export to the rest of the world (see Fig. 7b).

When intra-Africa trade is analyzed at a two-digit product level, fuel accounts for about 18% and is the top product traded within the continent. Though the continent has the highest percentage of untapped arable land and high import demand for food, only 11% of food products and only 7% of vegetables were traded within the continent in the year 2017 (Fig. 8).

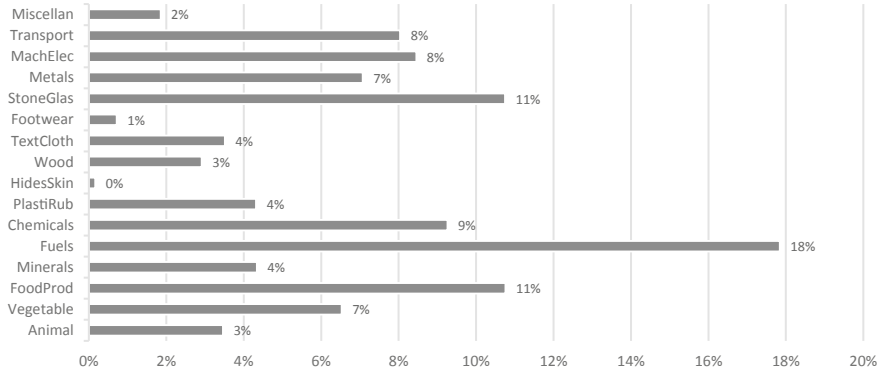

Fig. 8 Intra-African trade by main product category, 2017 (*Source* UN COMTRADE database. *Note* This product group is largely based on World Custom Orgainizations (WCO) Sector classification for the Harmonized Sytem (HS) product nomenclature with some minor difference)

Winners and Losers According to CGE Modelling

Country-Specific Analysis

The AfCFTA is assumed to have a huge potential to increase value chain integration, stimulate production and spur intra-African trade. The data provided in section "Intra-African Trade Today" indicate that the AfCFTA will not lead to a sudden surge in intra-African trade beyond the RECs at very short notice but offers a long-term change in relative prices supporting extra-RECs trade within Africa. However, as with trade liberalization generally, the gains may not be distributed evenly within as well as between countries (Subramanian and Wei 2007; Frazer and Van Biesebroeck 2010; Akman et al. 2018). Moreover, some countries may even suffer losses in welfare, terms of trade, and tax revenues, at least in the short run.

Using a computable general equilibrium (CGE) approach, Mevel and Karingi (2012), Jensen (2015), Mevel and Mathieu (2016), and Depretis et al. (2016) estimate the trade and welfare effects of the AfCFTA, the distributional consequences, and the likely winners as well as losers across countries and sectors. Mevel and Karingi (2012) find that the AfCFTA could increase intra-African trade by US$34.6 billion by 2022 assuming 2010 as a base year. This would increase the share of intra-African trade as a portion of its total trade from 10.2 to 15.5% over the period 2010–2022. However, it could reduce African countries' exports to the rest of the world by US$9.4 billion owing to trade diversion toward African partners. They find that governments in Sub-Saharan countries would experience tariff revenue losses, a terms of

trade loss, and a real income loss as a result of import tariff reductions. Among the potential member countries, the real income losses are likely to be substantial in the Democratic Republic of Congo (DRC), Malawi, Mauritius, Mozambique, Zambia, Zimbabwe, Botswana, and Nigeria, respectively.

CGE simulations by Jensen (2015) and Depretis et al. (2016) concur that the AfCFTA will boost intraregional trade and welfare. However, both studies find that the impacts would be asymmetric. Jensen (2015) finds that countries such as South Africa, Nigeria, and Kenya, with larger manufacturing bases and developed transport infrastructure, could benefit most in welfare.[23] African countries with relatively underdeveloped capital markets, such as Zimbabwe, could experience welfare losses from the AfCFTA. According to Jensen's estimation, the establishment of the AfCFTA could reduce Zimbabwe's tariff revenues by over one billion dollars, resulting in an overall welfare loss of US$1.471 billion.

Using four trade liberalization scenarios including tariff elimination in the agriculture sector, tariff elimination in all sectors, a 50% reduction in Non-Tariff Measures (NTMs) for goods and a 30% reduction in transactions cost associated with time, Depretis et al. (2016) find that the effects of the AfCFTA would vary across African countries. They estimate that while tariff elimination in agricultural goods could increase Cameroon's total trade by 8.5%, it could increase Botswana's total trade by 0.04% in 2027 compared with the baseline. Additional elimination of tariffs in manufacturing goods could increase Mozambique's total trade by 42% but could decrease Botswana's total trade by 0.14%. They argue that such differences might be attributed to the current differences in tariffs across African countries.

Sector-Specific Effects

From a sectoral point of view, the majority of the CGE studies document that agriculture and food products could gain the most from the AfCFTA. Mevel and Karingi (2012) estimate that exports of agriculture and food will increase by 9.4% (or US$5.0 billion) by 2022. They also highlight that exports of industrial products could increase by 4.7% (or US$21.1 billion).[24] Similarly, Depretis et al. (2016) indicate that African exports of agriculture, food, and energy would be most positively impacted, as different from industrial products. Mevel and Mathieu (2016), on the other hand, find that the establishment of the AfCFTA could stimulate the export of industrial products the most.

Income Percentile Effect

Trade theorists argue that trade liberalization and trade integration tend to generate wage disparities across workers subcategories. Melitz (2003) indicates that trade liberalization leads to wage dispersion as it increases trade and induces change in workforce composition. Likewise, Hummels et al. (2014) document that trade generates wage inequalities across workers subcategories.

There are few studies examining the potential effects of the AfCFTA on wages across workers' skill categories. Mevel and Karingi (2012) estimate that the establishment of the AfCFTA could increase wages of unskilled workers in non-agricultural sectors by 0.8% while increasing wages by 0.74% for the same category of workers working in the agricultural sector. They also find that wages of skilled workers could increase by 0.54%, a lesser extent compared to the increased wages of unskilled workers. However, workers engaged in countries that export primary goods such as oil, mineral, and metal products could experience wage losses, notably in Angola, Nigeria, Egypt, Zambia, and East African countries. Using 16 African countries, Depretis et al. (2016) also examine the potential wage impacts of trade liberalization through tariff elimination. They find that wages in all categories of workers could increase in all countries except Mozambique and South Africa.

The Political Economy of Tariff Exceptions and Trade Remedies Considering Social Problems

The AfCFTA has not been fully negotiated yet. From a political economy perspective, the final shape of exceptions to the liberalization scheme is of particular interest as they are a double-edged sword: On the one hand, countries may use them to protect the jobs of vulnerable groups and thereby improve the outcome from a human rights perspective.[25] These jobs are mostly found in labor-intensive industries, such as agriculture or textile production. On the other hand, protecting these industries is averse to the interests of another vulnerable group, namely, poor consumers, since poorer people spend a higher share of income on food and clothing than people with high income. As indicated in Chapter 3, consumers' interests are often neglected in trade negotiations, although there is ample evidence they benefit from trade liberalization (be it unilateral, regional, or multilateral) through at least three channels: First, import prices for consumption goods decrease, second, imported inputs used in producing domestic consumption goods get cheaper, and third, increased competition enforces productivity growth and innovations, thus offering better or cheaper products.

These three effects may well create a trade-off for policymakers with respect to the list of exceptions. African governments are regularly supported by Western NGOs opposing liberalization of agricultural sectors, often with the argument that liberalization leads to the destruction of smallholder farming and thereby hurts vulnerable groups. There is no evidence with respect to the AfCFTA yet, but in conversations the authors had with representatives of NGOs in the context of the AfCFTA in May 2019,[26] this argument was put forward again. It can statically convince, but in the medium and longer run, one may well argue that this sort of structural change is beneficial for consumers and leads to second-round effects that increase the demand for workers in other industries. Those laid-off in agriculture may then find new jobs in other sectors. Instead of supporting the status-quo for the poorest, it seems plausible to support changes for the better for all.[27]

There is another aspect relevant in this context. According to the IMF (2019, pp. 50f.), the distributional effects of the AfCFTA differ between agricultural exporters and manufacturing exporters. In the first group of countries, the rural population can gain, whereas it loses in manufacturing exporting countries. Again, this is a static analysis; for each country it must be considered whether the dismantling of trade barriers will increase the potential to export agricultural products. Against this background, the governments must carefully weigh the different interests in the long run.

Informal cross-border trade should also be considered. Although there is no exact data available, it is fair to assume that a lot of trade is taking place informally. There are rules in some RECs but no provisions in the AfCFTA. UNECA and FES (2017) address this problem and discuss options to prevent discrimination against informal cross-border traders, many of whom are relatively vulnerable women.

Fiscal Revenues and Trade Liberalization

Taxes on international trade are a significant portion of revenue for many African countries.[28] Given the relative fiscal dependency of African countries on tariff revenues, trade liberalization (as pursued in free trade areas) leads to revenue losses. If this decrease in tariff revenue is not offset by an increase in domestic tax revenues, it may constrain the region's economic growth and development, as African governments will face shortages of capital to finance key public goods and services such as health, education, and infrastructure.

Several studies have assessed the fiscal revenue impacts of trade liberalization in developing countries empirically. Keen and Mansour (2010) study 41 countries in Sub-Saharan Africa (SSA) during the period 1980–2005 and

argue that the formation of free trade areas and customs unions in Sub-Saharan Africa has resulted in a reduction in the shares of total tax revenue to GDP. They estimate that the average collected tariff revenues have also declined from over 20% of tax to GDP in the early 1980s to less than 13% in 2005, owing to trade liberalization. Using 99 trade liberalization episodes across the world since 1792, Cage and Gadenne (2012) find that import tax (tariff) cuts lead to a fall in tax revenues for over 40% of developing countries and that they are less likely to recover from the lost revenue through other taxation. They estimate that trade taxes as a share of GDP fall by 4 percentage points during trade liberalization episodes. A similar study by Kassim (2016) finds that a 10% reduction in trade taxes results in a 4.3% decrease in tariff revenues, on average, across 28 Sub-Saharan Africa countries though it increases total tax revenues.

The overall impact of trade liberalization on public revenues depends on many factors such as the extent of the trade liberalization, the structure of the tariff regime in relation to imports affected, the level of development, the structure of the economy and institutions, the size of the economy, and the foreign exchange regime. In addition, the tariff liberalization strategy, i.e., timing, sequencing, product selection, etc., are relevant in this context. Borg (2006) finds that trade liberalization has higher fiscal costs for small states. In assessing the potential fiscal costs of establishing the AfCFTA, Jensen (2015) finds that the potential for loss of trade revenues is high in Zimbabwe, Angola, DRC, Nigeria, Kenya, Tanzania, Ghana, Ethiopia, and Mozambique. On the other hand, this is not projected to be an issue for large countries including Egypt, Morocco, Tunisia, and Senegal. Mevel and Karingi (2012) found that the establishment of the AfCFTA would not be much of a threat for fiscal authorities as the stimulation of exports, and taxation on ensuing profits would offset the tariff revenue loss.

Countries may recover tariff revenue losses from other domestic sources. This, however, is only possible if there are favorable institutions in the country. Moller (2016) in a study of 31 low-income countries between 1975 and 2006 finds that for 1 dollar lost in tariff revenue, democratizing countries have been able to recover US$45c from other sources in the long run. However, countries with no democracy show no sign of regaining tariff losses. An additional determinant of countries' ability to offset tariff revenue losses is their level of development. Keen and Baunsgaard (2010) estimate that while high- and middle-income countries quickly replace trade taxes with domestic tax revenues, low-income countries only regain US$25c per dollar of lost trade taxes directly through domestic taxes.

5 Conclusions

The newly concluded AfCFTA is a promising attempt to increase trade and promote economic diversification. To understand the consequences of the agreement for Africans, we conducted a preliminary political economy analysis. Through reviewing African trade data and economic impact assessments of the AfCFTA, the agreement will probably benefit most industries, but may also harm some. In addition, it will have different effects on countries given their varying levels of development and participation in African trade flows. Overall, the data suggests that most countries will benefit, although a handful may end up being net losers. A few countries, notably the more diversified economies actively involved in intra-African trade, stand to benefit from a more ambitious agreement and can be expected to press for this result. Those that do not appear to have much to gain are likely less enthusiastic. Consumers in general may also benefit from lower prices, depending on the extent and nature of exclusions AfCFTA members seek from liberalization commitments. Those exclusions may be necessary to protect vulnerable groups in society, as well as for governments to shield tariff revenues in order to protect their fisci. The latter objective could be mitigated through elaboration of domestic taxation systems, which have their own political economy implications. This problem will certainly inhibit ambitious liberalization scenarios and be compounded by the sensitivities associated with liberalization, as well as the fact that African countries for the most part do not have a strong stake in intra-African trade.

Overall, though, we can conclude that it is too early to have a clear picture of individual groups' and actors' interests as well as of winners and losers. Nonetheless, it is obvious that governments are restricted by political circumstances and, therefore, often deviate from first-best or textbook solutions, the broad contours of which we set out in Chapter 3. The AfCFTA is a typical example of this logic. Despite having a very clear objective, there is still much to be negotiated. The sooner the negotiations proceed, the better governments can withstand such lobbying activities.

Appendix A: Assessments of CFTA Impacts—Select Literature

Author	Economic areas	Countries projected to gain	Countries projected to lose
Jensen (2015)	Total welfare	South Africa: *US$5.74 billion* Nigeria: *US$2 billion* Kenya: *US$1.3 billion* Senegal: *US$1.2 billion* Angola: DRC-*US$1.1 billion* Ghana: *US$813 million* Uganda: *US$683 million* Egypt: *US$518 million* Morocco: *US$572 million* Botswana: *US$68 million* Namibia: *US$463 million* Swazi-Lesotho: *US$100 million* Zambia: *US$454 million* Ethiopia: *US$255 million* Tunisia: *US$357 million* Malawi: *US$41 million* Mauritius: *US$76 million* Mozambique: *US$14 million*	Zimbabwe: *US$-1.47 billion* Madagascar: *US$-1 million*

(continued)

(continued)

Author	Economic areas	Countries projected to gain	Countries projected to lose
	Tax revenue		Kenya: *US$-416 million* Tanzania: *US$-445 million* Uganda: *US$-85 million* Rwanda: *US$-3 million* Egypt: *US$-25 million* Morocco: *US$-16 million* Nigeria: *US$-681 million* Angola-DRC: *US$-602 million* Ethiopia: *US$-165 million* Madagascar: *US$-3 million* Malawi: *US$-101 million* Mauritius: *US$-6 million* Mozambique: US$-88 million Zambia: US$-20 million Zimbabwe: *US$-1.1 billion* Ghana: *US$-382 million* Tunisia: *US$-20 million* Senegal: *US$-29 million*

(continued)

(continued)

Author	Economic areas	Countries projected to gain	Countries projected to lose
Mevel and Karingi (2012)	Change in export[a]	South Africa: *below 5%* Senegal: *5–10%* Nigeria: *below 5%* Tunisia: *5–10%* Morocco: *below 5%* Egypt: *below 5%* Zimbabwe: *15%* Zambia: *15–20%* Uganda: *5%* Tanzania: *15–20%* Mozambique: *5–10%* Mauritius: *below 5%* Malawi: *10–15%* Madagascar: *below 5%* Ethiopia: *5%* Angola & DRC: *below 5%* Botswana: *0%*	
	Change in real income	South Africa: *0.7%* Senegal: *0.3%* Tunisia: *0.3%* Morocco: *0.0%* Egypt: *0.3%* Uganda:*5%* Tanzania: *0.3%* Madagascar: *0.1%* Ethiopia: *0.3%*	Zimbabwe: *−1.4%* Angola and DRC: *−0.3%* Malawi: *−0.6%* Mauritius: *−0.8%* Mozambique*:* *−0.5%* Zambia: *−0.2%* Botswana: *−0.4%* Nigeria: *−0.4%*

(continued)

(continued)

Author	Economic areas	Countries projected to gain	Countries projected to lose
	Change in tariff revenue	South Africa: *5.9%* Botswana: 1.7% Egypt: *0.1%*	Zimbabwe: *−70.5%* Malawi: *−60.0%* Zambia: *−59.1%* Uganda: *−59.1%* Mozambique: *−54.0%* Tanzania: *−36.2%* Mauritius: *−18.6%* Senegal: *−10.2%* Nigeria: *−16.7%* Tunisia: *−6.4%* Morocco: *−5.9%* Madagascar: *−7.5%* Ethiopia: *−10.8%* Angola & DRC: *−15.2%*
Depretis et al. (2016)	Change in welfare[b]	Benin: *0.32%* Burkina Faso: *0.04%* Cameroon: *0.22%* Cote d'Ivoire: *1.66%* Ethiopia: *0.19%* Ghana: *0.24%* Guinea: *0.37%* Madagascar: *0.01%* Egypt: *0.03%* Mozambique:*11%* Senegal:*0.76%* South Africa:*0.55%* Tanzania:*0.43%* Uganda:*0.7%*	Botswana: −0.08% Malawi: −0.48% Nigeria: −0.02% Rwanda: *−0.05%*
	Change in export[c]	Burkina Faso: 9.31% Cameroon: 9.35% Cote d'Ivoire: 12% Ethiopia: 6.64% Madagascar: 0.74% Nigeria: 0.96%	

Note The table provides an overview of the papers assessed for the study of CFTA's impact on trade, tariff revenue and welfare

[a]The percentage value for each country corresponds to annual changes for the year 2022. In other words, it is the percentage change as compared to the 2010 baseline

[b]The percentage represents welfare changes at the completion of the CFTA, compared with the baseline, until 2027

[c]The percentage represents export changes at the completion of the CFTA. % changes compared with the baseline, 2027 under CFTA-T (total elimination of tariff) scenario for the six SSA countries out of their sample

Notes

1. Draper et al. (2018).
2. Draper et al. (2018).
3. AU (2015, 2).
4. It comes as a surprise, however, that the AU does not mention the combat of corruption as an aspiration. In fact, corruption is not mentioned at all in AU (2015), not even in the section on risks (ibid., pp. 18f.).
5. AU (2015, 9).
6. Erasmus (2018c).
7. These issues are at the core of the political economy discussion in Sect. 4 of this chapter.
8. Draper et al. (2018).
9. Erasmus (2019, 7).
10. Erasmus (2019).
11. These are: Algeria, Comoros, Equatorial Guinea, Ethiopia, Libya, Sao Tome and Principe, Somalia, Sudan, and South Sudan.
12. Draper et al. (2018), Berabab and Dadus (2018).
13. (Viner 1950): Viner's book marks the first contribution to the vast literature on regional integration.
14. Further personal benefits such as bribes are not covered in this analysis, as it does not focus on criminal behaviour.
15. These models are sometimes also called public choice models. See Mueller (2003) for a comprehensive overview.
16. Other than suggested by the Stolper-Samuelson-Theorem, the rent-seeking activities do not divide factors of production but different sectors.
17. Empirically, we find overwhelming support for the general thrust of Olson. The basic literature in this field includes besides Olson (1965, 1982), the work by Anne Krueger (1974), Finger et al. (1982) as well as Goldberg and Maggi (1999).
18. Draper et al. (2015).
19. Fundira (2018).
20. UNECA and FES (2017).
21. UNCTAD (2013).
22. Document compliance captures the time and cost for obtaining documents, preparing documents, processing documents, presenting documents; and submitting documents. Border compliance records the time and cost associated with custom clearance and inspection and port or border handling.
23. Jensen (2015) estimates that, following the establishment of the AfCFTA, South Africa will gain some US$5.74 billion.
24. Mevel and Karingi (2012) indicate that the export in service sector would fall, as there is not tariff cut applied in this sector.
25. UNECA and FES (2017).

26. Freytag took part in a workshop organized by the "Stiftung für Wissenschaft und Politik" in Berlin, May 8, 2019, where the IMF's Regional Economic Outlook for sub-Saharan Africa (IMF 2019) was presented and discussed.
27. UNECA and FES (2017, Chapter VI).
28. Addison and Liven (2012), Kassim (2016).

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What Are the Potential Benefits of African Continental Free Trade Area to the Food and Beverage Sector in Africa?

Isaac Bentum-Ennin, Grace Darko Appiah-Kubi, Dennis Boahene Osei, and Francis Kwaw Andoh

1 Introduction

Trade in Africa has for a long time been an important tool for growth and development. Before the establishment of the Organization of African Unity (OAU) in 1963, trade had been a vehicle for the economic, social, and political integration of African countries. The birth of the OAU boosted intra-African cooperation and integration at the continental level. The OAU also gave birth to many regional economic blocs that were originally formed to strengthen the economic space of regions to exploit the benefits that come

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with the formation of such regional blocs. Later, they served as pillars for the eventual formation of a continental economic community (UNCTAD 2016). The Lagos Plan of Action for the Economic Development of Africa 1980–2000 was adopted to articulate an African development plan that included the establishment of a Common Market. However, the efforts at building a continental community were thwarted because the level and the rate at which many regional economic communities (RECs) executed trade integration programs faltered.

The adoption of the OAU Abuja Treaty in June 1991 brought about the establishment of the African Economic Community. The Abuja Treaty articulated the formation of a continental free trade area as a stepping stone toward the realization of the African Economic Community. The coming into being of the African Union (AU) in 2002 as a replacement for the OAU increased the momentum toward the implementation of the objective of the formation of an African Continental Free Trade Area (AfCFTA). The Heads of State and Government at an AU Summit in 2012 approved a decision to found AfCFTA by the suggestive date of 2017 and also sanctioned the Action Plan to boost trade within Africa. The adoption of AfCFTA was to focus primarily on some areas of cooperation including productive capacity, trade policy and facilitation, trade finance and information, trade-related infrastructure, and factor market integration (UNCTAD 2016). The agreement to initiate discussions on the establishment of the AfCFTA by 2017 through discussions on trade liberalization was reached in June 2015 at a Summit by the African Heads of State and Government in South Africa. This initiative has presented major prospects as well as some challenges to boost intra-African trade.

According to UNCTAD (2016), a comprehensive vision of trade and development needs to be in place to multiply the benefits of the AfCFTA and promote developmental regionalism in Africa. The AfCFTA must remove intra-African trade barriers to reduce costs while at the same time improving productivity and competitiveness. The key question, therefore, is how beneficial the AfCFTA will be to the various sectors of the African economies. This chapter, therefore, examines the trade capacity in terms of import demand of member countries to take advantage of the AfCFTA, and the potential benefits that could be derived from the AfCFTA by one of the most important sectors in Africa—the food and beverage sector which usually attracts less attention from economic scholars. Specifically, the study makes four important contributions. First, it examines the relative contribution of the food and beverage sector and estimates the import cost multipliers of the sector in member countries to gauge the trade (import demand) potential of the

sector. Second, it examines the capacity of member countries to exploit the benefits of AfCFTA.

The AfCFTA is intended to boost trade among member countries. However, whether member countries can take advantage of it will to a large extent depend on their import capacity or cost. High import costs will restrict the import capacity of member countries thereby adversely affecting the continental free trade agenda. Moreover, if there is no significant demand for imports from within Africa because of some bottlenecks including high tariff rates or lack of capacity, there will be no incentive to export to AfCFTA member countries. Hence, this chapter's focus on import demand capacity. Third, the study estimates the real benefits of the food and beverage sector in Africa when environmental and import costs are taken into consideration. Finally, it simulates the effects of gradual and total removal of tariffs on import cost of production and general prices in the sector. While these issues are critical for the stakeholders to appreciate the potential benefits of AfCFTA to member countries, they have been given less consideration in the literature so far.

The rest of the chapter is organized as follows. The next section presents an overview of the food and beverages sector in Africa; which is followed by a brief examination of the relevant empirical literature and methodology. The last two sections present the results and discussions, and conclusion and policy implications, respectively.

2 Review of Literature

According to the Standard Industrial Classification (SIC), the food industry includes the manufacturing, processing, and preservation of meat, fish, vegetables, fruits, oils and fats, and dairy products; manufacture of grain mill products, starch products, and prepared animal feeds and other food products like bread, sugar, chocolate, pasta, coffee, nuts, and spices. Food products, therefore, can be defined as primary agricultural and fisheries products that have undergone some form of change through manufacturing and processing or performed some value addition activities such as preservation. Beverages, on the other hand, comprise of distilling, rectifying, and blending of spirits; ethyl alcohol production from fermented materials; manufacture of wine and beer, other malt liquors, breweries including sorghum beer breweries; manufacture of malt, soft drinks, and production of mineral water.

The food and beverage sector is one of the biggest components in the manufacturing sector in terms of job creation and value addition in many

countries. For example, the retail value of food and beverage sales was US$2.43 trillion worldwide in 2018, an increase from US$2.27 trillion in 2013. The sector is projected to reach US$2.73 trillion in 2023 with an expected cumulative average growth rate of 2.1% per year from 2018. While beverages alone are projected to perform slightly better with a cumulative average growth rate of 2.2% per year between 2018 and 2023, they also account for a significantly lower portion of the market. Sub-Saharan Africa is projected to be the fastest growing food and beverage market between 2018 and 2023 with a forecasted cumulative average growth rate of 3.84% per year (Gulfood Global Industry Outlook Report 2019).

Sales in Sub-Saharan Africa are deriving benefits from a growing consumer base, fast rate of urbanization, and better access to packaged food and beverage items on the back of an ongoing modern trade expansion. Nigeria is the most important country that contributes to growth within food and beverages in Sub-Saharan Africa. The country's food industry is taking advantage of rapid population growth and an economic recovery that has been happening since 2017 (Gulfood Global Industry Outlook Report 2019). Rapid urbanization and population growth in Africa are expected to aid the rise in consumer spending. Consequently, packaged foods and beverages are expected to experience further increase in demand, with increased access to international brands.

In recent years, the trend in many African countries has been that companies are making more investments in value-added processing and branded food products. This trend is significant as far as Africa's efforts at achieving economic development are concerned; because the provision of value-added products will decrease food losses, improve nutrition, and further its industrialization efforts. According to a report by the African Development Bank (2017), Africa's US$313 billion food and beverage market is estimated to yield US$1 trillion by 2030. This forecast offers the prospect of an increase in job creation, more prosperity, reduction in hunger, and enhancement in capacities for farmers and entrepreneurs in Africa to integrate into the global value chain. The continent must harness this potential to reduce unemployment, generate more wealth in rural areas, and enhance food and nutrition security.

The innovations in the food industry are generating more attractive prospects for women and youth in Africa. This is because innovation in the industry brings about an increase in output, employment, and earnings for these categories of people who dominate the industry. The agri-food industry in Africa, just as on other continents, plays a vital role in employment and income generation. The African Development Bank recognizes that the food

and beverages industry in Africa has the potential to help small and medium-sized enterprises (SMEs) to capture more value within the global value chain by drawing on African culture as a unique selling point.

With a predominantly young population and rising incomes across the region, and increasing national self-confidence, Africa is primed to be a huge target market for the food and beverage industry. According to the stakeholders in the food and beverage industry including non-governmental organizations such as consumer associations, environmental groups, industry groups, food manufacturers, policymakers, research organizations, and the media, Africa's emerging middle class will be the largest trade opportunity for the world's food and beverage industry over the next two decades. The World Bank has also reported that Africa's food markets could create a trillion-dollar opportunity by 2030 if farmers and agribusinesses gain access to more capital, electricity, better technology, and irrigated land to grow high-value nutritious foods and also if African governments can work more closely with agribusinesses to feed the region's fast-growing urban population (World Bank 2013).

Growth in middle-class households in many African countries including Nigeria and Egypt has been forecast to be the strongest because of rising incomes and employment opportunities in urban areas in these countries (Foodstuff Africa 2018). As these middle-income households expand, food and beverage expenses also increase at a high rate. In Nigeria, there is a strong demand for fast-food restaurants and processed food because of many factors such as the ever-growing young population, fast rate of urbanization, increasing affordability, and demand for convenience. Furthermore, there is a demand-switching taking place in Nigeria, away from unpackaged, unbranded products to packaged products because of increased urbanization which has resulted in consumers looking for more fast foods.

Figure 1 shows the regional distribution of imports from within the African continent that goes into the food and beverage sector. Southern Africa region accounts for the greatest share (33%) of total imports from within the continent. This is followed by East Africa with 22% and Central Africa with 21% of the Continent's total. West Africa had 14% whereas North Africa recorded the least share of 10% of the total imports from within the African continent for the year 2015. These percentages give some indication that all other things being equal, the Southern Africa region will stand to benefit most from the implementation of the AfCFTA.

The food and beverage market in the Southern African region is experiencing continuous growth with South Africa leading the way. According to the South African Department of Agriculture, Forestry, and Fisheries (2017),

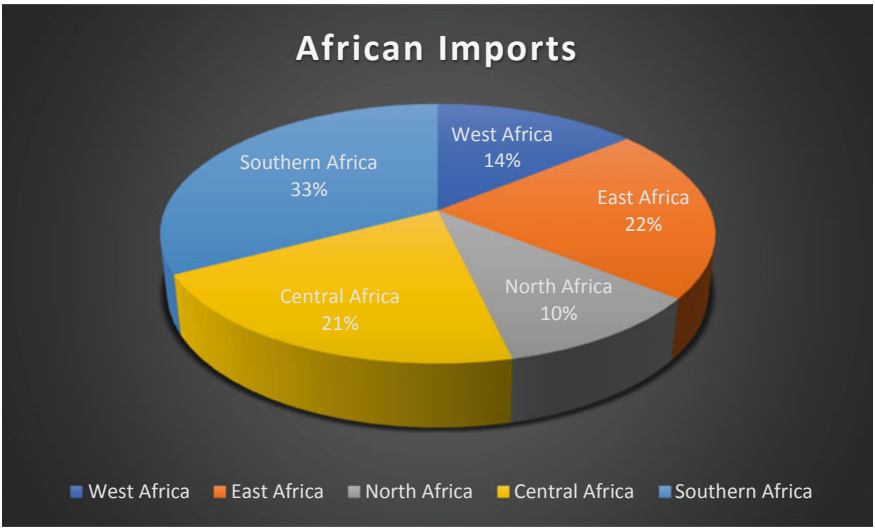

Fig. 1 Regional distribution of African imports in 2015 (*Source* Authors based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/)

South Africa has the most developed food and beverage market in Africa, with international brands continuing to make inroads into the country leading to increased competition with domestic operators. Although South Africa has the most developed food and beverage market in Africa, a very significant amount of its food imports originates from outside of Africa. For instance, during the second quarter of 2017, South Africa imported approximately 60% of its food from Asia and Europe. The share of Africa (23%) and the Americas (16%) is also significant, while the share of Oceania was marginal at about 1%. During the past five years, Europe and Asia have been the largest sources of food imports, while Africa and the Americas have been the least, with Africa showing some improvement overtime (South African Department of Agriculture Forestry and Fisheries 2017). Figure 2 shows the top ten sources of South African food imports in 2017. Among the top ten sources of South African food imports, Swaziland had the highest share of 15.3%, and Italy with the lowest share of 2.6%. Again, there was only one African country in the top ten countries.

The food and beverage sector in Africa also offers a different entry point into the global agricultural value chain, complementing more traditional approaches that focus on primary agricultural production and processing. The sector has the potential to become a brand for the countries and subregions in Africa, advancing regional integration and strengthening African

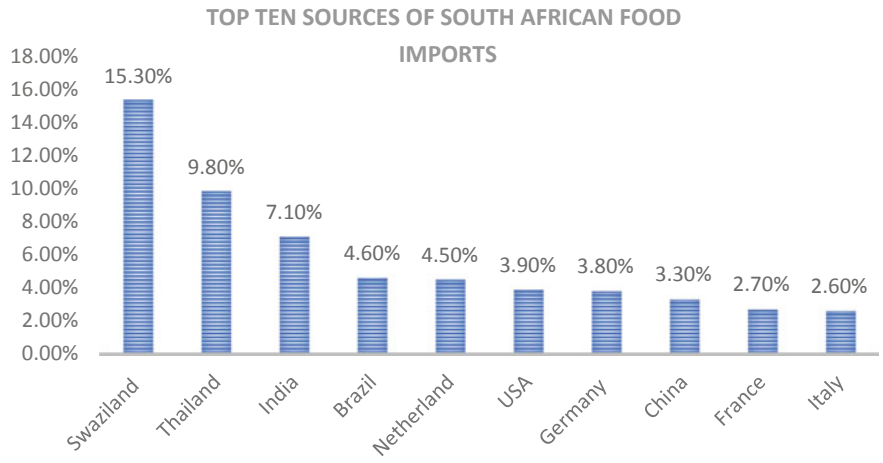

Fig. 2 Top ten sources of South African food imports in 2017 (*Source* Authors based on 2017 data from South African Department of Agriculture, Forestry and Fisheries)

identity. Africa's population has been projected by international organizations such as the World Bank and the United Nations to more than double by 2050 (World Bank 2019; United Nations 2020). According to the African Development Bank (2017), the youth constitutes the majority of the population in Africa, and they are also in the majority as far as unemployment is concerned. Therefore, government and private sector-driven programs aimed at empowering the youth to establish businesses along the agricultural value chain and at the same time providing food to feed the growing population will go a long way in optimizing the food and beverage sector (African Development Bank 2017). It is in the light of this that the execution of the AfCFTA that is intended to promote trade among member countries should be of interest to all the stakeholders in the food and beverage sector.

Using a multi-country and multi-sector Computable General Equilibrium (CGE) model to capture trade policy effects, Mevel and Karingi (2012) calculated the possible intra-African trade movements with, and without the free trade area, and the possible trade movements under a continental customs union. They found that trade liberalization under the free trade area in the absence of trade facilitation measures and the removal of non-tariff measures produced many results including; low intra-African trade in goods that was estimated at around 10% of total trade of Africa in 2010. They noted that such trade outcome was limited by a high tariff rate, at about 8.7%, with varied tariff structures that were much higher in several cases. In terms of the performance of intraregional trade among Regional Economic Communities,

Mevel and Karingi (2012) found that the highest level of trade occurred in the South African Development Community.

Further, Mevel and Karingi (2012) found that the AfCFTA would add US$17.6 billion (2.8%) to Africa's overall trade with the World in 2022 as compared to a 2022 baseline scenario which corresponds to the situation without implementation of any trade reform. Africa's exports would also be stimulated by US$25.3 billion representing 4%. According to Mevel and Karingi (2012), agriculture and food sectors would be the highest positively impacted sectors, with a projected growth of 9.4% over the 2022 baseline scenario. Finally, they showed that overall, intra-African trade would rise from 10.2% of total trade in 2010 to 15.5% by 2022. Elaborating further on the free trade area, UNCTAD (2016) has shown that reducing or removing tariffs on goods would only bring about a partial expansion in trade within Africa. A bigger impact on trade within Africa can only be realized if the removal of tariffs is followed by the removal of non-tariff barriers, reform of the services sector and improvement of trade facilitation measures.

3 Methodology

Estimating the Economic Impact and Import Cost Multipliers

This chapter employs an input–output (I–O) modeling and simulation approach to estimate economic impact and the import cost multipliers of the food and beverage sector in AfCFTA member countries to gauge the trade (import demand) potential of the sector. This in turn helps us to understand the capacity of member countries to take advantage of the AfCFTA. Also, we analyze the effects of gradual and total removal of tariffs on the cost of imports and general prices in the sector. The use of I–O in economic impact analysis is a standard approach in literature. Notable studies include Kweka et al. (2003) which used input–output analysis to estimate the economic impact of tourism and assessed its potential contribution to the Tanzanian economy; Fletcher (1989, 1994), and Wagner (1997), also used this approach to analyze the economic impact of the tourism sector. Sutthichaimethee and Sawangdee (2016) also used the same approach to evaluate and rank environmental problems caused by production within the services sector of Thailand, while Sutthichaimethee (2016) employed it to evaluate environmental impact from the top ten machinery sectors of Thailand. In a recent study, Bentum-Ennin (2018) analyzed the economic impact of demand for human capital

by employing input–output modeling. The input–output table for Ghana in 2011 was used to estimate the impact multipliers as well as carry out simulation exercises to predict the effects on the Ghanaian economy of future increases in the demand for human capital.

The model which has been used in this chapter makes use of the input–output (I–O) table, in which the production structure of the economy is represented by the value of transactions between sectors as can be found in Table 1. The rows of Table 1 present the output distribution of the sector whereas the columns show the structure of expense or cost of goods produced for the given sector. The I–O matrix is completed by adding final demand and primary inputs. The final demand represents the destination of sales that do not go to other sectors. It includes consumers (individuals, firms, and government) and exports. The primary inputs are the inputs that are not purchased from other sectors and made up of labor, land, capital, and imports. Table 1 shows a generalized 26-sector input–output table of the African region.

The production structure of an economic system as shown in Table 1 can be defined in matrix form as in Eq. 1 below

$$X = AX + F \tag{1}$$

where X is a vector of total output, A is the input coefficient matrix and F is the vector of final demand.

The matrix equation in (1) can be rearranged to give Eq. 2 below

$$(I - A)\, X = F \tag{2}$$

Multiplying the inverse of the coefficient matrix by the right-hand-side vector yields Eq. 3 below

$$X = (I - A)^{-1} F \tag{3}$$

Where $(I - A)^{-1}$ is the Leontief inverse matrix.

Relationships in the input–output Table 1 lead to the effect of a small change in the final demand of each sector (ΔF), which is a multiplier for final goods and services. From Eq. 3, the change in the total output (ΔX) can be expressed in terms of changes in the respective sectoral output. This is specified in Eq. 4, which is then used to estimate the multipliers.

$$\Delta X = [I - A]^{-1} \Delta F \tag{4}$$

Table 1 Input–output table of production sectors

Producing sector		Using sector									
		Intermediate demand					Final demand				Total output (X)
		Processing sectors									
		1	2	3	...	26					
Processing sectors	1	x_{11}	x_{12}	x_{13}	...	x_{126}	c_1	i_1	g_1	e_1	X_1
	2	x_{21}	x_{22}	x_{23}	...	x_{226}	c_2	i_2	g_2	e_2	X_2
	3	x_{31}	x_{32}	x_{33}	...	x_{326}	c_3	i_3	g_3	e_3	X_3
	...	...	...	...	...	...	...	....	...	....	...
	26	x_{261}	x_{262}	x_{263}	...	x_{2626}	c_{26}	i_{26}	g_{26}	e_{26}	X_{26}
Payment sectors	Value added	l_1	l_2	l_3	...	l_{26}	l_c	l_i	l_g	l_e	L
		n_1	n_2	n_3	...	n_{26}	n_c	n_i	n_g	n_e	N
	Imports	m_1	m_2	m_3	...	m_{26}	m_c	m_i	m_g	m_e	M
Total Outlays (X′)		X_1	X_2	X_3	...	X_{26}	C	I	G	E	X

Note X*i* = value of the output of sector *i* (*i* = 1...26); x*ij* = input coefficients ie.sales by sector *i* to sector *j*, or the value of inputs from sector *i* used to produce the output of sector *j* (*i* = 1...26; *j* = 1...26). L*j* = wages in sector *j* (*j* = 1...26). It represents the use of labor in the production of the *i*th product; N*j* = interest and profits in sector *j*; M*j* = total imports of sector *j*; C*j* = personal consumption expenditures for the output of sector *i*; I*j* = total investment expenditures for the output of sector *i*; G*j* = total government purchases of the output of sector *i*; E*j* = total exports of the output of sector *i*. The elements labelled *ci, ii, gi* and *ei* are the shares of outputs of sector *i* that go into consumption, investment, government expenditure and exports respectively. The other elements are the proportional shares of value added and imports that go into intermediate demand and final demand

The backward and forward linkages which measure the impacts or the relative contributions of the sectors are estimated from the Leontief inverse. The method by Rasmussen (1956) is based on the column (or row) sums of the Leontief inverse to measure inter-sectoral linkages. Based on the Leontief inverse matrix, the backward linkage is estimated as the column sums of the inverse matrix whereas forward linkage is estimated as the row sums of the Leontief inverse matrix.

Import cost multipliers of the food and beverage sector are estimated by multiplying the import cost coefficient by the Leontief inverse matrix. The resultant matrix shows the intensity of backward import effects of direct and indirect inputs and outputs. Also, the resultant matrix presents intensities of import costs that are useful to formulate an efficient trade policy. If the final demand (ΔF) increases, import cost will increase (ΔM) as shown in Eq. 5 below:

$$\Delta M = I_M[I - A]^{-1}\Delta F \tag{5}$$

where ΔM is the change in import cost, ΔF is the change in final demand, and I_M is the import cost coefficient and $I_M[I - A]^{-1}$ captures the import cost multipliers.

The real benefit derived from the food and beverage sector after environmental and import costs have been catered for is defined as revenue for the food and beverage sectors, minus the environmental and import costs, respectively.

Impact of the Implementation of African Continental Free Trade Area on General Prices

This section looks at the impact of the implementation of AfCFTA on the general prices of the food and beverage sector. The implementation of AfCFTA which brings about total removal or reduction in tariffs on imports is expected to reduce the cost of imports and lead to a reduction in general prices. The impact of the implementation of AfCFTA on prices can be derived using matrix notations as follows:

$$A'P + I_m = P \tag{6}$$

$$I_m = (I - A')P \tag{7}$$

$$P = (I - A')^{-1}I_m \tag{8}$$

$$\Delta P = \left[I - A'\right]^{-1} \Delta I_m \tag{9}$$

where P is the vector of prices, I_m is the vector of import cost coefficients, ΔP and ΔI_m are changes in prices and import cost coefficients, respectively.

Multiplying the Leontief inverse by the vector of changes in import costs coefficient allows for simulation exercises to be conducted to find out the effects on general prices in the food and beverage sector using different scenarios of removal of tariff rates.

Data

The inter-sector flow of transactions among 26 sectors including the food and beverage sector (see Appendix A) have been sourced from the input–output Table for 47 African countries which have been put into five sub-regional groups, namely; North Africa, Southern Africa, Central Africa, West Africa, and East Africa (see Appendix B). A 26-sector input–output table for 2015 published by Eora MRIO at http://worldmrio.com/countrywise/ has been employed in the estimation of the multipliers since that is the most recent for the countries under consideration. According to Bulmer-Thomas (1982), it takes several years to construct and publish input–output tables. Delays of five–seven years in the construction and publication are common, especially in developing countries. Again, using the 2015 input–output table is reasonable because, in developing countries, structural coefficients vary slowly as noted by Leontief (1986).

4 Results and Discussion

Economic Impact of the Food and Beverages Sector in Africa

This section highlights the importance of the food and beverage sector in terms of forward and backward linkages, as well as the income and tax revenue effects on African economies. This is to help bring to the fore what the continent stands to gain or lose in case there is any implementation of a policy or agreement that affects the sector either positively or negatively. Table 2 presents various impact multipliers of the food and beverage sector. In terms of forward linkage effects, which signify the importance of the sector as a supplier of product to other sectors, the greatest impact of 1.6034 is witnessed in the Central African subregion. This means that the food and

Table 2 Impact of the food and beverages sector

Impact of food and beverage sector										
Region	Forward linkage	Rank	Backward linkage	Rank	Income multiplier	Rank	Tax revenue multiplier	Rank	Cost of subsidy	Rank
West Africa	1.1466	14	1.8407	3	0.1326	21	0.0125	5	−0.0063	1
East Africa	1.3044	14	2.0712	1	0.3629	20	0.0544	9	−0.0477	1
North Africa	1.3669	11	2.0129	3	0.3148	20	0.0432	5	−0.0093	1
Central Africa	1.6034	11	2.3261	3	0.3772	21	0.0225	5	−0.0286	1
Southern Africa	1.2036	13	1.9850	4	0.2209	18	0.1584	7	−0.1881	1
Ave. Effect	1.3250		2.0472		0.2817		0.0582		−0.0560	

Note Ranks are based on 26 sectors of the economies
Source Authors' Estimates based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/

beverage sector supplies more to other sectors in the Central African subregion than it does in the other subregions. The least impact is registered in the West African subregion. In terms of the backward linkage effects (which signify the sector as a demander of products from other sectors), it can be seen from Table 2 that the food and beverage sector ranks among the top four sectors in Africa. Thus, this sector tends to provide an important stimulus to the economies of Africa. The sector ranks first out of the 26 sectors in East Africa as far as the demand for products from other sectors is concerned. In terms of the magnitude of the effect, the greatest impact of 2.3261 is again observed in Central Africa whereas the least effect of 1.8407 is registered in West Africa. These results indicate that a $1 million increase in final demand for food and beverage will generate approximately $2.33 million worth of output in Central Africa and approximately $1.84 million in West Africa. As noted by Jones (1976: 324), any sector with comparatively high linkage effects offers the greatest potential to stimulate the economic activities of other sectors and therefore, will have a greater effect on growth.

The food and beverage sector does not rank favorably in terms of income effects (see Table 2). The relatively low-income effects could be attributable to the type of labor that is employed in the sector. This is a sector that is highly dominated by unskilled or semi-skilled labor, whose average pay is usually relatively low. As noted by Woods (1997: 198), "hospitality work, such as that in the food and beverage sector, is often exploitative, demeaning, poorly remunerated, unpleasant, uncertain and taken as a last resort or because it can be tolerated in the light of wider social and economic commitments and constraints." The greatest effect as far as incomes are concerned occurs in Central Africa. This is followed by East Africa. In terms of government tax revenue (see Table 2), the greatest impact is registered in Southern Africa and it is followed by East Africa. The least impact occurs in West Africa. As far as providing government subsidies are concerned, the Southern Africa subregion enjoys the greatest amount of government subsidy. This is followed by East Africa, with West Africa enjoying the least subsidy. The food and beverage sector ranks first out of 26 sectors in all regions of Africa as far as receiving government subsidy is concerned. An increase in final demand by $1 million will cost the government about $0.19 million in Southern Africa and about $0.01 million in West Africa in terms of subsidies.

Table 3 shows the environmental costs and real benefits of the food and beverage sector to gauge and analyze the environmental sustainability of the sector. If the estimated environmental cost of production for a sector falls below the mean, it means there is a further capacity for production. On the other hand, environmental cost values that are greater than or equal

Table 3 Environmental costs and real benefits of the food and beverages sector

Region	Forward linkage	Environmental cost	Real benefits
West Africa	1.1466	0.0009 (0.0020)	1.1458 (1.4640)
East Africa	1.3044	0.0024 (0.0031)	1.3020 (1.6213)
North Africa	1.3669	0.0002 (0.0004)	1.3667 (1.6187)
Central Africa	1.6034	0.0013 (0.0022)	1.6021 (1.9048)
Southern Africa	1.2036	0.0033 (0.0063)	1.2003 (1.6802)
Ave. Effect	1.3250	0.0016	1.3234

Note In parentheses are the average environmental costs and real benefits based on all the 26 sectors for each region
Source Authors' Estimates based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/

to the mean signify no additional capacity for production. In other words, the sector is considered production inefficient and measures should be taken to lower environmental costs. When the estimated environmental costs of production of food and beverage in all the subregions are compared to their respective subregional averages based on all the 26 sectors, it can be said that the sector does not suffer from inefficiency in its production, implying that there is more room to expand production. However, if the estimated values are compared to the average (0.0016) based on only the food and beverage sector in the five regions, then the Southern Africa subregion is considered inefficient; implying, there is no additional capacity for production. The real benefit is calculated by subtracting the environmental costs from the revenue for a given sector. If the real benefit for a given sector is lower than the average, it represents a loss, whereas values greater than the average represent profit. The real benefits of the food and beverage sector in Africa are below the regional averages indicating that the sector is not profitable when the environmental cost is taken into consideration. The food and beverage sector can be made profitable if the output is enhanced in the various subregions to raise revenues given the fact that the environmental costs of production are minimal and there is more room for additional production.

African Continental Free Trade Area and Trade in Food and Beverages

The AfCFTA is expected to promote trade among member countries but trade may not be boosted if member countries have either reached or exceeded their import capacities. Table 4 presents the import costs multipliers of the food and beverage sector. The results indicate the import cost per unit of final demand for food and beverages based on total imports from all over

Table 4 Import costs of the food and beverages sector

Region	Total imports cost	Rank	Import cost based on African imports only	Rank
West Africa	0.0972	16	0.0116	11
East Africa	0.1621	10	0.0667	8
North Africa	0.1300	10	0.0053	4
Central Africa	0.1359	10	0.0413	3
Southern Africa	0.3406	11	0.3343	10
Ave. Effect	0.1732		0.0918	

Note (i) Ranks are based on 26 sectors of the economies. (ii) Values are based on basic prices
Source Authors' Estimates based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/

Table 5 Import costs and real benefits of the food and beverages sector

Import costs and real benefits					
Region	Forward linkage (1)	African import cost (2)	Total import cost (3)	Real benefit (1)–(2)	Real benefit (1)–(3)
West Africa	1.1466	0.0116	0.0972	1.1351	1.0494
East Africa	1.3044	0.0667	0.1621	1.2377	1.1423
North Africa	1.3669	0.0053	0.1300	1.3617	1.2370
Central Africa	1.6034	0.0413	0.1359	1.5621	1.4675
Southern Africa	1.2036	0.3343	0.3406	0.8693	0.8630
Ave. Effect	1.3250	0.0918	0.1732	1.2332	1.1519

Source Authors' Estimates based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/

the world as well as imports from Africa. The disaggregation of the import costs is to help examine the import capacity of the subregions and to gauge the potential benefits that the food and beverage sector stands to benefit from the AfCFTA. As far as total imports are concerned, all the subregions, except Southern Africa, can import more. Southern Africa subregion has exceeded its capacity since its import cost per unit of final demand for food and beverage (US$0.3406) is higher than the average cost of US$0.1732. The results are not different if only imports from Africa are considered. Therefore, the results imply that West Africa, East Africa, North Africa, and Central Africa's food and beverage sectors stand to benefit from the AfCFTA because they can take advantage of the AfCFTA to import more thereby boosting trade in Africa.

Table 5 presents the import costs and real benefits of the food and beverage sector to measure and analyze the profitability of the sector given the import

costs. The real benefit is calculated by subtracting the import costs from the sector's revenue. If the real benefit is lower than the average, it represents a loss, whereas values greater than the average represent profits. The real benefits per unit of final demand for the food and beverage sector in the subregions are US$1.1351, US$1.2377, US$1.3617, US$1.5621, and US$0.8693 for West Africa, East Africa, North Africa, Central Africa, and Southern Africa, respectively as compared to the African average of US$1.2332. The results, therefore, suggest that the food and beverage sector in East Africa, North Africa, and Central Africa are all profitable when imports from within Africa are taken into concentration. However, those of West Africa and Southern Africa subregions are not profitable. Given the fact that the import cost is below average and there is a further capacity to import from within Africa, the food and beverage sector in West Africa subregion can be made profitable if the output is enhanced to raise revenues.

Estimated Effects of the Removal of Tariffs: A Simulation Exercise

The removal of tariffs due to the implementation of the AfCFTA is expected to reduce the import cost of member countries and allow the free flow of commodities in Africa. Table 6 presents the simulation results from different scenarios of removal of tariff rates on imports in the food and beverage sector;

Table 6 Effects of reduction or complete removal of tariffs on import costs of food and beverages sector

Simulation								
Region	0%	5%	10%	15%	20%	25%	30%	35%
West Africa	0.0116	0.0121	0.0127	0.0133	0.0139	0.0144	0.0150	0.0156
East Africa	0.0667	0.0701	0.0734	0.0767	0.0801	0.0834	0.0867	0.0901
North Africa	0.0053	0.0055	0.0058	0.0060	0.0063	0.0066	0.0068	0.0071
Central Africa	0.0413	0.0434	0.0455	0.0476	0.0496	0.0517	0.0538	0.0558
Southern Africa	0.3343	0.3510	0.3677	0.3844	0.4012	0.4179	0.4346	0.4513
Ave. Effect	0.0918	0.0964	0.1010	0.1056	0.1102	0.1148	0.1194	0.1240

Source Authors' Estimates based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/

Table 7 Effects of the removal of tariffs on prices of food and beverages

Estimated effects of the removal of tariffs on prices					
Tariff rates (%)	West Africa	East Africa	North Africa	Central Africa	Southern Africa
5	0.0578	0.3336	0.0263	0.2067	1.6715
10	0.1156	0.6673	0.0525	0.4135	3.3429
15	0.1734	1.0009	0.0788	0.6202	5.0144
20	0.2312	1.3345	0.1051	0.8270	6.6859
25	0.2890	1.6681	0.1313	1.0337	8.3573
30	0.3468	2.0018	0.1576	1.2405	10.0288
35	0.4046	2.3354	0.1839	1.4472	11.7002
Rank	11	8	4	3	10

Note All the values are in percentages except the ranks
Source Authors' Estimates based on 2015 input–output data published by Eora MRIO at http://worldmrio.com/countrywise/

whereas Table 7 shows the estimated effects on prices of food and beverages. The scenarios are the different tariff rates that were selected based on the prevailing rates in Africa.

As part of the goal to achieve economic integration, the 15 Member States of the Economic Community of the West African States (ECOWAS), adopted the ECOWAS Common External Tariff (CET) on 25 October 2013. The implementation of the CET took effect in January 2015 with the standardized tariff ranging from 0 to 35% depending on the nature and the origin of imported goods. There is also the East African Community External Tariff which is levied at rates between zero and 100% with an average rate of 25%. In Southern Africa, tariff ranging from 0 to 30% apply and in Northern Africa, an average tariff rate of 5.8% across all products. Based on the above, tariff rates ranging from 0 to 35% were used for the simulation exercises.

Assuming a zero tariff rate, a US$1 million increase in final demand for food and beverages in Africa will require approximately US$0.01 million, US$0.07 million, US$0.01 million, US$0.04 million, and US$0.33 million worth of intermediate inputs imports from other parts of Africa into West Africa, East Africa, North Africa, Central Africa, Southern Africa, respectively. On average, a US$1 million increase in final demand for food and beverages will require approximately a US$0.09 million worth of intermediate inputs imports from within Africa. At the highest rate of 35%, the African import costs increase to about US$0.02 million, US$0.09 million, US$0.01 million, US$0.06 million, and US$0.45 million for West Africa, East Africa, North Africa, Central Africa, and Southern Africa, respectively. Import costs, therefore increase with tariffs rate. The average import costs will

increase to about US$0.12 million with the highest tariff rate of 35%. In all cases, the Southern Africa subregion stands to benefit most from any reduction or complete removal of tariff rates. This is not surprising given the fact that the Southern Africa subregion imports more from within the African continent compared to all other subregions. These results give some concrete evidence to the effect that the AfCFTA where African traders can benefit from minimum taxes to zero charges on a vast selection of goods traded between African countries will reduce the import costs thereby promoting trade among member countries. Furthermore, not paying tariffs automatically leads to fewer constraints in terms of excessive paperwork. Intra-African trade will, therefore, benefit from facilitation and exemptions.

The price effect of any policy or agreement is worth analyzing. The implementation of the AfCFTA is expected to lead to changes in prices. Specifically, the potential benefits associated with the AfCFTA are expected to translate into lower prices for a variety of goods including those from the food and beverage sector. The expected reduction in prices if realized will boost demand for the products in the food and beverage sector with multiplier effects impacting other sectors in African economies. The results in Table 7 show that if a tariff rate of 5% is removed completely it will reduce prices by about 0.06, 0.33, 0.03, 0.21, and 1.67% in West Africa, East Africa, North Africa, Central Africa, and Southern Africa, respectively. If a tariff rate of 35% is removed, prices in the food and beverage sector will reduce by approximately 0.4, 2.34, 0.18, 1.45, and 11.7% in West Africa, East Africa, North Africa, Central Africa, and Southern Africa respectively. The greatest price effects of the removal of tariffs as a result of the implementation of the AfCFTA will be registered in Southern Africa whereas the least effect will occur in the North Africa subregion.

5 Conclusions

This chapter underscores the fact that the food and beverage sector can play an instrumental role in expanding economic opportunities for countries within the AfCFTA. The sector's role lies primarily in the substantial forward and backward linkages it provides. Although the sector shows modest forward linkages, it ranks among the top four sectors in Africa in backward linkages. Indeed, both backward and forward linkages are critical to Africa's development because they are essential in stimulating further investment to promote growth. Specifically, the enormous backward linkages observed in the chapter are an indication that the food and beverage sector has huge potential to

generate a considerable investment in input supply to support production. Similarly, the existence of the forward linkages demonstrates the opportunity for the development of upstream investments to absorb the sector's products.

Moreover, conventional economic wisdom holds that high logistical inefficiencies in supply chains and production costs constitute a major setback to expansion in firms and sectors, especially in developing countries. Against this background, evidence that countries within the AfCFTA could benefit from the food and beverage sector through a reduction in import costs and prices is indeed heartwarming. Particularly, comparing the environmental cost of production across regions shows that the food and beverage sector in Africa does not suffer from production inefficiency. This indicates the existence of excess production capacity and therefore, reinforces the motivations for Africa's integration through a free trade area. Moreover, the real benefits of the food and beverage sector in Africa are below the regional averages indicating that the sector in the subregions is not profitable when environmental costs are taken into consideration. The sector can be made profitable if the output is enhanced in various subregions to raise revenues given the fact that the environmental costs of production are minimal and there is more room to expand production.

Finally, the chapter reveals that there is great potential for African countries to import from within the continent through AfCFTA. As pointed out, with exception of the Southern Africa subregion that has exceeded its capacity, all other regions have the excess capacity to import from within Africa. This is particularly the case for West, East, North, and Central Africa subregions where import cost per unit of the final demand for food and beverages is lower than the average cost. This excess capacity for African countries to import from within should boost intracontinental trade in Africa, providing further consolidation toward integration and development.

Generally, what emerges from the analysis is that an African Continental Free Trade Area in which African countries can benefit from minimum tariffs (including a tariff rate of zero) on a vast selection of goods traded, including those from the food and beverage sector will undoubtedly, proffer enormous benefits. These benefits come in the form of a reduction in import costs, creation of fewer constraints in terms of excessive paperwork especially in a situation of complete removal of tariffs, widening of trade potentials, and generating backward and forward linkages for further integration and accelerated growth in Africa.

Appendix A: List of All the 26 Sectors

Agriculture	Construction
Fishing	Maintenance and Repair
Mining and Quarrying	Wholesale Trade
Food and Beverages	Retail Trade
Textiles and Wearing Apparel	Hotels and Restaurants
Wood and Paper	Transport
Petroleum, Chemical and Non-Metallic Mineral Products	Post and Telecommunications
Metal Products	Financial Intermediation and Business Activities
Electrical and Machinery	Public Administration
Transport Equipment	Education, Health and Other Services
Other Manufacturing	Private Households
Recycling	Others
Electricity, Gas and Water	Re-export and Re-import

Appendix B: Countries Included in the Analysis

North Africa	Southern Africa	Central Africa	West Africa	East Africa
Algeria	Botswana	Angola	Benin	Burundi
Egypt	Lesotho	Central Africa Republic	Burkina Faso	Djibouti
Libya	Namibia	Cameroon Congo DR	Cape Verde	Eritrea
Morocco	Swaziland	Congo	Chad	Ethiopia
Sudan		Gabon	Cote d'Ivoire	Madagascar
Tunisia		Sao Tome Prin	The Gambia	Malawi
			Ghana	Mozambique
			Guinea	Rwanda
			Liberia	South Sudan
			Mali	Somalia
			Mauritania	Tanzania
			Niger	Uganda
			Nigeria	Zambia
			Senegal	Zimbabwe
			Sierra Leone	
			Togo	

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The AfCFTA: Trade and Investments Benefit for Nigeria

Chinwe Christopher Obuaku-Igwe

1 Introduction

On the 27th of June 2019, Nigeria bowed to the pressure and officially joined the African Continental Free Trade Area (AfCFTA). Nigeria's decision to join the AfCFTA has been applauded on grounds that the country is strategically positioned to reap the benefits of its membership in the continental trade union. Before Nigeria's membership in the AfCFTA, there was pressure from trade unions and the organized private sector who said that Nigeria would be exposed to the dumping of goods by other African countries.[1] They added that infant industries were still developing and would not compete favorably with others. The central questions to be examined in this chapter are: How will Nigeria benefit from free trade despite structural inefficiencies that could harm domestic industries? What sectors can be leveraged in this partnership? These questions are pertinent as Nigeria, the biggest economy on the continent joins the AfCFTA.

Policy experts have argued that instead of focusing on the possibility of being dominated by regional economies, Nigeria should concentrate on strengthening institutions as well as providing infrastructures and incentives that will enhance the competitiveness of infant industries.[2] While

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acknowledging challenges that can emanate from opening one's borders, they noted that the AfCFTA emerges against the backdrop of unsuccessful continental economic integration attempts that were characterized by failed target-deadlines, multiplication of Regional Trade Agreements (RTA), otherwise known as the "spaghetti bowl effect." This implies that the AfCFTA re-arranges continental integration by employing a "top-down" approach which is a drastic departure from the "bottom-up" structure championed by the African Economic Community (AEC) through Regional Economic Communities (RECs) that devastated a lot of economies.

This chapter begins with a background to the AfCFTA, how it evolved, and why concerns for intra-African trade relations necessitated a continental free trade area. It further discusses the trade and investment benefits of joining the AfCFTA for Nigeria with lessons from Taiwan. It concludes that an appropriate trade agenda for Nigeria has to be responsive to domestic industries within key sectors.

2 Background to the AfCFTA

The Need for a Continental Free Trade Area

On March 21, 2018, 44 African countries signed an agreement to create the African Continental Free Trade Area (AfCFTA). In terms of the numbers of participating countries, the AfCFTA is the world's largest free trade area since the formation of the World Trade Organization (WTO). The AfCFTA brings together 55 member states of the African Union covering a market of more than 1.2 billion people and a combined gross domestic product (GDP) of more than US$3.4 trillion.[3] Estimates from the Economic Commission for Africa (UNECA) suggest that the AfCFTA has the potential to boost intra-African trade by 52.3%.

The AfCFTA is part of Agenda 2063—a strategic framework for the socio-economic transformation of Africa. It builds on and seeks to accelerate the implementation of past and existing continental initiatives for growth and sustainable development. Agenda 2063 originated from the Lagos Plan of Action adopted in 1980 in Lagos for a continental free trade area, among other regional development initiatives.[4] In his Keynote address, President Kagame of Rwanda noted that some of the past and current initiatives the AfCFTA builds on include: the Lagos Plan of Action, The Abuja Treaty, The

Minimum Integration Programme, the Programme for Infrastructural Development in Africa (PIDA), the Comprehensive Africa Agricultural Development Programme (CAADP), The New Partnership for Africa's Development (NEPAD), Regional Plans and Programmes and National Plans.[5]

He added that the AfCFTA was built on national, regional, continental best practices in its formulation and emphasizes trade integration, partnerships, infrastructural and agricultural development by aligning its agenda to broader national, regional, and international policies. Part of the broader goal of the AfCFTA is to increase intra-African trade relations which is currently low.[6] UNECA reported that intra-African trade made up only 10.2% of the continent's total trade in 2010 due to high applied tariff protection rates, which average 8.7%, but often reach 20%, and are known to climb up to 45%.

They noted other inhibitors such as low development of African economies and their excessive dependence on commodity production and exports, weak transport infrastructure, poor trade logistics, high-security risks, and non-tariff barriers (NTBs). To address these issues, the 2012 African Union Summit, Heads of State and Government adopted a Decision (Assembly/AU/Dec.394 (XVIII)) on the Establishment of an African Continental Free Trade Area by the indicative date of 2017 and endorsed the Action Plan on Boosting Intra-Africa Trade (BIAT) which identifies seven areas of cooperation namely trade policy, trade facilitation, productive capacity, trade-related infrastructure, trade finance, trade information, and factor market integration.[7]

Furthermore, Article 6 of the Abuja Treaty committed the signatories to establish an African Economic Community in six stages over a period not exceeding thirty-four years. The first stage was conceptualized to strengthen existing Regional Economic Communities and establish new ones where they did not exist. Next, the Regional Economic Communities (REC) focused on stabilizing tariff barriers, non-tariff barriers, customs duties, and internal taxes. The third stage would involve at the level of each Regional Economic Community the establishment of a free trade area through the gradual removal of tariff barriers and non-tariff barriers to intra-community trade. This would also include the establishment of a customs union through adopting a common external tariff.[8]

Fourth, coordination and harmonization of tariff and non-tariff systems among the various RECs to establish a Customs Union at the continental level through adopting a common external tariff. Fifth, the establishment of an African Common Market through the adoption of common policies in several areas: harmonization of monetary, financial and fiscal policies: and

the application of the principle of free movement of persons as well as the provisions herein regarding the rights of residence and establishment. Finally, the consolidation and strengthening of the structure of the African Common Market, and setting up of a pan African Economic and Monetary Union including setting up of African Monetary Union, a single African Central Bank, and a single African currency.[9]

The African Union Assembly of Heads of State and Government, however, decided in 2012, to emphasize the creation of the AfCFTA, leaving aside the common market, and economic and monetary community.[10] This decision was taken as a result of a perceived need to enhance intra-African trade. In essence, the Abuja Treaty remains the overarching statement of African ambitions for economic integration. The rationale for the AfCFTA is summed up by Magwape[11] who suggests that for African countries to emerge as economic powers, they have to be fully involved in sustainable development discourses and participate in setting the agenda at the World Trade Organization (WTO) by bringing in African perspectives as well as other systemic perspectives that will facilitate investments.

3 Conceptual Framework and Literature Review

The African Union estimates that the AfCFTA is a colossus of about 1.2 billion people supported by an aggregate economy of about US$3.4 trillion, with the draft agreement committing countries to remove tariffs on 90% of goods—with 10% of "sensitive items" to be phased in later.[12] The liberalization of 90% of trade between member countries comes with a caveat where countries will decide which imports would be tax-free and those that would be taxed.

Also, members are allowed to label and shield 10% of their industries under "sensitive trade" as a way of protecting infant industries from global competition. Out of the 10% that is listed as sensitive, 3% would be on full tariff while the remaining 7% would be labeled "sensitive" with a tariff.[13] Countries would be allowed to build upon productive capacities by determining which industries to protect and where to increase, sustain, or reduce trade tariffs. In principle, the AfCFTA creates new multilateral trade architecture for Africa, primarily by addressing critical barriers to African trade simultaneously through the following measures:

- Consumers, traders, and businesses in Africa will no longer pay tariffs on a good number of goods that are exchanged between African countries;
- Traders can negotiate and have challenging non-tariffs customs paperwork removed for mobility and ease of doing business;
- Customs officials across countries will cooperate over standards of products, rules, and facilitation of trade transit for the mobility of goods and services across African borders;
- Liberalization of services will improve suppliers' access to African markets with conditions that are similar to that of their home country;
- Reciprocity in licensing, standards, and certification of suppliers of services will enable individuals and businesses to comply with regulations for operating in external markets;
- Protection against unexpected trade flow through strategies that will protect infant industries;
- The establishment of a conflict resolution apparatus and other mechanisms to facilitate intra-African trade, protect intellectual property rights, and address anti-competitiveness challenges.[14]

The AfCFTA is ambitious, aimed at deepening African economic integration, promoting agricultural development, food security, industrialization, and structural economic transformation through a single-air continental transport market with free movement of persons, capital, goods, and services. Yet, there are increasing doubts about its benefits to member states.[15] To understand Nigeria's prospects at the AfCFTA, it is necessary to start with a primer on the conceptualization, facts, and effects of Free Trade Agreements (FTA).

Free Trade Bloc at a Glance

The departure point for trade agreements is the General Agreement on Trade and Tariffs (GATT). The General Agreement on Tariffs and Trade (GATT) was a legal agreement between many countries, whose overall purpose was to promote international trade by reducing or eliminating trade barriers such as tariffs or quotas. According to its preamble, its purpose was to reduce tariffs and other inter-country trade barriers.[16] It was first discussed during the United Nations Conference on Trade and Employment and was the outcome of the failure of negotiating governments to create the International Trade Organization (ITO).

GATT was signed by 23 nations in Geneva on October 30, 1947, and took effect on January 1, 1948. It remained in effect until the signature by 123

nations in Marrakesh on April 14, 1994, of the Uruguay Round Agreements, which established the World Trade Organization (WTO) on January 1, 1995. The WTO is the successor to GATT, and the original GATT text from 1947 is still in effect under the WTO framework, subject to the modifications of GATT 1994.[17]

Since its establishment, the GATT has been predicated on the assumption that second-best is a regime where each member accords others the status of the Most-Favored Nation. The MFN system was seen as an antidote to the disaster of the l930s when the world was divided up into trading blocs.[18]

The GATT incorporated an important exception to the MFN principle in its Article 24. A subset of members could form a Free Trade Area (FTA), provided certain conditions were met. The AfCFTA can neither exist nor be understood outside other trading blocs.

Trade Liberalizations: Some Known Facts

Proponents of trade liberalization have argued that enthusiasm for freer international trade was due to four overlapping factors: anti-statism, poor economic performance, greater access to information, and World Bank pressure.[19] They reported that anti-statism was due to the global intellectual alignment away from big brother state power which did not eliminate the power of states, especially in authoritarian climes, but signaled a shift toward market-led economic decisions. Poor economic performance and Information: As populist macroeconomic policies created debt problems, attention was by necessity altered toward real productivity.

Also, greater access to information has prevented governments to insist that their citizens have to live a life different from the global norm. This has driven the shift to imports and greater integration with the global economy. It seems likely that these efforts drove the prevailing narrative away from either/or discussions—free trade versus protection—and toward a more differentiated judgment involving the importance of neutral trade regimes as opposed to regimes that are biased against exports.[20]

When considered as a body of literature, studies on the benefits of trade liberalizations seem inconclusive given divergences in national policy environments, particularly in Africa. However, many studies have indicated that trade liberalizations could be beneficial. Carrère[21] used a gravity model of international trade to assess ex-post regional trade agreements. The model included 130 countries and estimated with panel data over the period 1962–1996. The results showed that regional agreements have generated a

significant increase in trade between members. Trade agreements also encouraged nations to focus on areas that they have a competitive advantage by fostering a more dynamic business climate. Many governments subsidize local industry segments but after the trade agreement removes subsidies, those funds can be put to better use.[22]

Furthermore, investors will flock to the country and domestic industries will benefit from their expertise. This adds capital to expand local industries and boost domestic businesses especially in mining, oil drilling, and manufacturing. Cook[23] notes that trade liberalizations also lead to technology transfer and capacity development in priority sectors. Additionally, local companies also receive access to the latest technologies from their multinational partners and can build capacities gradually such as the recent introduction of digital farming in some parts of Africa through support from global companies who helped in developing local resources.

Free trade, extended to primary commodities such as grains and sugar could potentially lead to the extension of markets for countries with industrial capacity due to the availability of lower wage costs that allow them to undercut high-income countries.[24] Another known benefit of trade liberalization is sensitive trading.[25] The AfCFTA for instance makes allowance for member states to label and shield 10% of their industries as "sensitive trade" as a way of protecting infant industries from global competition. Out of the 10% that is listed as sensitive, 3% would be on full tariff while the remaining 7% would be labeled "sensitive" with a tariff to protect domestic industries and main export products of member states.

While free trade could be beneficial, most of the arguments against it stem from the fact that it increases inequality, destroys indigenous cultures, crowds out infant industries, degrades natural resources, reduces tax revenues, increases poor working conditions, and theft of intellectual property.[26] Free trade damages a nation's domestic industries by exposing them to competition from foreign producers with lower costs. For example, it has been argued that the North American Free Trade Agreement (NAFTA) damaged U.S. industries because low labor costs in Mexico allowed Mexican manufacturers to undercut American producers. The Economic Policy Institute argued that by 2010 NAFTA had transferred more than 600,000 American jobs to Mexico.[27]

Some studies purport that trade liberalizations could lead to the lowering of environmental standards as lax regimes in one country are exported to other participating countries.[28] For instance, the Canada–EU Comprehensive Economic and Trade Agreement (CETA) was stopped by a civil society based on the assumption that it would disrupt the planned Transatlantic

Trade and Investment Partnership (TTIP) with the United States. For most small economies with informal business sectors, these and more are good reasons not to open their borders as they depend mostly on primary goods which do not enhance competitiveness.[29]

4 Theoretical Framework

World-Systems Analysis: Theory and Approach

World-Systems Analysis by Wallerstein provides a general analytical framework for viewing Nigeria's involvement in the AfCFTA. Wallerstein[30] contended that global economic systems are a strategic mutualism between powerful and weak countries where each benefits from the others through a division of labor. In this global system, countries keep attempting to remodel social and economic systems to their advantage by dominating trade.[31] He argued that the global social-economic system is stratified into three distinct groups: the core, semi-periphery, and periphery countries.

Countries at the core are dominant due to their economic diversity, technological advancements, and strong governments. The nations at the semi-periphery are not dominant, however, enjoy a mutually beneficial relationship with core countries. The countries at the periphery are characterized by weak economic apparatus. Besides, a weak central government, poor infrastructure, and bureaucratic challenges contribute to their inability to compete globally.

Wallerstein used the concept of world-system analysis to describe the structure and roles of developed and underdeveloped countries in the global economic system.[32] This World-Systems analysis emphasizes stratification among countries where those with high levels of production and power tend to exploit weaker societies by obtaining goods, often raw resources at heavily discounted prices. Foregrounded by the world-systems analysis is the significance of dominance which is considered as being competitive through economic diversity, technological advancements, and strong government.

Applied to developing countries, Whally[33] pointed out that a country's decision to participate in free trade agreements should be underpinned by the fact that through mutual compromise on trade barriers, they will be able to remodel the system to create access to all parties. Also, participation in regional trade partnerships is often due to high chances of success due to the minimal number of participants and a previous history of failed negotiations at the global level. However, countries should be wary of trade-diversion

losses, a situation where other trade partners might want to divert trade to higher-paying or higher-cost suppliers within the same region.[34]

A world-systems approach, therefore emphasizes the importance of trade-offs and benefits that countries should consider ahead of time before signing up. Research has proven that protectionism has proven to be detrimental to low-income countries. Developing countries should strive for trade strategies that would ensure less technical dependence, lower debt, and equity in income distribution.[35]

The AfCFTA: Challenges for Nigeria

The structure of free trade is designed to enslave non-strategic and non-industrialized countries whose inadequate infrastructure and low technological advancement leave them at the mercy of dominant countries. Thus, Nigeria's agenda has to be profit-driven and as indicated by researchers,[36] beyond the domestic market, Nigeria can leverage the AfCFTA to enhance the exportation of agricultural products to other parts of the region. Nigeria has a long-standing culture of importation and has demonstrated a lack of political will to strengthen the capacity of local industries.

Most products from Nigeria are imposed with high tariffs, taxes, and priced low making them more expensive. In addition, there is an open-door policy where goods from neighboring countries are not heavily taxed.

For instance, in 2019, Nigeria's currency declined by 59.5%, lowering the value of its export products which makes it cheaper for foreign trade partners with stronger currencies.[37] At present, Nigeria's intra-African trade profile is low at 20.4% compared to external exports to European countries which are valued at 39.7%.[38] In essence, while Nigeria's numerical strength and cheap primary goods present an opportunity to its trade allies, Nigeria could remain economically disadvantaged if trade in intermediate goods is not boosted.

Historically, Nigeria is not a competitive country, irrespective of the GDP statistics. A review of Nigeria's economic development and trade strategy indicates that immediately after independence in the 1960s, import substitution was adopted as a major trade strategy. Part of the reason for this was primarily because Nigeria had an agro-economy and relied on the exportation of primary goods.[39] Several years later, the Nigerian economy is neither robust nor diversified and has been vulnerable to market fluctuations due to its heavy reliance on the exportation of primary goods. Parts of the challenges of the economy are huge debts, borrowing, and undeveloped capacity of its manufacturing sector which inhibits the ability to adjust to new markets. According to trade summary statistics from the World Integrated Trade Solution at the

World Bank,[40] Nigeria compares unfavorably to Kenya and South Africa in capital goods revealed comparative advantage (RCA). The RCA metric is an index used in global financial aspects to assess the general advantageous position or inconvenience of a given nation in a certain class of commodities or administrations as confirmed in terms of technical job patterns. The assembled countries' CTAD notes that it relies on the Ricardian trade theory, which points out the examples of trades between nations, represented by their overall inefficiency of contrasts, which can be used to provide an overall sign and first approximation of the serious fare qualities of a country.

Figure 1 shows clearly that Nigeria, considering its greater economic scale, ranks behind both countries in this measure of comparative advantage. As far as capital exports are concerned, the evidence is far better. According to the latest evidence available from the World Bank's Integrated Trade Solution, the export of capital between Nigeria and South Africa has been more than 100 times unbalanced against Nigeria.

The export market penetration index of the World Bank shall be measured as the number of countries to which a reporter exports a given commodity divided by the number of countries that record importing the commodity that year. Nigeria had a ranking of 3.15 for the latest year in which results were available in 2018. Also, Nigeria only exports 491 products compared to 3980 that are imported from other economies.[41]

The World Bank's index of Export Market penetration is calculated as the number of countries to which the reporter exports a particular product divided by the number of countries that report importing the product that

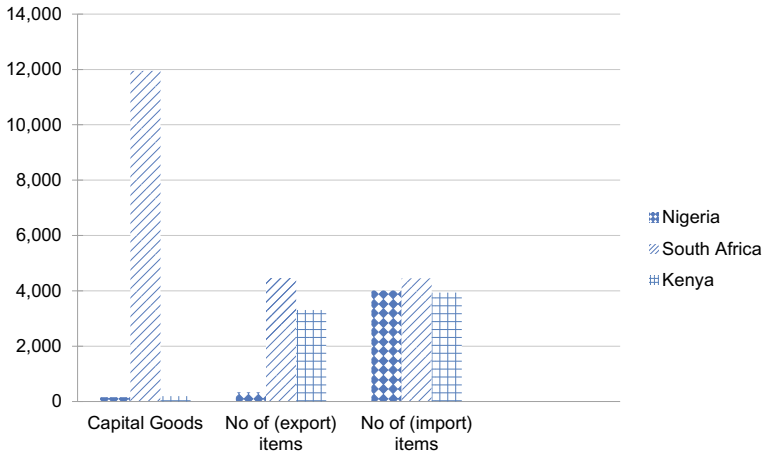

Fig. 1 Capital goods revealed comparative advantage between Nigeria, South Africa, and Kenya (*Source* World Integrated Trade Solution at the World Bank)

year. Nigeria has a score of 2.74.[42] For comparison, South Africa has a score of 10.93. Nigeria has a higher average than the West African average score. This indicates that relative to its neighbors, Nigeria has better prospects at the AFCFTA. The implication is that opening up to the entire African continent could work out with strategies that de-emphasize importation while strengthening manufacturing, labor-intensive sectors, technology, incentives, and strong institutions.

Economists and policymakers have agreed that while there were unmet expectations from trade pacts in the early 1980s, the gains far outweighed any recorded losses. They also suggested that if there is a need to assess the impact of trade liberalization based on previous outcomes, such analysis should inform policy recommendations on trade and not deter participation.[43]

The AfCFTA: Prospects for Nigeria-Lessons from Taiwan

Countries participate in free trade to increase their chances for economic growth, advance national interests and enjoy geopolitical influence. Small economies that wish to move from the periphery to the core of the global system will require strong political will. Arguably, the AfCFTA is an arena for conflicting interests where each country seeks to dominate. As such, prioritizing manufacturing, technological advancement, and strong institutions are fundamental to Nigeria's prosperity and growth at the AfCFTA. One need only consider the effect of the Structural Adjustment Program—(SAPs) of the eighties on the Nigerian economy (such as the loss of the groundnut pyramid and over 500 small scale industries in the South-East), to see the extent to which an open border could ruin non-competitive economies.[44]

Nigeria's potential to benefit from the AfCFTA will remain unrealized if policymakers fail to draw lessons from the experience of other economies that have benefitted from open trade. These countries are fertile locations for the emergence of innovation, new technology, and transformation. The World-systems analysis puts forth the notion that trade pacts bring countries together for mutually beneficial purposes. It argues that the extent to which countries can benefit from this arrangement or control trade is largely determined by their competitiveness which is a factor of innovation, technology, product selection, and strong institutional support. From this perspective, free trade is exploitative. Chase-Dunn[45] suggests solving the competitiveness riddle by understanding trends in economic systems summed such as capitalism, the interstate system, and core-periphery hierarchy. These involve having a specialty in high-wage production, high-technology, profitable commodity production, and geopolitical military competition.

A glance at new lead industries shows that countries that innovate and implement new technologies have high chances of benefiting from free trade just like Taiwan did. In the past two decades, Taiwan has successfully experienced upward mobility from the periphery to the core through open borders.[46] It became an independent member of the WTO in January 2002 and got integrated into the global economy through regional pacts with the Asia Pacific Economic Cooperation (APEC), the Asian Development Bank (ADB), and the Association for Southeast Asian Nations (ASEAN).

At present, Taiwan's economy depends on an open trade regime with Japan, China, Hong-kong, the United States of America, and ASEAN economies.[47] As an export-oriented economy, Taiwan's total trade in 1992 was over $180 billion which was representative of over 82% of its GDP. By 2013, its foreign trade amount had exceeded US$575.33 billion. It is important to point out that Taiwan's economic growth has been driven by foreign trade mostly from the electronics sector and contract manufacturing, which collectively contributed over 130% of its total GDP between 2007 and 2009.[48]

These sectors experienced increases in revenues which were equally visible in other sectors such as minerals which contributed over $23.69 million in revenues in 2013, followed by plastics which accounted for $21.95 billion and chemical products accounted for $21.28 billion in revenues in the same year. While efforts to improve the service, industry are underway in Taiwan, two of its logistic companies (freight and shipping) are highly ranked and responsible for 10% of container shipping across the world.[49] As for global trade, Taiwan's trade with its largest partner, the United States of America, accounts for over seventy billion in yearly trade.

Taiwan has been under political isolation with pressure from the Chinese government. Taiwan globalized its economy, prioritized innovation in the technology sector. It took advantage of trade relationships with ASEAN economies, by integrating most of its core sectors and businesses into regional supply chains which are currently valued at over $6 billion.

Secondly, over 99% of Taiwan's exports are from the industrial, information, communications, and technology sector where they emphasize the production of intermediate goods and components that are incorporated into final products and sold to bigger economies.[50] For instance, Taiwan produces over 94% of motherboards, 80% of laptops in the world, and most computer chips used by companies in the United States and Japan which increased their ranking as one of the Silicon Valley countries in Asia. Also, Taiwan transformed from a dictatorship to a democracy where 38% of its legislators are female, far above the global average of 22%.[51]

Taiwan's history, reforms, trade policies, and economic success hold lessons for countries who seek the same. An open border can no longer be said to hinder the growth of developing countries. Trading strategy that speeds up Nigeria's mobility in the core-periphery hierarchy and advances its interests will require economic diversification. Investment in manpower, agricultural goods, manufacturing, and other labor-intensive sectors such as mining, provision of credit/incentives for Small and medium enterprises (SMEs) that will enable them to connect to larger markets and strong institutions.

How Nigeria Can Benefit from the AfCFTA: Transferable Elements Emerging from the Good Practices in Free Trade

Nigeria has to improve the microeconomic capability of the economy to benefit from AfCFTA membership. Policymakers and governments have to emphasize economic diversification. Integrating Most of Nigeria's core manufacturing sectors and businesses into regional supply chains while introducing tariffs.

Nigeria's international trade policy is governed by the industrial revolution plan which was released in January 2014. The document included an analysis of the Nigerian economy and one identified threat was "Trends in Trade policies" which highlighted:

- The need for openness in the global economy and economic diversity;
- The urgency of restructuring the manufacturing sector to increase the production of steel and iron;
- The need for industrialization which will open doors to new markets;
- The need to scale-up local industries to meet the demands of emerging markets which will, in turn, make them more competitive;
- The need to invest in technology and strengthen skills in human resources;
- of the disadvantages of protectionism and the need to meet up with trends by signing up for *Common External Tariff (CET), Free Trade Agreements (FTA), Economic Partnership Agreements (EPA), Preferential Trading Agreements (PTA), and others*.[52]

In addition to Nigeria's industrial revolution plan, other elements to engage in mobilizing regional trade and investments as evident from good practices are high manufacturing capacity, improvement in infrastructure, technology, investment, quality of goods, competitiveness, and strong institutions which will be discussed in details below.

5 Manufacturing Capacity in the Agricultural Sector and Steel

Tomato Waste

In 2017, reports emerged that thousands of farmers in Northern Nigeria contracted to grow tomatoes for a set price by Dangote farms factory had decided not to grow the crop. Leaf miner pests had ruined the yields for the previous year and the farmers were wary of investing in tomatoes again. This situation left the processing factory set up by Aliko Dangote, Africa's richest man, short of raw materials. Established to process 1200 metric tons of tomatoes each day and produce 400,000 tons of paste annually, the Dangote Farms factory, just outside the northern city of Kano, was designed to meet Nigeria's domestic needs and help cut paste imports of 300,000 tons a year from China.

The facility by Dangote Group was designed to process at least the 900,000 tons of tomatoes that rot as waste annually out of Nigeria's yearly harvest of about 1.5 million tons. About 8000 farmers in the Kadawa Valley, near Kano, were contracted to supply tomatoes to the factory, at a guaranteed price of about $700 per ton compared with an average of less than $350 in the domestic market but were unable to meet up with supply demands.

The Food and Agriculture Organization[53] shows that Nigeria was ranked as the 16th largest tomato-producing nation in the world and has comparative advantages which could make it the world's leader in tomato production and exports. Tomato production in Nigeria for 2010 accounted for about 68.4% of West Africa, 10.8% of Africa's total output, and 1.28% of world output. They found that only 20% of tomato products in the Nigerian market were locally produced and identified six constraints affecting local production: storage, marketing, processing, funding, research, and development.

Another study[54] concluded that 21% of waste occurs at the point of processing and suggests that improving production and storage capacity can eliminate as much as 20% of wastage in Nigeria. The challenge is that Nigeria's industrial capacity to improve these elements of the value chain is very low. The importance of providing incentives and support to SMEs, traders, and farmers to improve production, crop grading, yield, soil texture, branding, and marketing of products is demonstrated by food insecurity, food waste, petty trading, high importation, and prevalence of informal sectors that cannot compete favorably with external competitors.

The Steel Challenges

As already mentioned, best practices in free trade for countries who want to move from the periphery to the core of the hierarchy suggest that a solid manufacturing base remains a vital component in the development of service activities.[55] This argument is illustrated by an analysis of the growth of employment in private and public service activities for the 43 Belgian districts over 1975–1988.[56] The results show that the broader the manufacturing base, the higher the growth of employment in private service activities. Studwell[57] agrees that of all comparable industrial sectors among nations, steel stands out and remains the first step into manufacturing and industrialization as shown by rich and highly industrialized countries. He added that the capability to make steel efficiently has, historically, signaled that a country will go on to make other things efficiently—a sort of entry-level test for the economic big time.

Nigeria established the Ajaokuta Steel project in 1979, a year before the adoption of the Lagos plan of action—with the strategic objective of providing a solid foundation for industrialization and manufacturing base of Nigeria. Nearly three decades later, despite over $10 billion in investments, the project remains moribund, locked in technical, administrative, and legal challenges. Apart from Nigeria, Jordan, Algeria, Egypt, South Africa, and Zimbabwe are the only African countries that can produce special grade alloy steel. At present, Nigeria lacks the manufacturing capacity to cope with the rest of Africa and needs to strengthen this sector.

Investment, Competitiveness, and Quality of Goods

There is some evidence to suggest that Nigeria's population is a blessing that can be leveraged at the AfCFTA. The EU debt crisis which led to a 2.3% decline in Taiwan's exports in 2012 is an example of how a decline in commodity demand could lower exports for all countries and lead to recession and current account deficit in export-oriented economies.[58] It may be argued that, unlike Taiwan, Nigeria's population could be a blessing given that it presents a market for locally manufactured goods and labor force and has the potential for more productivity if infrastructures, skills, and education capacities are strengthened.

According to the United Nations Economic Commission for Africa (UNECA), five in every ten African countries will become industrialized by 2022 due to diversity, the sophistication of export products, and new markets that will open up through the AfCFTA.[59] This projection underscores the

potential benefits for African economies as they open up their borders and boost intra-African trade. Commodities manufactured in Africa amounted to 43% of intra-African exports, compared to 19% of exports to external markets in 2015.

Similarly, the AfCFTA has the potential to boost trade and investment in Nigeria by the same margin, if the quality of industrial and consumer products are improved for existing and emerging markets with appropriate support from the government. Nigeria's economic growth has been attributed to exports of extractive products such as oil and gas which accounts for 91% of total exports. Just like Taiwan promoted 493 consumer products for emerging markets, Nigeria could do the same by providing support to SMEs across textile and agricultural sectors to enhance their capacities in technology, research, and development.

Not only does open trade promise access to other markets, but it also offers the opportunity to develop the resilience needed to overcome Nigeria's structural deficiencies. On one hand, the AfCFTA offers the ability to open up borders but protect domestic industries, lower competition, and improve exports by listing specific items under the "sensitive list." On the other hand, it enables countries to specialize in and monopolize certain manufacturing processes which further increases demand for their goods or opens up new trading opportunities.

The evidence from Taiwan and other economies like Brazil and South Africa show that a large country like Nigeria has a lot to benefit from entering trade partnerships with other regional partners if capacities are strengthened in various infrastructures and institutions. Porter[60] notes that "National prosperity is created, not inherited. It does not grow out of a country's natural endowments, its labor pool, its interest rates, or its currency's value, as classical economics insists." A nation's competitiveness depends on the capacity of its industry to innovate and upgrade. Companies gain an advantage against the world's best competitors because of pressure and challenge. They benefit from having strong domestic rivals, aggressive home-based suppliers, and demanding local customers.

6 Recommendations and Conclusion

In every trade agreement, there are always winners and losers, hence its gradual decline. However, for Nigeria to compete favorably as trade becomes globalized, the financial services industry/market has to be reformed and laws put in place have to enable domestic financial service providers to survive

the competition. Secondly, there has to be a shift from poor administration, research capacity, and labor standards. Nigerian policymakers have to strengthen research and data collection to aid enforcement of rules and protection of intellectual properties. Thirdly, policymakers need to reform labor standards to protect citizens. Also, the government needs to provide extensive support to small and medium scale companies to educate as well as facilitate the registration process for exportation and importation. Fourthly, commodity classification, and corresponding documentation as well as application processes have to be improved and done electronically to maximize time for applicants. Also, every trade-related information has to be available to all citizens and in easily accessible formats such as mobile applications, et cetera, to give citizens access to trade information, promotions, trade organizations, government subsidies, and services.

The immediate ancestor of the African Continental Free Trade Agreement is the 1991 Abuja Treaty on the African Economic Community and the UNCTAD has called it one of the most ambitious economic integration documents ever signed on the continent due to existing political and economic rivalry among African states. Despite controversies surrounding intra-African trade relations, inherent challenges in the variation of sensitive commodities, looming product monopoly, distribution of cost and benefits, and the political economy of African states which tend to work against trade policy imperatives, the discussion above demonstrates clearly that the benefits of being part of the accord far outweigh the damage to local industries. Finally, for its size and power, Nigeria's economy might have a gentle underbelly but it is in its immediate interest to strengthen these as it embraces the AfCFTA.

Notes

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The Impact of Regional Integration on Trade and Economic Development: A Tripartite FTA Gravity Model for the Future of the AfCFTA

Eduard Marinov and Dimitar Zlatinov

1 Introduction

Although the process of political integration in Africa has been a key goal among African leaders since the early years of independence (mid-twentieth century), the process has been slow, mainly due to a lack of political will. Economic integration on the other hand has achieved significant results, albeit less than expected. The Treaty for the establishment of African Economic Community (AEC) defines six stages, which are required to be fulfilled for its gradual creation. It adopts an integration approach closely linked to the success of integration processes of the regional economic communities (RECs). It also explicitly states that the AEC will be established on the basis of coordination and gradual integration of existing RECs.

Increased regional trade cooperation by means of removing intraregional trade restrictions is a critical strategy aimed at addressing the challenges posed

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by small domestic markets, limited economies of scale and the marginalization of African economies in world trade. As a result, a large number of trade blocs in Africa have been created. The aim is to reduce and remove trade barriers, with each country belonging to more than one preferential trade agreement.

There exists a multiplicity of trading arrangements in Africa. They range from bilateral agreements between individual countries to preferential trade areas (PTA), free trade areas (FTA), and customs unions (CU). Consequently, this poses a huge challenge to the business sector, customs administrations and other private and government agencies involved in the management or facilitation of trade. Two recent major steps toward continental economic integration have been the creation of the Tripartite FTA between the East African Community (EAC), the South African Development Community (SADC) and the Common Market for Eastern and Southern Africa (COMESA) in 2015, and the Agreement establishing the African Continental Free Trade Area (AfCFTA) in 2019.

The purpose of this chapter is to assess the general preconditions for trade between EAC, SADC and COMESA and other African countries employing the gravity model of trade. In addition to being members of Tripartite FTA, these RECs are also three of those recognized by the African Union (AU) as building blocks of AEC. However, there exist significant differences in the economic development of the countries within the RECs. These differences concern the size of their economies, their openness to the global economy, as well as trade regimes and patterns in international trade within the RECs and across Africa. Thus, despite the fact that they are three of the most advanced RECs in Africa with comprehensive regional integration programs, they present quite differing results in terms of trade and economic development.

The results of the study clearly indicate the effects and potential of trade integration in three of the most developed RECs recognized as building blocks of the AEC. They are also significant contributors to the broader PTA—the Tripartite FTA. This analysis will assess the future effects of regional integration in Africa in terms of the implementation of the Agreement establishing the AfCFTA.

The following section discusses the rationale behind Africa's current efforts to achieve multilateral trade liberalization. The subsequent section will review the process of economic integration in Africa, and analyze the economic characteristics of the countries participating in the Tripartite FTA. The last section applies the gravity model to the Tripartite FTA as a proxy for the potential future effects of the African Continental Free Trade Area.

2 Africa's Striving for Multilateral Integration—Rationale

This section is devoted to an analysis of the theoretical background. It will assess the different motivations of developing countries when participating in multilateral international economic integration agreements. It will seek an answer to the following question: why is Africa intent on a continental trade agreement and multilateral liberalization, while most countries in the global economy are turning toward bilateral trade agreements, and others are enacting measures aimed at protectionism?

Economic integration theories—both dynamic and static—are in most cases not fully applicable to integration agreements in developing countries. Theoretical literature on economic integration issues tends to discuss customs unions only in industrialized countries (Balassa 1965, p. 16). Their problems and environment are not so much related to economic development, but to relative changes of production and consumption features.

Traditional theory assumes that larger (in economic terms) participating countries benefit more substantially from integration.. If the size of the economy is measured in terms of gross national product, the benefits of integration for developing countries are negligible (Abdel Jaber 1971, p. 262). Balassa (1965, p. 38), however, argues that integration benefits depend not only on the size of the participating countries, but also on their rate of economic growth. Since developing economies tend to grow at higher rates than developed countries, their benefits of integration are relatively greater. Another possible indicator is population size. According to this criterion, developing countries should benefit from integration due to their high population levels (Hosny 2013, p. 144).

Developing countries tend to specialize in primary product manufacturing. This should not be seen as a negative indicator per se, since economic surplus gained thereby can be reallocated and invested efficiently in other sectors (Abdel Jaber 1971, pp. 256–257). In reality, however, this is rarely the case. Most developing countries adopt a trade policy of diversification and import substitution aimed at accelerating economic growth. Small developing countries can achieve balanced growth by increasing market size, thereby benefiting from economies of scale, and expanding their inter-industry transactions, i.e. through economic integration. This requires a strong level of commitment is required—both economically and politically.

Developing countries have historically sought motivation for economic integration in the benefits of trade diversion and import-substituting industrialization. With the subsequent introduction of the ideas of dynamic

integration, they find arguments for integration in the economies of scale, investment creation, and technology transfer, etc. Nowadays, however, the integration initiatives of developing countries far exceed such arguments. In fact, most of them are involved in pursuing policies of trade liberalization and deregulation as part of their overall stabilization programs agreed with international organizations. This approach is aimed at making economic integration policies compatible and complementary to other policies, thus promoting international competitiveness. Most developing countries, therefore, look upon economic integration as an instrument to enhance competitiveness in a global economy (Hosny 2013, p. 143).

According to Lipsey member states of an integration agreement with a GDP less reliant on international trade, can expect greater benefits from a customs union in terms of welfare (Lipsey 1960, pp. 508–509). This is very important for developing countries because trade as a percentage of GDP in low-income countries has always been lower than in countries with a high level of income. In recent years, however, this imbalance has decreased (Hosny 2013, pp. 144–145). This principle does not apply to countries with medium levels of income and least developed countries; the share of trade in GDP there is even more significant than that in high-income countries. This criterion clearly is not applicable to developing countries, since subgroups among them may have a larger or smaller share of trade in GDP when compared with high-income countries.

An integration agreement will bring more benefits in terms of welfare, if the share of intraregional trade is growing, while trade with the rest of the world is decreasing (Lipsey 1960, pp. 508–509). Studies have shown that trade between developing countries is always much weaker than trade between developed countries. This suggests that the benefits of integration in terms of welfare will also be less marked.

Other researchers (Balassa 1965; Abdel Jaber 1971), however, believe that this assumption should not always be taken for granted. They list a number of factors, which restrict trade between developing countries. They also argue that the removal of these barriers will likely lead to an increase in trade flows between developing countries engaged in an integration process. These factors include: first, the low level of economic development; second, an inadequate transport infrastructure and facilities; third, foreign currency control and other restrictions on imports; fourth, inadequate marketing; and fifth, a lack of standardization.

The clearest indicator of the success of an integration agreement is the increase in intra- and interregional trade as a part of the total trade flows of member states. Although this is an important aspect of integration, it should

not be seen as a means to its end (Inotai 1991, p. 10). Equally important are industrial development, adequate infrastructure, and improvements to technology, inter alia. The growth in regional trade may actually be the result of trade diversion from more efficient and competitive third countries. Therefore, it can be regarded as positive only if combined with improving global competitiveness as a whole.

A major part of imports from developed to developing countries consists of capital goods. From the point of view of dynamic analysis, integration among developing countries requires substantial investments. Since most imports from developed countries are in the form of capital goods, it is likely that the volume of imports of integrating developing countries will grow. Thus the long-term goal of integration between developing countries should not be to reduce trade with the outside world, but rather to change the trade structure (Mikesell 1965, p. 209).

If integration between developing countries results in trade diversion of consumer goods, this will lead to a release of more foreign currency for capital goods imports from third (developed) countries (Sakamoto 1969, p. 293). The volume of trade with the rest of the world may not change or may even increase, but importantly its structure will change.

It should also be noted that in developed countries, the main rationale for economic integration comes from economic groups of stakeholders. On the other hand, in developing countries, integration processes often initially start as a political goal, lead quite frequently to unsatisfactory economic results. Integration processes could be interpreted from the point of view of a combination of economic and political determinants (Haas and Schmitter 1964, pp. 713–720).

Clearly, the rationale behind economic integration among developing countries cannot be defined or explained merely by the static and dynamic effects which define integration between developed economies. In the case of developing countries, certain factors have a stronger impact on their willingness to participate in integration agreements, while other factors more controversially have a weaker impact. In order to assess the integration benefits and costs for developing countries, certain specifics need to be taken into account. These include the stage of economic development; structure of the economy; production characteristics; demand preferences; trade regimes and policies, inter alia. Account also needs to be taken of the complexity of the political determinants of economic integration among developing countries.

Despite Ackerman's (2016) statement that "the benefits of liberalization are important and obvious, but they have already been realized for most of the developed economies" (Ackerman 2016), the lower economic development,

the low volume of intra-African trade and the fast rate of economic growth, as well as the desire to have more market and bargaining power in global economy, renders the creation of a multilateral trade agreement such as the Tripartite FTA and more recently—the African Continental Free Trade Area, beneficial for African countries. These benefits, however, depend on many factors and should be assessed more thoroughly. Section 4 will introduce a model which will help in this assessment.

3 The Process of Economic Integration in Africa

The Common Market for Eastern and Southern Africa, the East African Community, and the Southern Africa Development Community are three of the eight RECs recognized by the AU as building blocks of the AEC. These three RECs are implementing separated regional integration programs in trade and economic development. They cover the establishment of free trade areas; customs unions; monetary unions; and common markets; as well as regional infrastructure development programs in transport; information communications technology; energy and civil aviation as a first step toward continental integration.

These three RECs began negotiations which led to the establishment of the Tripartite Free Trade Area on June 10th, 2015 at the Tripartite Summit of Heads of State and Government in Egypt. The Tripartite FTA was the launching pad for the establishment of the Continental Free Trade Area in 2019. It was envisaged on a tariff-free, quota-free, exemption-free basis by simply combining the existing FTAs of COMESA, EAC, and SADC. The main benefit to be secured from the Tripartite FTA is the establishment of a larger market with a single economic area. This economic area will be more attractive to investment and large-scale production. In addition, this Tripartite economic area will contribute to the solution of the current challenges arising from multiple membership. This will be achieved by supporting the ongoing harmonization and coordination initiatives of the three organizations aimed at achieving convergence of programs and activities. The idea of this wider market integration is viewed by many stakeholders as a positive development, and a strategy, which could be more realistic than a rush to establish customs unions.

The leaders of all African nations met recently on 7 July 2019 to discuss the critical expansion of their continental free trade zone. Should their

massive deal works, it will connect 1.3 billion people, create a 3.4 trillion USD economic bloc, and dynamize commerce within the continent itself. This agreement underlines the different direction Africa is moving in, when compared with other regions in the world. The continent's leaders are embracing integration, while certain other global counterparts have turned away from multilateralism (Shao 2019).

The Agreement establishing the African Continental Free Trade Area entered into force on 30 May 2019. The decision was adopted at the 18th Ordinary Session of the Assembly of Heads of State and Government of the African Union, held in Addis Ababa, Ethiopia in January 2012. In terms of the numbers of participating countries, the AfCFTA will be the world's largest free trade area since the formation of the World Trade Organization. Estimates from the Economic Commission for Africa (ECA) suggest that AfCFTA has the potential to boost intra-African trade by 52.3%. This will be achieved by eliminating import duties, and if non-tariff barriers are also reduced, trade may be doubled (ECA 2019, p. 3). As of 7 July 2019, only Eritrea has yet to sign the consolidated text of the AfCFTA Agreement. The main objectives of the AfCFTA are to create a single continental market for goods and services, with free movement of business persons and investments, and thus pave the way for accelerated establishment of a Customs Union. It will also expand intra-African trade through better harmonization and coordination of trade liberalization and facilitation and other instruments across the RECs and Africa in general. The AfCFTA is also expected to enhance competitiveness at the industry and enterprise level by exploiting opportunities for scale production, continental market access, and better reallocation of resources.

Both the Tripartite FTA and the AfCFTA mark a significant milestone in the process of post-independence African integration. As the nominated leader of AfCFTA, Mahamadou Issoufou, President of the Republic of Niger, said "the AfCFTA baby is healthy and growing. We need to ensure that the baby continues to grow. The decisions that we make are very critical in this regard. And when that is achieved, our voice and leverage will also grow. In this way, we would be better placed to negotiate mutually beneficial partnerships with the rest of the world. We should now strive to conclude the negotiations and move to the implementation phase to sustain the growth momentum of the AfCFTA baby… We have now reached a critical point in the journey of realizing the vision of Creating One African Market. We are about to enter the operational phase of this journey. This will be challenging. However, with the record established so far, I believe we are ready to meet any challenge, no matter how complex it might be. As the popular saying

goes: 'where there is a will, there is a way'. Our will to continue this journey is strong and unshakable" (AU 2019, pp. 7–8).

4 Economy and Trade of the Tripartite FTA Countries

The Common Market for Eastern and Southern Africa, the East African Community, and the Southern Africa Development Community—the three Regional Economic Communities in Eastern and Southern Africa comprise 29 countries[1] with a combined population of 625 million people and a GDP of 1.2 trillion USD. They account for half of the membership of the African Union and 58% of the continent's GDP (the main economic indicators for the countries participating in the Tripartite, are presented in Table 1). The Tripartite FTA is vital to the putative single market and continental integration toward the ultimate goal—a fully functioning African Economic Community.

The three RECs differ in terms of their scope and the development of the integration processes. The three RECs are implementing separated regional integration programs in trade and economic development, as well as regional infrastructure development programs as a first step toward continental integration.

Some of the participating countries in the Tripartite FTA negotiations belong to more than one of the RECs: COMESA has a total membership of 19, 8 of which are also members of SADC and 4 of EAC; EAC has a total membership of 5, 4 of which are also members of COMESA and 1 of SADC; and SADC has a total membership of 15, 8 of which are also members of COMESA and 1 of EAC. Multiple membership as illustrated above has made it difficult for countries belonging to more than one REC to fully implement the trading arrangements to which they have committed under the different RECs (TradeMark Southern Africa 2011).

It is often assumed that the more developed economies of South Africa, Egypt, and Kenya, with a combined share of regional GDP amounting to more than 60%, stand to gain more from the envisaged FTA, while others might be faced with possible economic polarization. Such generalized assumptions have often led to demands for asymmetrical tariff liberalization in favor of the smaller economies (ECA 2011). It is arguable that such

[1] Angola, Botswana, Burundi, Comoros, DR Congo, Djibouti, Egypt, Eritrea, Eswatini, Ethiopia, Kenya, Lesotho, Libya, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, South Africa, South Sudan, Sudan, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe.

Table 1 General economic indicators of the countries participating in the Tripartite FTA

	COMESA	EAC	SADC	Population (Million)	GDP (Million current USD)	GDP p.c (current USD)	Merchandise imports (Million current USD)	Merchandise exports (Million current USD)	Imports of goods and services (Million current USD)	Exports of goods and services (Million current USD)
Angola			•	30,81	105,751	3432	15,442	34,614	28,397	35,421
Botswana			•	2,25	18,616	8259	5905	5911	5900	6958
Burundi	•	•		11,18	3078	275	811	172	493	190
Comoros	•			0,83	1203	1445	301	40	305	124
Dem. Rep. Congo	•		•	84,07	47,228	562	5200	7900	14,843	13,402
Djibouti	•			0,96	1966	2050	804	142	1370	631
Egypt	•			98,42	250,895	2549	72,000	25,604	68,983	37,232
Eritrea	•			3,21	2608	811	950	13	604	375
Eswatini	•		•	1,14	4704	4140	1883	1794	2670	2233
Ethiopia	•			109,22	84,355	772	15,195	3163	19,185	6235
Kenya	•	•		51,39	87,908	1711	17,260	5747	19,086	10,440
Lesotho			•	2,11	2792	1324	2294	1028	1905	968
Libya	•			6,68	48,320	7235	12,493	18,379	13,215	14,460
Madagascar	•		•	26,26	12,100	461	4031	2848	4489	4073
Malawi	•		•	18,14	7065	389	2825	884	2280	1838
Mauritius	•		•	1,27	14,220	11,239	5666	2342	7311	5629
Mozambique			•	29,50	14,458	490	6786	4725	9195	5151
Namibia			•	2,45	14,522	5931	8156	4443	6325	5089
Rwanda	•	•		12,30	9509	773	2588	1050	2994	1666
Seychelles	•		•	0,10	1590	16,434	1284	547	1535	1351

(continued)

Table 1 (continued)

	COMESA	EAC	SADC	Population (Million)	GDP (Million current USD)	GDP p.c (current USD)	Merchandise imports (Million current USD)	Merchandise exports (Million current USD)	Imports of goods and services (Million current USD)	Exports of goods and services (Million current USD)
Somalia	•			15,01	4721	315	3198	345	4624	994
South Africa			•	57,78	368,288	6374	113,940	93,982	99,004	103,480
South Sudan		•		10,98	3071	280	468	1662	1815	1686
Sudan	•			41,80	40,852	977	7850	3485	14,539	11,926
Tanzania		•	•	56,32	57,437	1020	8803	3853	9117	8073
Tunisia	•			11,57	39,861	3447	22,706	15,534	22,348	17,395
Uganda	•	•		42,72	27,477	643	6574	3088	6589	4714
Zambia	•		•	17,35	26,720	1540	9462	9052	8742	9093
Zimbabwe	•		•	14,44	31,001	2147	4100	4514	6694	4333

Source World Development Indicators

assumptions may have prevented the smaller economies from reaping the dynamic gains of market integration and the potential restructuring of inefficient industries. The concerns regarding the smaller economies should not, however, be overstated to the detriment of promoting competitiveness and long-term growth of the smaller and poorer economies.

Intracontinental, Intra-Community, and Inter-Community Trade

Intracontinental trade volumes and in particular between RECs are highly indicative with regard to the progress and potential of a given REC. They are particularly significant in terms of the establishment of the African Economic Community through the merger of recognized existing RECs. The main objective of this process is the elimination of tariff and non-tariff barriers to trade, as well as the promotion of mutually beneficial trade relations between countries and RECs through schemes for trade liberalization. The promotion of interregional trade should help to enhance the specialization of African countries and thus increase the added value and competitiveness of manufacturing on a global level (ECA 2013).

In COMESA, the volume of intraregional trade for the period increased more than seven-fold, while its share increased by 2 percentage points, to 7%. The same increase in share and values can be observed in imports and exports. Both indices have increased by about 19% annually. In this community, intraregional trade is more than half of all intra-African trade (53%). Around two-thirds of intraregional trade in 2012 was carried out by Zambia (17%), Egypt (16%), the DR Congo (15%), and Kenya (13%). Egypt, Kenya, and Zambia are most active in terms of imports (62% total) while Zambia, Congo, and Libya—in exports (47% total). The share of intracontinental trade in COMESA is still low, but shows a steady upward trend, faster than the average growth of trade flows for the community. The impact of the deepening the integration process is obvious. More than half of the increase in the volume of intraregional trade happened after 2009, when the community began to operate as a customs union.

Although the smallest REC in terms of trade flow volume, the EAC is the leader in Africa in terms of share of intraregional trade—at 11.1%. Particularly high is the proportion of intraregional imports—at nearly 1/5, while exports account for only 8%. Unlike other RECs, however, the value of intraregional trade in this case is increasing more slowly than that of total trade. Correspondingly imports are growing more slowly than exports. Kenya has the largest share of intraregional trade (39%), followed by Uganda (28%)

and Tanzania (19%). Uganda and Rwanda traded most actively with other member states: Uganda carried out 16% of total and 28% intra-EAC trade; while Rwanda—respectively, 4 and 11%. A significant feature of the EAC community is the highly developed nature of the integration process, since it was created as a customs union. It is the only REC where there is an operational common market. This is evident from the higher levels of intraregional trade compared to other RECs. The fall in the share of intraregional trade could be due to the creation of a tripartite free trade area allowing all members of the community access to an even larger market as member states of either COMESA or SADC. Thus the share of intracontinental and especially interregional trade with these RECs has increased to the highest level in Africa—amounting to more than one-fifth of total EAC trade.

The value of intra-community trade in SADC is the highest of all RECs in Africa. Its share is also high at 10.9%—almost as much as in the EAC. The share of intraregional exports is the highest in Africa at 13.5%, while that of imports is 9%. Both indicators are increasing fast, by 19 and 16% annually. At 38% South Africa has the most significant share in intraregional trade. Correspondingly it is also the leader both in exports (25%), and particularly in imports (53%). Zambia is second in terms of trade share (16%). It is also second in exports (20%) and third in imports surpassed by Angola (respectively, 12.1 and 12.8% share). With a relatively high share of intraregional trade (8–10%) are Zimbabwe (third in exports with 15% share), Angola, Mozambique, and Congo. Zimbabwe is the leading economy in the community in terms of its share of intraregional compared to national trade at over two-thirds (66%), followed by Zambia (53%) and Malawi, Mozambique, and Congo (respectively, 32, 36, and 38%). None of these countries is a member of the South African Customs Union, the scheme of increased community integration. A de facto common market operates within the SADC (formally postponed to 2015) and an economic and monetary union—on the territory of SACU. SADC, of which South Africa, the largest economy on the continent, is a member, is the leader in intraregional trade in the continent is very close to the first REC—EAC, in terms of value and as a share. The members of the community are countries with the highest levels of intraregional trade compared to national trade.

The share of *intra-African trade* as a percentage of total trade varies between the three participating in the Tripartite FTA RECs (Table 2). It is lowest in COMESA at 13.2%, the SADC at 14%, while in EAC it is over one-fifth of community trade flow at 21.4%. The value of intracontinental trade is highest in SADC, followed by COMESA, while it is significantly lower in EAC. The most significant increase in volume is within SADC at

Table 2 RECs inter-community and intraregional trade

	COMESA	EAC	SADC
Share of REC total trade, %			
Africa	13.2	21.4	14.0
COMESA	7.0	14.4	5.4
EAC	2.2	11.1	1.0
SADC	6.8	9.3	10.9
Average annual growth, %			
COMESA	19.1	13.5	17.0
EAC	12.6	12.8	13.4
SADC	16.2	13.2	17.5

Source World Development Indicators

17%, and least—in the EAC at 12%. The share of intracontinental exports is greater than that of imports in SADC at 5 p.p., while in COMESA and EAC it is the opposite—imports exceed exports by 24 p.p. Intracontinental imports increased more slowly in EAC (11% average annual growth). In COMESA average annual growth rate is 14%, while the only REC where growth is above the average for the continent is SADC at 16.5%. Exports increased by 13–18% on an annual basis in all communities.

In terms of *inter-community trade*, intra-community trade has the highest share in almost all communities (around half to two-thirds of intra-African trade). The exception is EAC which trades more with COMESA. This is due to the fact that almost all its member states are also members of COMESA and apply its liberalizing trade regimes (Table 2).

Among RECs, the main trading partner of COMESA is SADC (6.8%). Trade with it is almost equal to the level of intraregional trade. EAC actively trades with COMESA (14.4%). The main trading partner of SADC among the other two RECs is COMESA (5.4%).

The best indicator of the success of an integration agreement is recognized to be the increase of the share of intra- and interregional trade in member states' total trade flow. The impact of integration agreements on trade in the Tripartite FTA could be used as an indicator of the future effects of the AfCFTA on intracontinental trade. Thus, the next section will model international trade effects for African countries using the gravity model.

5 Modelling the International Trade Effects for African Countries

This section will assess the impact of regional trade integration in COMESA, SADC, and EAC with regard to exports of member country goods and services.

Despite the recognized drawbacks of the gravity equation for trade mainly related to econometric evaluation, the gravity model remains a very popular econometric tool for international trade analysis (Chaney 2013). However, a review of literature has shown that it has not been widely used within the field of African studies. We have modified the gravity model of trade using a cross-country regression approach. The aim is to assess how trade among the countries concerned has been facilitated after they joined the regional trade agreements or, on the contrary, if there has been no significant impact on their trade relations. Using this as a basis, we deepened our analysis by examining the extent to which long-term export growth of countries in integration communities is a result of the growth in initial real GDP and exports, average population growth, common currencies, distance between trade partners, and borders. The period under review is 2000–2017.

This approach is used to determine the extent to which the deepening of trade integration of African countries based on the agreement establishing the AfCFTA in 2019 has been effective. This also takes into account the results of the current integration communities participating in the largest community to be established prior to the AfCFTA intra-REC FTA—the Tripartite FTA between COMESA, SADC, and EAC.

The Use of Gravity Models in International Trade Analyses

Gravity modelling is a technique often used in studies of international trade to determine the drivers and strengths of bilateral trade routes (Anderson 1979; Gómez-Herrera 2013). Early versions of the gravity model conclude that bilateral exports are closely linked to traders' revenue and geographical distance. Despite initial criticism that it is largely theoretical, the gravity model has gained popularity in recent decades due to its empirical success in predicting trade flows of various goods under different circumstances between two countries (Deardoff 1998). These models can be easily enhanced with other variables such as: a common language, common border, and the number of landlocked countries (Anderson and Wincoop 2003); regional trade agreements, currency union, and exchange rate regime (Henderson

and Millimet 2008; Kucera and Sarna 2006); trade integration with other countries, ex-colony or common colonizer (Melitz 2007; Kang and Fratianni 2006); tariffs, trade barriers, and transportation costs (Iwanow and Kirkpatrick 2007; Martinez-Zarzoso and Suarez-Burguet 2005). Thus, the gravity model can be used to explore the key national-level factors determining the volume trade mainly between two countries.

The gravity trade model has since been refined from a theoretical point of view. New theoretical foundations have been developed to increase returns to scale in markets with imperfect competition and product differentiation, at a company and national level (Baier and Bergstrand 2009; Evenett and Keller 2002; Baier et al. 2014). In fact, the gravity trade model has also become a tool commonly used tool to assess ex-post trade effects of currency unions (Glick and Rose 2002; Rose and Van Wincoop 2001; Bussière et al. 2008). This model has also proven to be an appropriate tool for the study and the trade creating and diverting effects, which can occur as a result of regional trade agreements (Kabir et al. 2017). The newly regained interest in this model has sparked debates concerning the choice of variables and employed econometric approach.

For more than fifty years, a wide range of studies have been carried out to explain bilateral trade volumes through the estimation of a gravity equation. The studies look for the evidence of the trade-enhancing effect of countries' integration. They also try to predict what bilateral trade surplus might be expected, if integration between two or more countries is achieved. The gravity equation has been used to estimate from an econometric point of view the ex-post partial (or direct) effects of economic integration agreements, national borders, currency unions, language, and other measures of trade costs. While the gravity model of trade is often used to analyze foreign trade flows between countries, the review for African countries shows that at the present time it is primarily used to assess bilateral trade with non-continental trading partners such as China (Diallo et al. 2017) and Turkey (Aman et al. 2017). This study would thus contribute to tracking the trade relations between integration communities within the continent itself, since in general assessment the results are unsatisfactory (Seid 2013).

Model Specifications

Most studies of the gravity model define exports of goods and services as a dependent variable (Kepaptsoglou et al. 2010). Other studies commonly use real GDP, population, distance, regional trade agreements, and currency union membership as explanatory variables. Our research is two-fold in terms

of testing the validity of dependent and independent variables for African trade integration processes. First, we aim to assess the effect of the entire African continent in establishing regional trade agreements for exports of goods and services. Secondly, we use cross-country data to evaluate the trade effects arising from a given regional trade agreement. Further, we enhance the application of the gravity model by testing its validity in more than two countries in Africa.

The limited range of comparable statistics available for African countries proves it useful in transforming the exports of goods and services and population data. Bearing in mind that these variables exhibit growth, we take a natural logarithm of the time series for population and exports of goods and services measured in constant 2010 US dollars. This logarithmic transformation allows us to calculate long-term growth rates based on World Bank data. Such transformations are carried out for thirty-one countries which are members of EAC, SADC, and COMESA since 2000, based on the comparable statistical data available. We also consider whether or not a country participates in the West African French Franc Zone (WAFFZ) and the Central African French Franc Zone (CAFFZ), which allows us to account for the effect of common currency on regional trade in Africa. Since the aim is not to assess bilateral trade flows but rather trade effects, two proxy variables are used: for distance—an average distance among capitals of reviewed countries listed in Table 3, and whether a country is landlocked or not.

Assuming that X_t represents exports of goods and services in year t where $t = t_1, \ \ldots, t_n$, hen the average growth rate of exports of goods and services of a country listed in Table 3 is X_{gr}:

Bullet $X_{gr} = \frac{lnX_{t_n} - lnX_{t_1}}{t_n - t_1}$.

The same technique is used to calculate the long-term growth rate of population.

Our research aim is to assess how the long-term growth rate of exports of goods and services is affected by its initial growth rate in period t_1, the growth rate of real GDP in period t_1, and the long-term population growth, if a country joins a regional trade agreement and/or uses a common currency, and distance. The selection of variables, especially the initial growth rate of real GDP and real exports, helps us to define the differing initial economic performances of the countries concerned. Thus, we modify the gravity model for more than two countries and study the regional trade integration impact on exports of goods and services. We thereby isolate GDP causality while taking into account the long-term population growth which plays a significant economic role in Africa.

Table 3 Members of COMESA, SADC, and EAC under review in 2000–2017

Country	COMESA	EAC	SADC	WAFFZ	CAFFZ	Landlocked
Algeria						
Angola			●			
Benin				●		
Botswana			●			●
Burkina Faso				●		●
Cameroon	●	●				●
Comoros						
Congo, Democratic Republic of					●	
Congo, Republic of the					●	●
Egypt, Arab Republic of					●	●
Eswatini	●					
Gabon	●		●			
Kenya					●	
Liberia				●		
Madagascar	●					
Mali	●					
Mauritania					●	
Mauritius	●					
Morocco	●		●			●
Mozambique	●					●
Namibia					●	
Nigeria						
Rwanda						
Senegal						
Sierra Leone				●		
South Africa	●	●				
Sudan			●			●
Tanzania						
Togo	●					
Uganda	●		●			
Zimbabwe	●		●			●

We employ a linear-log model to estimate change in exports of goods and services over time due to initial real GDP growth, long-term population growth, and regional trade integration processes. The regression equation is estimated in the following form:

$$X_{gr} = \alpha + \beta_1 \log(X_{t_1}) + \beta_2 \log(Y_{t_1}) + \beta_3 N_{gr} + \beta_4 COMESA + \beta_5 EAC + \beta_6 SADC$$

$$+ \beta_7 WAFFZ + \beta_8 CAFFZ + \beta_9 DIST + \beta_{10} LL + u_t \quad (1)$$

where:

X_{gr} is the long-term growth of exports of goods and services;
X_{t_1} is the real exports of goods and services in period t_1;
Y_{t_1} is the real GDP in period t_1;
N_{gr} is the long-term population growth;
$COMESA$ is a dummy variable for Common Market for Eastern and Southern Africa membership with values 1 for being a member and 0 for not being a member;
EAC indicates East African Community membership;
$SADC$ stands for Southern African Development Community membership;
$WAFFZ$ is a dummy variable for West African French Franc Zone;
$CAFFZ$ indicates Central African French Franc Zone dummy variable;
$DIST$ is a variable for average distance among capitals of thirty-one African countries in our sample;
LL is the variable indicating whether a country is landlocked;
u_t reflects the value of residuals.

In order to assess specific regional trade integration effects, we replicate the equation (1) for COMESA countries in the following manner:

$$X_{gr^{COMESA}} = \alpha + \beta_1 log(X_{t_1^{COMESA}}) + \beta_2 log(Y_{t_1^{COMESA}}) + \beta_3 N_{gr} + \beta_4 DIST + \beta_5 LL + u_t \quad (2)$$

Using Eq. (2) we estimate the relations between exports of goods and services, real GDP, population, and distance only for the twelve COMESA countries in our sample. We exclude variables for common currency zones, since these are irrelevant for the countries under review as Table 3 shows.

Equation (1) permits an assessment of the effect of long-term growth of exports of goods and services for thirty-one African countries upon their initial economic conditions and long-term population growth while some of them participate or do not in regional trade communities. If regional trade agreements in the countries under review are pertinent, then we would expect the respective dummy variables to be statistically significant. Equation (2) isolates the same effect but only for COMESA countries. We are not looking for such effects for SADC and EAC countries because of their low numbers

in the sample. We also aim to test the validity of the gravity model to examine whether or not distance matters in intraregional African countries' trade.

Econometric Estimation and Results

The econometric estimations of Eqs. (1) and (2) were performed in *R* Studios 2000–2017, using statistical data from the World Bank Open Data platform. Time series test for stationarity using the Augmented Dickey-Fuller test. The heteroscedasticity HC0 correction was also carried out. The results are summarized in Table 4.

The two estimated equations show that the only statistically significant variables are the initial growth rates of exports and real GDP. The regional trade agreements are statistically insignificant for the thirty-one African countries and the twelve COMESA members. Possible explanations for these results may be the divergent economic development of the countries reviewed, the heterogeneous commodity groups in African country trade,[2] the low integration processes in Africa, and macro-application of the gravity model for more than two countries according to our specific data and estimations. As expected, the variable for distance is negative, in line with the gravity model assumptions.

One of the specificities of the linear-log model is the interpretation of its coefficients. When regressions are estimated by Ordinary Least Squares (OLS), the value of the coefficients is multiplied by 0.01. Thus, one percentage real GDP growth in 2000, on average, leads to an increase in real growth of the exports of goods and services until 2017 by 0.04 percentage points, when all thirty-one countries are considered and 0.0412 percentage points for twelve COMESA members. This finding can be used as a measure of the indirect effect of participation in the regional trade community. However, the differences in the values of the coefficients in estimated Eqs. (1) and (2) are very small. Nevertheless, it may be concluded that countries with a higher real GDP growth in the initial period after signing a regional trade agreement will be in a more beneficial position than other countries. The success of such trade communities is closely linked to initial economic performance. This per se is fully in line with classical international trade theories and further reiterates the low level of economic integration in Africa.[3]

[2] One example is the export of flowers of African countries (such as roses from Kenya) which poses a number of problems for importers in terms of legislation (Kabatliyska and Anisimova 2010).

[3] This issue may be linked to paradoxes in international transfers of capital and technologies. A model that captures structural characteristics of countries when international exchange of capital and technologies is considered is developed by Atanasov (2017).

Table 4 Econometric estimation of Eqs. (1) and (2)

Dependent variable: Long-term growth rate of exports of goods and services		
Equation	(1) Total	(2) COMESA
Independent variables		
Intercept	−3.97362229 (0.7922435)	4.2917346 (0.81315)
LogX	−3.85883346 (0.0011474)**	−4.7003393 (0.01724)*
LogY	4.02062953 (0.0004189)***	4.1207362 (0.04875)*
Long-term population growth	0.82385527 (0.4427316)	0.8278749 (0.44639)
COMESA	0.7090892 (0.2792849)	–
EAC	−3.57018644 (0.8413)	–
SADC	−0.70571867 (0.7136010)	–
WAFFZ	0.96581088 (0.7813730)	–
CAFFZ	0.67978333 (0.6942238)	–
Distance	−0.00056324 (0.5987967)	−0.0015800 (0.18834)
Landlocked	0.80250124 (0.5956811)	0.2082352 (0.91287)
Adj. R^2	0.4577	0.7682
F-statistics	3.532	8.291
P-value	0.007857	0.01143
Breusch-Pagan test *P*-value	0.1771	0.3871

Note A single asterisk (*) denotes significance at the 10% level, two asterisks (**) at the 5% level, and three asterisks (***) at the 1% level. Standard errors are in parenthesis below the coefficients

The low effect of trade integration processes is also confirmed by the negative sign of initial export growth in the two equations estimated. A strong negative effect of exports can be observed in the initial period on the long-term growth rate of exports. This is nearly equal to the positive real GDP effect already commented. Hence, trade integration leads to lower real growth of exports for countries with higher exports before signing the regional trade agreements that make them inefficient. It should also be borne in mind that these results are conditional on available data, country-specific effects, and regional characteristics of the African continent. However, a more detailed

review of these specificities may shed light on the actions which need to be taken in the implementation of future trade agreements.

6 Conclusion

The development potential of Africa is clearly enormous. In recent years, there has been a significant realignment of key external players in recent years, and some of the countries in the region have been seriously involved in both regional and global international economic relations. The economic rationale for regional cooperation is particularly strong given the small size of many African countries in economic terms. However, despite the stated lofty goals, the process of economic integration on the continent has as yet been unable to produce the expected beneficial results.

The deepening of the integration process began with the tripartite initiative for harmonization and the establishment of a Free Trade Area between COMESA, EAC, and SADC. The Chairperson of the Ministerial meeting, Honorable Chiratidzo Iris Mabuwa, Deputy Minister of Commerce and Industry of Zimbabwe, hailed the agreement to launch the Grand FTA in June 2015 as a milestone in regional and continental integration. She declared that "Africa has now joined the league of emerging economies and the grand FTA will play a pivotal and catalytic role in the transformation of the continent" (Ngwenya 2014).

The recent start of the African Continental Free Trade Area could make Africa a serious player in the global economy. It would also bring benefits for both African and international investors, making it easier for businesses to expand operations across the region, thus fostering net income at the continental level, economic growth, and welfare.

However, the results of the current study to assess the entire African continental effect of establishing regional trade agreements for exports of goods and services have shown that the success of such trade communities depends on initial economic performance. Thus trade integration processes have low effect. Results also show that trade integration leads to lower real growth in exports for countries, which had higher exports before signing the regional trade agreements, something which makes them inefficient. A more detailed review of these specificities may shed light on the actions which need to be taken in the future implementation of the AfCFTA and in the process of creating a fully functioning AEC in general.

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Infrastructure

Technological Progress via Imports and Economic Growth in Africa

Jean-Claude Maswana

1 Introduction

It is now widely recognized that technological progress is at the very heart of economic growth and human development. Technological progress is about enhancement in the ways that goods and services are produced, marketed, and made available to end-users.

The rapid technological progress seen in developing countries between the 1990s and 2000s almost entirely involved the increasing use of pre-existing technologies rather than those resulting from R&D-related inventions (World Bank 2008).[1] The recent experience of economic growth and export performance of countries such as China shows that trade in parts and components is crucial in early stage of development (Thorbecke 2016).[2] Imports of parts and components that enter China duty-free and that can only be used to produce goods for re-export largely explain the country's export performance in early years.

Economic theories and development experiences alike show that countries that have successfully caught up with the advanced economies have typically gone through a process of significant technological progress. This mostly occurs in connection to certain types of imported inputs (Keller

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2001[3]; Maswana 2015[4]). Furthermore, the practice of technological progress induced by certain types of imported capital inputs, has been the cornerstone of development experiences in Asia; in that initially, countries have frequently relied on successful imports of foreign technologies to achieve indigenous technological development (Carolan et al. 1998).[5] While there has been notable progress in Asia in terms of capturing globally available technologies, the latter still have not been fully diffused and adopted in many countries in developing regions such as Africa.

Despite the central role technology progress, little empirical research exists on the extent to which trade via imports of certain categories of capital and intermediaries' goods facilitate technological progress and thus economic growth in developing countries (Datta and Mohtadi 2006)[6] in Africa. The lack of empirical research on this critical issue stems from measurement and data constraints associated with the concept and measurement of technology progress as a channel of technological progress. Although some of these constraints may still remain, recent progress in international trade statistics (e.g., the UNCTAD Statistics) has made it possible to mine the data and come up with acceptable proxy indicators for developing countries.

Taking advantage of the advances in trade statistics for African economies, the chapter tries to evaluate the degree to which imports-induced technology progress predicts economic growth in a panel of African countries. To do this, we used imports of parts and components indicator and incorporated it into an augmented growth model that follows Connolly (1997).[7] This model is then empirically tested using a panel system generalized method of moments, GMM (Arellano and Bond 1991[8]; Arellano and Bover 1995[9]; Blundell and Bond 1998[10]). We specifically use the generalized method of moments (GMM) system estimator later developed by Blundell et al. (2000).[11] This estimator has the potential advantages of minimizing the bias which is due to estimation of dynamic panel models, exploiting the dynamic and time-series properties of the data, controlling for the unobserved country-specific effects, and correcting for the bias that arises from the possible endogeneity of the explanatory variables. Ultimately, the underlined motivation of this chapter is to determine whether—and to what extent—a framework of trade-induced technological progress could be used to engineer technological progress and economic growth in Africa.

The rest of the chapter is organized as follows. The next section contains a brief overview of the related literature. Sections 3 and 4 cover methodological and data considerations, respectively. Section 5 presents the empirical results, and the last section concludes.

2 Literature Overview

A considerable amount of research has shown that the rapid diffusion of technology around the world has brought extraordinary benefits to many countries that would otherwise have limited access to productivity enhancement and economic growth. Literature on technology diffusion across countries shows that new technical ideas spill over from countries with innovation capacity (i.e., technology frontiers) to those with adoptive capacity through multiple channels. It follows thus that the diffusion channels and their characteristics play a key role in successfully affecting productivity and economic growth in receiver countries. International technology diffusion channels can include foreign R&D activities, trade, as well as foreign direct investments (FDI). Each of these channels affects the relative efficiency with which a given economy produces goods and services given a certain quantity of labor and capital.

As a reminder, this relative efficiency is known as total factor productivity (TFP). TFP is commonly interpreted as a measure of the technology of production and its rate of growth as a measure of technological progress or technology itself. As a reminder, technology is conventionally defined as "a collection of physical processes that transform inputs into outputs and knowledge and skills that structure the activities involved in carrying out these transformations" (Kim 1997[12]; Hill 2004[13]).

While early endogenous growth models such as that of Romer (1986[14]; 1990[15]) present R&D as a critical engine of economic growth, this view only weakly reflects the context of less-developed countries. Arguably, the less-developed countries undertake little R&D expenditure and thus cannot add much to innovation or technological progress via the R&D channel (Hausmann and Rodrik 2003[16]), but firms in less-developed countries reap the benefits of innovation through international trade or other forms of technology spillovers. Technology spills over through product variety, scale, and learning (e.g., Lucas 1988[17]; Matsuyama 1992[18]). Agosin (2007)[19] points out that technologically under-developed countries upgrade their technology capacity by imitating and adapting existing products. Similarly, Mendoza (2010)[20] shows that the structure most conducive to a developing country's rapid industrialization and technological catch-up would be one in which there is trade in intermediate goods and final products with growing variety and technology content. Furthermore, models in the product cycle literature (Vernon 1966[21]; Krugman 1979[22]; Grossman and Helpman 1991[23]) show that diversity of export products in developing countries is achieved through a complementary processing. That is, innovation is done in the North while

the South predominantly focuses on adoption and imitation, processing and exporting of finished products (using the South's cheap-labor advantage). In sum, less-developed countries initially reduce their technology gap through import-embedded technology and then proceed to imitation (Jovanovic and MacDonald 1994).[24]

In addition, Poyago-Theotoky (1998)[25] and Barro et al. (2003),[26] among others, argue that developing countries tend to catch up to the industrialized countries because the implementation of discoveries made elsewhere is cheaper than innovation. This mechanism tends to generate convergence even if diminishing returns to capital or to R&D do not apply. Technological progress has gained even greater prominence as the most critical contributor to economic growth since the emergence of endogenous growth theories.

Notably, technology progress via trade is not only a theoretical possibility but also a developmental fact. For many East Asian economies that were lagging behind in terms of technology, the imitation and adaptation of advanced technologies provided valuable opportunities to catch up to more advanced countries (Lee 2015).[27] Hu (2015)[28] assesses the dynamic process of technology progress in East Asian economies, particularly in South Korea, and the role of policies and institutions for technological development, and highlights four major contributing success factors: the proactive role of government, the high quality of human capital in science and engineering, a well-developed link to a global production network, and (more controversially) an international environment that was lax in enforcing intellectual property rights.

The essential nature of the complementarity between imports of parts and components and technology catch up has also been particularly highlighted by Acemoglu (2000)[29] in that technical change has been skill-biased over the past 60 years. In fact, the level of education has a crucial impact on the growth of total factor productivity because it determines the capacity of developing countries to adopt and efficiently implement technology from abroad (Mayer 2001).[30] In this respect, there are studies showing that the most important determinant of the speed with which a country adopts technologies is that country's human capital endowment (Comin and Hobijn 2003).[31] Clearly, technology adoption by developing countries can be enhanced (in terms of economic growth) when the country has a higher level of human capital, which increases its absorption capacity (Nelson and Phelps 1966[32]; Benhabib and Spiegel 1994[33]). A minimum threshold of human capital is needed for technology progress to be successful (Vandenbussche et al. 2006[34]; Teixeira and Fortuna 2011[35]).

In addition to education or human capital, the literature on growth recognizes other engines of economic growth that cannot be ignored. Factors such as institutions, innovational effort, and infrastructures such as those related to logistics, among others, have been widely cited. In regard to the latter, some recent literature (e.g., Arvis et al. 2010[36]; Maswana 2015[37]) shows a clear positive association between logistics performance and the share of parts and components in international trade in the context of developing countries. Hence, the logistics performance index has been added to our regressions.

It should be pointed out the distinction between effects of trade-induced technology via exports and imports. Although trade, broadly defined, has been known as a channel of international diffusion of technical ideas, the effect of exports on productivity is considered as relatively weaker than that of imports (Keller 2004).[38] That is, trade-induced technology diffusion is stronger when countries import intermediate capital goods (Teixeira and Fortuna 2010)[39] entering their production process. Since technology is embodied in intermediate capital goods, the transmission of these goods provides transmission of advanced technology (Kim and Lee 2004).[40] This is even the case considering the fact that in recent years production is increasingly technology-intensive, with capital and knowledge assets replacing labor.

All things considered, the present chapter used imports of goods in the technology-intensive categories (SITC-Rev. 4) as an attempt to both extend the empirical literature and evaluate the degree to which technology progress (as proxy by those trade variables) predict economic growth in a panel of African countries. This way of measuring technology progress via imports of the above trade category is consistent with Coe et al. (1997).[41] It is assumed that the higher the level of technology imitation in international trade between two countries, the higher the probability that industries in the country with lesser technological knowledge will converge to those in the country with greater technological knowledge.

3 Methodological Considerations

The reference model follows an augmented growth model of Connolly (1997),[42] wherein the engine of growth lies in learning by doing and trade-induced learning. The empirical estimation was based on panel data. The use of panel data to investigate the growth effects of trade or technological progress has been a common trend in recent years. Characteristics of the panel in used in the present chapter, short time span and relatively big number of

cross sectional observations, suggest using a model that can be expressed as:

$$y_{i,t} = \delta y_{i,t-1} + X_{it}\beta + \alpha_i + u_{i,t} \tag{1}$$

$$E(\alpha_i) = E(u_{it}) = E(\alpha_i u_{it}) = 0,$$

where y is the reported economic growth of country i in year t, X includes all other explanatory variables, α_i is the country-specific unobserved heterogeneity that varies across countries but not over time for any country, and $u_{i,t}$ is the idiosyncratic error term, which varies by country and over time. The country-specific unobserved heterogeneity is allowed to be correlated with the explanatory variables, and the idiosyncratic error term may also be correlated with some of those variables.

One problem with estimating Eq. (1) via the method of ordinary least squares (OLS) is the endogeneity of the lag in economic growth. If a country in Africa experiences a large positive growth shock for a reason not modelled, the shock is subsumed into the error term. The country-specific unobserved heterogeneity will appear larger over the entire time span of the data (since it does not vary from one year to another), and in the year following the growth shock, the lag in economic growth will also be large and positive. This positive correlation between the error term and the lag in economic growth would yield inconsistent and biased OLS results—results that in this case are biased upwards.

An initial attempt to purge the fixed effects might consist of estimation of panel-data fixed effects or least-squares dummy-variable regression (entering a dummy variable for each country). However, Roodman (2006)[43] shows that this will not entirely remove "dynamic panel bias" and in fact would result in downward bias on the lag in economic growth in the aforementioned example. One strategy for purging the unobserved heterogeneity is to difference the data. Equation (1), when first-differenced, yields the following:

$$y_{i,t} - y_{i,t-1} = \delta\left(y_{i,t-1} - y_{i,t-2}\right) + \beta\left(X_{i,t} - y_{i,t-1}\right) + \left(\mu_{i,t} - \mu_{i,t-1}\right) \tag{2}$$

that is,

$$\Delta y_{i,t} = \delta \Delta y_{i,t-1} + \beta \Delta X_{i,t} + \Delta \mu_{i,t}$$

To control for observed heterogeneity, GMM imposes the following moment conditions that exploit the absence of correlation between lagged

repressors and errors:

$$\begin{aligned} &E\left[y_{i,t-s}, \Delta\mu_{i,t}\right] = 0 \\ &E\left[yX_{i,t-s}, \Delta\mu_{i,t}\right] = 0 \\ &\text{for t} = 3, \ \ldots, \text{T}; \ \text{s} \geq 2 \end{aligned} \tag{3}$$

The differencing eliminates the country-specific unobserved heterogeneity. However, the lag in economic growth remains endogenous, because $y_{i,t-1}$ is correlated with $u_{i,t-1}$. Other explanatory variables may also be correlated with the lag in the error term if they are not strictly exogenous and are only contemporaneously exogenous in the non-differenced equation.

Nevertheless, difference GMM has some known limitations. Blundell and Bond (1998,[44] 2000[45]) and Bond et al. (2001),[46] when the time series are persistent or close to random walk processes, the lagged values of the variables are only weakly correlated with the endogenous variables and are weak instruments. Moreover, as Roodman (2006)[47] explains, the first-differenced transformation is best used for strongly balanced panels. In an unbalanced panel, if $y_{i,t}$ is missing, then both $\Delta y_{i,t}$ and $\Delta y_{i,t+1}$ will also be missing. Since our data are unbalanced (in any given year, a number of countries have missing data), we use a second option for purging the unobserved heterogeneity. This method, called "orthogonal deviation" (Arellano and Bover 1995), subtracts from $y_{i,t}$ the mean of all future available values. This method mitigates data loss and makes all the lagged variables available as instruments.

Arellano and Bover (1995),[48] Blundell and Bond (1998),[49] recommend a method known as system GMM that treats the model as a system of equations, the first in transformed form and the other in levels. They achieve this by making extra assumptions about the nature of the model. They assumed that the deviations of $y_{\text{i,t}}$ from its long-run average are not correlated to the individual-specific effect. In other words, the system GMM estimator combines two sets of equations: the standard set of equations in first differences and an additional set of levels equations. The first set of equations is the same as discussed for the first-differences GMM estimation. That is the first-differenced equation is considered alongside the levels of the series lagged two periods or more of the right-hand-side variables used as instruments in the regression. In the second set of levels equations, the lagged first difference of dependent and independent variables are used as instruments (Blundell and Bond 1998).[50] The following moment conditions are satisfied for the second

part of the system (the regression in levels):

$$\begin{aligned} &E\left[\Delta y_{i,t-1}\left(\alpha_i + \mu_{i,t}\right)\right] = 0 \\ &E\left[\Delta X_{i,t-1}\left(\alpha_i + \mu_{i,t}\right)\right] = 0 \\ &\text{for } t = 3, \ \ldots, \mathrm{T} \end{aligned} \tag{4}$$

Blundell and Bond (1998)[51] confirmed that the System-GMM method outperforms difference-GMM estimator in samples where the time period is relatively small and the autoregressive parameter is high.

Two conditions, namely, the validity of the instrument used, and the validity of assumption that the error terms are serially uncorrelated, should be satisfied in order to obtain the consistent GMM estimator (Arellano and Bover 1995).[52] First, the Arellano–Bond test for the serial correlation is used to test whether there is a second-order serial correlation in the first-differenced residuals, under the null hypothesis that the residuals are serially uncorrelated. Failure to reject the null hypothesis indicates the absence of a second-order serial correlation; which in turn provides evidence that GMM estimator is consistent. Second, the Hansen J-*test* and the Diff-in-Hansen test are applied to test the null hypothesis of instrument validity and the validity of the additional moment restriction necessary for system GMM. No rejection of this null hypothesis provides evidence of the validity of the instruments used.

4 Data Considerations

The datasets for our two proxy measures of trade-induced technology progress (namely imports of parts and components as share of total imports, and technology-intensive import categories as share of total imports) have been built from raw data extracted from the United Nations Conference on Trade and Development (UNCTAD 2020).[53] Arguably, separating intermediate goods into parts and components allows for a much more nuanced description of international trade which might allow for a better analysis.

Related to the first variable of interest, data on imported parts and components series are based on Standard International Trade Classification (SITC) Revision 3, imports related to group 7 and include items related to Office machines (class 75), Telecommunication equipment (class 76), Apparatus for electrical circuits; board, panels (class 77), radio broadcast parts, household appliance parts, Parts & accessories of vehicles (classes 72, 78), rotating electric plant & parts thereof, Other power generating machinery & parts (71),

etc.… (UNCTAD 2020[54]). Moreover, for the second key variable of interest, technology-intensive imports, data series follow SITC rev.3 products, by technological categories, known as Lall Classification (Lall 2000)[55] and include items such as medium technology such as automotive (class 78), manufacturing such as fertilizers (class 56), cosmetics (class 55), Railway vehicles & associated equipment (class 79), Cinematographic & photographic supplies (class 88), Telecommunication equipment (class 76), Aircraft & associated equipment; spacecraft, etc. (class 79), Medicinal and pharmaceutical products (class 54), Automatic data processing machines (class 75), and so on.

The datasets comprise time-series data, covering the 2010–2018 period, for 38 sub-Saharan African countries (see, Appendix, Table 4), which are sourced as indicated in Table 1. Regression-wise, the dependent variable is the GDP per capita growth rate, defined as "the sum of the gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products" (World Bank 2020).[56] Following Barro (1997),[57] the benchmark model includes physical capital investment (defined as "real gross domestic investment [private and public] as a percentage of GDP") next to the technology progress proxy, as independent variables.

Moreover, some additional variables must be considered to control for other factors that could potentially lead to spurious correlation between the independent variable and the trade-induced technology progress proxies. Specifically, secondary school enrollment and logistics performance are added as control variables. In this regard, as previously discussed, technical skills acquired through education are required to successfully adopt foreign technical knowledge embedded in relevant imports categories. Similarly, logistics performance index is sourced from the World Bank LPI Database (Arvis et al. 2018).[58] The index ranks countries on six dimensions of trade, including customs performance, infrastructure quality, and timeliness of shipments. The data used in the ranking comes from a survey of logistics professionals who are asked questions about the foreign countries in which they operate (Arvis et al. 2018).[59]

5 Empirical Results

We started by carrying out these tests just to make sure that none of the variables is integrated of order I(2) or above. Stationarity is tested using two common panel unit root tests, the IPS test by Im et al. (2003) and the Fisher-type test by Maddala and Wu (1999)[60] and Choi (2001).[61] Results

Table 1 Data sources

Variables	Sources
1- Real GDP per capita, constant 2005 $ (GDP)	Feenstra et al. (2019). PWT 9.1; missing data from World Develop. Ind
2- Physical capital Investment (Investment)	Feenstra et al. (2019). PWT 9.1; missing data from World Develop. Ind
3- School enrolment (Education)	World Development Bank, 2020, World Bank
4- Imports of parts & components (Techprog1)	UNCTAD Database, raw data source, in $US
5- Technology-intensive imports (Techprog2)	UNCTAD Database, raw data source, in $US
6- Total imports of goods and services	UNCTAD Database, raw data source, in $US
7- Logistics performance index (Logistics)	World Bank's Logistics Performance Statistics, 2020

of these tests for variables in levels and in first differences are reported in Table 5. These results show that for all the variables, except for Techprog2, the level data is non-stationary; however, their first difference shows stationarity regardless of whether the trend is included in the test or not. Therefore, it was deemed safe to proceed with the GMM estimation.

The results of the system GMM estimation are presented in Table 2. Looking at the benchmark model (Columns 1 and 2), the control variables of the augmented growth model maintain their expected signs and influence. Specifically, the lagged dependent variable is significant and negatively signed as expected. Also, investment rate has a positive and highly significant coefficient, although being smaller (0.043) compared to the size commonly found in studies such as Barro (1999)[62] where it has been found to average 0.059. Also, both the expected signs of education achievement (Column 2) and logistics performance index are positive and significant at the conventional 10% level. Noteworthily, the *p*-value of 0.342 (Column 3) for the Sargan/Hansen test of overidentifying restrictions confirms the joint validity of our instruments. Similarly, the *p*-value of 0.691 for the Arellano–Bond test for second-order correlation in differences (the AR[2] test) rejects first-order serial correlation in levels. Results in subsequent columns confirm the validity of our System-GMM estimations. Having established a valid benchmark, we subsequently included our main variable of interest, trade-induced technology progress, in two variants (Techprog1, and Techprog2).

Proceeding further, the inclusion of our alternative measures of technology progress noticeably changes the regression results for the impact of investment on GDP per capita growth (Columns 3–5). Notably, the coefficient

of investment increased from 0.043 and 0.113 in the benchmark models up to over 0.104 in subsequent models. Also, Techprog1 has a positive coefficient (0.0291) and is significant at the 10% and 1% level of confidence (Column 4). This result can be interpreted to mean that an increase in the share of parts and components in "import category" to total imports by one unit at the mean is associated with an increase in GDP per capita growth of 0.029 percentage point. However, the coefficient of Techprog2, which is 0.062, is not significant, even at the 10% level. This suggests that for African countries, the preconditions for the realization of a positive nexus between technology-intensive imports, income, and growth are not yet being achieved.

As expected, education (a proxy for skills) is positively signed and significant across all specifications. Remarkably, the size of its coefficient is relatively higher in models with the inclusion of Techprog1 and Techprog2. This may reflect the idea that less education per se, rather it is the use of it in creative activities that significantly affect economic growth.

Quite surprising, the coefficient of the logistics index is not significant in most specifications (except in Column 3). The coefficient of logistics being insignificant contributor to economic growth while imports of parts and components variable (Techprog1, Column 4) reflect the fact that the latter categories of imports are low-technology parts with low sophistication, and thus, do not require a significant logistics quality. The existing literature indicates that the impact of logistics, or other types of infrastructures, on economic development is significant only where they result in removing a bottleneck and more generally the direct impact of logistics may be absent where the appropriate conditions are not met (Vickerman et al. 1997[63]; Sloboda and Yao 2008[64]).

Finally, we report more results from the robustness exercise to investigate the strength of our findings. Roodman (2007),[65] and Neanidis and Varvarigos (2009)[66] have conducted robustness tests to show the applicability of their basic findings to a variety of changes in variable definitions and data subsets. In line with these papers, our robustness test involves comparing baseline results with two sub-samples, which represents middle-income countries and low-income countries. Findings are presented in Table 3 for the Low-income countries (LIC) and Middle-income countries (MIC) sub-samples. Both of our key variables of interest partially survive the test though only for the sub-sample Middle-income countries. This may be because Middle-income countries have greater absorptive capacity relative to their low-income counterparts. Noticeably, a low economic development level (lower the economic development level, the greater the distance to the

Table 2 Results of panel system GMM estimation

	(1)	(2)	(3)	(4)	(5)
GDP ($t-1$)	−0.026***	−0.626**	−0.791***	−0.633**	−0.627**
	(0.004)	(0.083)	(0.001)	(0.077)	(0.058)
Investment ratio	0.043***	0.113***	0.133**	0.114**	0.049**
	(0.002)	(0.002)	(0.046)	(0.024)	(0.014)
Education		0.0631***	0.135*	0.187*	0.094**
		(0.001)	(0.095)	(0.060)	(0.073)
Logistics			0.0669**	0.1070	0.0944
			(043)	(0.137)	(0.249)
Techprog1				0.0291**	
				(0.041)	
Techprog2					0.062
					(0.268)
Observations	326	396	392	386	306
Specification tests					
Sargan/Hansen, *p*-value	0.342	0.487	0.331	0.417	0.368
Ar(2) Test, *p*-value	0.691	0.661	0.562	0.647	0.714

Notes Numbers in parentheses *p*-values. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; *t*-values reported in parentheses
Ar(2) Test refers to the Arellano–Bond test for second-order correlation in differences, and Sargan/Hansen refers to the Sargan/Hansen test of overidentifying restrictions

technological frontier) implies that development factors are generally at low levels, producing a poor technological absorptive capacity.

Additionally, the coefficient of logistics variable is significant only for the case of MIC sub-sample and in the model that includes technology-intensive imports (Techprog2). This somewhat confirms our previous result in Table 2.

This may suggest that for technological progress to occur, African countries/firms are more dependent on imported inputs than on improving logistics quality. Taken together, these findings corroborate the idea that African countries initially reduce the technology gap through import-embedded technology and then proceed to trade-related infrastructures (such as logistics). This interpretation slightly differs from those particularly on FDI impacts that posits the absorptive capacity (e.g., logistics performance) as a precondition to expected spillovers in host countries. Meaning that logistics performance may be acting as a moderate enabler rather than one of the required preconditions.

Overall, the results of estimation in this section broadly indicate that imported parts and components (our first measure of technology progress) have some impact on economic growth in at least in the MIC sub-sample. However, the impact of technology-intensive imports (our second measure of

Table 3 Robustness test results (sub-samples)

	(1-LIC)	(2-MIC)	(3-LIC)	(4-MIC)
GDP ($t-1$)	−0.107**	−0.058*	−0.74477***	−0. 561*
	(0.0046)	(0.054)	(0.001)	(0.064)
Investment ratio	0.09841**	0.119**	0.104*	0.084*
	(0.024)	(0.014)	(0.058)	(0.052)
Education	0.0031***	0.094**	0.1441**	0.1723*
	(0.000)	(0.011)	(0.032)	(0.066)
Logistics	−0.0966	−0.0644	−0.0029	−0.0261***
	(0.117)	(0.1733)	(0.463)	(0.0016)
Techprog1	0.0184	1.382**		
	(0.335)	(0.041)		
Techprog2			0.385	0.0621**
			(0.227)	(0.023)
Observations	181	192	188	194
Specification tests				
Sargan/Hansen, *p*-value	0.435	0.589	0.623	0.691
Ar(2) Test, *p*-value	0.728	0.7461	0.451	0.454

Notes LIC: low-income countries; MIC: Middle-income countries
Numbers in parentheses *p*-values. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; *t*-values reported in parentheses
Ar(2) Test refers to the Arellano–Bond test for second-order correlation in differences, and Sargan/Hansen refers to the Sargan/Hansen test of overidentifying restrictions

technology progress) on economic growth is not clearly evidenced. Chiefly, given the scarcity of R&D activities in most African countries, technology progress induced by imports of parts and components—entering the production or assembly lines of finished goods—play a role in promoting economic growth. Consequently, the successful adoption of foreign technologies may be seriously constrained by the lack of skills and logistics performance. These two constraints affect countries regardless of their level of economic development. Therefore, economic policy based on imported technologies seems effective, especially under the global environment marked by the knowledge economy, provided that constraints such as logistics and skills (and the ability to imitate and innovate using foreign inputs) can be addressed.

Going forward, the regressions performed here may still be subject to several methodological limitations, such as measurement errors or sample selection. Although measuring technology progress using trade indicators is a valid practice, there is still a conceptual gap that should be recognized. As data on trade statistics become available for more African countries, future research should allow sufficient time for the influence from changes in the input variables to affect the output variables.

6 Conclusion

A number of studies have shown that foreign sources of technology are an important contributor to productivity growth for the developed economies. Extending this line of literature, the present chapter aimed at assessing the effects of imports-induced technology progress on economic growth in Africa, by using a production function approach in a panel system GMM estimator. The findings suggest that imported parts and components (our first measure of technology progress) have some impact on economic growth in at least in the MIC sub-sample. However, the impact of technology-intensive imports (our second measure of technology progress) on economic growth is not clearly evidenced. Our results also reveal that, quite surprisingly, the link between trade-induced technology progress and growth in the context of African countries is conditional to the level of economic development. Particularly, the growth effects of trade-induced technology progress—as measured by imports of parts and components—is greater in Middle-income countries than in Low-income African countries.

Combining these results, we may conclude that importing of low-technology–intensive items for processing purposes has the potential for enhancing technological progress by providing domestic firms in Africa with access to technologies, which are embodied in foreign capital goods that are not available domestically. Hence, African policymakers would do well to foster technological progress by focusing on various incentives designed to encourage local firms to engage in imports of technology-intensive parts and components as inputs to their production processes.

Appendix

See Tables 4 and 5.

Table 4 List of countries: Sub-Saharan Africa

Low income countries (LIC)		Middle income countries (MIC)	
1	Burundi	20	Angola
2	Benin	21	Botswana
3	Burkina Faso	22	Cote d'Ivoire
4	Central African Republic	23	Cameroon

(continued)

Table 4 (continued)

Low income countries (LIC)		Middle income countries (MIC)	
5	Congo, Dem. Rep	24	Congo, Rep
6	Ethiopia	25	Djibouti
7	Guinea	26	Gabon
8	Liberia	27	Ghana
9	Madagascar	28	Equatorial Guinea
10	Mali	29	Kenya
11	Mozambique	30	Mauritania
12	Malawi	31	Mauritius
13	Niger	32	Namibia
14	Rwanda	33	Nigeria
15	Sierra Leone	34	Sudan
16	Chad	35	Senegal
17	Togo	36	South Africa
18	Tanzania	37	Zambia
19	Uganda	38	Zimbabwe

Note Based on the World Bank's 2020 classification, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of $1025 or less in 2018. Also, under the middle-income categories include both the World Bank's lower-middle-income economies (countries with a GNI per capita between $1026 and $3995) and upper middle-income economies (countries with a GNI per capita between $3996 and $12,375). For further, see World Bank Country and Lending Groups at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

Table 5 Panel unit root test results

Variable	Deterministic	IPS	Fisher-type	1st-diff. IPS	1st-diff. Fisher-type
GDP	Constant	8.6178	49.997	−16.613***	372.68***
	Const. & trend	2.779	4.662	−11.208***	294.06***
Investment	Constant	−1.981**	133.035	−17.896***	449.27***
	Const. & trend	−4.292*	123.499	−13.682***	485.793***
Education	Constant	1.675	218.641	−38.5591***	1841.44***
	Const. & trend	−0.311	332.612	−34.6433***	1628.74***
Techprog1	Constant	3.4102	88.0152	−19.4984***	486.187***
	Const. & trend	6.6892	87.0152	−15.5027***	374.654***

(continued)

Table 5 (continued)

Variable	Deterministic	IPS	Fisher-type	1st-diff. IPS	1st-diff. Fisher-type
Techprog2	Constant	−13.3086***	256.962***	−29.2630***	592.273***
	Const. & trend	−10.8704***	402.396***	−18.2065***	454.254***
Logistics	Constant	5.2681	320.663	−31.472***	1874.55***
	Const. & trend	0.8033	323.643	−26.1881***	1198.20***

Notes
*Rejects the null of a unit root at the 10% level
**Rejects the null of a unit root at the 5% level
***Rejects the null of a unit root at the 1% level

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Global Value Chain Participation and Inclusive Growth in Sub-Saharan Africa

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1 Introduction

Sub-Saharan Africa (SSA) has seen a steady trend of economic growth in recent times. The SSA gained annual growth of 1.3 percent, 2.6 percent, and 2.7 percent in 2016, 2017, and 2018, respectively (United Nations 2020). Growth in the sub-region was projected to further increase from its 2019 rate of 3.2 percent to 3.6 percent in 2020 (IMF 2020). Economic growth in SSA however slightly lags behind that of North Africa, which recorded growth rates of 4.0 percent, 2.6 percent, and 3.4 percent in 2017, 2018, and 2019, respectively and is projected to grow by 3.6 percent in 2020 (United Nations 2020). The higher GDP growth in the North African subregion is mainly due to Egypt's strong growth momentum (African Development Bank 2019). Apart from South Asia, East Asia, and North Africa, the SSA sub-region has outperformed other developing economies like those of Western

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Asia as well as Latin America and the Caribbean, and Western Asia (United Nations 2020).

Notwithstanding this relative improvement in growth, remarkable income inequality still persists in the region (see, Alvaredo et al. 2018). According to Ravallion and Chen (2019) and the United Nations (2020), the share of SSA's population living in extreme poverty has risen in the past few decades; a situation which is contrary to that of other developing regions like Asia. This is surprising, given the fact that the SSA has grown steadily over the period. Despite its promising growth momentum in the past decade and potentials (United Nations 2020), SSA is still home to ten out of the nineteen most unequal countries in the world (Odusola et al. 2017).

These inequalities result in a number of undesirable social and economic conditions. Inequality has been found to disrupt social solidirity, political stability, and is detrimental to economic growth, lessening the impact of growth on poverty reduction (Aoyagi and Ganelli 2015; Kakwani and Son 2008). It is for these reasons that policymakers are calling for a concerted effort aimed at equitable distribution of the benefits of growth and have, therefore, set for themselves a goal to reduce inequalities within and among countries (Sustainable Development Goal 10). As Anand et al. (2013) argue, the equitable distribution of income or benefits gained from economic growth triggers inclusive growth.

Inclusive growth thus encompasses economic growth and equity in the distribution of benefits (Aoyagi and Ganelli 2015). In this chapter, we adopt a macro perspective and operationalize inclusive growth as growth in income and equitable distribution of growth gains. Earlier studies have identified a number of drivers of inclusive growth. One of these being the income level of a country. It is argued that as low-income countries grow with fewer people finding opportunities in high-paying jobs, income inequality rises and inclusive growth is hampered. However, as these economies expand and opportunities abound for the masses, income inequality diminishes and growth becomes more inclusive. A survey of the literature reveals other determinants of inclusive growth such as investments in infrastructure, government spending, financial deepening, fiscal redistribution, inflation, output volatility, and unemployment. According to Anand et al. (2013) and Aoyagi and Ganelli (2015), favourable developments in these factors open up opportunities for people to be gainfully employed to contribute to economic growth and share in the benefits of growth. Sources of macroeconomic instability such as inflation and output volatility, on the other hand, are found to retard inclusive growth (Aoyagi and Ganelli 2015). Another factor that has gained attention in the literature as a driver of inclusive growth is global value

chain (GVC) participation (Anand et al. 2013). GVC refers to the fragmentation of the production process across different countries (Saito et al. 2013). GVC is also defined as the 'trade in value added' of an economy. "Trade in value added describes a statistical approach used to estimate the sources of value that is added in producing goods and services" (OECD, WTO and UNCTAD 2013, p. 9). It acknowledges the fact that global value chains imply that a country's exports at certain times rely on intermediate input imports and, in turn, value added by upstream industries in other countries. The trade in value added thus traces the value added by each country in the production chain.

There are two recognized pathways through which GVC participation drives inclusive growth. First, GVC participation creates employment and incomes for people in developing countries by helping firms in participating countries gain access to wider markets (World Bank 2019). This means that when a country participates in GVC, existing firms acquire new technologies to enhance both productivity and product quality. In line with this, subsidiary firms emerge to provide services like sorting, assembling, and distribution; all of which create employment, enhancing income growth, poverty alleviation, and inclusive growth in the process. Second, participation in GVC has the potency of increasing the value addition of participating countries thereby supporting inclusive growth if the gains are shared equitably (UNCTAD 2013).

According to UNCTAD (2013), there are two main ways through which countries participate in GVC: (1) through domestic value addition, and (2) through foreign value addition. Domestic value addition involves the value added to exports of commodities that are originally produced by the exporting country to be used as intermediate inputs by other firms in other countries. Foreign value addition, on the other hand, involves countries importing primary or intermediate inputs from other countries and adding value to them (i.e., either by converting them into other intermediate goods or final goods) for export. In whichever form GVC is pursued, evidence shows that, relative to non-GVC participating countries, countries that engage in GVC are more inclusive as they tend to: (1) grow faster (Saito et al. 2013; Altomonte et al. 2018), (2) provide more durable employment opportunities, and (3) reduce poverty (World Bank 2019).

All countries in the world, in one way or the other, engage in GVC. However, compared to other regions, the participation of SSA in GVC is low. This is more so in the case of foreign value addition (UNCTAD 2019). This situation is due to the fact that there are relatively few downstream industries in SSA to convert imports from other economies into semi-finished and

finished goods. As shown in Table 1, in 2017, the GVC participation rates of developed economies, developing countries, and the European Union were all higher than that of SSA (UNCTAD 2019). SSA's GVC participating industries are largely downstream and agriculture-based and thus participate in domestic value additions and export to upstream industries in the advanced and emerging economies. More worrisome is the fact that SSA lacks adequate technology to either boost productivity in their downstream industries or convert its commodities into semi-finished and finished goods for exports.

To the best of our knowledge, even though GVC participation is the new face of global investment, production, and trade (Sakamoto and Sung 2018), its effect on inclusive growth has not been explored in SSA. Though there is no contention that, studies have been done on GVC participation on the one hand, and inclusive growth on the other hand, knowledge on whether or not the GVC participation and inclusive growth nexus holds in the SSA remains a void in the growth literature. Also, our focus on SSA is informed by policy as the region continues to remain highly unequal in terms of income distribution despite remarkable economic and social progress over the last two decades (see, UNCTAD 2019). For instance, real per capita income in SSA has risen by 50 percent and infant mortality rate has fallen from 108 to 55 per 1000 live births between 2000 and 2018 (Zhang 2018).

Considering the low industrial and service export base but a large pool of labor, SSA countries have a golden opportunity of reducing the high unemployment and income inequality trends through GVC participation (see, Allard et al. 2016). By specializing in a particular segment of the production chains, each participating country gets an opportunity to add to the

Table 1 Global value chain participation rate (%), by region, 2017

Region	Foreign value added (FVA)	Domestic value added (DVA)	Global value chain participation rate
Developing Economies	28	28	56
Africa	14	41	55
Sub-Saharan Africa	14	33	47
Asia	31	28	59
Transition Economies	13	44	57
Least Developed Countries	9	32	41
Developed Economies	32	28	60
European Union	38	27	65

Source UNCTAD (2019)

production of goods and/or services and in turn increases its value addition to exports. Also, given that the composition of GVC participation in SSA differs significantly from other regions (see, Table 1), it can be inferred that the effect of GVC participation on the different regional blocs would differ.

The goal of this chapter, therefore, is to estimate the effects of GVC participation on inclusive growth in SSA. We go a step further to explore channels through which GVC affects inclusive growth and proffer policy measures to enhance SSA's participation in GVC. It is hypothesized that participation in GVC has a positive effect on inclusive growth in the selected SSA countries. The uniqueness of this chapter lies in the fact that it is the first of its kind to examine the effects of the components of GVC participation on inclusive growth in SSA.

The rest of the chapter is organized as follows: The next section focuses on the methodological foundation of the chapter. The last two sections provide discussion of the results, followed by conclusion and policy recommendations.

2 Methodology

Theoretically, participation in GVC contributes to inclusive growth through direct job creation and economic growth. GVC participation is an avenue for the employment of both skilled and unskilled labor, particularly for women if the economic activity is a labor-intensive one, thereby engendering inclusive growth. In developing economies like those of SSA, engaging in capital-intensive activities, on the other hand, limits employment growth and worsens exclusivity. As a result of technological diffusion associated with GVC participation, firms become more productive—contributing to a faster rate of economic growth. The expansion of the economy in turn creates an avenue for more employment opportunities and rising incomes (UNCTAD 2013; World Bank 2019).

Empirical Strategy

We first examine the effect of GVC participation on inclusive growth by specifying the following baseline model:

$$\begin{aligned} \ln INGRW_{it} = &\theta + \ln INGRW_{i,t-1}\delta + \quad \ln GVC_{it}\pi \\ &+ X_{it}\beta + + \propto_i + \mu_t + \varepsilon_{it} \end{aligned} \tag{1}$$

where $\ln INGRW_{it}$ is the log of inclusive growth for country i in year t, calculated as the simultaneous growth of both income and equity (Fig. 1 provides details on how inclusive growth was calculated); $\ln INGRW_{i,t-1}$ is one year lag in the inclusive growth of country i representing the initial condition; $\ln GVC_{it}$ is the log of GVC participation; X_{it} is a matrix of control variables for country i in year t; θ is a scalar; β and δ are vectors of parameters; $\propto_i$ captures country-specific fixed effects; μ_t is captures time effects; whereas ε_{it} is the general stochastic disturbance term.

We estimate Eq. (1) using the system generalized method of moments (GMM) estimator. The system GMM estimator, in this context, is superior to the traditional cointegration and ordinary least squares techniques since it resolves the endogeneity problem caused by the strong correlation between the lagged dependent variable and the unobserved country-specific fixed effects $\propto_i$ mostly observed in growth models. Our parameter of interest, π, measures the effect of GVC participation on inclusive growth and forms the basis of our hypothesis. From Eq. (1), we specify the general system GMM framework as:

$$\ln INGRW_{it} = \ln INGRW_{i,t-k} \sum_{k=1}^{p} \vartheta\delta + \quad \ln GVC_{it}\pi + X_{it}\beta + + \propto_i + \mu_t + \varepsilon_{it} \tag{2}$$

We proceed to test the hypothesis that GVC participation has both direct and indirect effects on inclusive growth. To do this, we estimate another equation using the dynamic GMM pooled estimator as in the case of Eq. (2) with an additional covariate which is an interaction between GVC participation and GDP growth (GDPG). A significant coefficient of this interaction will mean that the effect of GVC participation on inclusive growth is mediated by income growth. A careful look at Eq. (2) shows a potential case of endogeneity due to a possible bi-causality between the measures of GVC participation and the dependent variable, inclusive growth (see details on test for bi-causality in Table 7). This endogeneity problem is external to the specification of our GMM model. To the extent that the presence of endogeneity can undermine the efficiency of our estimates, we address it, by constructing an instrument (INT) from an estimated gravity equation (Altomonte et al. 2018). Details on the construction of the instrument is presented in the next section.

Gravity Model Specification

Given that, the behavior of the stochastic disturbance term in any regression model mimics that of the dependent variable, in theory, the measures of GVC participation correlates with the disturbance term in our regression. This therefore biases the coefficients of the measures of GVC participation. To address this challenge, we construct an exogenous instrumental variable from an estimated gravity model with value additions to exports from country i to country j as the dependent variable (Altomonte et al. 2018). The difference between the value addition to export (which is the dependent variable) in our gravity model and that of the measures of GVC participation in our empirical strategy lies in the fact that the value addition in the gravity model is value addition to export from one country to another while the GVC participation in our empirical strategy is value additions to exports from country i to the rest of the world. The gravity equation is specified as:

$$\begin{aligned} lnValue_{ijt} = & lnPop_{it} + lnPop_{jt} + lnDistance_{ij} \\ & + Contiguity_{ij} + Landlocked_{j} + \varepsilon_{it} \end{aligned} \tag{3}$$

From Eq. (3), value added to exports from country i to country j at time t (i.e., $lnValue_{ijt}$) is said to be dependent on the natural logs of the populations of both countries at time t and time-invariant dyadic variables: $lnDistance_{ij}$ is the log of the simple distance between the capitals of country i and country j in kilometers; $Contiguity_{ij}$ is a dummy taking value '1' if country i and country j share a border and '0' if otherwise; $Landlocked_{j}$ is a dummy with the value '1' if country j is landlocked and '0' if otherwise. We obtained data on the value additions to exports from the UNCTAD-Eora Global Value Chain Database. Data on the populations of the countries were obtained from the World Development Indicators (WDI) while data on dyadic variables were sourced from the CEPII data in the GeoDist Database.

We then use only the deterministic part of Eq. (3) as our exogenous instrument for the endogenous measures of GVC participation. There exist no correlation between our instrument (INT) and inclusive growth (INGRW) as shown in Table 4. We however observe that our instrument and all the measures of GVC are significantly correlated (p-value < 0.01). Given these two observations, we conclude that our instrument is good. The gravity model estimates are presented in Table 8.

3 Data Description

Data Sources

We employed a balanced panel data for nineteen (19) SSA countries for the period 1991–2017. The choice of countries is based entirely on data availability for the study period. The observations per country are twenty-seven (27). A list of the SSA countries selected for our analysis are listed in Table 2.

We obtained data from three sources: the UNCTAD-Eora Global Value Chain Database, GeoDist Database, and WDI. The outcome variable, inclusive growth (INGRW), is measured as the growth in income and equity in income distribution, and is calculated following Anand et al. (2013). To obtain this measure, the product of the per capita income (PCI) and income equity index (IEI) for each country in a given year is estimated (see details in Fig. 1). The equity index ranged from 0 to 1. An index of '0' means perfect inequity (i.e., only one person has all the income) while an index of '1' indicates perfect equity (i.e., income is shared equally to all persons).

The variables of interest are the three measures of GVC participation: domestic value added, foreign value added, and total value added. Domestic value added (DVA) is the value added to exports whose outputs are produced by domestic industries while foreign value-added (FVA) is the value added to exports whose outputs are produced by foreign industries. Total value added (VA) is the sum of the domestic value addition and foreign value addition. Data on the three measures of GVC participation are obtained from the UNCTAD-Eora Global Value Chain Database.

Additionally, to capture the economic structure of the countries under consideration, we used the share of employment in agriculture as a percentage of total employment (AGRIC) as a control variable. Similarly, we used gross fixed capital formation as a percentage of GDP (GFCF) as a proxy for the level of fixed investment in the countries. Data on both AGRIC and GFCF are obtained from the WDI. The significance of controlling for the share of employment in agriculture in our model is to capture the importance of

Table 2 Selected countries

Angola	Gabon	Niger
Botswana	Gambia	Nigeria
Burundi	Ghana	Rwanda
Cameroon	Kenya	Senegal
Central African Republic	Madagascar	Seychelles
Chad	Mauritius	South Africa
Cote d'Ivoire		

the agricultural sector in employment and income generation for the poor in SSA, given that employment in the sector forms more than 50 percent of total employment in the sub-region (Timmer 2002; Hasan and Quibria 2004). The significance of controlling for GFCF in our model stems from the fact that SSA countries are developing and capital formation is essential for its growth (Kodongo and Ojah 2016). Also, spending on social and economic infrastructure does not only provide a conducive environment for businesses to thrive but also creates opportunity for people to participate in economic activity and benefit from the resultant growth (Ali and Son 2007).

Descriptive Statistics

Table 3 shows the summary statistics of the variables in our study. For instance, the average value of GVC participation is US$ 5,747,109. This is less than US$ 116,000,000 for high income and US$ 34,300 for emerging economies (OECD, WTO and UNCTAD 2013).

Table 3 Summary Statistics

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
Income equity index	513	0.358	0.036	0.213	0.487
Per capita income (in US$)	513	5338.339	5999.849	496.084	26,382.290
Inclusive growth (in US$)	513	1949.832	2273.340	105.433	10,949.640
GDP growth	513	3.643	5.530	−50.248	35.224
Total value added (in US$)	513	5,747,109	16,219,758	34,300	116,000,000
Domestic value added (in US$)	513	4,941,753	13,515,496	22,400	94,400,000
Foreign value added (in US$)	513	804,402.2	2,801,438	4870	21,500,000
Gross fixed capital formation	513	19.562	8.303	2.632	59.723
Employment in agriculture	513	52.981	24.863	4.600	92.842
Country-to-country value addition to exports	513	95.700	29.450	11.0441	148.318

Source Authors' calculation using data from UNCTAD-Eora Global Value Chain Database, GeoDist Database, and World Development Indicators (WDI)

The average domestic value addition to exports is a little over six (6) times that of the average foreign value addition. The gap between foreign value addition and domestic value addition is common among all the selected 19 SSA countries (Fig. 2). This partly explains the region's low capacity to attract upstream industries. Since SSA economies are predominantly agriculture-based, most GVC industries are downstream and add very little to GVC. That is, SSA countries mostly exports products either in their raw states or after little processing to upstream industries in more advanced countries.

Table 3 shows that the average capital formation in SSA is low, averaging around 20 percent of GDP over the study period. This suggests that SSA countries have low capital to invest in manufacturing, technology, and other high growth-inducing ventures. The low capital formation thus leads to low investment in agricultural technology, which in turn results in low productivity in the agriculture industry (which accounts for more than 50 percent of total employment) poverty and inequality (Sembene 2015; Hickey et al. 2001; Odusola et al. 2017).

The SSA subregion is one of the most unequal regions in the world in terms of income distribution (Ravallion 2014; Ortiz and Cummins 2011). From Table 3, the average equity index for the selected SSA countries is 0.358. This low equity index confirms the big income gap reported by earlier researchers. According to the United Nations Office on Drugs and Crime (2005), the richest 10 percent in Africa earn 31 times more than the poorest 10 percent. The present chapter shows that the income gap is even wider in the SSA subregion with even the most equitable country having an index lower than 0.5 (see, Table 3).

The low-income equity in SSA implies that the real per capita income in SSA is, on the average, less than what is often reported. Put differently, the average share of national income that actually goes to a majority of the citizens is less than the per capita income value in official statistics. This is evident in Table 3, where the average per capita income among the 19 countries (US$ 5338.339) is almost thrice the average inclusive growth statistic (US$ 1949.832). The effect is that the regional and country-specific economic pictures that are painted from GDP and per capita income statistics perspectives are different from what is experienced by residents, which might consequently inform wrong policies and economic decisions.

A pairwise correlation analysis is carried out to inspect the correlation between variables and the results are reported in Table 4. The correlation coefficients between regressors (i.e., GVC, GFCF, AGRIC, and GDPG) are low (below 0.5). This is evidence of no 'threat' of collinearity or multicollinearity in our empirical model.

Table 4 Correlation Matrix

CASE		INGRW	VA	DVA	FVA	GFCF	AGRIC	GDPG	INT
Dependent Variable	INGRW	**1.000**							
	VA	**0.206**	**1.000**						
		(0.000)							
	DVA	**0.202**	**0.999**	**1.000**					
GVC		(0.000)	(0.000)						
	FVA	**0.222**	**0.971**	**0.958**	**1.000**				
		(0.005)	(0.000)	(0.000)					
	GFCF	**0.418**	**−0.087**	**−0.098**	**−0.030**	**1.000**			
Control		*(0.036)*	*(0.050)*	*(0.027)*	*(0.495)*				
Variables	AGRIC	**−0.589**	**−0.406**	**−0.404**	**−0.402**	**−0.209**	**1.000**		
		(0.090)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*			
	GDPG	**0.012**	**−0.013**	**−0.011**	**−0.025**	**0.186**	**−0.054**	**1.000**	
Other		*(0.795)*	*(0.767)*	*(0.811)*	*(0.576)*	*(0.000)*	*(0.221)*		
Variables	INT	**−0.019**	**0.377**	**0.394**	**0.281**	**0.036**	**−0.124**	**−0.071**	**1.000**
		(0.664)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.422)*	*(0.005)*	*(0.110)*	

Source Authors' calculation using data from UNCTAD-Eora Global Value Chain Database, GeoDist Database, and World Development Indicators (WDI)

Note P-Values in parenthesis. For clearer understanding of the matrix, the variables are defined as follows: Inclusive growth (INGRW), total value added (VA), domestic value added (DVA), foreign value added (FVA), gross fixed capital formation (GFCF), employment in agriculture (AGRIC), GDP growth (GDPG), and instrumental variable (INT) which is the value addition to export from one country to another

4 Regression Results

To examine the effect of GVC participation on inclusive growth in SSA, we regress the three measures of GVC participation together with our control variables on inclusive growth. Two regression estimates are presented as seen in Tables 5 and 6. The former tests the hypothesis that GVC participation fosters inclusive growth in SSA while the latter investigates the pathways through which GVC participation affects inclusive growth in the SSA subregion. In each of the models, the three measures of GVC participation are introduced into the models separately such that no two measures are used as independent variables in the same model. Total value added is used as the measure of GVC participation in the first model while domestic value added and foreign value-added measures of GVC participation are put into

Table 5 Results on GVC participation and inclusive growth in SSA

Dependent Variable: Log of inclusive growth			
	(1)	(2)	(3)
Log of inclusive growth (−1)	0.970***	0.971***	0.967***
	(0.009)	(0.009)	(0.010)
Log of gross fixed capital Formation	0.059***	0.057***	0.059***
	(0.010)	(0.010)	(0.012)
Employment in agriculture	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)
Log of total value addition for export	0.007*		
	(0.004)		
Log of domestic value addition for export		0.007*	
		(0.004)	
Log of foreign value addition for export			0.009*
			(0.005)
Diagnostics			
Number of observation	513	513	513
Country fixed effects	YES	YES	YES
Time effects	YES	YES	YES
Wald χ^2	4.91×10^6	4.88×10^6	3.00×10^6
[*p*-value]	[0.000]	[0.000]	[0.000]
Hansen test	5.88	5.90	5.45
[*p*-value]	[0.437]	[0.434]	[0.487]
AR(2)	−1.59	−1.60	−1.57
[*p*-value]	[0.112]	[0.110]	[0.117]

Note Standard errors in parenthesis; *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

the second and third models, respectively. The corresponding models are numbered (1), (2), and (3).

GVC Participation and Inclusive Growth in Sub-Saharan Africa

Our results show that all the measures of GVC participation foster inclusive growth in SSA (Table 5). This finding is consistent with findings on the effect of GVC participation on inclusive growth in some other parts of the world. For instance, Anand et al. (2013) have found that GVC participation impacts inclusive growth positively in emerging markets while Huang and Quibria (2013) provide similar findings using data on 74 foreign aid recipient countries. The effect of GVC participation on inclusive growth in SSA, though positive (as in the case of other economies), is small. From Table 5, even if SSA doubles its total value addition in trade, inclusive growth will, on the average, increase by only 0.7 percent.

Interpretation of the low impact of GVC participation on inclusive growth in SSA can be understood by examining our inclusive growth measure (see, Fig 1). Two possible interpretations are evident. First, GVC participation as a share of national income in SSA is too small to cause a significant increase in per capita income (OECD, WTO and UNCTAD 2013). Second, the distribution of the share of national income generated through GVC participation is done less equitably. Our discussion focuses on the second interpretation. GVC participation in SSA is largely through the production of primary commodities for further processing in upstream industries in other countries. According to the literature, GVC participation tend to impact highly on the shared growth momentum of economies specializing in machinery, electronics, transportation, and other advanced manufactures and services (United Nations Industrial Development Organization 2015). Individuals in agrarian economies like SSA countries are therefore not able to benefit fully or significantly from GVC participation. The low GVC participation in SSA further explains the small coefficients of the measures of GVC participation (see, Table 2). GVC participation is largely expected to increase income equity and thus reduce poverty through employment. Given the low participation of SSA countries in GVC, the number of jobs created by GVC industries is low plausibly accounting for the non-inclusive growth trajectory in recent times.

The impact of GVC participation in SSA, therefore, does not only depend on the share of GVC on exports but also largely on the number and quality of jobs created by GVC industries. This is more evident when one compares the effect of domestic and foreign value additions on inclusive growth in the SSA

(see, Table 5). Per our results, foreign value addition has a relatively higher impact on inclusive growth. That is, though domestic value additions in all the SSA countries under consideration far outweigh their foreign value additions as we show in Fig. 2, a percentage increase in foreign value addition has a higher effect on equitable income growth. This revealing result stems from the fact that foreign value additions are done by upstream industries whose firms are mostly able to contribute significantly to national income and provide quality and high paid jobs. Employees of these industries are therefore able to earn good income, which translates into the reduction of income inequality between these employees and high-income earning citizens. Also, the high national income gained can feed into social investments and protection to improve welfare and equity. It should, however, be noted that this result leans itself to the potential of foreign value addition in propelling inclusive growth in SSA without controlling for the current growth path.

Given that SSA's GVC participation is largely through domestic value addition, one would have thought that it should have a greater impact on inclusive growth. Domestic value addition in SSA is mostly done by downstream agriculture and agriculture-related businesses, which are largely labor-intensive and thus provide low-quality jobs. That is, even though domestic value chain addition creates employment and serves as a source of income to a far greater number of residents of SSA, the incomes earned by individuals engaged in those activities are too small (due to low productivity) to significantly reduce income inequality.

Pathways of GVC Participation to Inclusive Growth in Sub-Saharan Africa

In this section, we analyze the pathways through which GVC participation affect inclusive growth in the selected SSA countries (see, Table 6). In the preceding section, we argue that GVC participation in SSA countries contributes less to inclusive growth due to the low capacity of the region to: (1) develop downstream activities, and (2) attract more upstream industries to contribute more to economic expansion and employment creation. In this section, we discuss how GVC participation translates into inclusive growth in SSA. We do this by interpreting the coefficients of the 'standalone' measures of GVC participation and also the coefficients of the interaction terms of the measures of GVC participation and GDP growth in Table 6.

Our results show that GVC participation in SSA has a positive direct impact on inclusive growth but the indirect effect showed otherwise (i.e.,

Table 6 Results on pathways to inclusive growth in SSA

Dependent Variable: Log of Inclusive Growth			
	(1)	(2)	(3)
Log of inclusive growth (−1)	0.975***	0.976***	0.977***
	(0.011)	(0.010)	(0.017)
GDP growth	0.061***	0.057***	0.054***
	(0.011)	(0.010)	(0.018)
Log of gross fixed capital formation	−0.000	0.000	−0.005
	(0.006)	(0.006)	(0.006)
Employment in agriculture	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)
Log of total value addition for export	0.015***		
	(0.006)		
LnVA × GDPG	−0.004***		
	(0.001)		
Log of domestic value addition for export		0.014***	
		(0.005)	
LnDVA × GDPG		−0.003***	
		(0.001)	
Log of foreign value addition for export			0.016
			(0.011)
LnFVA × GDPG			−0.004*
			(0.002)
Diagnostics			
Number of observation	513	513	513
Country fixed effects	YES	YES	YES
Time effects	YES	YES	YES
Wald χ^2	7.44×10^6	7.56×10^6	8.25×10^6
[*p*-value]	[0.000]	[0.000]	[0.000]
Hansen test	3.40	3.36	3.16
[*p*-value]	[0.758]	[0.763]	[0.788]
AR(2)	−1.46	−1.46	−1.67
[*p*-value]	[0.143]	[0.145]	[0.094]

Note Standard errors in parenthesis; *$p < 0.1$; **$p < 0.05$; ***$p < 0.0$. LnVA, LnDVA, LnFVA, and GDPG represent log of total value added, log of domestic value addition for export, log of foreign addition for export, and GDP growth respectively

coefficient of interaction term is negative). A positive direct impact means that, at a given level of economic growth, an increase in GVC participation creates more (quality) jobs for citizens, inducing equitable distribution of income. The negative indirect effect of GVC participation on inclusive growth as shown in Table 6, however, signifies that growth in national income due to GVC participation is not shared equitably. This boils down to the fact that a large share of growth in incomes in SSA countries due to increase in

GVC participation comes from activities of or benefits some few rich citizens (Ortiz and Cummins 2011). Overall, we find strong empirical evidence that, given the current trend of economic growth in SSA, a 1 percent increase in GVC participation induces inclusive growth by 0.0004 percent (i.e. net effect). In addition, given the current growth trajectory in SSA, a percentage point increase in domestic and foreign value additions, increases inclusive growth by 0.003 percent and 0.001 percent, respectively. This suggests that, per the structure of the economies we consider, if growth occurs at the backdrop of domestic value addition, inclusive growth increases faster than if it is driven by foreign value addition.

5 Conclusion and Policy Implication

Following our results, we conclude that GVC participation induces inclusive growth in the SSA. Though the region's foreign value addition is less than its domestic value addition, the inclusive growth effect of the former is higher than that of the latter. This is so because upstream industries, which are mostly involved in foreign value additions, provide quality jobs and thus higher incomes to their employees as compared to downstream industries, which mostly engage in domestic value addition. Also, as compared to downstream industries, firms in upstream industries have higher contribution to economic growth due to their use of improved technology. We also show that the effect of GVC participation on inclusive growth in SSA is mainly through employment creation by participating firms resulting to growth in incomes. Further, though GVC participation increases economic growth, the prosperity is not shared equitably.

The implications are that policymakers in SSA should map out strategies/policies to boost inclusive growth. Governments can do this by providing incentives to attract upstream firms into their countries as these firms boost both economic expansion and sustainable employment opportunities. Given that a large number of employees in the SSA are in the downstream industries, equity and inclusive growth is likely to increase faster if productivity in these industries is enhanced. High productivity implies that these employees earn higher incomes, thus reducing income inequality. To this end, governments in SSA should invest in labour-efficient technologies and capital-intensive technologies, and if possible, subsidize their use to help boost productivity in the sector. More importantly, to realize inclusive growth, governments should increase their social protection and investment spending to vulnerable groups.

Appendices

Appendix A: Measurement of Inclusive Growth by Anand, Mishra, and Peiris (2013)

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To integrate equity and growth in a unified measure, Anand et al. (2013) proposed a measure of inclusive growth based on a utilitarian social welfare function drawn from consumer choice literature, where inclusive growth depends on two factors: (i) income growth; and (ii) income distribution. Similar to the consumer theory where the indifference curves represent the changes over time in aggregate demand, Anand et al. (2013) decomposed the income and substitution effect into growth and distributional components. The underlying social welfare function must satisfy two properties to capture these features: (i) it is increasing in its argument (to capture growth dimension), and (ii) it satisfies the transfer property—any transfer of income from a poor person to a richer person reduces the value of the function (to capture distributional dimension).

A measure of inclusiveness is based on the concept of a concentration curve. Following Ali and Son (2007), Anand et al. (2013) defined a generalized concentration curve, which they called the social mobility curve, S^c, such that:

$$S^c \approx \left(y_1, \frac{y_1 + y_2}{2}, \ldots\ldots\ldots, \frac{y_1 + y_2 + \ldots + y_n}{n} \right)$$

where n is the number of persons in the population with incomes $y_1, y_2, \ldots\ldots, y_n$, where y_1 is the poorest person and y_n is the richest person. This generalized concentration curve is basically a cumulative distribution of a social mobility vector $S \approx (y_1, y_2, \ldots\ldots\ldots, y_n)$ with an underlying function $W = W(y_1, y_2, \ldots\ldots\ldots, y_n)$ satisfying the two properties mentioned above to capture growth and distribution dimensions. Since S^c satisfies the transfer property, a superior income distribution will always have a higher generalized concentration curve. Similarly, since it is increasing in its argument, higher income will also have a higher generalized concentration curve. As in Ali and Son (2007), the generalized concentration curves can be presented in continuous time to be more amendable to econometric analysis. The population is arranged in the ascending order of their income. Let $\overline{y_i}$ be the average income of the bottom i percent of the population, where i varies from 0 to 100 and y_i is the mean income. Anand et al. (2013) plotted $\overline{y_i}$ for different values of i (curve AB in Fig. 1 below). Curve AB represents

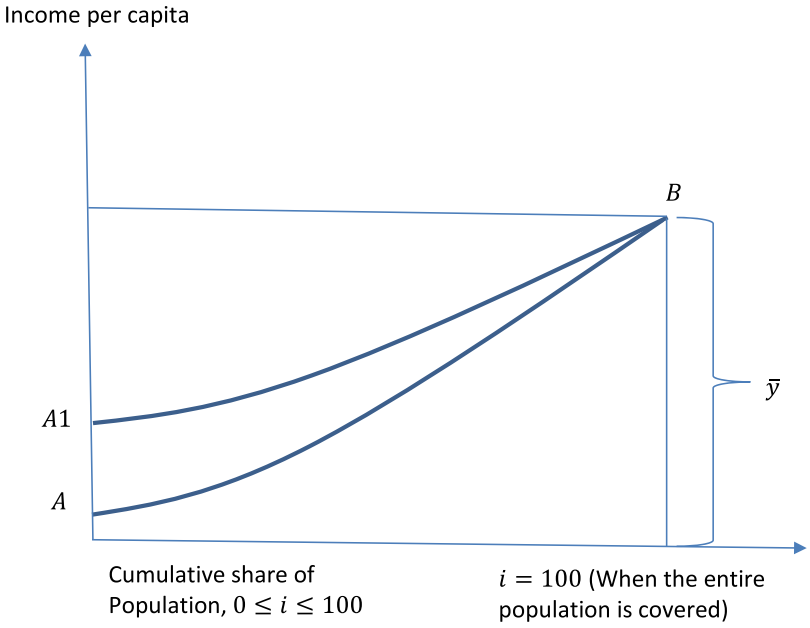

Fig. 1 Social mobility curves

a social mobility curve discussed above. Since a higher curve implies greater social mobility, growth is inclusive if the social mobility curve moves upward at all points. However, there may be degrees of inclusive growth depending on: (i) how much the curve moves up (growth); and (ii) how the distribution of income changes (equity). This feature of the social mobility curve is the basis of our integrated measure of inclusive growth. Thus, if two generalized concentration curves do not intersect, they could be ranked on social mobility (i.e., inclusiveness of growth). To illustrate the point made above, Fig. 1 depicts two social mobility curves with the same average income ($\bar{y}$) but different degrees of inclusiveness (i.e., different income distribution). Social mobility curve (A1B) is more inclusive than the social mobility curve AB, as the average income of the bottom segment of the society is higher.

To capture the magnitude of the change in income distribution, Anand et al. (2013) used a simple form of the social mobility function by calculating an index (or social mobility index) from the area under the social mobility curve:

$$\bar{y}^* = \int_0^{100} \overline{y_i} di$$

The greater the $\bar{y}^*$, the greater is the income. If the income of everyone in the population is the same (i.e., if income distribution is completely equitable) then $\bar{y}^*$ will be equal to $\bar{y}$. If $\bar{y}^*$ is lower than $\bar{y}$, it implies that the distribution of income is inequitable. So, the deviation of $\bar{y}^*$ from $\bar{y}$ is an indication of inequality in income distribution. Ali and Son (2007) use this feature of $\bar{y}^*$ and propose an income equity index (IEI) as:

$$\omega = \frac{\bar{y}^*}{\bar{y}}$$

For a completely equitable society, $\omega = 1$. Thus, a higher value of ω (closer to one) represents higher income equality. Rearranging,

$$\bar{y}^* = \omega * \bar{y}$$

Inclusive growth requires increasing $\bar{y}^*$, which could be achieved by: (i) increasing $\bar{y}$, that is increasing average income through growth; (ii) increasing the equity index of income, ω, through increasing equity; or (iii) a combination of (i) and (ii). Differentiating the above equation:

$$d\bar{y}^* = \omega * d\bar{y} + d\omega * \bar{y}$$

where $d\bar{y}^*$ is the change in the degree of inclusive growth. Growth is more inclusive if $d\bar{y}^* > 0$. It also allows us to decompose inclusive growth into income growth and change in equity. The first term is the contribution of an increase in average income (keeping income distribution constant) while the second term is the contribution of changes in the income distribution (keeping the average income unchanged). Inclusive growth depends on the sign and the magnitude of the two terms (See Tables 7 and 8).

Table 7 Test for endogeneity (Bi-Causality) between inclusive growth and regressors for SSA

Dependent Variable:	Log of VA	Log of DVA	Log of FVA
lnVA (−1)	0.975***		
	(0.010)		
lnDVA (−1)		0.972***	
		(0.010)	
lnFVA (−1)			1.011***
			(0.012)
Log of inclusive growth	0.087***	0.094***	−0.020
	(0.023)	(0.023)	(0.035)
N	513	513	513

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Note LnVA, LnDVA, LnFVA, and GDPG represent log of total value added, log of domestic value addition for export, log of foreign value addition for export, and GDP growth respectively. In each of the three(3) models, we controlled for Log of gross fixed capital formation (GFCF) and employment in agriculture (AGRIC); Standard errors in parenthesis. Statistical significance of the Log of inclusive growth shows bi-causality of GVC participation on inclusive growth

Dependent Variable: AGRIC			
	(1)	(2)	(3)
AGRIC (−1)	1.002***	1.002***	1.004***
	(0.005)	(0.004)	(0.003)
Log of inclusive growth	−0.190	−0.159	−0.152
	(0.404)	(0.381)	(0.329)
N	513	513	513

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Note AGRIC represents employment in agriculture (AGRIC). In each of the three(3) models, we controlled for log of gross fixed capital formation (GFCF), log of total value added, log of domestic value addition for export, log of foreign value addition for export respectively; Standard errors in parenthesis. Not significant coefficients of Log of inclusive growth shows there is no bi-causality between employment in agriculture and inclusive growth

Dependent Variable: Log of GFCF			
	(1)	(2)	(3)
Log of GFCF (−1)	−0.975***	−1.048***	−0.331
	(0.214)	(0.223)	(0.211)
Log of inclusive growth	−0.020	0.026	0.0001
	(0.035)	(0.041)	(0.0003)
N	513	513	513

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Note GFCF represents gross fixed capital formation. In each of the three(3) models, we controlled for employment in agriculture (AGRIC), log of total value added, log of domestic value addition for export, log of foreign value addition for export respectively; Standard errors in parenthesis. Not significant coefficients of log of inclusive growth shows there is no bi-causality between gross fixed capital formation and inclusive growth

Table 8 Gravity model estimates for SSA

Dependent variable: Log of value addition to export from country to country	
	Estimates
Log of population of exporting country	0.369*** (0.012)
Log of population of importing country	0.277*** (0.013)
Log of distance to capital city of importing country	−1.686*** (0.023)
Contiguity	−2.443*** (0.109)
Landlocked	−1.412*** (0.043)
Constant	8.342*** (0.339)
Number of observations	10.388
Adjusted *R*-squared	0.45

Note Standard errors in parenthesis; *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
Contiguity is binary in nature: '0' if the exporting and importing countries do not share a border and '1' if otherwise. Landlocked is also binary: '0' if the country is not landlocked and '1' if otherwise

See Fig. 2.

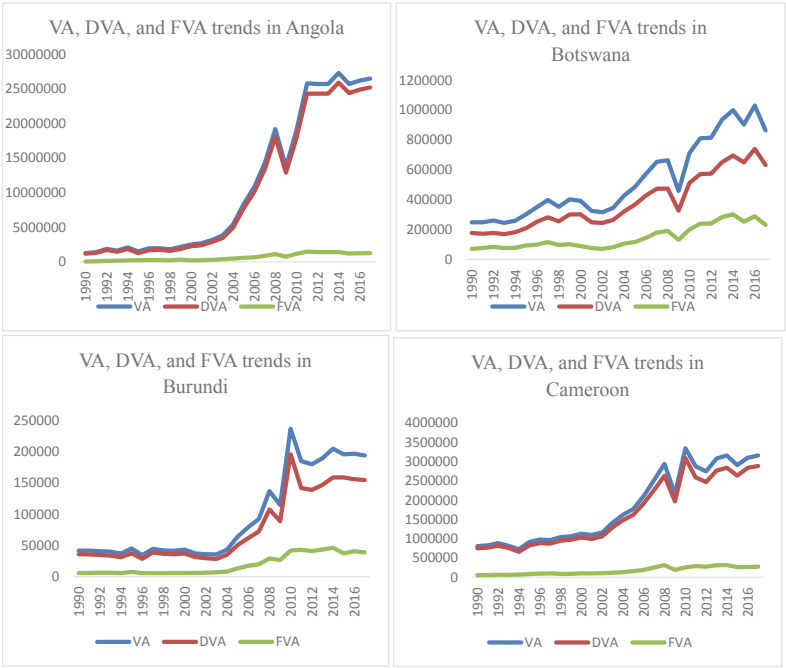

Fig. 2 Trends in VA, DVA and FVA in selected countries

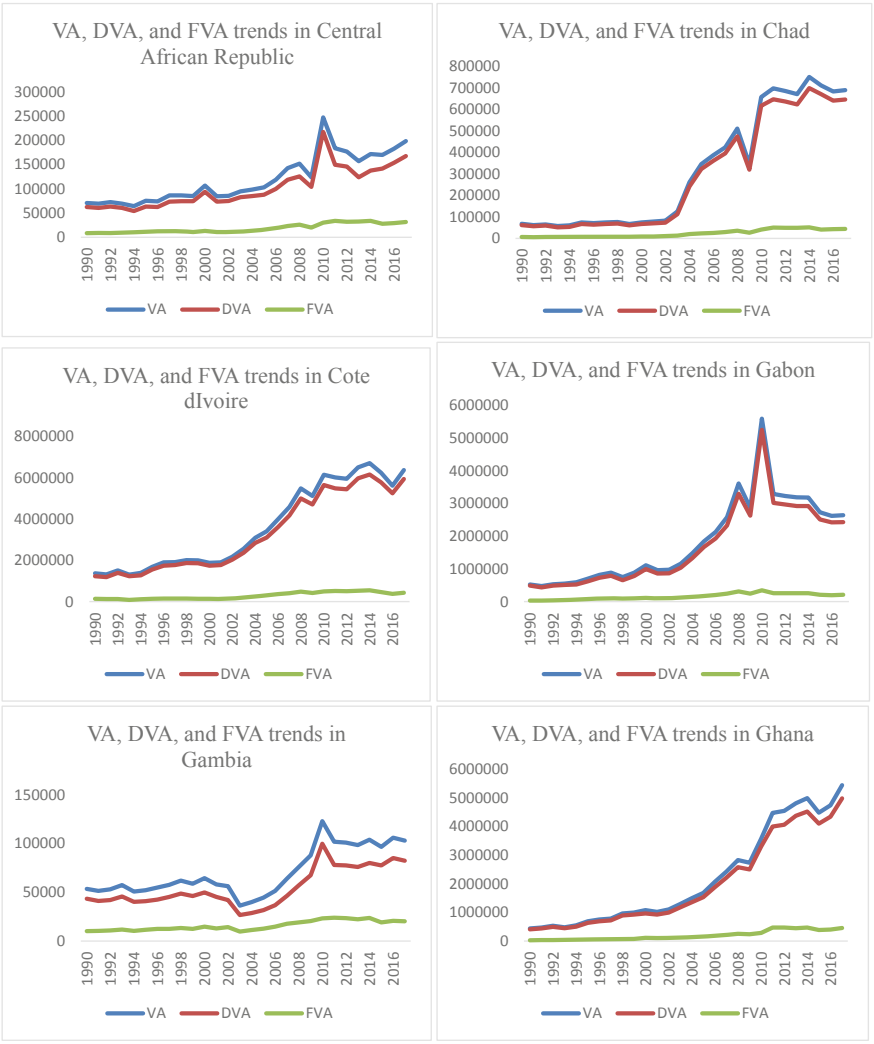

Fig. 2 (continued)

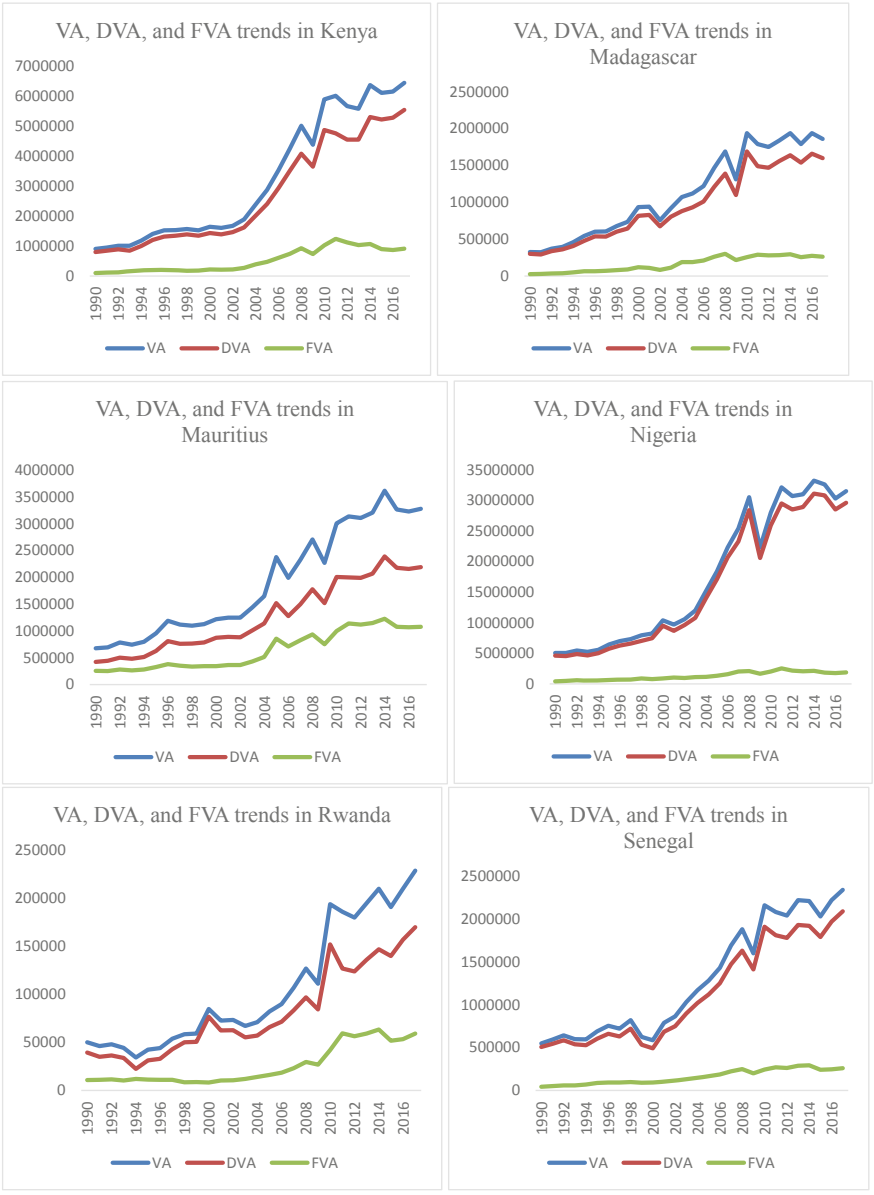

Fig. 2 (continued)

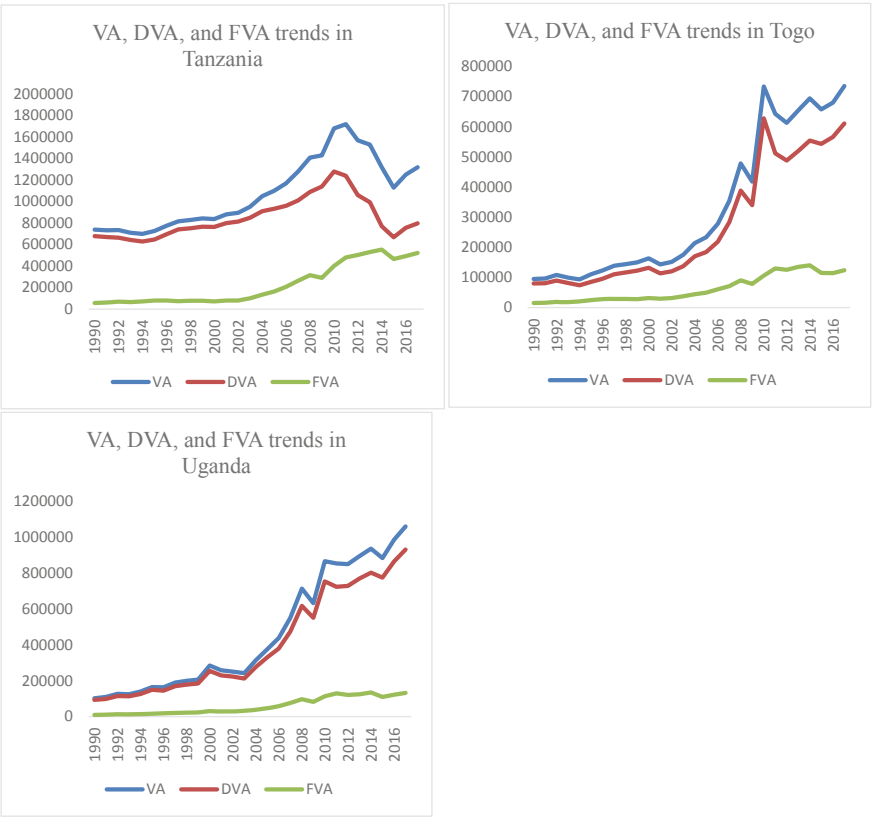

Fig. 2 (continued)

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Infrastructure Development and Sectoral Growth Nexus: Evidence from Sub-Saharan Africa

Dennis Boahene Osei and Isaac Bentum-Ennin

1 Introduction

The development of infrastructure has long been regarded as a sine qua non for achieving robust economic growth in most countries. According to AfDB (2018), infrastructure development is a prime mover of economic growth and standard of living of Africans. In particular, investment in infrastructure has the tendency to significantly influence human development and poverty reduction as well as helping to achieve the Sustainable Development Goals (SDGs). Nevertheless, poor infrastructure remains an impediment in doing business in most countries in Africa, decreasing the productivity of firms by nearly 40% (AfDB/World Bank 2011). Given this understanding, most countries including those in Africa continue to make strides in improving infrastructure access, quantity, and quality. While the role of infrastructure in fostering economic growth is well-documented (see Aschauer 1989; Canning and Pedroni 2004; Calderón and Servén 2010; Kodongo and Ojah 2016; Chakamera and Alagidede 2018), issues around infrastructure development and sectoral growth have not received much attention in the literature.

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This chapter, therefore, is an attempt to understand the relationship between infrastructure development and sectoral growth in Sub-Saharan Africa (SSA).

Economic growth is slow in SSA and this could be attributed to the large infrastructure deficit in the region. A recent study by Calderon et al. (2018) highlighted the existence of a huge infrastructure gap in terms of quality, quantity, and access in SSA. According to the World Bank (2017), SSA lags all developing regions in almost all dimensions of infrastructure performance. However, key sectors in the region exhibit varying trends in terms of infrastructure performance. For instance, the SSA's power sector has witnessed slow progress despite data from the World Development Indicators (WDI) of the World Bank showing an increase in access to electricity from 27.65% in 1996 to 47.67% in 2018. This suggests that over the past two decades the power sector has failed to provide access to electricity to more than half of the population in the region. Worryingly, it is estimated that only one out of five persons have access to electricity and if it continues on this trajectory less than 40% of SSA countries would attain universal access to electricity by 2050.[1] Besides, the electricity demand per capita for SSA countries in 2018 is low as it stood around 370 kWh relative to 920 kWh in India and 2300 kWh in developing Asia (International Energy Agency 2019). On the supply side, Africa's electricity generating capacity increased from 155 gigawatts in 2010 to nearly 245 gigawatts in 2018 and this is about a quarter of the installed capacity in European countries. Mostly, this capacity is generated from sources such as natural gas, coal, hydropower, and oil. Despite the recent increase in electricity generating capacity in Africa as a whole, SSA is still lacking as the power generating capacity per capita has remained flat over the past 30 years. To tackle the energy infrastructure deficit, there is the critical need to increase energy supply investment which has reduced above 30% since 2011 (International Energy Agency 2019).

The transportation infrastructure is equally lagging other regions. With road serving as the key mode of transport in Africa—carrying 80% of goods and 90% of passengers, about 53% of the roads remain unpaved (Organization for Economic Co-operation and Development 2018). It is imperative to note that SSA is the only region where road density has decreased over the past two decades (Calderon et al. 2018). Similarly, the density of railway networks is low and this is largely because governments in most African countries have invested heavily in roads abandoning most railways (Olievschi 2013). Sanitation infrastructure is another area that needs important attention. While available data from the World Bank suggests an increase in the

[1] For details see https://africa-energy-portal.org/events/sub-saharan-africa-power-2018.

number of people using at least basic sanitation services (percentage of population) from 22.99% in 2000 to 30.88% in 2017, there is the necessity for much progress to be achieved to meet the SDG target 1.4 which emphasizes equal access to basic sanitation services by 2030.

Conversely, the quality and quantity of SSA's telecommunication infrastructure have improved tremendously. Specifically, the number of mobile cellular subscriptions per 100 people increased from 0.001% in 1989 to 82.4% in 2018. Although the subscriptions of fixed telephone (per 100 people) increased from 0.71% in 1975 to 1.56% in 2009, there was a continuous decline subsequently as the rate of subscriptions reduced to 0.86% in 2018 (World Bank 2020). The fall in telephone subscriptions can largely be attributed to the growth in the usage of mobile phones. Additionally, individuals using the internet have improved significantly over the past years, with the number of internet users as a percentage of the population increased from 0.069% in 1996 to 18.71% in 2017 (World Bank 2020). There is also a considerable rise in SSA's access to safe water services even though disparities between urban and rural areas still exist. To be precise, access to at least basic drinking water services rose from 45.66% in 2000 to 60.94% in 2017. More importantly, people using at least basic drinking water services in the urban areas increased to 84.14% in 2017, from 77.54% in 2000. With regard to rural areas, less than half of the rural population have access to water services as the number of people using basic water services stood at 45.69% in 2017 (World Bank 2020). There is still a considerable need for infrastructure investment across different sectors in SSA to help decrease the productivity gap and raise economic growth.

Theoretically, the link between infrastructure and economic growth can be explained from three schools of thought (Fedderke and Garlick 2008; Kodongo and Ojah 2016). The first school of thought argues that infrastructure stock contributes to national output and directly induces economic growth. According to Aschauer (1993) and Gramlich (1994), this argument holds because infrastructure is regarded as part of the country's physical stock and hence, a factor of production. The second school of thought opines the complementary role of infrastructure to other factors of production. Proponents of this school of thought (e.g., Barro 1990) elucidate that infrastructure complements other factors of production in two ways: (i) increasing total factor productivity by reducing the cost of inputs and expanding the production process, and (ii) improving set of profitable investment opportunities. The last school of thought emphasizes that accumulation and productivity of a factor (e.g., labor) is incentivized by infrastructure (Fedderke and Garlick 2008). This suggests that infrastructure affects economic growth by stimulating aggregate demand (Kodongo and Ojah 2016). From these views, it can

be inferred that infrastructure is key in stimulating economic growth and the role it plays in most sectors (e.g., agriculture, industry, and service) cannot be overemphasized.

Empirically, it is increasingly becoming an axiom that investment in infrastructure spurs economic growth (see Aschauer 1989; Easterly and Rebelo 1993; Chakamera and Alagidede 2018). This is because burgeoning literature has focused more on understanding the infrastructure–economic growth nexus, neglecting the crucial role infrastructure plays on specific sectors of the economy like agriculture, services, and industry. This suggests that studies examining the relationship between infrastructure development and sectoral growth remain unexplored and sparse. Understanding the sectoral impact of infrastructure is an empirical matter and hence, this chapter aims at examining the relationship between infrastructure development and sectoral growth.

Several extant studies have emerged in the empirical literature relating infrastructure with key macroeconomic variables, both at the country (e.g., Estache and Vagliasindi 2007; Fedderke et al. 2006; Owolabi-Merus 2015; Shi et al. 2017; Khan et al. 2020) and cross-country levels (e.g., Bougheas et al. 1999; Estache et al. 2005; Calderón and Servén 2010; Kodongo and Ojah 2016; Nsiah and Fayissa 2016; Chakamera and Alagidede 2018). The first strand of literature focused on the relationship between infrastructure and economic growth as well as its causality. The seminal work by Aschauer (1989) provided the first evidence on the relationship between infrastructure and economic growth. Findings from the study revealed that the stock of public infrastructure capital is a significant determinant of aggregate total factor productivity. Following Aschauer (1989), subsequent studies (including Canning and Pedroni 2004; Bougheas et al. 2000; Calderón and Servén 2010; Kodongo and Ojah 2016; Chakamera and Alagidede 2018) confirmed the positive impact of infrastructure on economic growth.

The second strand of literature offers evidence on the relationship between infrastructure and trade flows. Bougheas et al. (1999) relying on different proxies for infrastructure (measuring the stock of public capital and the length of the motorway network) found that by reducing transport cost infrastructure enhances the volume of trade in the European Union (EU) and Scandinavian countries. Limao and Venables (2001) used an index computed from the communication and transport measures of infrastructure and established that deterioration of infrastructure increases transport cost which in turn decreases trade flows in landlocked and coastal countries. Relying on aggregate measures of trade facilitation and infrastructure,

Iwanow and Kirkpatrick (2009) found these measures as important determinants in magnifying export performance in Africa. Using the Poisson estimator, Francois and Manchin (2013) studied the impact of infrastructure and institutional quality on trade. The authors concluded that infrastructure and institutional quality matters most for both exporting and importing countries.

The third strand of literature focusing on the effect of infrastructure on Foreign Direct Investment (FDI) has yielded mixed empirical results. For example, Root and Ahmed (1979) examined the determinants of manufacture FDI in developing countries and finds infrastructure as very crucial in explaining FDI flows. This result is in line with Hymer's (1970) statement that countries that actively build infrastructure facilities attract direct investment from foreign investors. In a similar study, Asiedu (2002) used the number of telephones per 1000 population as a measure of infrastructure development and found that, it positively enhances FDI flows to non-SSA countries. On the contrary, the author further established no effect for SSA countries as infrastructure development does not significantly impact FDI flows. This result could largely be attributed to the use of a single variable to measure multidimensional infrastructure development.

The fourth strand has focused on analyzing the impact of infrastructure on poverty and inequality. For instance, in a study exploring the link between infrastructure reform and poverty alleviation in Latin America, Estache et al. (2002) emphasized the need to rely on infrastructure investment as a tool in tackling poverty when access and affordability of basic services remain a crucial problem. Another study by Calderón and Servén (2004) provided empirical evidence on infrastructure and income inequality and realized that higher levels of infrastructure stock and quality result in lower income inequality. The results of the study suggest that infrastructure development is crucial in alleviating poverty among the poor in most countries.

This chapter relates to the strand of literature that analyzes the effect of infrastructure on economic growth but the point of deviation is that, it disaggregates the economy-wide growth to its sector components. It is imperative to note that while most studies on SSA (Kodongo and Ojah 2016; Chakamera and Alagidede 2018) devoted to understanding the infrastructure–economic growth nexus gives us a holistic understanding of the relevance of infrastructure on growth, they fail to provide more nuanced information that is important for sector-level policies; and that is the gap that this study aims to fill. Specifically, it analyzes the impact of infrastructure on agriculture, industry, and services sectors across countries over time

periods. Apart from few country-specific studies on the role of infrastructure on the manufacture (Mesagan and Ezeji 2016; Ogwo and Agu 2016), industry (Akekere et al. 2017), and service sectors in Nigeria (Thamarapani 2013) as well as the agriculture sector in Nigeria (Ighodaro 2010) and Philippines (Llanto 2012), no other study to the best of our knowledge has examined the relationship between infrastructure development and sectoral growth using panel data for SSA countries.

The rest of the chapter is organized as follows: the next section presents a literature review on the relationship between infrastructure and economic growth, followed by a discussion of the methodology. The last two sections present the results and discussions, and policy implications, respectively.

2 Brief Literature Review

There is evidence to suggest that infrastructure positively impacts economic growth in Africa. For example, Fedderke et al. (2006) found robust evidence that infrastructure investments led to economic growth in South Africa. Another study by Owolabi-Merus (2015) equally found a positive and significant relationship between infrastructure development and economic growth in Nigeria. Estache and Vagliasindi (2007) emphasized the importance of infrastructure investment choices (e.g., tradable versus non-tradable and rural versus urban areas) in stimulating economic development in Ghana. They further stressed the need to manage institutions (regulatory function) in infrastructure to accelerate growth. Focusing on electricity infrastructure, Wolde-Rufael (2005) established a long-run relationship between energy use and economic growth relying on data for 19 African countries from 1971 to 2001. Again, Wolde-Rufael (2006) examined the long-run and causal relationship between electricity consumption and economic growth for 17 African countries. The findings from the study showed that whereas a long-run relationship between electricity consumption and economic growth exist for only nine countries, causality was also established for only 12 countries. Similarly, Nsiah and Fayissa (2016) analyzed the long-run relationship between infrastructure investment and economic growth. Relying on Panel Fully Modified OLS (PFMOLS) model and panel data for 50 African countries spanning from 1995 to 2012, the authors found all measures of infrastructure (transportation, sanitation, water, and communication) to be positive and significantly enhance long-run economic growth, except for the electricity measure of infrastructure.

Looking at SSA, Estache et al. (2005) studied the role of geography and legal origins in the infrastructure–growth nexus. Evidence from their study showed that when the indicators of telecommunication, roads, and water are used as proxies for infrastructure, the economic growth effect is higher in Anglophone countries compared to non-Anglophone countries. The study further found no difference in the growth effect of infrastructure in the coastline and landlocked countries in SSA except when roads indicator was used as a proxy for infrastructure. Specifically, it was revealed that the impact of infrastructure (paved roads per capita) on economic growth is higher among coastline countries compared to landlocked countries. In a related study, Calderón and Servén (2010) examined infrastructure and economic development in SSA. Their study found that infrastructure quantity and quality have a positive (negative) impact on economic growth (income inequality). Furthermore, Kodongo and Ojah (2016) also examined the infrastructure–growth nexus in SSA. The results of the study based on system GMM and panel data between 2000 and 2011 indicated that infrastructure spending and access play important role in fostering economic growth and development. The study revealed again that the impact of infrastructure spending on economic growth is relatively more important for lesser developed economies than more developed economies. More recently, Chakamera and Alagidede (2018) applied system GMM to examine the effect of infrastructure quantity and quality on economic growth. The authors found strong evidence of a positive effect of infrastructure development on economic growth, with the greatest contribution coming from infrastructure quantity. Further evidence shows a unidirectional causality from infrastructure to economic growth.

An aspect of the infrastructure-growth literature that has less understanding relates to the impact of infrastructure on sectoral growth. This notwithstanding, Ogwo and Agu (2016) researched on the transport infrastructure, manufacture sector performance, and economic growth in Nigeria over the period from 1999 to 2011. Results from the study indicated that road infrastructure quality dampens manufacturing capacity utilization which in turn significantly affects the manufacturing production index. There is also evidence that the contribution of the transport and manufacturing sector to economic growth is inhibited by the annual budgetary allocation to the transport sector. Llanto (2012) found a significant positive link between rural infrastructure and agricultural productivity. More specifically, it was realized in the study that electricity and roads are crucial determinants of agricultural productivity. In addition, Ighodaro (2010) examined infrastructure and agricultural growth in Nigeria and concludes that whereas the relationship between telecommunication infrastructure and agricultural growth is

significant and positive, that of electricity supply and agricultural growth is significant but negative. Using cointegration analysis, Thamarapani (2013) established a significant positive relationship between telecommunication infrastructure growth and service sector growth. Also, the study found a unidirectional causal relationship between telecommunication infrastructure growth and service sector growth.

From the foregoing, it can be realized that the literature on infrastructure–growth nexus is inconclusive because extant panel studies have relied on an aggregate measure of economic growth. Nevertheless, we argue that the aggregate measure of economic growth is not informative since infrastructure potentially impacts on economic growth through various sectors of an economy. In this chapter, we examined the relationship between infrastructure and the growth of specific sectors like agriculture, service, and industry in SSA.

3 Methodology

Data

The chapter uses panel data for 29 SSA countries[2] for the 2000–2014 period. The choice of countries is based on data availability over the sampling period. We gleaned these data from different sources. Data on sectoral growth, inflation, labor, government expenditure, terms of trade, and telecommunication infrastructure were sourced from the WDI of the World Bank. Data on financial infrastructure was also obtained from the Global Financial Development database of the World Bank. Again, data on political stability was gleaned from the Polity IV Project (Centre for Systemic Peace). Data on energy infrastructure was obtained from International Energy Statistics. Sanitation and water infrastructure data were also sourced from the WHO/UNICEF (Joint Monitoring Programme). Finally, the transport infrastructure was obtained from the Central Intelligence Agency (CIA) Factbook (Photius Coutsoukis).

The main variable, infrastructure development, is computed as an index using the Principal Component Analysis (PCA),[3] taking into account the quantity and quality dimensions of infrastructure. This was done to overcome the criticism against the use of a single variable measure of infrastructure. According to Calderón and Servén (2010, as cited in Kodongo and Ojah 2016), "measuring infrastructure as a single variable fails to capture

[2] See Table 5 for the list of countries.

[3] Refer to Sect. 3.2 for discussion on the computation of the infrastructure development index.

the multi-dimensional and heterogeneity of infrastructure across periods and countries." Following Donaubauer et al. (2016) and Chakamera and Alagidede (2018), the chapter relied on the following indicators of infrastructure: (i) *Energy infrastructure*—electricity generation capacity—billions of Kilowatts, (ii) *Telecommunication infrastructure*—fixed telephone and mobile phone subscriptions per 100 persons, (iii) *Water (Sanitation) infrastructure*—number of persons with access to improved drinking water (sanitation) per every 1000 population, (iv) *Transport infrastructure-* Roadways (km), paved roads(km), (v) *Financial infrastructure (using finance indicators measuring depth, efficiency and stability*[4]*)*—Domestic credit to the private sector as a percentage of GDP, bank cost to income ratio, Bank Z-score (captures the probability of default of a country's commercial bank system). We relied on the real value-added output in the agriculture, service, and industry sectors as proxies for sectoral growth. These measures have been widely used in the literature (see for instance, Kumi et al. 2017) and they served as dependent variables in our models used in examining the infrastructure–sectoral growth nexus. Value added in the agriculture sector is measured as net output after summing all output of the sector less intermediate inputs. With regard to the service sector, the value added includes wholesale and retail trade (including hotels and restaurants), transport, government, financial, professional, and personal services such as education, health care, and real estate service. Likewise, value added in the industry sector consists of value additions in the manufacturing, mining, electricity, construction, gas, and water.

A choice of control variables is based on the standard neoclassical growth theory and include; inflation, government expenditure, labor, political stability, and terms of trade. Inflation variable is defined as GDP deflator, which is used to capture the rate of price changes and is expected to negatively impact sectoral growth. Government expenditure is used as a measure of final government consumption expenditure expressed as a percentage of GDP. While labor is expressed as the percentage of the economically active population aged 15–64 years, terms of trade is net barter terms of trade computed as the ratio of export to import price. Political stability (measured by polity2) is defined as a regime score that ranges from +10 (full democracy) to −10 (full autocracy). This score was derived by deducting the autocracy (AUTOC) value from the democracy (DEMOC) value.

[4] Finance indicator measuring access was excluded because data points were not available for all countries includedin the study.

Computing Infrastructure Development Index

By way of creating an index of infrastructure development to respond to the criticism against the use of a single variable measure of infrastructure, we employed the PCA. The novelty of PCA is that it transforms large data set of variables, which are possibly correlated because measuring the same dimension, into a smaller set of linearly uncorrelated variables referred to as principal components which represent most of the information in the original variables (Joliffe 2002). The PCA is designed in such a way that the first principal component explains much of the variations among the original variables. Additional principal components are computed to account for the remaining variance among the original correlated variables and they are normally independent of the previous principal components. The cut-off point for the number of principal components is based on the magnitude of their variances (Habyarimana et al. 2015). In this chapter, PCA was used to combine important indicators of infrastructure into a single index. Preferably, the first component was used since it accounts for the greater variability in the original variables. Mathematically, the principal component approach is expressed below as Eq. 1;

$$\text{INFRA}_j = b_{11} X_1 + b_{12} X_2 + \ldots + b_{1P} X_P \tag{1}$$

where $X_1, X_2, \ldots, X_P$ are variables under study (indicators of infrastructure), INFRA_j denotes first principal components, and b_{1P} represent the factor score coefficients(weights).

Empirical Strategy

Following Kumi et al. (2017), we specify a baseline model in Eq. (2) where infrastructure development and other control variables relate to agriculture sector growth. For brevity, we specify only models for the agriculture sector while leaving the industry and service sectors to follow the specifications in Eqs. (2) and (3), respectively.

$$AGRIC\_SECT_{it} = f\begin{pmatrix} INFRA_{it}, LAB_{it}, INF_{it,} \\ TOT_{it,} GEXP_{it}, PSTAB_{it} \end{pmatrix} \tag{2}$$

where $i = 1, 2, 3, \ldots, N$ is the cross-sectional dimension of countries; $t = 1, 2, 3, \ldots, T$ represent time; $AGRIC\_SECT_{it}$ denotes agriculture sector growth; $INFRA_{it}$ is the index for infrastructure development; LAB_{it} represents labor; $INF_{it,}$ is inflation; $TOT_{it,}$ denotes terms of trade, $GEXP_{it}$ is government expenditure, and $PSTAB_{it}$ represents political stability. These variables entered into our model based on the standard neoclassical growth model where economic growth depends on capital, labor, and total factor productivity.

On this score, we relied on an empirical strategy to estimate a dynamic log-linear baseline equation where agriculture sector growth depends on its initial lag, infrastructure development, and set of standard control variables. This is specified in Eq. (3) as follows:

$$\begin{aligned} logAGRIC\_SECT_{it} &= \delta_o logAGRIC\_SECT_{it-1} \\ &+ \delta_1 INFRA_{it} + \delta_2 \log LAB_{it} + \delta_3 INF_{it} \\ &+ \delta_4 logTOT_{it} + \delta_5 logGEXP_{it} + \delta_6 PSTAB_{it} \\ &+ \alpha_i + \gamma_t + \mu_{it} \end{aligned} \tag{3}$$

where $logAGRIC\_SECT_{it-1}$ is the logarithm of the initial lag of agriculture sector growth; α_i is unobserved country-specific effects; γ_t is the time-specific effects; and μ_{it} is the idiosyncratic error term. All other variables denote their usual meaning. It is worth noting that in estimating such a model, one potential problem usually encountered is the presence of endogeneity. The simultaneous presence of $logAGRIC\_SECT_{it-1}$ and α_i in Eq. (3) potentially shows endogeneity because the lagged dependent correlates with the error term. To resolve the endogeneity issue, we relied on the system GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998), which combines a system of regression in difference and levels. The novelty of this estimator relative to difference GMM estimator is that it improves efficiency and avoids weak instrument problems. More specifically, we relied on the system GMM estimator because the alternative estimator (difference GMM) has poor finite properties when the regressors are persistent (Arellano and Bover 1995).

For our post estimations to check for model adequacy, we employed two formal tests, namely, serial correlation test and Hansen's test for over-identification restriction. While the serial correlation test examines the null hypothesis that the error term is serially uncorrelated (whether first or second-order), Hansen's test examines the exogeneity of the instruments with the null hypothesis that over-identifying restrictions are valid.

4 Results and Discussion

Preliminary Findings

Before presenting our main empirical results, we proceed with a discussion of descriptive statistics of all variables employed in the study. These statistics are shown in Table 1.

From the Table, we observe average value additions of 26.4%, 47.2%, and 26.3%, during the 2000–2014 period for the agriculture, service, and industry sectors, respectively. This suggests a high growth for the service sector compared to agriculture and industry sectors. Further evidence indicates that while sectoral value additions vary widely, the values of their standard deviation also show a high degree of variability. This is more associated with the agriculture sector growth given its high standard deviation of 13.6 relative to 10.1 and 10.8 of the industry and service sectors, respectively. Infrastructure development index measured using indicators from the energy, telecommunication, water, sanitation, transport, and financial sectors were found to have a standardized mean of approximately zero and standard deviation of 1.89. This finding is akin to Donaubauer et al. (2016). To have a glimpse of the pattern of variables used in computing the infrastructure development index over the sample period, we equally present their summary statistics. Starting with the energy infrastructure, we realized that average installed electricity generating capacity is 11.07 billion kilowatts, with some countries generating as low as 0.047 billion kilowatts and others as high as 245.58 billion kilowatts. This suggests a widespread of SSA's electricity generating capacities. For the telecommunication infrastructure, there is evidence of high mobile phone usage as the average value of mobile phone subscriptions (per 100 people) is estimated at 35.16% relative to the fixed telephone subscriptions (per 100 people) which have a mean value of 2.70%. On average, while 68.1% of the sampled countries' population have access to improved drinking water, only 31.1% have access to improved sanitation. The low rate of access to improved sanitation reiterates the need to pay more attention to the inadequate sanitation condition in SSA. As for the transportation infrastructure, we observe a mean length of 50,255.53 kilometers over the study period. What is more worrisome is the small length of paved roads averaged 7,923.458 kilometers. On the components of financial infrastructure, we observe that bank cost to income ratio (financial sector efficiency), bank z-score (financial sector stability), and domestic credit to the private sector (financial sector depth), respectively averaged 59.89%, 12.14%, and 21.67%. This suggests that the efficiency of the financial sector compared

Table 1 Descriptive statistics (2000–2014)

	Observations	Mean	Standard Deviation	Minimum	Maximum
Dependent Variables	434	26.403	13.604	2.032	56.925
Agriculture sector growth					
log (Agriculture sector growth)	434	1.321	0.354	0.308	1.755
Service sector growth	434	47.246	10.146	20.542	73.985
log (Service sector growth)	434	1.664	0.098	1.313	1.869
Industry sector growth	434	26.336	10.808	3.163	66.293
log (Industry sector growth)	434	1.385	0.180	0.500	1.821
Independent Variable					
Infrastructure development index	399	0.000	1.889	−4.233	5.762
Indicators					
Energy Infrastructure	435	11.070	41.421	0.047	245.582
Electricity generation capacity					
Telecommunication infrastructure					
Fixed Telephone subscriptions	432	2.708	5.500	0	31.503
Mobile phone subscriptions	434	35.163	37.523	0.019	171.375
Water and Sanitation Infrastructure					
Access to improved drinking water	435	68.100	15.276	38	99.9
Access to improved sanitation	435	31.109	19.377	6.6	93.2

(continued)

Table 1 (continued)

	Observations	Mean	Standard Deviation	Minimum	Maximum
Transport Infrastructure					
Roadways (km)	435	50.255.53	75.231.46	1860	534.131
Paved roads (km)	419	7923.458	14.848.04	206	73.506
Financial Infrastructure					
Domestic credit to the private sector	428	21.676	27.296	0	160.125
Bank Z-score	431	12.147	6.9413	2.812	46.403
Bank cost to income ratio	428	59.890	12.563	21.026	99.488
Control Variables					
Labour	435	54.129	4.595	47.018	71.025
log (Labour)	435	1.732	0.035	1.672	1.851
Inflation	435	14.538	126.220	−18.075	2630.123
Government expenditure	434	14.181	5.084	2.058	31.573
log (Government expenditure)	434	1.122	0.166	0.313	1.499
Terms of trade	432	118.227	36.371	21.397	235.391
log (Terms of trade)	432	2.053	0.133	1.330	2.372
Political stability	432	2.442	5.053	−9	10

Source Authors' Computations

to stability and depth is much higher. Furthermore, labor force is averaged 54.12% and shows less variability across the countries. The average inflation rate is 14.53%, suggesting that the sample period under consideration is characterized by double-digit inflation. Similarly, the mean of government expenditure as a percentage of GDP is also 14.18%. Besides, the average value of terms of trade is quite high indicating favorable terms of trade over the sample period. Conversely, political stability shows a mean value of 2.44, suggesting a low level of political stability. This clearly emphasizes the necessity to deepen SSA's democratic principles (Osei et al. 2017). Table 6 provides the correlation coefficients of all variables used in the study.

Relationship Between Infrastructure Development and Sectoral Growth

This section systematically examines the relationship between infrastructure development and sectoral growth in SSA. Tables 2–4 show the system GMM results of four different specifications of the impact of infrastructure development on sectoral growth proxied by real value additions of agriculture, industry, and service sectors. We regress infrastructure development (computed as the first principal component of infrastructure indicators—*see Table 7 for the result on the PCA*) and the initial lag of the dependent variable together with other standard control variables on real sectoral value additions of agriculture, industry, and service sectors. We also include time and country effect dummies in our estimations to account for time and country-level heterogeneity. In all our estimations, we used Hansen's test of over-identification restriction to assess the overall validity of the instruments and found that all *p*–values are insignificant. This suggests that we fail to reject the null hypothesis of the overall exogeneity of the instruments. Besides, we test for autocorrelation and the results indicate no evidence of second-order autocorrelation since the *p*–values for (AR [2]) were statistically insignificant. To check for the models' adequacy, we rely on the *p*–values of the Wald chi-square statistic. The high (low) Wald chi-square statistic (*p*–values) shows that the regressors in each model are jointly significant. Conclusively, our post-estimation tests suggest that our models are well specified and the results discussed below provide consistent and unbiased estimates.

Closely looking at Tables 2–4, it can be realized that the coefficients of the lagged dependent in all the models are positive and statistically significant, suggesting that past values of real sectoral value additions positively influence current values of sectoral value additions although the effects are less than unity except in Table 2 (column 3). On the infrastructure–sectoral growth nexus, as shown in Tables 2–4, the coefficient of infrastructure development is positive in all sectors except the agriculture sector which is negative and statistically insignificant. This insignificant result is unsurprising because infrastructure is made up of several indicators of which some may not directly relate to agriculture sector growth. Nevertheless, a more plausible explanation for this finding could also be attributed to the inadequate and underdevelopment of the infrastructure in the agriculture sector in SSA, which potentially constrains agricultural productivity and growth. On the policy front, this

Table 2 Effect of infrastructure development on agriculture sector growth in SSA (2000–2014)—System GMM estimations

[Dependent variable: log (Agriculture Sector Growth)]				
	1	2	3	4
Lagged dependent	0.8848*** (0.0801)	0.9591*** (0.0443)	1.0058*** (0.0234)	0.9803*** (0.0416)
Infrastructure development	– 0.0209 (0.0127)	– 0.0114 (0.0071)	– 0.0030 (0.0032)	– 0.0126 (0.0077)
log (Labour)	0.0932 (0.0642)	0.0368** (0. 0182)	0.0256** (0.0120)	0.0327*** (0.0126)
Inflation	– 0.0019 (0.0017)	– 0.0003 (0.0002)	– 0.0004* (0.0002)	– 0.0005* (0.0003)
log (Terms of Trade)	–	– 0.0059 (0.0269)	– 0.0217 (0.0178)	– 0.0112 (0.0228)
log (Government Expenditure)	–	–	– 0.0083 (0.0117)	– 0.0109 (0.0096)
Political Stability	–	–	–	0.0018** (0.0008)
Diagnostics				
Country and time effects	YES	YES	YES	YES
Wald χ^2 [*p*–value]	1.180.000 [0.000]	821.433.10 [0.000]	6.610.000 [0.000]	970.508.87 [0.000]
Hansen test [*p*–value]	4.66 [0.324]	16.29 [0.234]	20.25 [0.319]	20.27 [0.162]
AR (2) [*p*–value]	– 1.57 [0.116]	– 1.12 [0.264]	– 1.00 [0.317]	– 1.08 [0.281]
No. of groups	29	29	29	29

Note *, **, and *** denote 1 0, 5, and 1% significance level respectively. Dependent variable (agriculture sector growth) and all other independent variables are estimated in logs except infrastructure development index, inflation, and political stability

finding may reflect the need to improve infrastructure in the agriculture sector to stimulate productivity and growth.

With regard to the industry sector, infrastructure development is positively related to output growth and it is robust at a 10% level of significance in all specifications except in column 1 when we do not control for terms of trade, government expenditure and political stability. From Table 3, the industry sector value addition increases by 0.47% (see column 4) when there is a unit percentage improvement of infrastructure. The implication is that

Table 3 Effect of infrastructure development on industry sector growth in SSA (2000–2014)—System GMM estimations

[Dependent variable: log (Industry Sector Growth)]				
	1	2	3	4
Lagged dependent	0.9314***	0.7571***	0.7350***	0.7172***
	(0.0274)	(0.0225)	(0.0178)	(0.0265)
Infrastructure development	0.0022	0.0038**	0.0037*	0.0047*
	(0.0015)	(0.0017)	(0.0020)	(0.0025)
log (Labour)	0.0573***	0.1458***	0.1590***	0.1817***
	(0.0218)	(0.0203)	(0.0239)	(0.0377)
Inflation	– 0.0008***	– 0.0004***	– 0.0004***	– 0.0003**
	(0.0002)	(0.0001)	(0.0001)	(0.0001)
log (Terms of Trade)	–	0.0436***	0.0432***	0.0323*
		(0.0098)	(0.0088)	(0.0179)
log (Government Expenditure)	–	–	0.0056	0.0159
			(0.0084)	(0.0105)
Political Stability	–	–	–	– 0.0015**
				(0.0007)
Diagnostics				
Country and time effects	YES	YES	YES	YES
Wald χ^2	593.694.77	697.570.20	621.181.40	476.659.57
[*p*–value]	[0.000]	[0.000]	[0.000]	[0.000]
Hansen test	16.08 [0.138]	25.17	22.65	22.26
[*p*–value]		[0.155]	[0.253]	[0.175]
AR (2)	– 0.77 [0.443]	0.30	0.30	0.29
[*p*–value]		[0.761]	[0.762]	[0.773]
No. of groups	29	29	29	29

Note *, **, and *** denote 1 0, 5, and 1% significance level respectively. Dependent variable (Industry sector growth) and all other independent variables are estimated in logs except infrastructure development index, inflation, and political stability

improvement in infrastructure (e.g., roads, electricity, telecommunication, water, etc.) leads to increased productivity, competitiveness, and employment which further translate into industrial growth. For the service sector, a unit percentage increase in infrastructure magnifies real service sector value additions by 0.44% (see Table 4: Column 4). This suggests that, as infrastructure stock and quality increases, infrastructure services such as transport, water, energy, telecommunication, and financial increases translating into higher employment levels and support for other sectors which propels output growth in the service sector. Comparing the magnitude of the coefficients in the infrastructure–sectoral growth nexus after controlling for terms of trade,

Table 4 Effect of infrastructure development on service sector growth in SSA (2000–2014)—System GMM estimations

[Dependent variable: log (Service Sector Growth)]				
	1	2	3	4
Lagged dependent	0.4757*	0.6398***	0.4622***	0.4889***
	(0.1841)	(0.1333)	(0.0865)	(0.0902)
Infrastructure development	0.0066***	0.0044***	0.0058***	0.0044***
	(0.0019)	(0.0012)	(0.0016)	(0.0014)
log (Labour)	0.5091***	0.4129***	0.5676***	0.5326***
	(0.1786)	(0.1591)	(0.0847)	(0.0904)
Inflation	− 0.0005*	− 0.0003	− 0.0002	− 0.0003
	(0.0003)	(0.0003)	(0.0002)	(0.0002)
log (Terms of Trade)	–	− 0.0533*	− 0.0732***	− 0.0620***
		(0.0274)	(0.0126)	(0.0113)
log (Government Expenditure)	–	–	0.0609**	0.0544***
			(0.0159)	(0.0139)
Political Stability	–	–	–	0.0007
				(0.0007)
Diagnostics				
Country and time effects	YES	YES	YES	YES
Wald χ^2	473.914.12	772.210.20	946.751.93	950.078.02
[*p*–value]	[0.000]	[0.000]	[0.000]	[0.000]
Hansen test	4.99	8.71	9.35	10.16
[*p*–value]	[0.545]	[0.368]	[0.499]	[0.516]
AR(2)	0.29	0.44	0.43	0.44
[*p*–value]	[0.769]	[0.661]	[0.668]	[0.660]
No. of groups	29	29	29	29

Note *, **, and *** denote 1 0, 5, and 1% significance level respectively. Dependent variable (service sector growth) and all other independent variables are estimated in logs except infrastructure development index, inflation, and political stability

government expenditure, and political stability, we observe a higher impact in the industry sector relative to the service sector.

Turning to the control variables, we found the coefficient of labor to be significantly positive in all sectors although less robust in the agriculture sector since not all specifications are significant (refer to Table 2: Column 1). Specifically, a unit percentage increase in labor force increases growth by 0.53% in the service sector and 0.18% in the industry sector compared to 0.03% in the agriculture sector. This suggests that labor is output enhancing in all sectors in SSA. This finding is consistent with Kumi et al. (2017). The variable inflation proxied by GDP deflator captures the rate of price changes

in the region and its significance suggests a negative impact on output growth in all sectors except the service sector. By implication, our evidence indicates that higher inflation deteriorates output growth in the industry and agriculture sectors. Moreover, whereas the coefficients of terms of trade are significant and have alternate signs in the industry and service sector, it is insignificant in the agriculture sector. Specifically, for the industry sector, it was realized that the output growth impact of terms of trade is positive which suggests that favorable terms of trade lead to a higher impact on industry sector growth. This result conforms with the study of Chakamera and Alagidede (2018) despite using an aggregate measure of growth.

On the contrary, the effect of terms of trade on output growth is negative in the service sector and this is robust irrespective of the model specification. This result suggests that an increase in service sector growth worsens terms of trade. Further, it was again realized that terms of trade is not an important factor in explaining output growth in the agriculture sector. This result is contrary to the study of Hazell et al. (1995) in India, implying that increase in the agriculture output worsens terms of trade. Given the coefficient of government expenditure, we observe that while a positive and significant relationship was found between government expenditure and real value addition in the service sector, no relationship was established between government expenditure and the real value addition in the agriculture and industry sector. This implies that government expenditure is a crucial determinant of service sector growth. Besides, using polity2 to proxy political stability in SSA, we establish a positive relationship between political stability and output growth in the agriculture sector, suggesting that the existence of democracy creates a stable environment which accelerates growth in the agriculture sector. By contrast, the result from the industry sector in Table 3 indicates a negative effect of political stability on output growth. Further evidence indicates no relationship between political stability and service sector output growth. These findings highlight the need to continuously strengthen democratic laws and principles to ensure a favorable environment to support sectoral growth in SSA.

5 Conclusion and Policy Implications

Infrastructure is a key barometer to sustainable economic growth as it enhances the competitiveness of key sectors by reducing transaction and trade costs as well as enhancing market accessibility. Despite this, earlier studies attempting to analyze the relationship between infrastructure and

growth have not been informative as they failed to examine the impact of infrastructure development on specific sectors of economies across countries. Building on recent empirical evidence, this chapter examined the infrastructure–sectoral growth nexus by relying on panel data for 29 SSA countries for the 2000–2014 period.

Our evidence based on system GMM shows a positive and significant effect of infrastructure development on sectoral value additions of the industry and service sectors. The implication of this finding is that the improvement of infrastructure propels output growth. More specifically, in the case of the industry sector, infrastructure improvement is critical since it potentially increases productivity, competitiveness, and employment levels which further leads to higher output growth. In the service sector, the finding is very important because it gives an indication that additional infrastructure increases infrastructure services such as transport, water, energy, telecommunication, financial, among others which lends support to other sectors of an economy and also, generates higher employment levels leading to output growth. However, it was realized that there is no relationship between infrastructure development and agriculture sector value addition. This highlights the infrastructure gap and the need to heavily improve infrastructure in the agriculture sector to stimulate productivity and growth.

Based on the findings, we also conclude that there are shared and differential determinants of output growth in the agriculture, industry, and service sectors in SSA. Specifically, among our control variables, we found labor as the only crucial determinant of output growth in all sectors. This means that labor, which is needed in all sectors, as a factor of production matters more in explaining sectoral growth in SSA. Additionally, while inflation and political stability are the shared determinant of output growth in the agriculture and industry sectors, terms of trade is also found as the shared determinant of output growth in the industry and service sectors. Government expenditure measured by final government consumption expenditure enhances only service sector value addition and hence, serves as a different determinant of output growth in the agriculture and industry sectors in SSA. By implication, government expenditure matters more in explaining service sector growth.

On the policy front, our evidence highlights the differential impact of infrastructure development on sectoral growth in SSA. It is worth mentioning that our findings are informative and present crucial insights for policymakers and regulators, especially in SSA to design and implement policies targeted at improving infrastructure to propel the growth of specific sectors such as

agriculture, industry, and service sectors. Our study has opened new avenues necessitating further research efforts. It will be interesting to focus on specific infrastructure sectors (e.g., power, telecommunication, transport, water, sanitation, etc.) and examine its impact on sectoral growth. Perhaps the growth impact of infrastructure may be well explained by a particular category of infrastructure relevant to a specific sector of an economy.

Appendices

See Tables 5, 6, and 7

Table 5 List of countries

1. Benin	16. Mali
2. Botswana	17. Mauritius
3. Burkina Faso	18. Mauritania
4. Burundi	19. Mozambique
5. Cameroon	20. Namibia
6. Central African Republic	21. Niger
7. Chad	22. Nigeria
8. Congo Democratic Republic	23. Rwanda
9. Cote d'Ivoire	24. Senegal
10. Gabon	25. South Africa
11. Ghana	26. Sudan
12. Guinea	27. Togo
13. Kenya	28. Uganda
14. Madagascar	29. Zimbabwe
15. Malawi	

Table 6 Correlation coefficients

	AGRIC_SECT	INDUS_SECT	SERV_SECT	INFRA	LAB	INF	TOT	GEXP	PSTAB
AGRIC_SECT	1.0000								
INDUS_SECT	−0.6304	1.0000							
SERV_SECT	−0.4715	−0.1745	1.0000						
INFRA	−0.7564	0.3758	0.4992	1.0000					
LAB	−0.3891	0.2197	0.1361	0.2743	1.0000				
INF	0.0984	−0.0072	−0.1120	−0.0531	−0.0347	1.0000			
TOT	0.0731	0.1251	−0.2951	0.0273	−0.2038	0.0720	1.0000		
GEXP	−0.2919	0.1161	0.3349	0.3917	0.0842	−0.1567	−0.0327	1.0000	
PSTAB	−0.2554	−0.0227	0.3486	0.4157	−0.1177	0.0715	−0.1414	0.3229	1.0000

Note AGRIC_SECT is agriculture sector growth; SERV_SECT is service sector growth; INDUS_SECT is industry sector growth; LAB, INF, GEXP, TOT, INFRA and PSTAB denote labour, inflation, government expenditure, terms of trade, infrastructure development index and political stability respectively

Table 7 Principal component analysis for infrastructure index

	Eigenvalue	Proportion	Cumulative
PC 1	3.570	0.357	0.357
PC 2	2.162	0.216	0.573
PC 3	1.055	0.106	0.679
Diagnostic	Overall value		
Kaiser–Meyer–Olkin Measure of Sampling Adequacy	0.719		

Source Authors' Computations

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Female Labor Force Participation, Infrastructure, and Sectoral Value Additions in Sub-Saharan Africa

Thomas Yeboah, Emmanuel Kumi, and Muazu Ibrahim

1 Introduction

Across the globe, men tend to participate more in the labor market than females. In many contexts, men have historically performed productive roles while women traditionally engage in unpaid domestic work and reproductive roles including caring for children. In this regard, the contribution of women to national production and income has historically been far more limited (Bianchi et al. 2000; Gasparini and Marchionni 2015; Ortiz-Ospina and Tzvetkova 2019; Kelan 2018). One of the most striking phenomena of the new millennium is the extent to which women have increased their share of

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the labor force. The increasing involvement of women in paid work has been driving employment trends (Chen et al. 2014; Gasparini and Marchionni 2015; Klasen 2019). Indeed, the gender differences in labor force participation rates have been narrowing over the last three decades. According to the World Development Report (2012), the global rate of female labor force participation increased slightly from 50.2% in 1980 to 51.8% in 2008 whereas the male participation rate fell from 82 to 77.7% over the same period.

The International Labor Organization (ILO) estimates, however, indicate that despite strong economic growth rates in emerging and developing economies, the rate of female labor participation across the globe declined from 51.3% in 1998 to 48.5% in 2018 (ILO 2018). Whereas an estimated 307 million women have joined the labor market over the last two decades, females account for just 39.2% of the global labor force (ILO 2018; Verick 2018). Notwithstanding the fall in global female labor force participation rates, the gender gap in labor force participation has narrowed. Data from the World Development Report suggest that the gender gap in labor force participation narrowed from 32% points to 26% points for the period between 1980 and 2008 (World Development Report 2012). For the period between 1998 and 2018, the gender gap in labor force participation further narrowed slightly from 27.5% points to 26.6% points (ILO 2018).

Forecast indicates that female labor force participation rates will fall in the next coming decades to reach an estimated figure of 45.9% in 2030 (Verick 2018). This suggests that unless trends are reversed through policy measures, the goal of improving labor market outcomes for women will be far from reality (Verick 2018). Regional distribution of female labor participation across developing and emerging markets shows considerable variation, far more than the participation of men. Compared to South Asia, North Africa, and Middle East, where the labor force participation of those aged 15 years and older is less than 30%, female labor force participation for Sub-Saharan Africa (SSA) has hovered around 60% between 1998 and 2018. With the exception of Africa, labor force participation is significantly higher for females than males in all the regions of the world (World Development Report 2012; World Bank 2019).

An avalanche of theoretical and empirical research has sought to examine the reasons for the increasing participation of women in paid work (see Ejaz 2007; Rahman and Islam 2013; Roby et al. 2016; Appiah 2018; Verick 2018). The existing literature tends to gravitate toward the conclusion that

the determinants of women labor force participation vary greatly and are shaped by changes in the pattern of economic growth, fertility rates, educational attainment, social norms, the extent of support for women in childcare, and the quality of women's employment or jobs (Klasen 2019; Verick 2018). The relationship between how women participate in the labor market and evolving demographic and socioeconomic factors is multidimensional. On the one hand, the participation of women in the world of work is shaped by poverty levels, particularly in low-income economies, and on the other hand, by rising educational attainment of women and the opportunity structures for employment that are open to women in the more advanced economy.

Also, during times of economic crisis, women may be compelled to move out of the household economy to take up jobs (mainly informal in nature) to complement household income and expenditure (Cazes and Verick 2013; Verick 2018).

For the most part, studies on female labor force participation have heavily concentrated on the factors influencing their participation in the labor market albeit with mixed evidence. What is missing in the literature is the impact of female labor force participation on the various sectors of the economy. To the extent that female labor force participation affects overall economic growth through its effect on sectoral contributions, this chapter deviates from focusing on aggregate growth to investigate the unique contributions of female labor participation on the various sectors of the economy. Focusing on aggregate growth may create the notion that women labor force participation and contribution to economic growth is equal for all sectors. However, delineating the disaggregated effect on sectoral value additions has far-reaching implications for policy as it potentially reveals the disproportionate effects. As far as we know, there exists no study that has examined the unique sectoral effects of women labor force participation in the agriculture, industrial, and services sub-sectors. This has created a gap in knowledge that needs urgent attention. More tellingly, while building domestic level of infrastructure is one of the major preoccupations of countries in SSA, till date, we do not know how infrastructural development mediates the relationship between female labor force participation and sectoral growth. In this regard, the specific objective of this chapter is to examine the unique contribution of women's labor force participation on sectoral value additions in SSA in addition to investigating the moderating effect of infrastructure in female labor force participation-sectoral value additions link.

The chapter, therefore, makes significant contributions to the literature in several ways. Anecdotally, discussions on the contribution of women to the various sectors have largely been gleaned from public discourses with very

little empirical backing. To the best of our knowledge, this chapter presents pioneering empirical evidence on the impact of female labor force participation on the various sectors of the economy. In this endeavor, we reveal the disproportionate effect of women's contribution to sectoral value additions. We also unearth the referring role of infrastructure in the impact of female labor force participation on each sector. Through this, the chapter brings to bear whether domestic level of infrastructure magnifies or dampens the effect of female labor force participation. Methodologically, in addition to using recent data, the chapter relies on an estimation approach that is capable of controlling for the potential endogeneity in labor force participation–sectoral growth nexus and by so doing, this chapter produces efficient and reliable estimates. The chapter finds that, while female labor force participation positively affects sectoral value additions, it is only significant for the service sector with no apparent effect on the industrial and agricultural sectors. More so, our evidence also suggests the impact of female labor force participation on the service sector is further magnified by improved infrastructure.

The remainder of the chapter is organized as follows. The next section provides a brief overview of existing literature on female labor force participation. This is followed by stylized facts on female labor force participation, sectoral value additions, and infrastructure. Methodology, data, and empirical strategy follow subsequently, with the findings and discussions, and policy implications provided in the last two sections.

2 Literature Review of Female Labor Force Participation

Undoubtedly, there is dearth of theoretical and empirical studies on the relationship between female labor force participation and sectoral value additions. The existing literature is heavily concentrated on what drives women's participation in the labor market. Broadly, the literature on determinants of female labor force participation in the developing world can be summarized under three strands. The first strand relates to fertility decline. In all regions with the exception of SSA, fertility has declined to levels as low as below three children per woman by 2010. The recent pace of fertility declines in some regions, notably in South Asia and Middle East and North Africa (MENA) is remarkable. This reduction has meant that the time that women spend with being pregnant and caring for babies has reduced significantly, providing space for greater participation in the labor market (Rahman and Islam 2013;

Klasen 2019). Nonetheless, the empirical literature, however, remains inconclusive on the relationship between fertility decline and female labor force participation. Whereas cross-country studies report positive association (De Laat and Sevilla–Sanz 2011), several country-specific studies found negative relationship (Bloom et al. 2009; Mishra and Smyth 2010).

The second strand relates to a reduction in gender gap in education. The erstwhile Millennium Development Goals (MDGs) significantly boosted investment in formal education among girls and young women and it is unsurprising that female educational attainment has improved substantially in the developing world in recent years (Roby et al. 2016; Verick 2018). While SSA is slightly lagging behind, the gender ratio in secondary school enrolment in all other regions have approached unity; 100% for Latin America and East Asia and 80 and 65% for the MENA and South Asia, respectively. In most developing countries, the ratio has consistently been above 1 for tertiary education (Klasen 2017a). This expansion has led to fertility decline and subsequently enabled female labor participation. Some empirical studies support this assertion (see Chen et al. 2014). Higher educational attainment improves the participation of women in the labor market quantitatively and enhances women's self-esteem and competitive work skills (Ejaz 2007; Angel–Urdinola and Haimovich 2009). It is imperative to note that, similar to fertility decline–female labor participation nexus, the empirical literature provides inconclusive results on the effects of education on women labor force participation.

The third strand of literature relates to the high growth rates that many developing countries have experience since the 1990s. Per capita growth rates in many developing economies during the 1990s were above 2%, with South and East Asia growing around 3–4% (Klasen 2017a). Such high growth rates have increased demand for labor and this has in turn boosted female participation in the labor market (Klasen 2017b). Verick (2018) suggests that female labor participation is a driver and outcome of growth and development.

One of the key hypotheses emerging from the literature on female labor force participation, is that there remains a U-shaped relationship between women labor force participation and economic development, proxied by GDP per capita. The main thrust of this hypothesis is summarized by Verick (2018: 2) as follows: "In its basic form, the hypothesis posits that female participation rates are highest in poor countries, where women are engaged in subsistence activities, and fall in middle–income countries because of the transition of (mainly) men to industrial jobs. As education levels improve and fertility rates fall, women are able to join the labor force in response to growing demand in the services sector."

The hypothesis posits that female labor force participation would remain high in places where agriculture is the dominant economic activity, but this decreases as countries move to industrial status and then increases in a more service-oriented economy (Çağatay and Özler 1995; Gaddis and Klasen 2014; Cavalcanti and Tavares 2011). Earlier empirical assessments of the U-shaped hypothesis using cross-sectional regressions and correlations concluded by affirming the U-shaped relationship between female labor force participation and economic development (see Goldin 1994; Clark et al. 2010; Mammen and Paxson 2000). Luci (2009) and Tam (2011) investigated the U-shaped relationship between female labor force participation and economic growth using both static and dynamic panel methods. Both authors find evidence to support the U-shape relationship within countries over time although some of the identified turning points were noticeably low. Equally problematic is the fact that the authors utilized women labor force participation rates from the earlier versions of ILO's Economically Active Population Estimates and Projections (EAPEP) database, without accounting for recent revisions. Moreover, the authors failed to discuss the potential endogeneity of GDP, although the dynamic estimators could potentially account for this. More recently, Appiah (2018) examined the relationship between female labor force participation and economic growth using panel data for 139 countries that make up the developing world. By utilizing the two-step system Generalized Method of Moments (GMM) estimator, the author found a positive marginal effect of increased in female labor force participation on per capita GDP growth but at a decreasing rate. The study further reported no difference in the impact of female labor force participation on economic growth in SSA economies and other developing countries, as a whole.

Beyond these strands of literature, the drivers of female labor force participation in SSA are multidimensional. A study by Nchake and Koatsa (2017) found that the participation of women in the labor market in SSA is influenced positively by the level of household expenditure, levels of economic development, female education, and access to communication infrastructure. On the contrary, legal and policy regimes on gender equality (in terms of economic opportunities workplace and in credit market), number of children a woman bears, unemployment, transparency and control of corruption, HIV prevalence among women, rating of public sector on accountability all hinder women's participation in the labor market of SSA countries (Nchake and Koatsa 2017).

3 Stylized Facts About Female Labor Force Participation, Sectoral Value Additions, and Infrastructure in SSA

Labor force participation of women is more significant in SSA where many women act as economic agents of informal enterprises compared to elsewhere across the globe (Spring 2009). Female labor force participation in SSA has been rising since at least the 1970s. It was estimated to be 63% in 2010 and rose to 64% in 2014, although there remain gender differences between males and females. Despite the fall in male labor force participation in SSA from 80% in 1990 to 76% in 2014, it remained higher than female labor force participation by 10% in 2014 (World Development Indicators 2016). Figure 1 presents the trends in female labor force participation rate as a proportion of the total number of females within the active age bracket 15–64 years.

From Fig. 1, we find a nonlinear trend in female labor force participation rate. We observe a growing participation of women in the labor force from the 1990s to 2001 before dropping in 2004 and increasing in 2006. However, between 2007 and 2012, female labor force consistently declined before recording some upward trends afterward. While we do not have disaggregated macroeconomic data on the sectors where these women are engaged in, evidence on the trends in sectoral value additions as reported in Fig. 2 suggests that, similar to the female labor force participation rate, trends in sectoral value additions as a percentage of GDP is also nonlinear.

From Fig. 2, it is clear that the service sector has the highest value additions while the agricultural sector has the lowest. In the early 1990s, we notice

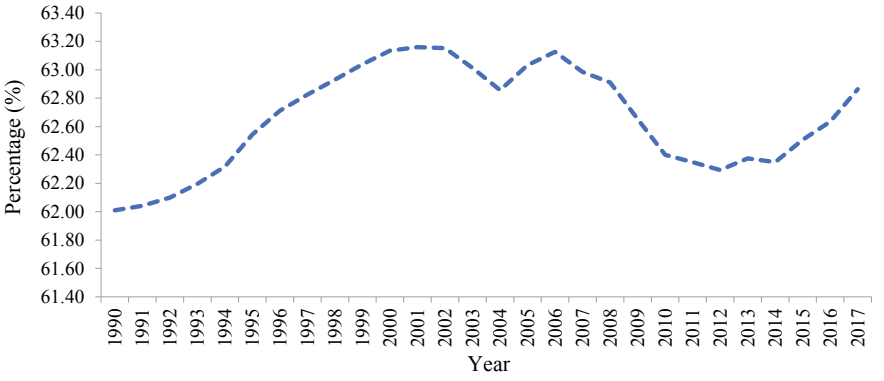

Fig. 1 Trends in female labor force participation rate in SSA (*Source* Authors' construct using data from the World Development Indicators, 2019)

an increase in the value additions of the service and agricultural sectors and this period coincided with the increases in the female labor force participation. While the service sector recorded a marginal drop over the period 1995–1997, the industrial sector witnessed a boost over the same period. Interestingly, an opposite trend is observed in 2009 for the service and industrial sectors. Indeed, the performance of both the agricultural and industrial sectors appears constant since the early 2000s to 2017 although there are some few noticeable changes (see Fig. 2). Table 1 presents four-year averages of female labor force, sectoral value additions, and infrastructure. We observe that, the highest value additions of the service sector were recorded in 2014–2017 while that of both the industrial and agricultural sectors was in 1994–1997. Female labor force participation rate decreased from 63.01% in 2002–2005 to 62.92% in 2006–2009. While the service sector value additions increased around this period, the drop in the female labor force participation coincided with reduced value additions in the industrial and agricultural sectors.

With regard to fixed telephone subscriptions, Table 1 shows a growing subscriber base per 100 people from 1.02 in 1990–1993 to its all-time highest of 1.53 in 2006–2009 before decreasing consistently in the subsequent two periods. However, the gross fixed capital formation as a proportion of GDP decreased from 24.25% in 1990–1993 to 21.05% in 2002–2005 before marginally increasing to 22.03% in 2006–2009.

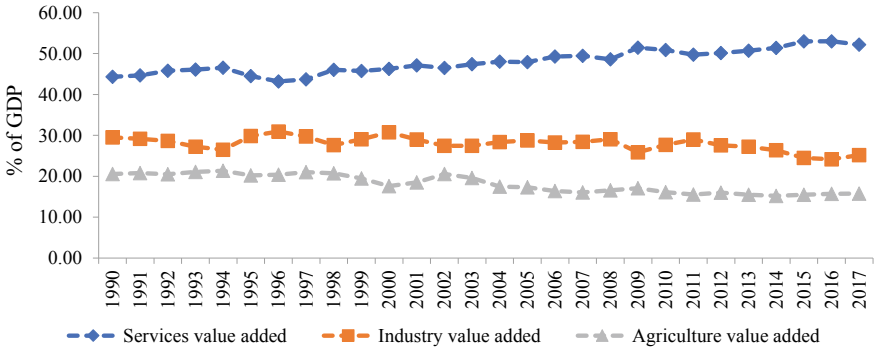

Fig. 2 Trends in sectoral value additions as a percentage of GDP in SSA (*Source* Authors' construct using data from the World Development Indicators, 2019)

Table 1 4–year averages of female labor force, sectoral value additions and infrastructure

	Female labor force participation	Service sector	Industrial sector	Agricultural sector	Fixed telephone subscriptions	Gross fixed capital formation
1990–1993	62.09	45.22	28.64	20.71	1.02	24.25
1994–1997	62.60	44.48	29.25	20.74	1.14	22.36
1998–2001	63.07	46.29	29.10	19.08	1.39	21.97
2002–2005	63.01	47.47	28.02	18.74	1.49	21.05
2006–2009	62.92	49.72	27.91	16.52	1.53	22.03
2010–2013	62.35	50.36	27.87	15.78	1.31	20.88
2014–2017	62.59	52.39	25.05	15.55	1.06	21.34

Source Authors' construct using data from the World Development Indicators, 2019

4 Methodology

Empirical Strategy

To the extent that the overarching aim of this chapter is to investigate empirically the contributions of female labor force participation and infrastructure to sectoral value additions, we set a baseline model where sectoral value additions depends on among others, its lag, female labor force participation, and infrastructure. Specifically, we estimate the following Eq. (1) below:

$$SECV_{it} = \gamma_o SECV_{it-1} + \gamma_1 FLFP_{it} + \gamma_2 INFRA_{it} + \gamma_3 CONT_{it} + \varepsilon_{it} \quad (1)$$

where i and t represent country and time indices respectively; $SECV_{it}$ is a vector of sectoral value additions; $SECV_{it-1}$ is the one-period lagged sectoral value addition used to measure the initial conditions; $FLFP_{it}$ and $INFRA_{it}$, respectively denote female labor force participation and a vector of infrastructure while $CONT_{it}$ represents a vector of other controls; ε_{it} is the error term.

From Eq. (1), female labor force participation spurs sectoral value addition if $\gamma_1 > 0$ and significant at conventional levels otherwise participation of females in workforce does not promote sectoral value addition. Similarly,

if levels of infrastructure promote sectoral growth if $\gamma_2 > 0$ and statistically significant. Beyond the direct effect of female labor force participation and infrastructure, we investigate whether there is a conditional effect of female labor force participation through infrastructure. In other words, we investigate how female labor force impacts sectoral value additions given the level of countries' infrastructure. To do this, we include a multiplicative interactive term of female labor force participation and infrastructure into the sectoral value addition above. In this endeavor, we specify the following equation:

$$SECV_{it} = \alpha_o SECV_{it-1} + \alpha_1 FLFP_{it} + \alpha_2 INFRA_{it} + \alpha_3 CONT_{it} + \theta(FLFP_{it} \times INFRA_{it}) + \varepsilon_{it} \quad (2)$$

$$\varepsilon_{it} = \rho_i + \sigma_t + \mu_{it}$$

where ρ_i is unobserved country-specific fixed effects; σ_t is the time effects while μ_{it} is the idiosyncratic error term. From Eq. (2), the interactive effect is measured by θ and is expected to shed light on the conditional impact of female labor force participation via infrastructure.

From Eq. (2), we examine the conditional effect of female labor force participation on sectoral value addition by taking the partial derivative of sectoral value addition with respect to the female labor force. In doing this, we arrive at Eq. (3) below:

$$\frac{\delta SECV_{it}}{\delta FLFP_{it}} = \alpha_1 + \theta INFRA_{it} \quad (3)$$

We evaluate the net effect of female labor force participation relying on Eq. (3). Indeed, from both equations above, including the lagged dependent variable suggests a potential correlation between the factors driving sectoral value addition and the error term since lagged sectoral value addition depends on ε_{it-1} which is a function of the country-specific effect (ρ_i). Thus, our specified equations suffer from Nickell's (1981) bias due to the correlation. We therefore estimate the equations relying on the generalized method of moments (GMM) proposed by Arellano and Bond (1991) which eliminates ρ_i or any related time-invariant country-specific variable eminent in the data. According to Baltagi et al. (2009), taking the first difference in the use of GMM has added advantage. First, this procedure reduces any endogeneity stemming from the correlation of ρ_i and the right-hand side regressors. Second, by difference, the GMM estimation approach helps to ensure that all the regressors are stationary and for that matter testing for unit roots is

not necessary. In this chapter, we rely on the system GMM which combines both a regression in its first difference and in levels (Arellano and Bover 1995; Blundell and Bond 1998). Our approach is able to control for possible endogeneity eminent in the data. We rely on four-year averages to produce seven non-overlapping periods of the form 1990–1993; 1994–1997; 2014–2017. Indeed, as requirement for the use of the GMM, the number of cross-sections (N) must be sufficiently higher than the time period (T) and this is met given that, $N = 33$ and $T = 7$.

Roodman (2009) cautions the use of the system GMM especially when T is small on the back of higher number of internally determined instruments. To the extent that too many instruments potentially overfit our instrumented variables, for the lagged sectoral value addition, we use as instruments in the first difference lagged one period for the equations in levels. However, for the equations in the first difference, we rely on the first lagged value. With regard to the other regressors which are assumed to be endogenous, we use the second lagged value as instruments. Based on this, we adopt the two-step system GMM. The validity of our instruments is checked using the Sargan test of over-identifying restrictions which examine whether our set of instruments, as a group, are exogenous. In addition, we also test for the absence of second-order serial correlation of the residuals.

Data

This chapter relies on a balanced annual panel dataset of 33 SSA countries for the period 1990–2017.[1] The selection of these countries and time period is based entirely on data availability. Consistent with the literature (see Tsani et al. 2013), we proxy female labor force participation rate as the proportion of female participating in the labor force to the total female population in the economically active age bracket 15–64. We rely on three sectoral value additions proxied by the real value-added output in service, industry, and agriculture. In particular, value addition in the service sector include value added in wholesale and retail trade (including hotels and restaurants), transport, government, financial, professional, and personal services such as education, health care, and real estate services. With regard to the industry, we rely on value added in mining, manufacturing, construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. For the agricultural sector, we use value added in forestry, hunting, and fishing, as well as cultivation of crops and livestock production. These value additions have been used in

recent literature (Ibrahim and Alagidede 2018; Sare et al. 2019; Opoku et al. 2019). Indeed, for each of these value additions, we concentrate on the net output after adding up all outputs and subtracting intermediate inputs.[2]

Following Asiedu (2002) and Ibrahim et al. (2019), infrastructure is measured by fixed telephone subscriptions (per 100 people) which refers to the sum of active number of analogues fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents, and fixed public payphones. As a robustness check, we also measure infrastructure by gross fixed capital formation as proportion of GDP. According to the World Development Indicators (WDI), this indicator includes land improvements, plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. We also include control variables selected based on the literature. These control variables are foreign direct investment net inflows, financial development (measured by private credit as a percentage of GDP), government expenditure (% of GDP), and trade openness. We hypothesize that all these control variables will positively influence sectoral value additions. Annual data for all the variables were gleaned from the WDI of the World Bank 2019 database.

5 Findings and Discussions

This section discusses the empirical results of the chapter. It begins by first providing the findings based on the descriptive statistics and the correlations between the variables. Table 2 presents the descriptive statistics and correlation coefficients of these variables.

From Table 2, we find a mean female labor force participation rate of 64.162% with a standard deviation of 13.552. Among the sectoral value additions, service sector has the highest average value of 44.275% while the industrial and agricultural sectors have almost the same mean although the former is slightly higher. Thus, a cursory view at the sectoral value additions suggest the growing service sector in SSA and this is consistent with Sare et al. (2019) who argue that performance in the service sector in Africa outstrips that of the other sectors. We also observe low average value of fixed telephone subscriptions per 100 people while capital formation averages 19.9% of GDP. We compute the coefficient of variation as the ratio of standard deviation to mean in order to show an intra-level volatility of the variables. We find that, fixed telephone subscription is the most volatile given the value

Table 2 Summary statistics

Variables	Female labor force [1]	Service sector [2]	Industrial sector [3]	Agric sector [4]	Fixed telephone [5]	Capital formation [6]	FDI [7]	Trade openness [8]	Private Credit [9]	Govt' expenditure [10]
Mean	64.162	44.275	24.763	24.781	1.791	19.939	2.936	65.987	15.947	14.386
St. Dev	13.552	10.427	11.733	14.559	2.788	8.536	4.538	28.636	14.041	5.819
CV	0.211	0.236	0.474	0.588	1.557	0.428	1.546	0.434	0.880	0.404
Min	32.471	12.435	4.555	1.828	0.000	−2.424	−8.589	19.684	−6.640	0.911
Max	91.948	77.020	77.413	63.831	15.585	74.608	50.018	170.407	84.052	40.444
Skewness	−0.462	−0.073	1.573	0.273	2.679	0.942	4.207	1.094	2.138	0.734
Kurtosis	2.649	3.000	6.372	2.172	10.362	6.075	32.280	4.049	7.978	4.592
Correlations										
[1]	1.000									
[2]	– 0.306	1.000								
[3]	– 0.335	– 0.159	1.000							
[4]	0.481	0.548	−0.690	1.000						
[5]	−0.361	0.525	0.180	−0.592	1.000					
[6]	−0.086	0.095	0.290	– 0.347	0.205	1.000				
[7]	−0.007	−0.004	0.140	−0.104	0.053	0.382	1.000			
[8]	−0.360	0.045	0.578	−0.519	0.309	0.291	0.345	1.000		
[9]	−0.228	0.496	0.007	−0.437	0.798	0.147	0.028	0.163	1.000	
[10]	−0.086	0.286	0.142	−0.382	0.393	0.048	−0.059	0.325	0.419	1.000

Notes St. Dev = Standard deviation; CV = Coefficient of variation; Min = Minimum; Max = Maximum

of CV while female labor force participation is the least volatile. Further evidence suggests that apart from female labor force participation and the service sector, all the other variables are positively skewed. Among the series, the service sector is almost normally distributed given the value of the skewness and kurtosis. With the exception of female labor force participation and the agricultural sector, all the other series are leptokurtotic. Turning to the correlation coefficient, we find that, apart from the agricultural sector, female labor force participation is negatively correlated with all the variables albeit weakly.

Beyond these descriptive statistics and correlations, we perform three separate regressions for each of the three sectors. In the first regression, we show findings on the impact of female labor force participation on sectoral value addition while the second regression control for the effect of infrastructure. In the third regression, we include the interactive effect of female labor force participation and infrastructure to examine the conditional impact. We begin with the service sector in Table 3.

From Table 3, the coefficient of the lagged service sector value addition is negative and statistically significant at 1% suggesting that the previous level of service sector value addition drives current value additions. In other words, higher initial sectoral value additions imply lower values of current value additions. Thus, trends in service sector value additions in SSA converge over time and for that matter, countries with lower initial service sector growth will catch with those with higher service sectoral growth. This finding on the convergence of the service sector is robust to model specification and consistent with Kumi et al. (2017). On the impact of our main variable of interest, in column 1, our findings show that, female labor force participation positively affects service value additions where a unit-percentage rise in female's involvement in the workforce significantly increases value additions in the service sector by 0.3621%.

We further observe that, the coefficients of all the control variables are positive and significant at 1%. For instance, the service sector value additions spur by 0.1211% following a 1% increase in trade openness. Thus, the opening of economies to international markets heightens service sector growth. Indeed, increasing integration with the international markets promotes competition and as well permits technological transfers in service delivery all of which are healthy for the service sector. Similar effect is also observed for the foreign direct investment (FDI) although its coefficient is lower relative to trade openness. Government size and financial development also increase service sector value additions.

Table 3 Female labor force participation and service sector [Dependent variable: ln (Service sector value additions)]

Variables	1	2	3
Lagged service sector	−0.6671***	−0.6645***	−0.6501***
	(0.0291)	(0.0351)	(0.0355)
	[0.000]	[0.000]	[0.000]
Female labor force participation	0.3621**	0.4104***	0.5237***
	(0.1760)	(0.1526)	(0.1748)
	[0.040]	[0.007]	[0.004]
Trade as % of GDP	0.1211***	0.1342***	0.1242***
	(0.0120)	(0.0141)	(0.0146)
	[0.000]	[0.000]	[0.000]
FDI as % of GDP	0.0049***	0.0048***	0.0031**
	(0.0009)	(0.0012)	(0.0014)
	[0.000]	[0.000]	[0.024]
Government expenditure as % of GDP	0.1006***	0.0862***	0.0971***
	(0.0299)	(0.0152)	(0.0167)
	[0.001]	[0.000]	[0.000]
Private credit as % of GDP	0.0306***	0.0308***	0.0274***
	(0.0110)	(0.0075)	(0.0083)
	[0.006]	[0.000]	[0.001]
Telephone per 100 people	–	0.0048	0.7589*
		(0.0127)	(0.4575)
		[0.704]	[0.097]
Interaction effect	–	–	0.4220*
			(0.2529)
			[0.095]
Constant	1.2696	1.3958	1.1218
	(0.3512)	(0.3067)	(0.3407)
	[0.000]	[0.000]	[0.001]
Diagnostics			
Time effects	Yes	Yes	Yes
Wald χ^2	922.93	783.82	725.77
p–value	0.000	0.000	0.000
AR (1) [*p*–value]	0.003	0.005	0.007
AR (2) [*p*–value]	0.153	0.545	0.642
Sargan test [*p*–value]	0.195	0.201	0.211
No. of countries	33	33	33

Notes *, **, and **, respectively denote significance at 10, 5, and 1%. Values in () and [] are the standard errors and *p*–values, respectively. Windmeijer (2005) robust standard errors are used

In column 2, we control for infrastructure proxied by fixed telephone subscription. Here, we observe that, although the coefficient of infrastructure enters with a positive sign, statistically, the effect of infrastructure is insignificant suggesting that infrastructure does not matter in service sector growth. Anecdotally, it is expected that, higher infrastructure in the form

of telephone subscriptions promotes service delivery by facilitating efficient and speedy delivery of communications among agents in the service sector. However, in the case of SSA, our findings do not support this assertion. The rather low fixed telephone subscriptions in the subregion can be attributed to its insignificant impact in driving value additions in the service sector. In this regression, the impact of female labor force participation maintains its positive and significant effect on service sector growth with a relatively higher coefficient. The impact of the other control variables does not change even with the inclusion of the infrastructure.

Beyond the unconditional impact of female labor force participation, we examine the effect of female labor force participation on service sector value additions conditional on infrastructure by including the interactive effect of female labor force participation and infrastructure. Four potential outcomes are possible. First, if the coefficients of both female labor force participation and the interactive terms are positive, it implies that female labor spurs service sector value additions and improvement in domestic level of infrastructure magnifies the positive effect of female labor force participation on the service sector. Second, if the coefficients of both female labor force participation and the interactive term are negative, then our evidence will imply that participation of female labor does not promote value additions in the service and higher infrastructure heightens the negative effect of female labor force participation on the service sector. Third, if the coefficient of female labor force participation is negative and that of the interactive term is positive, then our findings will imply that female labor force does not spur value additions and higher infrastructure dampens the negative effect of female labor force on sectoral value additions. Fourth, if the coefficient of female labor force participation is positive and that of the interactive term is negative, then our evidence suggests that female labor force participation promotes sectoral value additions and infrastructural improvement dampens the positive effect of female labor force on sectoral value additions.

From column 3, the coefficient of female labor force is significantly positive (0.5237%) and so is the coefficient of the multiplicative interactive term. Thus, while higher female labor force increases value additions in the service sector, higher level of infrastructure magnifies this positive link. We evaluate the net effects of female labor force at the mean, minimum, and maximum levels of infrastructure. When evaluated at the mean, our findings show a net effect of female labor force participation of 1.2795% which is about 2.4 times higher than the unconditional effect. However, given the minimum value of zero for infrastructure, there is no difference between the net effect of female labor force evaluated at the minimum of infrastructure and the unconditional

effect of female labor force participation. Conversely, when examined at the maximum level of infrastructure, the net effect of female labor force participation on the service sector is exceedingly higher and weighs about 7.1006%. Thus, these findings reveal that, while female labor force supports value additions in the service sector, when complemented with improved infrastructure, the impact of female labor force could be enormous. More broadly, improved infrastructure facilitates an efficient working environment making it easier for females to freely navigate through. The ILO (2014) reports that, women account for majority of the labor participation in the service sector while their participation in the industrial sector continues to fall over time. Indeed, as opposed to poor infrastructure, improved infrastructure that removes the bottlenecks and rigidities associated with participation of females in the labor market is expected to encourage females from actively contributing their quota in service delivery, thus, increasing the value additions.

We turn our attention to the effect of female labor force on the industrial sector as shown in Table 4.

Similar to the service sector, there is also evidence of convergence in the industrial value additions. However, compared to the service sector, the speed of convergence is higher in the industrial sector. With regard to the impact of female labor force, our findings show that, female labor force participation does not significantly affect industrial value additions in SSA although the coefficient is positive. The implication is that, higher involvement of females in the labor force does not matter for the industrial sector. To the extent that the industrial sector comprises mining, manufacturing, construction, electricity, water, gas among others, the insignificant effect of female labor force participation on industrial value additions can be attributed to the low involvement on women in the industrial sector. Indeed, this sector is often not regarded as an area for women as it often involves physical manpower. Compared to the service sector which is often occupied by women and increasingly being feminized, the industrial sector heavily tilts toward engineering which is not actively pursued by women. And as argued by Lechman and Kaur (2015), the low labor demand in purely industrial sector creates unfavorable conditions for women to participate in the labor market. Thus, the insignificant effect of female labor force participation to drive value additions in the industrial sector is not surprising.

The insignificant effect of female labor force does not improve even when we control for infrastructure (column 2). In this regression, the impact of infrastructure is positive and significant at 1% where a unit-percentage increase in fixed telephone subscriptions spurs industrial value additions by 0.0373%. With regard to the control variables, similar to service sector, trade

Table 4 Female labor force participation and industrial sector [Dependent variable: ln (Industrial sector value additions)]

Variables	1	2	3
Lagged industrial sector	– 0.7403***	– 0.7422***	– 0.7024***
	(0.0354)	(0.0344)	(0.0485)
	[0.000]	[0.000]	[0.000]
Female labor force participation	0.1540	0.1913	0.2260
	(0.2031)	(0.2781)	(0.4380)
	[0.448]	[0.492]	[0.606]
Trade as % of GDP	0.1868***	0.1671***	0.2170***
	(0.0092)	(0.0138)	(0.0296)
	[0.000]	[0.000]	[0.000]
FDI as % of GDP	0.0025**	0.0065***	0.0049***
	(0.0012)	(0.0015)	(0.0012)
	[0.046]	[0.000]	[0.000]
Government expenditure as % of GDP	0.0631***	0.0454	0.0505*
	(0.0221)	(0.0277)	(0.0284)
	[0.004]	[0.101]	[0.076]
Private credit as % of GDP	0.0245***	0.0222*	0.0235*
	(0.0062)	(0.0125)	(0.0151)
	[0.000]	[0.076]	[0.087]
Telephone per 100 people	–	0.0373***	0.0291***
		(0.0084)	(0.0081)
		[0.000]	[0.000]
Interaction effect	–	–	– 0.1472
			(0.2612)
			[0.573]
Constant	– 0.1581	– 0.2096	– 0.3178
	(0.3959)	(0.5165)	(0.8371)
	[0.690]	[0.685]	[0.704]
Diagnostics			
Time effects	Yes	Yes	Yes
Wald χ^2	1272.35	972.54	966.06
p–value	0.000	0.000	0.000
AR(1) [*p*–value]	0.021	0.059	0.060
AR(2) [*p*–value]	0.135	0.204	0.211
Sargan test [*p*–value]	0.154	0.120	0.176
No. of countries	33	33	33

Notes *, ** and *** respectively denote significance at 10, 5 and 1%. Values in () and [] are the standard errors and *p*–values respectively. Windmeijer (2005) robust standard errors are used

openness, FDI and financial development significantly matter for industrial value additions. However, the impact of government expenditure loses significance while maintaining the positive sign (column 2). In column 3 where the multiplicative interactive term is included, we do not find evidence of the significant effect of female labor force participation implying that, its impact on the industrial sector is robustly benign. While the coefficient of infrastructure maintains its direction of effect and level of significance albeit reduced magnitude, the coefficient of the interactive term is negative and statistically insignificant. Against this backdrop, we have sufficient evidence to infer that, there is no conditional and unconditional effect of female labor force participation on industrial value addition. In fact, in the case of SSA, our data suggests that, even if improvement in infrastructure in the form of higher fixed telephone subscription is to have any transmission effect on the industrial sector, such effect is rather a dampening one. We turn to female labor force–agricultural sector nexus.

Table 5 presents results on how female labor force participation influences value additions in the agricultural sector. Beginning with the coefficient of the lagged term, we find evidence of convergence given the negative coefficients consistent with the earlier findings. This notwithstanding, the speed of convergence is greater in the agricultural sector relative to the service and industrial sectors. With regard to the variable of interest, similar to the industrial sector, the coefficient of female labor force participation is positive and insignificant (column 1). This finding does not change even when we control for infrastructure (column 2) and the interactive term (column 3). In column 2, the impact of infrastructure is positive and significant. However, the effect loses significance once the interactive effect is controlled for. From Table 5, it is observed that, irrespective of the model specification, the impact of female labor force participation on agricultural value additions is insignificant. The African Development Bank (AfDB) (2015) notes that, in Africa women contribute substantially to agricultural activities and account for about 70% of total employees. However, we do not find any significant effect of female participation on the agricultural value additions. While this finding may be counter-intuitive, to the extent that women in agriculture are largely smallholder subsistent farmers may account for the insignificant effect since for the most part, their outputs are consumed at the household level. Juxtaposing the mediation role of infrastructure in female labor force–sectoral value additions nexus, it is clear that the magnifying role is greater in the service sector. Indeed, following ILO's (2014) evidence that in the case of the service sector, women participation is higher compared to men. In this case, providing improved infrastructure will by far aid in increasing the impact of

Table 5 Female labor force participation and agricultural sector [Dependent variable: ln (Agricultural sector value additions)]

Variables	1	2	3
Lagged agricultural sector	– 0.8910***	– 0.9179***	– 0.9151***
	(0.0405)	(0.0298)	(0.0282)
	[0.000]	[0.000]	[0.000]
Female labor force participation	0.0492	0.4773	0.2115
	(0.7567)	(1.0370)	(1.1466)
	[0.948]	[0.645]	[0.854]
Trade as % of GDP	0.0212***	0.0507***	0.1029***
	(0.0024)	(0.0025)	(0.0256)
	[0.000]	[0.000]	[0.001]
FDI as % of GDP	– 0.0071***	– 0.0051**	– 0.0048**
	(0.0023)	(0.0021)	(0.0022)
	[0.002]	[0.015]	[0.030]
Government expenditure as % of GDP	0.0062	0.0301	0.0231
	(0.0191)	(0.0389)	(0.0371)
	[0.745]	[0.439]	[0.533]
Private credit as % of GDP	0.0107	0.0183	0.0149
	(0.0167)	(0.0152)	(0.0260)
	[0.522]	[0.229]	[0.567]
Telephone per 100 people	–	0.0333***	0.0650
		(0.0089)	(0.7654)
		[0.000]	[0.932]
Interaction effect	–	–	– 0.0564
			(0.4204)
			[0.893]
Constant	0.2373	0.8976	0.4271
	(1.4010)	(1.8951)	(2.1005)
	[0.865]	[0.636]	[0.839]
Diagnostics			
Time effects	Yes	Yes	Yes
Wald χ^2	6612.86	3132.39	3624.58
p–value	0.000	0.000	0.000
AR (1) [*p*–value]	0.001	0.032	0.004
AR (2) [*p*–value]	0.543	0.666	0.645
Sargan test [*p*–value]	0.212	0.190	0.200
No. of countries	33	33	33

Notes *, ** and ***, respectively denote significance at 10, 5 and 1%. Values in () and [] are the standard errors and *p*–values respectively. Windmeijer (2005) robust standard errors are used

the female labor force participation on sectoral value additions. It is therefore not surprising that the magnifying role of improved infrastructure in female labor participation-service sectoral output linkage is statistically significantly.

With regard to the controls, our findings show that while trade openness significantly improves agricultural value additions, higher levels of FDI decrease agricultural output. In both cases, the effects are insensitive to model specifications. Indeed, while international openness creates opportunities for technology transfer necessary to boost agricultural sector production process, foreign capital inflows crowd-out agricultural production. However, both the effect of government expenditure and financial development do not matter for the agricultural sector.

Sensitivity Test

While the above relies on fixed telephone subscriptions to proxy infrastructure, this section uses gross fixed capital formation as an indicator of infrastructure. We present the results in Table 6.

Table 6 presents results on the sensitivity analysis. We find that, to a very large extent, results from the sensitivity analysis are qualitatively similar to the earlier findings. The convergence of the sectoral value additions is confirmed with the agricultural sector recording the highest speed of convergence. While female labor force participation positively affects all the sectoral value additions, it is only significant for the service sector. This positive and significant effect on the service sector is upheld even when we control for the interactive term of female labor force participation and gross fixed capital formation (column 2). The coefficient of the interactive effect is significantly positive confirming our earlier evidence: while higher female labor force increases value additions in the service sector, higher level of infrastructure magnifies this positive link. When evaluated at the mean of gross fixed capital formation, our findings show a net effect of female labor force participation of 9.4636% which is exceedingly higher than the unconditional effect of 0.2757%. However, given the minimum and maximum, the net effects are −0.8413 and 34.6551%, respectively. Thus, these findings reveal that, while female labor force participation spurs service sector growth, when accompanied by improved infrastructure, the effect of female's participation in the labor market could be huge. Consistent with the earlier evidence, we do not find sufficient evidence of the impact of female labor force participation on the industrial and agricultural sectors.

On the adequacy of the models, we reject evidence of first-order serial correlation but not the second-order correlation. Thus, the instruments

Table 6 Female labor force participation and sectoral value additions

Variables	Service		Industry		Agriculture	
	1	2	3	4	5	6
Lagged value addition	– 0.6009*** (0.0435) [0.000]	– 0.5581*** (0.0472) [0.000]	– 0.6592*** (0.0434) [0.000]	– 0.6443*** (0.0448) [0.000]	– 0.8546*** (0.0465) [0.000]	– 0.8351*** (0.0709) [0.000]
Female labor force participation	0.3187*** (0.0393) [0.000]	0.2757*** (0.0846) [0.000]	0.2714 (0.2601) [0.297]	0.0872 (0.3299) [0.791]	0.4304 (0.8924) [0.630]	0.1344 (0.0943) [0.320]
Trade as % of GDP	0.1346*** (0.0299) [0.000]	0.1311*** (0.0261) [0.000]	0.1988*** (0.0112) [0.000]	0.1790*** (0.0196) [0.000]	0.0555 (0.0464) [0.232]	0.0072 (0.0233) [0.755]
FDI as % of GDP	0.0017* (0.0009) [0.081]	0.0019** (0.0009) [0.040]	0.1008*** (0.0015) [0.000]	0.1009*** (0.0020) [0.000]	– 0.0055** (0.0021) [0.011]	– 0.0073** (0.0030) [0.016]
Government expenditure as % of GDP	0.1175*** (0.0445) [0.008]	0.1227*** (0.0404) [0.002]	0.0282 (0.0314) [0.370]	0.0738** (0.0361) [0.041]	– 0.0054 (0.0231) [0.815]	– 0.0079 (0.0269) [0.769]
Private credit as % of GDP	0.0569*** (0.0138) [0.001]	0.0336*** (0.0127) [0.004]	0.0419*** (0.0124) [0.000]	0.3044*** (0.0177) [0.000]	0.0178 (0.0134) [0.182]	0.0195 (0.0123) [0.112]
GFCF as % of GDP	0.0709*** (0.0072) [0.000]	0.1556 (0.5181) [0.764]	0.0517*** (0.0037) [0.000]	0.0189*** (0.0089) [0.000]	– 0.0233* (0.0129) [0.072]	– 0.0966 (0.9718) [0.921]
Interaction effect	–	0.4608* (0.1853) [0.087]	–	0.1302 (0.3415) [0.703]	–	0.0380 (0.5358) [0.943]
Constant	1.2400 (0.5015) [0.013]	0.5800 (0.5047) [0.250]	0.2666 (0.4917) [0.588]	0.1403 (0.5972) [0.814]	1.0636 (1.6779) [0.526]	0.2644 (0.5420) [0.332]
Diagnostics						
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Wald χ^2	2139.72	1529.71	1064.38	1109.69	1663.15	1290.43
p–value	0.000	0.000	0.000	0.000	0.000	0.000
AR(1) [*p*–value]	0.019	0.021	0.033	0.043	0.051	0.049
AR(2) [*p*–value]	0.464	0.234	0.753	0.543	0.323	0.346
Sargan test [*p*–value]	0.189	0.195	0.211	0.194	0.201	0.198

(continued)

Table 6 (continued)

Variables	Service		Industry		Agriculture	
	1	2	3	4	5	6
No. of countries	33	33	33	33	33	33

Notes *, ** and *** respectively denote significance at 10, 5 and 1%. Values in () and [] are the standard errors and *p*–values respectively. Windmeijer (2005) robust standard errors are used

generated from the lags are valid. The overall validity of the instruments is also examined using the Sargan test. Results from Sargan tests show that our instruments are valid and the results produced by the system GMM are reliable.

6 Conclusion and Policy Implications

Extant literature has drawn attention to female labor force participation in developing countries. In this field of study, the concentration of most existing studies has been on identifying the factors that drive female labor participation in the labor market and whether the involvement of women in the labor market drives economic growth. This has created a gap in knowledge on the impact of the female labor force participation on the various sectors of the economy including agriculture, manufacturing, and service sectors. A lack of sectoral value analysis in previous studies has created an erroneous impression that female labor force participation impacts equally on all the sectors of the economy. Overall, this chapter finds that the impact of female labor force participation is disproportionate for all sectors of the economy in SSA. Specifically, while female labor force participation positively affects sectoral value additions, its effect is only significant for the service sector with no apparent effect on the industrial and agricultural sectors. We further uncover that well-developed infrastructure magnifies the positive impact of female labor force on the service sector. We conclude that, while female labor force participation spurs service sector growth, when accompanied by improved infrastructure, the effect could be huge.

Indeed, the significance of women's involvement in driving the service sector may well be viewed from the very nature of the sector. By its nature, the service sector largely revolves around issues on commerce, government, financial, professional, and personal services such as education, healthcare, and real estate services. Thus, their appealing and relatively easier nature is likely to draw more women. More so, unlike the other sectors, the service

sector may not require physical use of manpower, or strength. Increasingly, the service sector is feminized and the significant impact of female labor force participation on the service sector value addition is unsurprising. While this holds, the benign impact on the industrial output may highlight aspects of potential gender discrimination and less favorable opportunities for women to engage. To the extent that the industrial sector is labor-intensive may well call for higher demand for men relative to females in the labor market as input in the production process. Given its relatively labor-intensive nature, females may also not be enthused in joining the industrial sector which is predominantly manufacturing, mining, and construction among others.

The findings of the chapter have several policy implications. To ensure higher participation of females, contemporary industrial sector can be integrated with the service sector while removing the bottlenecks that militate against women's participation in the industrial sector.

Given that the impact of female labor participation in the agricultural sector is positive, it will be useful for policy to provide incentive for female labor participation in the agricultural sector. Incentives can take the form of modernizing the sector through land reforms and provision of improved seedlings, technology, access to credit and market connections, and input subsidies among others to enable females engaged in the sector to gradually shift from subsistence-based production to a more business-like orientation, or commercial agriculture. This can further boost female labor force participation value addition in the agricultural sector.

Notes

1. The countries are Benin, Botswana, Burundi, Burkina Faso, Cape Verde, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Cote d'Ivoire, Ethiopia, Eswatini, Gabon, Ghana, The Gambia, Guinea, Kenya, Lesotho, Mali, Malawi, Niger, Nigeria, Namibia, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.
2. In this study, we do not use manufacturing value addition since it is a subset of the value additions in the industrial sector.

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Governance

Sectoral Growth and Income Inequality in Sub-Saharan Africa: The Role of Fiscal and Monetary Policies

William Godfred Cantah, Eric Amoo Bondzie, and Joshua Sebu

1 Introduction

The growth of various sectors of an economy is key to the attainment of Sustainable Development Goal one (SDG 1—No Poverty) set by the United Nations. Driven by this goal, a number of Sub-Saharan African (SSA) economies have focused their attention on achieving sustained economic growth, which is seen as one of the means of reducing poverty in SSA. According to Beegle et al. (2016), poverty levels in SSA declined from 57 percent in 1990 to about 43 percent in 2012. Various projections by the World Bank indicate the levels of poverty in SSA are expected to decline further. The reduction in poverty rates across SSA was achieved mainly as a result of consistent growth that has been maintained in the region (Chuhan-Pole et al. 2013).

Despite the strides made to reduce poverty, the efforts toward the reduction of inequality in SSA have not yielded the expected results. Undoubtedly, SSA remains one of the unequal regions in the world (Odusola et al. 2017). In

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fact, a recent World Bank (2018) report showed that about 55 percent of the total income generated in 2016 by SSA countries went to the top 10 percent income earners. This suggests that the growth experienced in the region has only served to widen the gap between the rich and the poor. The role of economic growth in increasing inequality within and between countries has been a puzzle in both theoretical and empirical literature (see Kuznets 1955; Mohamd et al. 2018; An and Jeon 2006; Banerjee and Duflo 2003). Though these studies contribute immensely to the growth–inequality nexus, they fail to show which particular sector of the economy (i.e., agricultural, industrial and services) contributes to this relationship. To help resolve the flaws in the existing empirical literature, Siami-Namini and Hudson (2017); González Gordón and Resosudarmo (2018) examined the impact of sectoral growth and monetary policy on income inequality in developing countries. Again, though several studies have examined the impact of monetary and fiscal policies on income inequality (see for example Amaral 2017; IMF 2014), they have failed to consider the real sectors through which monetary and fiscal policy work to affect growth and inequality in the economy. Thus, to bridge the gap in the literature, we examine how the workings of fiscal and monetary policies affect various sectors of the economy, thereby causing income inequality. In order to capture this effect, the study interacts respective policy measures with the sectoral variables to analyze how these variables work to influence income inequality. The chapter focuses on Sub-Saharan African (SSA) countries because SSA is one of the highly unequal regions in the world.

The rest of the chapter is organized as follows: extensive review of both theoretical and empirical literature; a description of the methodology as well as the data used; the results and its associated discussions; conclusions and policy implications.

2 Literature Review

One of the early studies which relate to economic growth and income inequality was the seminal paper by Kuznets (1955) which showed that in a developing economy, market forces first increase and, then, decrease economic inequality. This positive relationship between economic growth and income inequality implies that when a country's income grows, inequality also increases, but when exceeding a turning point, this relationship becomes negative with growth decreasing income inequality. The growth model of Solow with the assumption that all countries of the world will converge to

the same levels of per capita income can also be highlighted here. Other studies that are similar to the Solow Model of economic growth can be related to Baumol's (1986) Beta Convergence Studies and Economic Growth Models by Barro and Sala-i-Martin (1992). However, these studies failed to highlight the vital role that monetary and fiscal policies play in sectoral economic growth. Much theoretical and empirical literature has tried to find the linkages between monetary and fiscal policies and how they affect income inequality in both advanced and emerging economies.

Theoretically, there are several channels through which both monetary and fiscal policies contribute to income inequality. For instance, monetary policy transmits into the various sectors of the economy through income, wealth and substitution effects. It affects both households and the financial sector through the interest rate pass-through. An expansionary monetary policy that reduces real interest rates increases financial asset prices and net savers whose wealth is concentrated in short-duration assets and net borrowers whose liabilities are of relatively long duration benefit from this expansionary monetary policy. According to Coibion et al. (2017) and Inui et al. (2017), a fall in the interest rate affects the balance sheet of high-income holding households through differences in the composition of their assets portfolio which further widens the income inequality. Moreover, households obtain their incomes from different sources which may respond to changes in monetary policy differently. Low-income households tend to rely more on transfers, while middle-income households rely on labor income. Those at the upper tail of the income distribution rely relatively more on business and capital income. If a fall in interest rates stimulates economic activity, expansionary monetary policy may result in increased wages and decreased unemployment, thereby increasing inequality at the lower end of the distribution. Higher unexpected inflation levels reduce the real value of nominally fixed debts which favor borrowers at the expense of lenders.

The argument here is that inflation hurts rich households more than other groups as rich households hold more long-term bonds than poor and middle-class households. Doepke and Schneider (2006) argue that expansionary monetary policy increases income inequality through higher inflation as low-income households relying primarily on labor earnings hold more liquid assets than high-income ones. At the same time, there are other transmission channels that would predict that expansionary monetary policy can reduce inequality through savings redistribution as an unexpected decrease in policy rates benefits borrowers who are generally poor. Erosa and Ventura (2002) observe that poor households hold more cash relative to other financial assets than rich households and therefore, through the inflation channel

the poor pay a disproportionate share of the inflation tax and are hurt more by inflation.

On the fiscal side, Neoclassical Models of economic growth postulate that population growth and technological progress affect the steady-state of equilibrium growth which leads to a more important role for the government expenditure and Tax in economic growth (see Barro and Sala-i-Martin 1990; García-Peñalosa and Turnovsky 2007). Fiscal policy that redistributes income from the rich to the poor people reduces the savings rate of the economy, and thus, economic growth can also reduce. Most poor people do not have the opportunity to invest, and those extremely poor cannot participate in productive activities. As a result, income inequality makes economic growth lower, and income equality makes it higher. Since the 1980s, several authors began to study the impacts of fiscal policy on income inequality and especially on economic growth. For the most part, these studies seek to show how the economy reacts to government spending or how taxation can affect the rate of economic growth. The Kuznets' inverted U-shape shows that the level of income inequality increases at the initial stages of development and, then, begins to decline (Kuznets 1955). A number of empirical studies have confirmed the theoretical argument of Kuznets. Mohamd et al. (2018) indicated the existence of the Kuznets hypothesis in SSA. That is, the study by Mohamd et al. (2018) seems to suggest that rising levels of inequality in SSA is temporary, so inequality would eventually decline. Similar results were also obtained by An and Jeon (2006) and Banerjee and Duflo (2003) for a panel of OECD countries and cross-country studies, respectively. Analyzing the Kuznets' inverted U-shape hypothesis suggests that changes in income inequality are mainly the consequence of the expansion of high-income modern sectors of the economy at the expense of low-income traditional sectors. Thus, an examination of the growth–inequality nexus that ignores the role played by key sectors of the economy would not provide adequate information on the source of the inequality.

Atkinson (2015), identified technology, employment, social security, the sharing of capital and taxation as key policy areas that could bring about a clear shift in the distribution of income toward lower levels of inequalities. Colciago et al. (2019) suggests that the effect of conventional monetary policy on income inequality yields mixed findings, although there seems to be a consensus that higher inflation increases inequality. On the other hand, the conclusions concerning the impact of unconventional monetary policies on income inequality are also not clear-cut. This is because policies may reduce income inequality by stimulating economic activity and may also increase inequality by boosting asset prices. Regression estimates by Ezeaku

et al. (2018) for the Nigerian economy reveal that the private sector credit, interest rate, and exchange rate channels have negative effects on real output growth, both in the long run and in the short run. Furceri et al. (2016) provide new evidence of the effect of monetary policy shocks on income inequality. They used a measure of unanticipated changes in policy rates for a panel of 32 advanced and emerging market countries over the period 1990–2013. The paper found that contractionary (expansionary) monetary actions increase (reduce) income inequality. The effect, however, varies over time, depending on the type of the shock (tightening versus expansionary monetary policy) and the state of the business cycle, and across countries depending on the share of labor income and redistribution policies. Siami-Namini and Hudson (2017) examined the impact of sectoral growth and monetary policy on income inequality in developing countries. Their results indicated that growth in the agricultural and industrial sectors tend to have a reducing effect on income inequality, whereas the impact of growth in the service sectors was found to have an increasing effect on inequality. Their study further indicated the existence of Kuznets' inverted U-shape hypothesis for growth in the industrial sector. Similarly, González Gordón and Resosudarmo (2018) looked at the sectoral-income inequality nexus in Indonesia. Their study was based on panel data for the Indonesian economy collected between 2000 and 2010. Results obtained from their study indicated that manufacturing and services share in GDP impacted positively on income inequality. On the other hand, the share of agriculture in GDP negatively impacted on income inequality. Although these studies considered how changes in various sectors of the economy influence income inequality, they ignored the extent to which fiscal and monetary policies could affect these individual sectors of the economy to affect income inequality.

González Gordón and Resosudarmo (2018) provided evidence of strong associational effects between economic growth in the manufacturing, agriculture, mining, and services sectors and income inequality, using panel data for Indonesian districts and cities over the period 2000–2010. Dolado et al. (2018) studied how capital-skill complementarity interacts with monetary policy in affecting inequality between high and low-skilled workers. They found that an unexpected expansionary monetary policy shock increases earnings inequality by lowering the labor share of income for low-skilled workers and raising it for high-skilled workers. Aghion and Bolton (1992) and Galor and Zeira (1993) pointed out the role of fiscal policy as a transmission channel between inequality and growth. The evidence from these studies showed that initial inequality could slow growth; thus, a negative relationship between these two variables. In economies with high-income

inequalities, as is common in developing countries like Brazil, there are greater demands for income redistribution policies which make governments of such economies target high levels of taxes. These high tax policies, in turn, directly affect investment decisions of firms and investors, thereby affecting economic growth (Alesina and Perotti 1996). Al-Shatti (2014) highlights that there is a positive relationship between the per capita income and fiscal policy such that the income elasticity of public expenditure is always more than one. However, other studies have shown that this relationship is not linear because sometimes government expenditure to GDP decreases, thus the elasticity of GDP to government expenditure is inelastic.

The literature reviewed suggests that there are no clear-cut studies that discuss the role monetary and fiscal policy plays in affecting sectoral growth and income inequality. This chapter, therefore, tries to bridge the gap by finding the causal linkages of how monetary and fiscal policies contribute to sectoral income inequality.

3 Methodology and Data

The use of panel data minimizes the complications associated with empirical research in the case of constrained time frames or missing data and other inhibiting factors identified by Sala-i-Martin (1994). The dataset employed for this study comprises forty-three (43) countries and from 1996 to 2017. However, using panel data does not eliminate the time-varying omitted variables that could bias the estimates of the variables of interest (Wooldridge 2016). This problem of endogeneity is considered due to an omitted variable in the fixed effect panel data set, including country dummies and time dummies. The models estimated is specified as follows:

$$GINI_{it} = \theta_0 + \beta_1 X_{it} + \beta_2 TAX_{it} + \beta_3 XFP_{it} \sum_{i=1}^{n} \phi_i Z_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (1)$$

$$INI_{it} = \theta_0 + \beta_1 X_{it} + \beta_2 TAX_{it} + \beta_3 XMP_{it} \sum_{i=1}^{n} \phi_i Z_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (2)$$

where $GINI_{it}$ represents the Gini index of country i at time t; X_{it} captures the value-added in the three major sectors of any economy; TAX_{it} captures

fiscal policy decision (measured by the level of taxation) by the central government; MP_{it} represents monetary policy; XFP_{it} and XMP_{it} are the interactions between a fiscal policy with sectoral value-added and monetary policy with sectoral value-added, respectively. The interaction terms were used in order to identify the extent to which fiscal and monetary policy moderates the relationship between income inequality and sectoral value-added. Z_{it} was used to represent other key control variables obtained from literature and ε_{it} represents the error term which is iid $\left(0, \sigma^2\right)$. Variables included in Z_{it} include Foreign Direct Investment (FDI), Real Gross Domestic Product (RGDP) and Corruption Control (CC). The inclusion of these variables as controls were mainly informed by the literature (Pan-Long 1995; Stiglitz 2016; Ucal et al. 2016; Uslaner 2017; Zhang and Zhang 2003).

It is important to note that for each of the equations stated above, the effect of each sector on inequality is estimated separately. That is, the chapter examined the effect of the agricultural, industrial, and the services sectors on income inequality in separate estimations to avoid the problem of multicollinearity. The interdependencies among the three major sectors of the economy are well documented in the empirical literature (see, for e.g., Aviral 2011; Koo and Lou 1997; Macrae 1971; Subramaniam and Reed 2009). Hence, estimating the effect of the various sectors of the economy separately on income inequality provides more consistent estimates than combining all the three sectors with their respective interaction terms in the same equation.

To account for the endogenous issue of income inequality and the reversed effect running from income inequality to sectoral value-added and GDP, the study employed a dynamic panel data setting. The following models were considered:

$$GINI_{it} = \theta_0 + \psi GINI_{it-1} + \beta_1 X_{it} + \beta_2 FP_{it} + \beta_3 XFP_{it} \sum_{i=1}^{n} \phi_i Z_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (3)$$

$$GINI_{it} = \theta_0 + \psi GINI_{it-1} + \beta_1 X_{it} + \beta_2 MP_{it} + \beta_3 XMP_{it} \sum_{i=1}^{n} \phi_i Z_{it} + \gamma_t + \alpha_i + \varepsilon_{it} \quad (4)$$

The presence of the first-order lagged dependent variable in the model implies the assumption of strictly exogenous variables may not hold for the lagged dependent variable that contains observations from period 2 to t on the dependent variable (GINI), and the residual term is a collection of observations from 1 to t which leads to a correlation between the regressor and the

error terms. Hence the application of regression techniques based on ordinary least squares would possibly lead to a biased estimate of the lagged dependent variable, even in the case of infinite individuals (Hsiao 2014). To solve this problem, the approach suggested by Arellano and Bond (1991)—the differenced generalized method of moments (GMM), which involves taking the first difference, and, then, using the lagged levels of the dependent variables as instruments for endogenous variables in the first-difference equation could have been used. However, Arellano and Bover (1995) and Blundell and Bond (1998) argued that such instruments were likely to be poor, hence, such an approach would be weak if the dependent variable was close to a random walk situation and the panel data was short. Thus, Blundell and Bond (1998) developed the system GMM to help deal with the situation. The system GMM can be seen as an improvement in Arellano and Bond's (1991) difference GMM by permitting the use of additional level equations and the use of first difference lagged levels as instruments.

4 Data and Descriptive Statistics

The dataset used for this study was sourced from the World Bank's World Development Indicators (WDI), World Governance Indicators (WGI) and the Standardized World Income Inequality Database (SWIID). Specifically, the income inequality index (GINI) was sourced from SWIID. Agriculture Value Added (AVA), Industrial Value added (IVA), Services Value Added (SVA), growth of money supply (proxy monetary policy), Tax revenue as a percentage of GDP (a proxy for fiscal policy), foreign direct investment (FDI) and Real GDP were all sourced from WDI. Data on Corruption Control was also sourced from the WGI. The data used was an unbalanced data of 43 Sub-Saharan African countries which were observed over the period 1996–2017. The 43 out of the 46 countries in SSA employed in the study was purely based on data availability. The list of countries is presented in Table 3.

Though the World Development Indicators provide time-series data on income inequality, it has a considerable number of missing observations, hence making the use of the data relatively difficult. The study, therefore, opted to use the SWIID data developed by Solt (2016). The SWIID is seen as a better source for the measure of inequality since it overcomes comparability, accuracy, and consistency issues associated with the income inequality index developed by Deininger and Squire (1996). These weaknesses in the measure by Deininger and Squire (1996) were first raised in the works of Atkinson and Brandolini (2001), Galbraith and Kum (2005) and Malinen (2012). Apart from key variables of interest (AVA, IVA, SVA, TAX and MP),

the inclusion of all other variables (control variables) was mainly informed by literature.

Table 1 presents the descriptive statistics of the variables used for the study. The average value of the Gini over the study period (1996–2017) was found to be 0.44, which is relatively low (see Odusola et al. 2017). Figure 1 presents summarized trends in income inequality and the contribution of the various sectors of the economy to GDP in SSA over the study period. Figure 1 indicates that inequality peaked between 2002 and 2004 and began to decline steadily from 2005 to 2013. Income inequality in SSA, however, rose sharply between 2014 and 2016; which has raised some questions among policymakers and researchers alike. The questions, then, to ask are: what has caused the sudden change in the trend of inequality? Is it as a result of structural changes in the economy? Is it the result of changes in fiscal and monetary policies?

The average contributions of the agriculture, industrial and services sectors to GDP are 24.62, 23.31, and 45.64% respectively. The service sector has overtaken the agricultural sector, which for the larger part of the twentieth Century was the leading contributor to GDP for most African economies. Thus, an examination of Fig. 1 confirms this as the contribution of the service sector to GDP in SSA has been rising steadily since 1996 whereas the contribution of the agricultural sector also steadily declines. The contribution of the industrial sector to GDP has remained relatively stable over the study period. Based on the trajectory of the three main sectors of the economy, one

Table 1 Summary statistics

Variables	Observations	Mean	Standard Deviations	Minimum	Maximum
GINI	929	0.442	0.070	0.301	0.631
Agricultural Value Added	900	24.794	15.141	1.828	79.042
Industrial Value Added	894	23.307	11.841	2.073	77.414
Services Value Added	884	45.458	10.846	12.435	82.586
Tax Revenue	727	15.340	9.404	0.583	90.067
Money Supply	893	29.234	20.809	0.024	151.549
Foreign Direct Investment	853	4.504	7.747	−5.387	103.337
Corruption Control	753	−0.565	0.622	−1.723	1.217
Real GDP	857	28,600	72,000	125	464,000

NB: Real GDP in millions of US Dollars. GINI is the income inequality index
Source Authors' computation

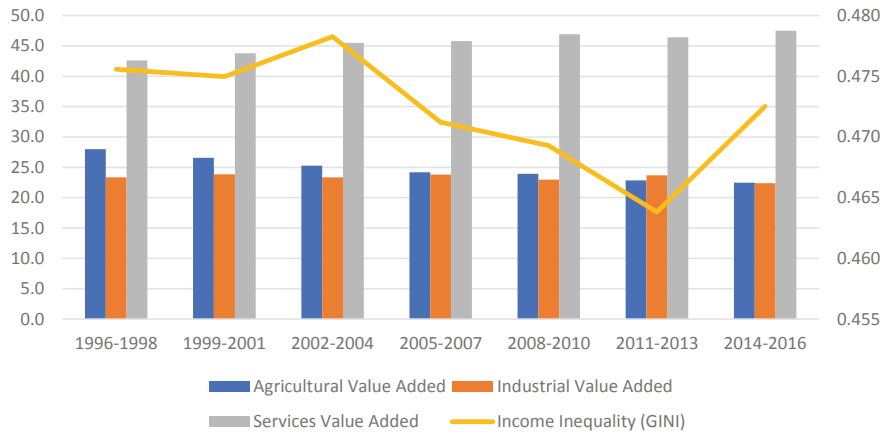

Fig. 1 Inequality in SSA and Sectoral Contribution to GDP (*Source* Authors' computation)

question that comes to mind is, can we attribute the sharp rise in inequality to the rising contribution of the services to GDP? This study attempts to find answers to this question in the next section.

5 Empirical Results and Analysis

The main empirical results from System GMM are presented in Table 2. We also present fixed effect results for the same model in Table 4 in the appendix to serve as a robustness check. The results of the fixed effect model are similar to the system GMM in terms of the signs of the coefficients. The empirical discussion mainly focuses on the System GMM results in Table 2. It is important to note that the study used the natural log value of RGDP in the regression estimates to avoid any possible effect of extreme values. Discussion on the empirical results would be in two parts. The first part discusses the estimated results on the role of fiscal policy in affecting the relationship between sectoral growth and income inequality. The second part also examines the role of monetary policy in affecting the relationship between sectoral growth and income inequality.

Due to the interaction between fiscal/monetary policy on sectoral value-added, the study analyzes the impact of each sector on inequality by taking into account the level of fiscal/monetary policy. This requires differentiating Eqs. (3) and (4) with respect to each sector and analyzing its effect on inequality at a given level of fiscal/monetary policy. The outcome of this differentiation is summarized in Figs. 2 and 3 for fiscal and monetary policies, respectively.

Table 2 Empirical results from system GMM

	Fiscal Policy			Monetary		
VARIABLES	(1)-Agric	(2)-Industry	(3)-Service	(4)-Agric	(5)-Industry	(6)-Service
L.GINI	1.061***	0.973***	0.960***	1.000***	1.049***	1.022***
	(0.034)	(0.022)	(0.052)	(0.051)	(0.018)	(0.022)
Foreign Direct Investment	−0.003*	−0.006**	−0.010***	−0.006***	−0.011***	−0.0113***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003	(0.002)
Corruption Control	1.523***	1.148***	1.131***	-0.601	0.941**	0.492
	(0.326)	(0.233)	(0.185)	(0.397)	(0.430)	(0.418)
Real GDP	−0.228	0.809*	−0.414	−0.245	1.173***	−0.412***
	(0.487)	(0.477)	(0.275)	(0.294)	(0.390)	(0.119)
Tax Revenue	0.744	0.0207*	0.015**			
	(0.580)	(0.011)	(0.007)			
Agricultural Value Added	−0.941***			−0.244		
	(0.342)			(0.331)		
Tax Revenue—Agricultural Value Added	0.311**					
	(0.657)					
Industrial Value Added		−0.799*			−0.545***	
		(0.430)			(0.102)	
Tax Revenue—Industrial Value Added		−0.007				
		(0.033)				
Services Value Added			0.009***			0.014***
			(0.002)			(0.004)
Tax Revenue—Services Value Added			0.001***			
			(8.11e-05)			
Money Supply				−0.050***	−0.011	−0.002
				(0.016)	(0.014)	(0.003)

(continued)

Table 2 (continued)

	Fiscal Policy			Monetary		
VARIABLES	(1)-Agric	(2)-Industry	(3)-Service	(4)-Agric	(5)-Industry	(6)-Service
Money Supply—Agricultural Value Added				0.002*** (0.001)		
Money Supply—Industrial Value Added					0.0006 (0.0006)	
Money Supply—Services Value Added						5.46e-05 (6.05e-05)
Observations	726	724	720	727	718	715
Number of Economies	43	43	43	43	43	43
Joint Sig Test (χ^2)	Agricultural Value Added/Tax Revenue—Agricultural Value Added	Industrial Value Added/Tax Revenue—Industrial Value Added	Services Value Added/Tax Revenue—Services Value Added	Agricultural Value Added/Money Supply—Agricultural Value Added	Industrial Value Added/Money Supply—Industrial Value Added	Services Value Added/Money Supply—Services Value Added
	7.59[0.023]	4.93[0.085]	52.73[0.000]	8.33[0.016]	6.97[0.031]	16.68[0.000]
Arellano-Bond AR (2) Test	−0.696[0.485]	−0.259[0.796]	−1.238[0.216]	−1.527[0.127]	−1.485[0.138]	−1.685[0.100]
Sargan test of overidentification	231.15[0.187]	252.58[0.147]	256.08[0.114]	232.12[0.176]	228.76[0.218]	214.80[0.433]

Note L.GINI is the coefficient of the lag value of income inequality, Real GDP is measured in Natural Logs. Values in parenthesis are the robust standard errors. A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level and three asterisks (***) at 1% level. (1)-Agric, (2)-Industry and (3)-Services refers to models that takes fiscal policy (Tax revenue) into account in the estimation. On the other hand (4)-Agric, (5)-Industry and (6)-Services refers to models that takes monetary policy (monetary growth) into account in the estimation. Values in square brackets [] are the probability values

Income Inequality, Sectoral Growth and Fiscal Policy

Table 2 also presents results on the role of fiscal policy in the relationship between sectoral growth and income inequality. As mentioned in the methodology, each sector of the economy was also included in separate equations to avoid the issue of multicollinearity. Column (1) of Table 2 is the estimation results for the effect of agricultural value-added on income inequality. The result in column (1) indicates that increases in agricultural value-added is inversely related to the level of inequality and is statistically significant at 1 percent. The inverse relationship between AVA and income inequality is consistent with results obtained by Siami-Namini and Hudson (2017) for Sub-Saharan African countries. Contrary to the inverse relationship between agricultural value-added and income inequality, the study found a positive relationship between a tax increase and income inequality. This result is probably because the main source of tax revenue for several Sub-Saharan African economies is indirect (see Cheeseman and Griffiths 2005), as such an increase in tax revenue is an indication of increases in the level of indirect taxes which intend increases the gap between the poor and the rich. This is clearly in line with results obtained by Martinez-Vazquez et al. (2012) for a panel of 150 countries across the world.

The summary of the effect of agricultural value-added in the presence of Tax is presented in Fig. 2. The figure indicates that increases in the level of taxes dampen the income inequality-reducing the effect of an increase in agricultural value-added. Thus, a high level of taxation tends to adversely

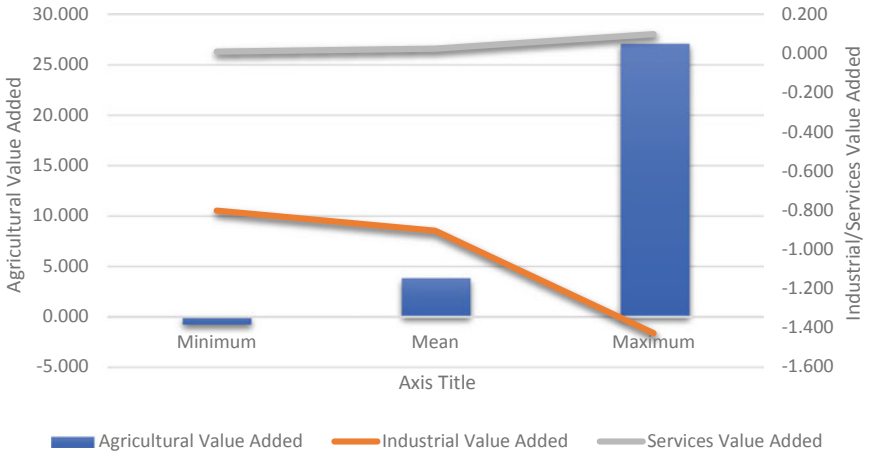

Fig. 2 Effects of sectoral value added on income inequality at various levels of tax revenue (*Source* Authors' computation based on estimated results)

affect the ability of the agricultural sector to reduce income inequality. This is because the agricultural sector mostly employs the poor and vulnerable people in SSA, hence increasing the level of taxes (which are mostly indirect taxes) only contributes to reducing their income. The result of the effect of industrial value-added (IVA) on income inequality is presented in column (2) of Table 2. The results indicate the existence of an inverse relationship between inequality and IVA. Thus, the expansion of activities in the industrial sector would contribute to the reduction in income inequality. The results from the joint significance test (as shown in column [2] of Table 2) indicate that, when the level of tax revenue is taken into account, IVA tends to have a significant effect on inequality. Contrary to the results obtained from the effect of AVA, the study found that increases in the tax level reinforce the negative effect of IVA on inequality (see Fig. 2). This is probably because the industrial sector in Sub-Saharan Africa (SSA) is largely dominated by mining activities which generate lots of profits relative to other sectors. Besides, activities in the industrial sector of SSA are largely dominated by foreigners such that an increase in taxes in that sector tends to increase tax revenue available for pro-poor policies. This result is consistent with the results obtained by González Gordón and Resosudarmo (2018).

The effect of value-added from the services (SVA) was found to be positive and significant at one percent (see column [3] of Table 2). The interaction term between SVA and TAX was also positive and significant at one percent. The result clearly shows that increases in tax revenue mainly work to reinforce income inequality (see Fig. 2). A positive relationship between SVA and income inequality could be attributed to the fact that the service sector tends to employ more people in urban areas than in rural areas. Also, a number of those employed in the service sector are among the high-income earning group in society, thus contributing to the increasing gap between the poor and the rich. The inequality reinforcing effect of Tax as shown in Fig. 2 could be attributed to the high dependence of SSA economies on indirect rather than direct taxes to finance their activities. This is because indirect taxes are in most cases levied on consumer goods and some limited number of services. Thus, the cost that is incurred via indirect taxes is usually avoided in the services sector, contributing to higher levels of income relative to other sectors of the economy.

Additionally, the positive relationship between income inequality and growth in the service sector could be as a result of the fact that real wage growth mainly occurs in the service sector, which creates the biggest wage differential between service and non-service employees. Conventionally, we think of jobs moving from agriculture to the industry as economic

growth. These findings may imply that the services sector is the engine of future economic growth, sidestepping the industrialization process. Hence the growth in the services sector generates the traditional initial increase in income inequality as the economy develops.

Income Inequality, Sectoral Growth and Monetary Policy.

Results on the role of monetary policy in the relationship between sectoral growth and income inequality are presented in columns (4) to (6) in Table 2. Though the coefficient of AVA is not significant, the joint significance test (see column [4]) indicates that when monetary policy is taken into account, AVA becomes significant. The result indicates that a percentage increase in AVA causes income inequality to reduce by 0.20 percent at the mean of monetary growth. The positive coefficient of the interaction between monetary policy and AVA could be attributed to the fact that increases in the supply of money cause increases in the general price level which erodes the purchasing power of individuals (see Erosa and Ventura 2002). Since the agricultural sector in SSA countries is very vulnerable to various conditions, increases in the rate of inflation tend to harm the earnings of workers in the agricultural sector.

The effect of IVA on income inequality is provided in column (5) of Table 2. The result shows that in the absence of monetary policy (i.e., when money supply= 0), a percentage increase in IVA causes inequality to decline by 0.55 percent. However, when the mean of monetary policy is taken into account, an increase in IVA causes inequality to decline by 0.53 percent. This implies that on average, an expansionary monetary policy dampens the inequality-reducing effect of IVA by 0.02 percent. The IVA is able to overshadow the inequality increasing effect of monetary policy because the industrial sector compensates for the inflation increasing effect of expansionary monetary policy relative to the agricultural sector.

Contrary to the results obtained for the industrial sector (IVA), the estimates obtained from the services sector (as shown in column [6] of Table 2) indicate that monetary policy only reinforces the income inequality increasing effect of SVA. In terms of the effect of monetary policy on income inequality, when the average values of AVA, IVA and SVA are all taken into account as indicated in columns (4), (5) and (6), respectively, we find that expansionary monetary policy in all cases causes inequality to increase (see Fig. 3). Figure 3 indicates that given the average value of AVA, IVA, and SVA, the expansionary monetary policy only contributes to increasing the level of inequality in SSA. The effect is higher when the services sector is taken into account.

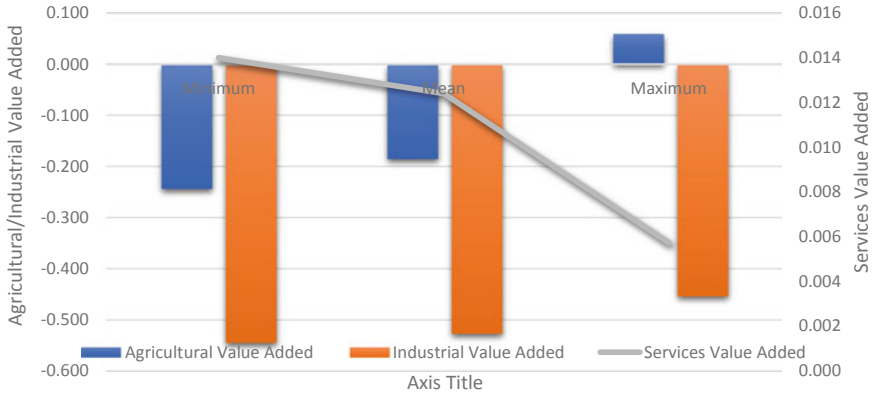

Fig. 3 Effects of sectoral value added on income inequality at various money supply levels (*Source* Authors' computation based on estimated results)

To ascertain how robust our estimates are, we performed Arellano–Bond tests on all the models, and the results indicate the absence of serial correlation. We also performed the Sargan over-identification test (to check for the robustness of the GMM instruments used), and the results from the test indicated that our model was identified. These results are reported at the bottom of Table 2. To further check the robustness of our estimates, the study estimated fixed and random effect models (the Hausman test in all cases indicated that the fixed effect was consistent). The signs of coefficients obtained in the fixed effect model (which is presented in Table 4 of the Appendix) were consistent with those obtained from the System GMM.

6 Conclusions and Policy Implications

Despite the strong growth performance of SSA over the last decade, inequality has been on the increase. The present study, therefore, sought to examine how growth in the three main sectors affected income inequality when fiscal and monetary policy are taken into account. The results of the study indicate that an increase in Tax tends to dampen the income inequality-reducing effect of agriculture value-added. The study also found that increases in taxes enhance the income inequality-reducing and increasing effect of industrial value-added and services value-added, respectively. In terms of the role of monetary policy, the study found that an expansionary monetary policy on the average tends to dampen income inequality-reducing effect of agricultural value-added and industrial value-added and enhances the positive effect of services value-added on income inequality.

The results of the study imply that taxes that affect output in the agricultural sector must be reduced. Policymakers can compensate for the reduction in taxes in the agricultural sector with some level of increased taxes in the industrial sector since it would go a long way to reduce inequality in SSA. The study also implies that SSA economies have to focus on policies that would enhance the development of the agricultural and industrial sectors of the economy since they tend to have a greater reducing effect on income inequality. Expansionary monetary policy is detrimental to the fight against inequality.

Appendix

See Tables 3 and 4.

Table 3 Countries used for the study

List of Countries	
Angola	Liberia
Benin	Madagascar
Botswana	Malawi
Burkina Faso	Mali
Burundi	Mauritania
Cabo Verde	Mauritius
Cameroon	Mozambique
Central African Republic	Namibia
Chad	Niger
Comoros	Nigeria
Congo, Dem. Rep	Rwanda
Congo, Rep	Sao Tome and Principe
Cote d'Ivoire	Senegal
Eswatini	Seychelles
Ethiopia	Sierra Leone
Gambia, The	South Africa
Ghana	Sudan
Guinea	Tanzania
Guinea-Bissau	Togo
Kenya	Uganda
Lesotho	Zambia
	Zimbabwe

Table 4 Results of fixed effect model

VARIABLES	(1) GINI	(2) GINI	(3) GINI	(4) GINI	(5) GINI	(6) GINI
FDI	−0.023**	−0.022	−0.022	−0.018	−0.026**	−0.024**
Corruption Control	(0.010)	(0.013)	(0.014)	(0.0108)	(0.010)	(0.010)
Real GDP	0.690	1.421*	1.599*	1.357*	1.522*	1.777***
FDI	(0.639)	(0.823)	(0.868)	(0.804)	(0.810)	(0.364)
Corruption Control	−0.804	−2.867***	−2.330**	−2.632	−3.804**	−1.801***
	(1.641)	(0.815)	(1.060)	(1.613)	(1.446)	(0.414)
Tax Revenue	7.876**	0.060**	0.030			
	(3.137)	(0.026)	(0.042)			
Agricultural Value Added	−8.344**			−0.276		
	(3.256)			(0.829)		
Tax Revenue—Agricultural Value Added	0.359**					
	(0.150)					
Industrial Value Added		1.102*			−0.730	
		(0.619)			(0.689)	
Tax Revenue—Industrial Value Added		−0.178**				
		(0.066)				
Services Value Added			0.0142			0.006
			(0.028)			(0.014)
Tax Revenue—Services Value Added			0.001			
			(0.001)			
Money Supply				−0.037	−0.046	−0.005
				(0.076)	(0.046)	(0.004)
Money Supply—Agricultural Value Added				0.002		
				(0.004)		
Money Supply—Industrial Value Added					0.002	
					(0.002)	

(continued)

Table 4 (continued)

VARIABLES	(1) GINI	(2) GINI	(3) GINI	(4) GINI	(5) GINI	(6) GINI
Money Supply—Services Value Added						−0.000
						(0.000)
Constant	232.7***	87.51***	62.68***	69.50***	56.53***	58.16***
	(64.84)	(13.75)	(7.455)	(11.91)	(10.16)	(2.986)
Observations	757	744	721	766	757	753
	0.125	0.133	0.084	0.082	0.097	0.081
Number of Economies	43	43	43	43	43	43

Note Real GDP is measured in Natural Logs. Values in parenthesis are the robust standard errors. A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level and three asterisks (***) at 1% level. (1), (2) and (3) refers to models that takes fiscal policy (Tax revenue) into account in the estimation. On the other hand (4), (5) and (6) refers to model that takes monetary policy (monetary growth) into account in the estimation

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Gender Wage and Employment Gaps in the Sub-Saharan Africa Economic Sectors

Melaku Abegaz and Gibson Nene

1 Introduction

Gender inequality is multifaceted. It has social, economic, and political dimensions pervasively prevailing across the developing and developed countries. World leaders have spent a significant amount of time and resources to bridge the gender gap by setting global agendas outlining common visions and goals that many countries promised to incorporate in their development policies. In 2000, 191 United Nations (UN) member states committed to eight Millennium Development Goals (MDGs). Among the MDGs, the third goal was to promote gender equality and empower women with a specific target of eliminating gender disparity in access to primary and secondary education by 2015. The 2015 MDG progress report by the UN indicated that there was significant progress in narrowing the gender inequality over the years 2000–2015, particularly in primary education, but disparities across regions remained in all levels of education.

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The report also pointed that women continue to face discrimination in access to work, economic assets, and participation in the private and public decision-making process. The 2030 Agenda for Sustainable Development was introduced to advance several development goals including the unfulfilled MDG promises. In September 2015, 193 countries adopted the seventeen Sustainable Development Goals (SDGs) including achieving gender equality.

Despite the efforts and progress made by international organizations and governments at the national and local levels, gender inequality continues to be a significant problem, particularly in developing countries. The Global Gender Gap Report by the World Economic Forum (WEF) publishes national and regional gender gap indices on economic, education, health, and political aspects. According to the WEF 2016 report, the economic gender gap will not be closed for another 170 years if the current rate of change is maintained. At the global level, the composite gender gap index suggests that there is a 31.7% gap which is to be closed over the coming years and generations. The gaps between men and women were 41 and 77% in the economic participation and opportunity and the political participation categories, respectively. Based on the distance from parity, the Middle East and North Africa with a remaining gap of 40% followed by South Asia (33%) and SSA (32%) have higher levels of gender gap than the other regions.

Many SSA countries have made laudable achievements in reducing the gender gap in education and economic participation. Between 1991 and 2015, the ratio of girls to boys in primary and secondary education increased from 0.84 to 0.93 and from 0.77 to 0.87, respectively (UN 2015). Besides, the share of women in non-agricultural wage employment increased from 24 to 34%, the highest progress compared to other regions. However, the region has a long road ahead before it can achieve gender equality. It still lags in several gender gap measures behind the averages for developing countries. For instance, the developing region's average proportion of women in paid non-agricultural employment was 48% in 2015, far higher than that of SSA (34%) (UN 2015). As noted in the UNDP's (2016) Africa human development report, increased female participation in the labor market has not meant increased opportunities in highpaying jobs or enterprises. A gender wage gap outside agriculture is pervasive across all labor markets in SSA, where, on average, the unadjusted gender pay gap is estimated at 30% (UNDP 2016).

The two objectives of this chapter are: (i) provide a discussion of the trends and current levels of gender inequality in SSA, and (ii) present an in-depth review of the empirical work on gender wage and employment gaps. Setting a foundation for the empirical review, we present a summary of the two main theoretical frameworks of market discrimination. This is followed by

a discussion of the Oaxaca–Blinder empirical methodology popularly used in empirical studies of gender wage gap. The rest of the chapter is organized as follows: Sect. 2 presents descriptive statistics on gender trends in SSA, Sect. 3 provides a theoretical background to supplement understanding of the empirical review, and Sect. 4 discusses the empirical review. Finally, Sect. 5 summarizes and concludes the chapter.

2 Gender Gap Trends in SSA Based on WDI and UNDP Data

In this section, we present descriptive statistics of the trend and current levels of gender inequality in SSA using data from two sources, the World Bank's world development indicators (WDI) and the United Nations Development Programme (UNDP)'s human development index (HDI). We discuss disparities in labor market outcomes and human development in education, health, and living conditions. To this end, we will focus on the WDI employment gap indicator and two UNDP indices, the gender development index (GDI) and the gender inequality index (GII). A discussion of the employment gap is presented next.

Employment Gap Based on WDI Data

Inequalities in labor market outcomes involve various elements including gaps in employment, labor force participation, wages as well as sectoral and occupational segregation. A single measure or index that captures all aspects of the labor market is not available. An indicator used to capture labor market inequality in employment is the gap between the male and female employment to population ratio based on the International Labour Organization (ILO) estimates available in the World Banks's WDI database. The male and female employment to population ratio has been used to measure the employment gap in empirical studies (Wamboye and Seguino 2015; Wamboye et al. 2015). Figure 1 depicts the employment gap in twelve SSA countries with higher and lower average gaps for the period 1995–2018. In 2018, the average SSA female employment to population ratio was 11.3% lower than that of males, indicating fewer employment opportunities for women than men. Over the past 20 years, the region realized a slight decline in the employment gap with an increase in the female and a decrease in the male employment ratios.

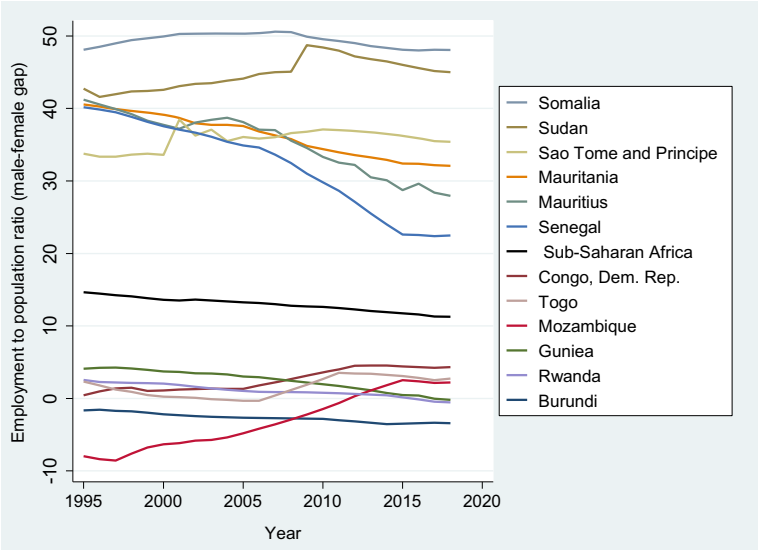

Fig. 1 Male–female employment-to-population ratio gap in sub-Saharan Africa (1995–2018) (*Source* Authors' compilation using data from the World Bank's WDI database)

SSA countries with an extremely higher male–female employment to population ratio gap of more than 30% include Somalia, Sudan, Sao Tome and Principe, and Mauritania. In 2018, there were ten countries with an employment gap of 20% or higher, and more than half of SSA countries had a gap of 10% or more, leaving women at a disadvantage. In contrast, there were a few countries, such as Burundi, Rwanda, and Guinea, with a higher employment to population ratio for females than males, generating a negative male–female employment gap. These countries also had a higher female labor force participation rate. Other countries with a lower male–female employment gap (less than 5%) include Mozambique, Togo, and Congo, Dem. Republic.

Compared to other developing regions, SSA has a lower average employment gap. In 2018, as shown in Fig. 2, the region had one of the highest female employment to population ratio and the lowest male–female employment gap. South Asia had the highest employment gap followed by the Middle East and North Africa, and Latin America and the Caribbean. However, the low employment gap in SSA hides significant labor market disparities in the region. For instance, as shown in Fig. 3, SSA has the lowest share of wage and salaried workers (23.4% of the total employment in 2018). The region with the second-lowest share of wage and salaried workers was South Asia (25.5%) followed by East Asia and the Pacific (55%). Besides,

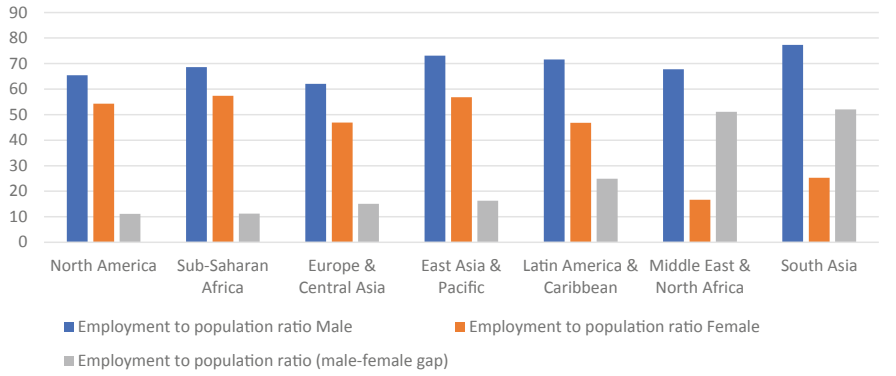

Fig. 2 Employment to population ratio (male, female, and the gap) across regions in 2018 (*Source* Authors' compilation using data from the World Bank's WDI database)

Fig. 3 Wage and salaried workers ratio (male, female, and the gap) across regions in 2018 (*Source* Using the World Bank's WDI database)

SSA has the lowest share of wage and salaried female workers (as % of the total female employment) and the highest gender gap in the composition of wage and salaried employment. The male–female gap in the share of wage and salaried employment was 12.8%, far higher than that of South Asia in the second place (6%). This suggests that, despite the high female employment to population ratio, women are concentrated in non-wage/non-salaried employment dominated by the informal sector.

While the employment gap helps shed light on gender inequality in the region, it is important to document measures based on different considerations that provide a good understanding of the issue. Next, we present a discussion of the gender gap based on the UNDP's gender human development index.

Gender Human Development Gap

Starting in 1990, the UNDP annually produced the HDI to measure the development of a country with special emphasis on the human dimension of development instead of only focusing on national income. HDI is a composite measure based on three key elements: health (measured by life expectancy at birth), education (measured by mean years of schooling for adults and expected mean years of schooling for children), and living standard (measured by gross national income per capita). The human development report also generates separate HDIs for females and males to address the issue of gender inequality.[1] As a result, the gender development index (GDI) introduced in 2014 is calculated as a ratio of the female HDI to the male HDI measuring gender disparities in human development achievements.

The world average HDI for women in 2017 was 6% lower than for men (UNDP 2018). The gap was wider (13.8%) in low human development countries. SSA had the third-largest gap (10.7%) preceded by Arab states (14.3%) and South Asia (16.3%).[2] From hereon, our discussion focuses mainly on the 2017 HDI statistics. Figure 4 presents the trend of GDI for ten SSA countries with low and high inequality in 2017. The figure shows an increasing trend of the average GDI for SSA and the world, signifying a decrease in the human development gap between males and females. For instance, while the world average gap decreased from about 10% in 1995 to 6% in 2017, the average gap in SSA decreased from about 17 to 11%. However, the gap in SSA continued to be above the world average and the difference has persisted throughout the period. Countries in the region with the highest gap include Chad, Central Africa Republic, Guinea, Mali, and Niger. In 2017, the human development gap in these countries was more than 18%.

On the other hand, a few SSA countries have a lower HDI gender gap than the world average. Despite the low human development in Lesotho and Burundi, and a medium human development in Namibia, these countries achieved male–female HDI parity. Burundi scored the fastest growth in GDI narrowing the gap from 17% in 1995 to zero in 2015. Other countries with

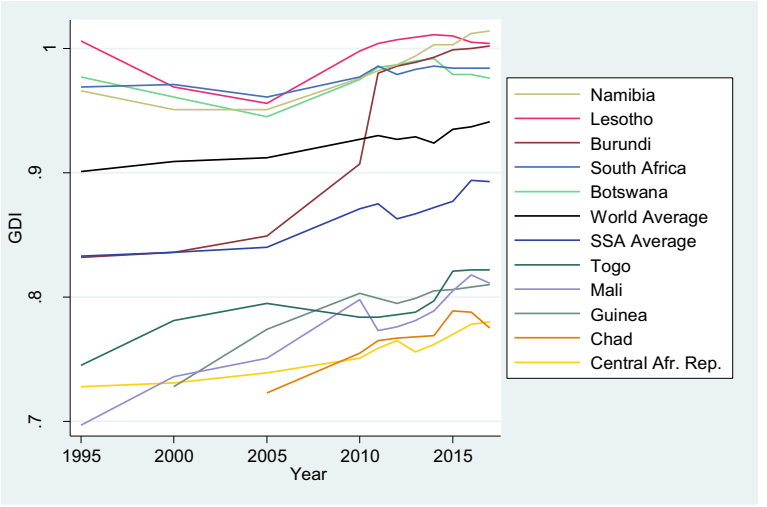

Fig. 4 GDI trend for a sample of SSA countries with low and high values (1995–2017) (*Source* Based on data from the UNDP data center: http://hdr.undp.org/en/data)

a lower gender human development disparity include South Africa (1.5% in 2017), Botswana (2.5%), and Mauritius (3%).

The UNDP also produces a gender inequality index (GII) with a primary focus on the disadvantages women face in reproductive health, education, political participation, and the labor market.[3] It addresses women's empowerment and gender achievement gaps in human development. Figure 5 depicts the trend of GII for SSA countries with low and high inequality. It shows that the average gender inequality in the region has been far greater than the world average, presenting a heavy constraint for women's empowerment in the region. According to UNDP (2018), SSA was ranked first among developing regions with a higher GII followed by Arab states and South Asia. The region has the lowest achievement in women's reproductive health with the highest maternal mortality ratio (549 deaths per 100,000 live births) and adolescent birth rates (101.3 births per 1000 women ages 15–19). Besides, it has the lowest achievement in education with only 29% of women and 39% of men have at least some secondary education. In contrast, SSA has the highest female labor force participation rate (65%) and the lowest labor force participation gap (9%). Moreover, the region has a higher share of parliament seats held by women (23.5%) than other developing regions except for Latin America and the Caribbean (28.8%).

Figure 5 also reveals that gender inequality is distributed unevenly across the region in which some countries (such as Central Africa Republic, Mali, Cote d'Ivoire, Liberia, and Congo) pose significantly higher disparity than

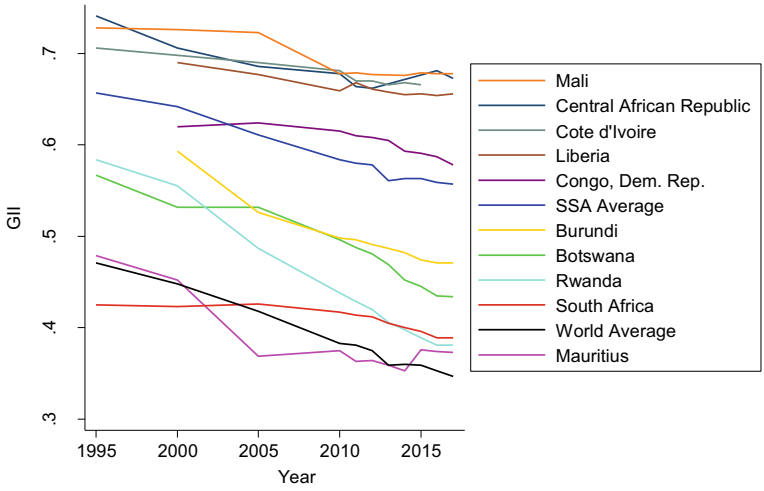

Fig. 5 GII for a sample of SSA countries (1995–2017) (*Source* Based on data from the UNDP data center: http://hdr.undp.org/en/data)

others (such as South Africa, Mauritius, Rwanda, Botswana, and Burundi). On the positive side, the trend shows that countries in the region achieved some progress in reducing the inequality over the past two decades. For instance, the average GII for the region decreased from 0.66 in 1995 to 0.56 in 2017, indicating a 15% decrease in the aggregate measure of gender disparity in human development. Overall, the data presents the existence of a wide gender gap in health, education, political participation, and labor market outcomes across the region.

3 Theoretical Frameworks of Gender Economic Gap

There are several ways to explain the existence of wage and employment gaps across gender and racial lines. One of the main reasons behind the persistence of female–male wage and employment gaps worldwide is discrimination. Discrimination results when members of a certain group are treated differently than others despite having the same productive skills. In the economics literature, there are two main theoretical frameworks in the area of market discrimination, taste-based and statistical discrimination.

First, we will provide a brief discussion of the taste-based discrimination model developed by Becker (1957). In his book, The Economics of Discrimination, Becker provided the first formal economic framework to analyze

market discrimination. Becker defined discrimination as the difference in wages between two workers of equal productivity. His framework focused on the relationship between racial prejudice among whites and discrimination against minorities in a perfectly competitive model. In the short-run equilibrium, minorities receive lower wages even in situations where they are equally productive as their white counterparts. This type of discrimination is referred to as taste-based discrimination. In the long run, the entry of more nondiscriminating employers will force discriminating employers to exit the industry. In sum, discrimination only exists in the short run and the long run is characterized by the absence of discrimination.

The departure from solely attributing wage gaps to the taste of dislike among employers was first challenged by Arrow (1972) who argued that by predicting the absence of discrimination in the long run, the Becker model fails to explain the persistence of discrimination. A second shortcoming with the Becker model was that discrimination tastes were taken as a given (Guryan and Charles 2013). The shortcomings of the Becker model led to the development of models focused on statistical discrimination. Arrow (1972) provides one of the first theoretical models of statistical discrimination. Such models are based on rational optimization with limited information (Guryan and Charles 2013). Employers assess a specific characteristic of a potential employee based on limited information. In addition to the imperfect signals of the applicant's productivity received by the employer during an interview, the employer has access to a lot of information including the potential employee's group membership including race, gender, and ethnicity. Because of the lack of perfect information on applicants, the employer would use a weighted average of the signals received during the interview and the average productivity of the workers who belong to the same group as the applicant (Guryan and Charles 2013). The employer will end up treating applicants as members of specific groups based on race, gender, or ethnicity which will lead to discrimination.

A few studies attempted to empirically test the extent of market discrimination in the context of both taste-based and statistical discrimination (Charles and Guryan 2008; List 2004). However, empirical works often do not attempt to test these theories directly in terms of which one explains discrimination the best. Much of the work which focused on wage and employment gaps quantifies discrimination based on the seminal works of Oaxaca (1973) and Blinder (1973). The Oaxaca–Blinder methodology attempts to measure the degree of wage discrimination by gender or race by decomposing the wage gap between the "explained" and "unexplained" components. The explained component is the proportion of the gap due to

differences in characteristics such as education, experience, and other individual factors. The unexplained wage gap attributed to the differences in returns to the wage generating characteristics is often argued to be the result of discrimination.

The Oaxaca–Blinder decomposition, which involves separate estimations of a standard Mincerian log wage equations for men and women, is:

$$\bar{w}_m - \bar{w}_m = \beta_m\left(\bar{x}_m^{'} - \bar{x}_f^{'}\right) + \left(\beta_m - \beta_f\right)\bar{x}_f^{'}$$

where $\bar{w}_m$ and $\bar{w}_f$ are the means of the natural logs of male (m) and female (f) wages, and $\bar{x}_m$ and $\bar{x}_f$ are the means of the observable productivity-related characteristics of males and females. Besides, the β_m and β_f are estimated coefficients from the male and female log earnings equations, respectively. The first part of the decomposition, $\beta_m\left(\bar{x}_m^{'} - \bar{x}_f^{'}\right)$, represents the wage gap explained by differences in characteristics, and the second part $(\beta_m - \beta_m)\bar{x}_f^{'}$ represents the unexplained component arising from differences in returns to characteristics.

The above decomposition uses the male wage structure as the nondiscriminatory benchmark based on the assumption that males are paid competitively but females are discriminated against. However, results could be different if the decomposition uses the female wage structure as a competitive outcome and assumes males are compensated differently. The sensitivity of the standard Oaxaca–Blinder approach to using the male or female wage structure as the nondiscriminatory outcome is known as the index problem. To solve this problem, Neumark (1988) proposed a general approach based on the assumption that the coefficients of a pooled (males and females) wage equation represent a nondiscriminatory wage structure. Therefore, the Neumark decomposition substitutes coefficients (β^*) from a pooled wage regression for the male coefficients (β_m) in the above Oaxaca–Blinder decomposition.

The practice of using the unexplained gap in the decomposition analysis as a measure of the degree of labor market discrimination is not without shortcomings. Lack of data or missing important productivity variables in wage regressions could lead to overestimating the degree of discrimination. The unexplained component also misses the fact that discrimination affects human capital accumulation and other productivity generating characteristics of male and female workers differently. However, there is no standard approach to mitigate these problems. The next section documents the empirical evidence on gender economic gaps in Africa.

4 Empirical Evidence of Gender-Based Economic Gap in Africa

Studies on gender-based wage and employment gaps using African data can be grouped into two categories: studies using household data and those using manufacturing data. Most of the studies used household or labor force survey data. Besides, many recent studies have utilized employer–employee matched manufacturing sector data. As a result, the current section is organized based on the sources of data used in the studies. First, we will review studies that used household or labor force surveys. Second, we will cover studies that focused on the manufacturing sector data.

Evidence from Household Data

The work by Appleton et al. (1999) is among the first gender wage gap studies to use nationally representative household data from three SSA countries, Uganda (1992), Ethiopia (1990), and Cote d'Ivoire (1985, 1986, and 1987).[4] The data showed that male wages exceeded female wages by about 33, 25, and 3% in Uganda, Ethiopia, and Cote d'Ivoire, respectively. Decomposition of the gaps using the Neumark (1988) approach revealed that in the private and public sectors in Ethiopia and the private sector in Uganda and Cote d'Ivoire, the earnings differentials were largely due to differences in returns to the wage generating characteristics. In the public sector in Uganda and Cote d'Ivoire, however, differences in wage generating characteristics played a significant role. These results suggest that the public sector in Uganda and Cote d'Ivoire experienced less wage discrimination than the private sector, but no such evidence was found for Ethiopia.

Glick and Sahn (1997) for Guinea and Kabubo-Mariara (2003) for Kenya investigated gender differences in employment and earnings in three alternatives: self-employment, private sector wage employment, and public sector wage employment.[5] The studies showed that education strongly increases the likelihood of men and women being a private or public wage employee. Controlling for background characteristics, gender played an important role in determining labor market participation and earnings. Glick and Sahn (1997) for Guinea indicated that women of identical background to men had much lower chances of entering wage employment and faced significant earnings differentials, 120% in self-employment and 20% in public sector employment. In contrast, in private wage employment, women earned slightly higher than men do. According to Kabubo-Mariara (2003), the gender wage gap was lower in Kenya, 9% in the private and 4% in the

public sectors. Decomposition of the gender earnings differentials in Guinea revealed that unexplained factors account for more than half of the gap in self-employment and three-quarter of the gap in the public sector. Similarly, for Kenya, more than 70% of the gaps in the private and public sectors remained unexplained by differences in characteristics.

For Botswana, Siphambe and Thokweng-Bakwena (2001) used a 1995/6 Labor Force Survey to investigate the wage gap between men and women in the formal private and public sectors. The study showed that female workers earned 73 and 81% of male wages in the private and public sectors, respectively. Decomposition of the wage gaps using the Oaxaca–Blinder methodology revealed that 66 and 33% of the gaps in the private and public sectors, respectively, due to differences in rewards to labor market characteristics. Similar to Appleton et al. (1999) for Uganda and Cote d'Ivoire, the public sector in Botswana showed relatively less discrimination against women than the private sector.

Kolev and Robles (2010) studied the gender pay gap in Ethiopia using the 2005 labor force survey. They showed that female workers earned 80, 74, and 35% of male wages in the public, formal private, and informal private sectors, respectively. The gaps were relatively lower for older women and those in the upper wage distribution. The study indicated that differences between men and women in human capital and job characteristics accounted for more than three-quarters of the earnings gap and the rest remained unexplained.[6] In the public and private informal sectors, much of the gap can be explained by observed characteristics and selection across occupation and industry. In the private formal sector, more than half of the gap remained unexplained. This supports the findings of Appleton et al. (1999) which left 85% of the private sector wage gap in Ethiopia unexplained by human capital characteristics without control for occupation and industry. Finally, the inclusion of job characteristics in the decomposition process significantly lowered the contribution of differences in human capital and the unexplained component, suggesting that job selection may indirectly capture the effect of education, job discrimination, and individual work preferences.

In a related study, Nordman and Roubaud (2009) examined returns to human capital in urban Madagascar by introducing an actual measure of workers' experience rather than the often-used potential experience using matched biographical and labor force surveys. Results showed a higher gender difference in returns to experience when using actual than potential experience, as the latter fails to account for the labor market interruption of female workers. Besides, the earnings gap explained by observable characteristics greatly increased when an actual experience is used instead of a

proxy. Accordingly, the authors called for more precise measures of women's actual experience in the estimation and decomposition of the gender wage gap in developing countries. In another study for Madagascar, Nordman et al. (2010), used two cross-sectional household surveys (2001 and 2005) to examine gender employment and wage inequalities. The study found that education increased the probability of men and women getting public sector employment, followed by private formal employment and informal self-employment. The study also found a stable gender wage inequality of about 20% and that the portion unexplained by individual and job characteristics was about 35% in both survey years after controlling for job characteristics.

A recent study by Nordman et al. (2011) used urban household surveys from seven West African capitals for the period 2001–2003 to study gender and ethnic earnings gaps. The unadjusted log earnings differences between male and female workers (a measure of gender wage gap) vary significantly across cities, from about 0.49 in Niamey (Niger) to 0.78 in Lome (Togo). Decompositions of the gaps suggested that selection across sectors (public, private, and informal) accounted for 25% in Cotonou to 40% in Abidjan, and differences in individual characteristics accounted for 12% in Daka to 45% in Lome of the within-sector gender differences in earnings. More than half of the gaps remained unexplained by individual characteristics and sectoral location across the cities.[7] Further, results showed that the gender gaps are wide at the bottom of the distribution where women are disproportionately concentrated, and the unexplained component diminished in the upper earnings distribution.

Consistent with the findings of Kolev and Robles (2010) for Ethiopia, Glick and Sahn (1997) for Guinea, and Appleton et al. (1999) for Côte d'Ivoire and Uganda, Nordman et al. (2011) showed that gender earnings gaps are relatively small in the public and private formal sectors with some variations across the cities.[8] However, the log earnings gap in the informal sector appeared to be very large, ranging from 0.41 in Dakar to 0.74 in Ouagadougou. The authors provided three alternative explanations why the informal sector mainly dominated by self-employment has a larger earnings gap: gender differences in characteristics, lower productivity in jobs held by women, or lower female productivity in certain jobs, and gender differences in access to capital.

Recent studies with a specific interest in gender wage gap along the earnings distribution include Agesa et al. (2013) for Kenya and Bhorat and Goga (2013) for South Africa. The two studies used the re-centered influence function (RIF) and data from household surveys. While the latter found a higher gender wage gap at the bottom of the distribution than at the top in South

Africa, the former found a larger wage gap at the lower and upper ends of the distribution in Kenya. In South Africa, Bhorat and Goga (2013) indicated that the gap at the bottom is largely explained by differences in productive characteristics, while the unexplained component is responsible for the gap at the top of the distribution. In fact, the higher productive characteristics of women at the top of the distribution served to mitigate the discriminatory behavior of employers. In Kenya, Agesa et al. (2013) found that gender differences in characteristics, main occupation, industry, and education account for the largest share of the gender pay gap at the lower (10th and 20th) and upper (80th and 90th) percentiles of the distribution. However, in the middle of the wage distribution (between the 40th and 70th percentiles), gender differences in returns to attributes accounted for the largest share of the gender pay gap. The two studies provide different policy implications to combat gender wage inequality in the two countries along the earnings distribution. For instance, strategies to lessen wage discrimination should target employees in the middle- and upper-income distribution in Kenya and South Africa, respectively.

Evidence from Manufacturing Data

Fafchamps et al. (2009) used employer–employee matched manufacturing sector data from eleven African countries to investigate whether wage gaps associated with education and gender are driven by selection across occupations and firms. Despite large differences across countries, the study showed that, on average, sorting across firms and occupations accounted for over half of the total education wage gap. While sorting explained all the education wage gap in Ghana, a country with the lowest gap among the eleven countries, it played no role in Zimbabwe and Burundi. Results also showed the existence of a significant gender wage gap mostly explained by sorting among firms. Besides, a large gender difference in the education wage gap has been observed across the countries. With a higher education wage gap for women, largely attributed to sorting among firms, the gender wage gap narrows with education leaving less educated women at a disadvantage. An exception to this observation was Morocco where women with higher levels of education were paid less than men.

In a related study for Morocco, Nordman and Wolff (2009a) investigated the glass ceiling effect using a matched worker-firm dataset of more than 8000 employees and 850 employers. Results from a quantile earnings regression accounting for firm heterogeneity showed that the gender earnings gap is higher at the top of the wage distribution than at the bottom confirming the

existence of a glass ceiling effect in the Moroccan manufacturing sector. The gap after controlling for firm factors range from about 4.5% at the bottom to about 15% at the top of the earnings distribution. As in Fafchamps et al. (2009), the results suggested that the returns to education are slightly higher for men than for women throughout the earnings distribution. Furthermore, the study found that the observed earnings gap depends largely on differences in returns to labor market characteristics than differences in endowments. This suggests that female workers are rewarded less for their observed endowments than males all the way up to the top positions. Besides, the glass ceiling effect is reinforced over time in Morocco as high-wage male workers benefited from higher earnings growth than women.

Besides, Nordman and Wolff (2009b) examined the relevance of the glass ceiling hypothesis in Mauritius and Madagascar using matched employer–employee data collected in 2005. Linear log hourly wage regressions showed a significant within-firm gender wage gap of more than 35% in the Mauritius manufacturing sector, but no significant gap existed in Madagascar. Decomposition results indicated that the large wage gap in Mauritius was mainly due to differences in returns to labor market characteristics, suggesting that female employees endowed with the same characteristics as men would earn on average 25% less. The results also showed that accounting for firm heterogeneity is important for both islands. Selection across firms indicates the existence of high paying firms for men and low paying firms for women. The study found no compelling evidence of a glass ceiling phenomenon in the manufacturing sectors of Mauritius and Madagascar. This is contrary to the glass ceiling effects in the manufacturing sector of Morocco shown in Nordman and Wolff (2009a).

For Ethiopia, Temesgen (2006) used survey data collected by the Investment Climate Unit of the World Bank in 2002, which covered 427 manufacturing firms and more than 2500 workers. The study found an average gender wage gap of up to 30%, showing that men outearning women in the manufacturing sector. However, the wage premium for men declined to 5% after controlling for individual and establishment-level characteristics. Decomposition of the gap using the Oaxaca–Blinder and Neumark approach revealed that close to 60% of the premium is due to wage differentials in returns to human capital, referring to discrimination or differing treatments to men and women in the labor market. Temesgen (2006) also indicated that decomposition exercises that do not account for firm characteristics would lead to a biased estimation; in his case, underestimate the discrimination component by nearly half.

Many of the studies discussed above used variants of the Oaxaca–Blinder decomposition method. Such studies often attribute the unexplained wage gap by the observed worker, job, or firm characteristics to discrimination. However, this approach fails to disentangle wage gaps due to unobserved productivity differentials and those attributed solely to labor market discrimination (Hellerstein et al. 1999). Using firm-level matched employer–employee data, Hellerstein et al. (1999) proposed a methodology that allows joint estimations of firm-level wage equation and production function. Accordingly, one could perform statistical tests to examine whether gender productivity differentials equal gender wage differentials to determine the presence, or lack thereof, of wage discrimination unexplained by productivity gaps.

Van Biesebroeck (2011) followed the Hellerstein et al. (1999) approach to evaluate whether productivity premia associated with worker characteristics (education and experience) are equal to the corresponding wage premia in the manufacturing industries of three Sub-Saharan Africa countries. Results showed that the gaps between wage and productivity premia for experience and school are the largest in Tanzania, followed by Kenya. In Zimbabwe, the wage and productivity premiums were statistically equal to each other, reflecting a rather competitive labor market in the more developed economy of the three countries. The study also showed that productivity premia for an extra year of schooling to be higher for female than male workers. This may be due to the lower average schooling level of women in which the diminishing returns to schooling is less important. Besides, the gap between productivity and wage premia of schooling are large for female workers in Kenya and Tanzania, showing that women are not fully compensated for their increased productivity due to an extra year of schooling.

Abegaz and Nene (2018) also followed the Hellerstein et al. (1999) approach to examine whether women in the manufacturing sector of Ghana were paid lower than their productivity. The study compared gender wage and productivity gaps using firm-level panel data for the period 1992–2003.[9] Apart from the existence of a significant gender wage gap, results showed no statistically significant difference between the gender wage and productivity gaps, indicating the absence of within-firm gender wage discrimination. The study argued that causes for the observed gender wage gap may include between-firm wage inequalities and sorting of female workers to low productivity and low wage firms in the sector.

Finally, apart from the exercises involving wage decomposition and the comparison of wage and productivity gaps, some studies employed manufacturing data to examine the gender-ethnicity intersectionality and the effects

of market institutions on the gender wage inequality in Africa. Using the 2004 Tanzanian Household Worker Survey, which collected information on earnings in the manufacturing sector, Elu and Loubert (2013) examined the intersectionality of ethnicity and gender as a source of gender inequality. In a quantile regression, the study indicated that gender alone is not an independent source of earnings differentials in the Tanzanian manufacturing sector. However, the interaction of gender with ethnicity revealed that women who belong to five different ethnic groups, in contrast to the other fourteen ethnic groups, faced earnings discrimination and lower returns to schooling.

On the effects of market institutions on the gender pay gap, Temesgen (2008) used establishment-level data for the urban manufacturing sector of Nigeria. The study found that market institutions such as unions and firm characteristics affect the level of gender wage inequality in Nigeria. Women are less likely to benefit from union wage premia and that the wage gaps are higher in unionized firms because women are generally less likely to join unions. On the other hand, the study indicated that public enterprises are more gender-egalitarian compared with private firms. Besides, firm-level investment in workers' training plays an important role in narrowing the gender wage gap.

5 Summary and Conclusion

The works reviewed above laid out some of the main causes of gender wage inequality in SSA. Table 1 provides a summary of the wage decomposition results of some of these studies. Although it is difficult to rank causes of the gender wage gap in the region, the major factors identified include:

1. **Discrimination**: Studies have found a substantial amount of wage gaps unexplained by the observed worker, occupation, and industry characteristics (see, Table 1). In some cases, women's relatively higher levels of schooling and other productivity-enhancing characteristics served to lower the gender wage gap. However, differences in returns to these characteristics still remained excessively high as evidenced by the negative contribution of the differences in characteristics and the more than 100% contribution of the unexplained component to the total gender wage gap.[10] The unexplained portion of the gender wage gap may reflect labor market biases and discrimination against women in Africa. It may also capture the roles of social norms, religion, and ethnicity in the allocation of labor and gender disparities in labor market outcomes.

Table 1 Summary of wage decomposition results of empirical studies using African data

Paper	Country (Data year)		Mean log wage gap	Explained	Unexplained
Appleten et al. (1999)	Ethiopia (1990)	Private	0.56	14%	86%
		Public	0.20	−18%	118%
	Uganda (1992)	Private	0.38	4%	96%
		Public	0.31	41%	59%
	Cote d'Ivoire (1985, 86,87)	Private	−0.05	−260%	360%
		Public	0.24	47%	53%
Glick and Sahn (1997)	Guinea (1990)	Self-employment	0.79	44%	56%
		Private wage	−0.05	−380%	280%
		Public wage	0.18	23%	77%
Siphambe and Thokweng-Bakwena (2001)	Botswana (1995/6)	Private	0.84	34%	66%
		Public	0.92	67%	33%
Kolev and Robles (2010)	Ethiopia (2005)	No control for job characteristics	0.74	81%	19%
		Control job for job characteristics		58%	32%
Nordman et al. (2011)	7 West Africa cities (2001–2003)		0.69	41%	59%
Bhorat and Goga (2013)	South Africa	10th percentile	0.63	41%	59%
		50th percentile	0.35	24%	76%
		90th percentile	0.07	−303%	403%
Nordman et al. (2010)	Madagascar	2001	0.23	66%	34%
		2005	0.22	62%	38%
Baye et al. (2016)	Cameroon (2005, 2010)	25th percentile	0.36	16%	84%
		50th percentile	0.20	63%	37%
		75th percentile	0.20	51%	49%
Nordman and Wolff (2009a)	Morocco	10th percentile	0.12	45%	55%
		50th percentile	0.23	40%	60%
		90th percentile	0.39	53%	47%
Nordman and Wolff (2009b)	Mauritius (2005)		0.37	40%	60%
	Madagascar (2005)		−0.07	42%	−142%
Temesgen (2006)	Ethiopia (2002)		0.27	40%	60%
Kabubo-Mariara (2003)	Kenya (1994)	Private	0.90	28%	72%
		Public	0.42	22%	78%

Source Authors compilation

2. **Job characteristics and industryaffiliation**: The type of employment (formal, informal, and self-employment) and industry characteristics account for a larger proportion of the explained component of the gender wage gap. In many cases, job characteristics are less favorable for women in Africa. The reviewed studies show that wage and earning gaps are much higher in the informal and self-employment sectors in which women are overrepresented. The concentration of women in jobs less favorable to them indicates the presence of structural and socioeconomic factors leading to job segregation and job discrimination against women.
3. **Firm selection**: Studies indicated that accounting for firm heterogeneity in the wage regressions reduces the magnitude of the gender wage gap, reflecting the effect of a selection process that leads to the presence of high-paying firms for men and low-paying firms for women.[11]
4. **Education gap**: Education plays an instrumental role in combating gender-based economic inequality by reducing the opportunity and earnings gaps between male and female workers. Higher educational attainment increases labor market participation, productivity, and wages of women. Studies showed that education increases the probability of women entering formal private and public wage employment in which the gender earnings gap is lower than the informal wage employment and self-employment sectors.[12] In the manufacturing sector, returns to education are positive and serve to reduce the male–female wage gap.[13] Besides, gender differences in education account for a significant proportion of the wage gap due to differences in attributes.
5. **Experience gap**: Continued and uninterrupted occupational experience and labor market attachment benefit women and explains a significant component of the explained gender wage gap next to education. However, throughout Africa, women are responsible for most domestic works, including parenting and taking care of the elderly. Such obligations reduce their attachment to the labor market and the prospects to advance human capital.

To sum, apart from the above general observations, the review provides a glimpse of the labor market heterogeneities in SSA countries. Results show significant variations in the magnitude and underlining causes of gender wage inequalities across countries. However, there is a significant void in the literature with respect to the dynamics of gender-based wage inequalities over time and across sectors. There are only a few studies that address the issue in the manufacturing sector. In addition, research on institutional factors that may

affect male–female wage and employment inequalities is largely absent. Institutions such as collective bargaining, labor regulations, and policies on wage discrimination could influence gendered labor market outcomes. The roles of social, cultural, and religious practices and governance systems also need a thorough examination.

Notes

1. While life expectancy and mean years of schooling for females and males are readily available from different data sources, the report generates estimates of gross national income per capita for female and male based on the respective shares of the economically active population and the total population. For more details, refer to UNDP (2018).
2. The most current available data on HDI is the 2017 data.
3. The index incorporates data on materiality mortality rate, adolescent birth rates, proportion of parliamentary seats occupied by females, proportion of adult females and males (aged 25 years and older) with at least some secondary education, and the female and male labor force participation rates.
4. The surveys were the "Integrated Survey of Uganda" (1992), "Survey of Adolescent Fertility, Reproductive Behavior and Employment Status of the Youth Population in Urban Ethiopia" (1990), and the "Living Standards Measurement Surveys of Cote d'Ivoire" (1985, 1986 and 1987).
5. The studies used household surveys for Guinea (1990) and Kenya (1994) and estimated a Mincerian earnings function for men and women in each employment type by including selection bias terms (inverse Mill's ratios) to account for selection bias of employment in a given sector.
6. Job characteristics include the sector of activity, types of wage employment, terms of employment, and occupation. Human capital characteristics include education, potential experience, and training.
7. Lome is an exception where about 45% of the gap remained unexplained by such labor market features.
8. Gaps are actually negative (meaning that females earn more than males on average) in the public sector in Niamey and the private sector in Ouagadougou.
9. The data was collected by the Regional Program for Enterprise Development (RPED) of the World Bank and the Center for the Study of African Economies (CSAE).
10. See, Appleton et al. (1999) for Ethiopia, Glick and Sahn (1997) for Guinea in the private sector, and Bhorat and Goga (2013) for South Africa in the 90th percentile income group.
11. See, Fafchamps et al. (2009), Nordman et al. (2010), Nordman and Wolff (2009b), and Abegaz and Nene (2018).
12. See, Glick and Sahn (1997) and Kabubo-Mariara (2003).

13. See, Fafchamps et al. (2009) and Temesgen (2006). The exception from the reviewed studies is Nordman and Wolff (2009a) for Morocco in which education does not contribute to reducing the wage gap.

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The Impact of Aid for Trade on Trade Costs Facing African Economies

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1 Introduction

It is common knowledge that the global trading environment has undergone tremendous change in recent years. The growing importance of value chains and the complex production networks that support them are having an impact on the trade and investment priorities of countries. The process is shifting the emphasis away from running a full production process toward specializing in a narrower range of intermediate goods and services. In some countries, such changes are creating pathways to new forms of competitive advantage and export opportunity. Nevertheless, the transition is stymied in countries where producers are technically ill-equipped to participate in

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the global or regional value chains and the policy and institutional environment is not conducive, especially in the developing world (OECD and WTO 2015). Africa represents a notable case in point because many African countries offer rich potentials for international traders and investors. While they are making continental inroads, African countries still face difficulties, largely due to market access problems and high trade costs. Often, they face excessive and sudden changes in tariffs, infrastructural, and logistical hurdles that lead to delays in the clearance and delivery of goods, excessive bureaucracy, widespread bribery, and corruption that plague many African countries and contribute to the problem.

According to Anderson and van Wincoop (2004), trade costs can be attributed to two main sources: (a) the bilateral factors of separation between the exporting and the importing countries, often dependent on exogenous factors (geographical distance, language barrier, common colonial history, or a common borders) and (b) endogenous factors representing the 'thickness' of the trading partners' borders. These include logistics such as warehousing, brokerage, reliability, data and information management, trade facilitation bottlenecks such as border control and transit systems, international connectivity, tariffs, and non-tariff measures. While the imperatives for reducing trade costs and becoming competitive in the international markets is in the interest of every country, they specifically attract substantial attention in developing regions such as Africa where the supply-side constraints that limit the capability of countries and firms to actively engage and benefit from the rising global trading system are broad (Arvis et al. 2013).

Emphasizing the relevance of overcoming these constraints, the Doha round of negotiations of the World Trade Organization (WTO) paved the way for a new initiative known as *Aid-for-Trade* (*AFT*). There is no single definition of *AFT*. Taking into account the target areas to which the initiative is directed, however, it can be summed as development aid specifically extended to help developing countries formulate better trade strategies, negotiate more effectively, and implement outcomes (trade policy and regulation), build roads, ports, and telecommunications linking domestic and global markets (infrastructure), diversify exports and attain comparative advantage (productive capacity), and cope with the costs of concessions associated with trade agreements resulting in reduced tariffs, preference erosion, and declining terms of trade (adjustment assistance). At its core, the rationale for the *AFT* initiative rests on the proposition that strengthening the recipient countries' ability to connect and interact with each other and the rest of the world would enhance their trade performance.

Given its well-known implications for trade, the *AFT* initiative quickly garnered the attention of policymakers, both in the developed and developing countries.Consequently, significant amounts of financial resources have been committed and disbursed by various agencies including the Organization for Economic Co-operation and Development (OECD) countries and multilateral organizations (the European Development Fund, the World Bank, the United Nations Funds and Programs). According to OECD/WTO (2019), a total of USD 410 billion from bilateral (*BLT*) and multilateral (*MLT*) sources has been disbursed through the initiative to 146 developing countries from 2006 to 2017, a significant amount of which went to recipient countries in Asia (USD 154.7 billion) and Africa (USD 146 billion). The report further indicates that a total of 178,141 *AFT* projects have been funded since 2006, with a median and average project size amounting to USD 98,400 and USD 2.25 million, respectively. On average, disbursements grew by 9.3% annually from USD 14.9 billion during the 2002–2005 baseline period to USD 42.2 billion in 2017 (OECD/WTO 2019). Understanding the extent to which the initiative enhanced the trade performances of the recipients, thus, remains a timely and relevant research agenda.

Using comprehensive estimates of bilateral trade cost data over the 2004–2011 period and *AFT* inflows originating from bilateral (*BLT*) and multilateral (*MLT*) sources, we address three specific questions: (1) have *AFT* inflows to Africa reduced bilateral trade costs facing African nations in any discernible way? (2) does the level of *AFT* inflows from one source influence the extent to which *AFT* inflows from the other source(s) impact trade costs, given that not all recipients are equally targeted by *AFT* from bilateral (*BLT*) and multilateral (*MLT*) sources, and (3) does the presence of better infrastructure improve the marginal effects of *AFT* on trade costs?[1]

Our research is relevant for several reasons. First, almost all African countries have benefited from aggregate *AFT* inflows originating from both bilateral and multilateral sources with varying degrees. Evaluating the impact of the initiative helps in identifying the critical factors underlying its functioning in terms of what works best, what does not, and why. Second, several studies have argued that increased *AFT* disbursements lead to improvements in trade performance with considerable variations in the observed effects (Gnangnon 2018; Wang and Xu 2018; Cadot et al. 2014; Pettersson and Johansson 2013; Vijil and Wagner 2012). Identifying the differential effectiveness of the *AFT* initiative from various sources (bilateral and multilateral) can extend our understanding of whether the pitfalls of the traditional development aid disbursements permeate to the functioning of *AFT* as well.

Third, trade costs limit firms' access to technology and intermediate inputs and prevent their entry into and movement up the global value chain (WTO 2017). The extent to which *AFT* improves the trade performance of a country, thus, may hinge upon the infrastructure endowment of a country, all else equal. An examination of the effect, if any, that the infrastructure endowment of the recipients may have on the relative effectiveness of *AFT* inflows, therefore, provides a more tangible measure of the functioning of the initiative.

Fourth, effectively addressing barriers that limit the growth and development progress of a nation has proven to be a challenge to donor agencies (OECD 2006). Results derived from our research may be beneficial since *AFT* related efforts may face much of the same challenges inherent in all aid deliveries. Finally, the discretion that development aid recipients have in identifying, prioritizing, and channeling aid resources to various economic sectors, or projects is often influenced by the sources of aid (Maizels and Nissanke 1984; Rodrik 1995; Martens et al. 2002; Burnside and Dollar 2000; Neumayer 2003). Beyond enhancing our understanding of the factors that underlie the overall efficacy of the initiative, our study has the potential to yield information relevant for coordination of future aid disbursements.

Our results (obtained from a random intercept and coefficient mixed-effects model that permits to account for structural variability among African nations in five sub-African regions (East, West, North, South and Central), the country-specific differences in trade policy, and gravity model variables often used to define trade costs) indicate that *AFT* inflows to African countries (both at the aggregate level and across bilateral and multilateral sources) are associated with significant reductions in the bilateral trade costs facing recipients in the sub-African regions. The observed trade costs reduction effects also remain consistent across the two major economic sectors (manufactured goods and agricultural products). Furthermore, our results show that the marginal trade cost reduction effect of *AFT* from both sources tends to increase with a rise in the level of *AFT* from either source as is the case with the infrastructure endowments available in the recipient countries. We take these observations as evidence indicating the critical importance of *AFT* projects directed at infrastructure in the recipient countries as is the relevance of the coordination in *AFT* inflows originating from bilateral and multilateral sources.

The remainder of the paper is organized as follows. Section 2 provides a brief review of the extant literature on the effectiveness of *aid-for-trade*. In Sect. 3, we discuss the empirical model, data, the variable of interest, and the control variables. The results, interpretations, and robustness checks of our

findings are presented in Sect. 4. Section 5 draws some conclusions based on the results and highlights some policy implications.

2 A Related Literature

The effectiveness of *AFT* in trade cost reductions has been studied by a number of researchers (Tadesse et al. 2017; de Melo and Wagner 2015; Cadot et al. 2014; Hühne et al. 2014; Martínez-Zarzoso et al. 2017; Moïsé and Le Bris 2013; Massa 2013; Basnett 2013; Vijil and Wagner 2012; Calì and te Velde 2011; Limão and Venables 2001; Hoekman and Wilson 2010; Hayashikawa 2009). In addressing the effectiveness of *AFT*, however, several of these studies only focus on different targets (infrastructure, trade flows, trade costs) and the components of the initiative (trade policy and regulation, trade facilitation, and capacity building).

Moïsé and Le Bris (2013) show that poor infrastructure is a major contributor to the high transaction costs that impede trade. Examining the relationship between roads and telecommunication, shipping costs, and trade volumes, Limão and Venables (2001) conclude that poor infrastructure accounts for 40% of transport costs for coastal countries and up to 60% for landlocked countries. Subsequent studies also confirm the view that infrastructure is an underlying cause of the high trade costs in developing countries. For example, Hummels and Schaur (2013) show that each day of delay in transit is equivalent to a tariff increase of 0.6–2.3%. These observations prove that trade-related institutions and regulations (port operations, customs authorities, exchange rate policies, export taxes, or policy barriers to entry into key service sectors) may have substantial impact on trade costs, undermining the effectiveness of *aid for trade*.

Cali and te Velde (2011) demonstrate that *AFT* allocated to trade facilitation measures has reduced the costs of trade facing developing countries with the implication that *AFT* targeted to infrastructure contributes in the expansion of exports, especially in the mining and manufacturing sectors, the highest effect being observed in Africa. Using gravity estimates from cross-country regressions with a focus on *AFT* targeted at trade policy and regulatory reforms, Helble et al. (2012) show the importance of reforming customs to increase efficiency, eliminating bureaucratic interventions that create opportunities for corruption, and adopting procedures that speed the flow of goods across borders in lowering trade costs. The authors estimate that USD 1 in *AFT* targeted to trade policy and regulatory reform may lead

to about USD 1.3 in additional trade value, indicating the importance of the selective use of *AFT* where it can have the biggest impact.

Using comprehensive estimates of ad valorem tariff equivalent bilateral trade costs over the years 2002–2010 period, Tadesse et al. (2017) address whether *AFT* reduces trade costs and if the trade costs reduction effect of the *AFT* inflows originating from bilateral and multilateral sources are complementary and provide a plausible explanation for the cross-country variations in the extent to which *AFT* promotes trade flows. Basnett (2013) asserts that *AFT* works best when it is targeted to improving infrastructure, trade facilitation, and value chains, and the binding constraints of growth in the recipient countries. Taken together, the observed impacts vary considerably depending on the level and type of *AFT* intervention, the income level and geographical region of the recipient country, and the sector to which the aid flows are directed. The existing empirical literature tends to confirm that *AFT* is effective at both the macro and micro levels (Basnett et al. 2012). Only limited information, however, exists on the relative impact of *AFT* from bilateral and multilateral sources and whether infrastructure alters the dynamics, an issue at the center of our empirical endeavor.

Extending the analysis, Tadesse et al. (2021) explicitly examine whether infrastructure and its components influence the effectiveness of *AFT* inflows to all recipients including those in Africa, and show that the effectiveness of *AFT* inflows on bilateral trade costs increases with a rise in the level of infrastructure available in the recipient countries using data over the period 2002–2011 period. The present study can be taken as a follow up effort to their analysis. While we take the cue from the study conducted by Tadesse et al. (2021), we diverge from them (a) by limiting our analysis to African countries and their trading partners and also by explicitly modeling the bilateral factors of diversity among African countries located in the five subregions of the continent (East, West, North, South and Central) and (b) endogenous factors representing the 'thickness' of each country's borders. Accounting for the subregional variation and within each region, the country- and time-specific heterogeneity is critical for several reasons. First, the trade orientation of Northern and Western African countries differs from those located in the Southern or Eastern parts of Africa. Second, the historical and colonial variations of the structures of the countries in the different sub-regions are also notable. Finally, even among those located in the same sub-region, significant differences in the export and import structure, the political, and socio-economic stabilities of the governments in different countries differ considerably. For example, Djibouti, Ethiopia, Kenya, and Somalia are all located in the Eastern geographical region of Africa. Unlike Somalia

and Kenya, Ethiopia is a landlocked country and its bilateral trade cost structure relies on the terms and conditions set by the bilateral political and socio-economic relationships of the governments of Djibouti, Kenya, and Somalia in promoting the primary export commodity (i.e., coffee) while Djibouti and Somalia may focus on renovating their port facilities.

3 Model, Data, and Variables

The Empirical Model

We use aggregate and sector-specific measures of bilateral trade costs (TC_{ijt}^{k}) facing the i^{th} ($i = 1, 2, \ldots, 51$) AFT recipient country in the k^{th} region ($k = 1, \ldots, 5$), trading with the j^{th} partner ($j = 1, 2, \ldots,129$), during the t^{th} year as our dependent variable ($t = 2004–2011$). Our model attributes the bilateral trade costs (TC_{ijt}^{k}) between recipient i and its trading partners, among others, lagged year (one year) value of AFT inflows (AFT_{it-1}^{k}), the infrastructure endowment ($iNFR_{ijt}^{k}$) of the recipient, and a vector ($\mathbf{Z}$) of recipient-trading country pair and time-specific non-stochastic control variables.

Included in vector $\mathbf{Z}$ are the geodesic distance between the recipient i and its trading partner j (a widely used proxy for transportation costs), inward and outward multilateral resistance terms represented by the index of economic remoteness of the recipients and their trading partners computed following Head and Ries (1998) and using World Bank (2017) data, where $REM_{it} = 1/\sum_{k=1}^{K}\left[(Y_{kt}/Y_{wt})/GD_{jk}\right]$, Y_{wt} is gross world product, and k identifies potential non-country j trading partners for country i.[2] We also include dummy variables that identify whether the AFT recipient i and its trading partner j, respectively, are landlocked, have past colonial relationships, share a common border and language, and have any form of trading agreement(s). In Eq. (1), we specify the trade cost a typical country in any of the Africa sub-region as.

$$ln\ TC_{ijt}^{k} = \alpha_0 + \beta_1 ln\ AFT_{it-1}^{k} + \beta_2 iNFR_{ijt}^{k} + \beta_3\left(ln\ AFT_{it-1}^{k}\, x\ iNFR_{ijt}^{k}\right) + Z'\beta + \gamma_i + \gamma_j + \gamma_t + u_{ijt}^{k} \quad (1)$$

The literature is replete with that document the differences in the effectiveness of the aggregate development aid from bilateral and multilateral sources (see, for example, Minoiu and Reddy 2010). We, however, disaggregate the lagged *AFT* inflows into those from bilateral (BLT^k_{it-1}) and multilateral (MLT^k_{it-1}) sources to permit heterogeneity in the possible effects of *AFT* originating from the respective sources. Equations (2) and (3) below represent the corresponding specification for *AFT* from bilateral (*BLT*) and multilateral (*MLT*) sources.

$$ln\ TC^k_{ijt} = \alpha_0 + \alpha_1 ln\ BLT^k_{it-1} + \ \alpha_3\ iNFR^k_{ijt} + \ \beta_3\left(ln\ BLT\ AFT^k_{it-1} x\ iNFR^k_{ijt}\right) + 2Z'\beta\ + u^k_{ijt} \quad (2)$$

$$ln\ TC^k_{ijt} = \alpha_0 + \alpha_2\ ln\ MLT^k_{it-1} + \ \alpha_3\ iNFR^k_{ijt} + \ \beta_3\left(ln\ MLT\ AFT^k_{it-1} x\ iNFR^k_{ijt}\right) + 2Z'\beta\ + u^k_{ijt} \quad (3)$$

In addition to informing us of the corresponding effects, the coefficients α_1 and α_2 in Eqs. 2 and 3 enable us to assess the effects of *AFT* from the respective sources. Both Equations, however, assume independence in the flow of *AFT* from bilateral and multilateral channels to the recipient country *i* and their respective impact on trade costs. While independence in the inflows of *AFT* from the respective sources is plausible, independence in the functioning and/or impacts of *AFT* from bilateral and multilateral sources is tenuous because disbursements from both sources often finance projects designed to help the recipient overcome its supply-side constraints to participate in international trade.

In each specification, the term u^k_{ijt} represents an assumed independently and identically distributed random error term. Each of the Equation can also be estimated using the OLS or the standard panel data estimation approaches (fixed, or random effects). Either estimation, however, relies on the assumption that there is no variation in the trade structure of *AFT* recipients across various sub-regions in the continent. Although supply-side constraints facing many developing countries often mirror each other, the assumption that bilateral trade costs facing aid recipient countries, or factors that influence their capacity to participate in international trade are invariant across geographic locations (sub-regions) is hard to maintain Thus, there is a potential for the error terms u^j_{it} and $\upsilon^{j'}_{it}$ to be correlated, particularly among recipients in the same geographic region. To address the problem, we define a recipient-specific random term ζ_i that enables us to decompose the error term into

two components following Baltagi (2001):

$$u_{ijt}^{k} \equiv \zeta_i + \ _{ijt} \tag{4}$$

Substituting Eq. (4) into our baseline specification (Eq. 3) yields a multilevel random intercept and random coefficient (mixed-effect) model, a specification from which we derive most of the information used in our discussions and inferences. Equation (5) illustrates the model.

$$\begin{aligned} ln\ TC_{ijt}^{k} = (\alpha_0 + \zeta_{0i}) \ + \ (\alpha_1 + \zeta_{1i}) ln\ BLT_{it-1}^{k} + (\alpha_2 + \zeta_{2i})\ ln\ MLT_{it-1}^{k} \\ + \alpha_3\ iNFR_{ijt}^{k} + (\alpha_4 + \ \zeta_{3i}) \left[\ln BLT_{it-1}^{k} \times lnMLT_{it-1}^{k}\right] \\ + Z'\beta \ + \gamma_i + \gamma_j + \gamma_t + _{ijt} \end{aligned} \tag{5}$$

The vector of coefficients β represents the unknown fixed-effects parameters to be estimated and α_0, γ_i, γ_j, and γ_t denote the constant term, the recipient, its trading partner country, and time-specific fixed-effects, respectively. Whereas the random parameters ζ_{0i} represent the average deviation of the effects of *AFT* due to the regional cluster k in which the recipient is located, $(\zeta_{1i} \pm \zeta_{3i})$ and $(\zeta_{2i} + \zeta_{3i})$ represent the recipient country-specific deviation of the effect of *AFT* inflows from *BLT* and *MLT* sources (at the margin) from the average effects indicated by α_1 and α_2, respectively.

The Variables, Data, and Expected Signs

Table 1 provides the list of variables included in our model, the scale and units of measurements used, and the descriptive statistics of the variables of interest for all *AFT* recipients based on data over the 2002–2011 period. To facilitate comparisons and depict the differences, we provide the results by the broad geographic regions of the recipients in other regions as well. The data on *AFT* inflows are from the OECD (2016) Credit Reporting System. Trade cost data are from the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP 2016). The infrastructure data are from (Donaubauer et al. 2016).

Results in the table indicate that the average ad valorem tariff equivalent bilateral trade costs facing a typical recipient is 305.9%. Not surprisingly, the bilateral trade costs facing the recipients in different regions and the sectors considered (agricultural and manufactured goods trade) vary considerably. For example, while the typical *AFT* recipient in Europe and Asia, on average, faces trade costs amounting to 181.8 and 201% of the value of the

Table 1 Descriptive statistics of the variables by geographic regions of AFT recipient countries (2002–2011)

	Africa	America	Asia	Europe	Pacific	Total
Trade Cost Measure:						
Total Bilateral Trade Costs of Recipients (**Ad valorem tariff equivalent**)	325.2***	305.3	285.0***	280.9***	321.6***	305.9***
	(167.9)	(164.1)	(158.1)	(164.9)	(174.1)	(165.2)
Manufactured Goods, Trade Costs	223.8***	215.6***	195.9***	177.4***	205.0	207.9***
	(116.0)	(109.2)	(97.34)	(95.68)	(88.79)	(107.2)
Agricultural Goods, Trade Costs	360.2***	326.4***	343.2*	300.2***	334.0**	340.9***
	(174.4)	(157.7)	(166.2)	(139.5)	(148.7)	(165.6)
Aid for Trade Inflows (Millions, USD):						
Aggregate AFT	230.8***	78.98***	406.6***	310.2***	34.18***	250.7***
	(259.8)	(101.9)	(523.7)	(656.7)	(42.65)	(394.9)
AFT-Bilateral Sources	112.4***	36.67***	201.2***	105.6***	28.51***	152.7***
	(158.3)	(80.91)	(421.4)	(140.2)	(37.92)	(271.7)
AFT-Multilateral Sources	118.4*	22.31***	105.4	204.6***	15.675***	97.98***
	(138.8)	(38.53)	(168.0)	(591.0)	(7.594)	(212.2)
Institutional Quality Measures (Index):						
Aggregate Institutional Quality	0.391***	0.479***	0.4023***	0.456***	0.430	0.427***
	(0.118)	(0.128)	(0.104)	(0.0952)	(0.0740)	(0.119)
Infrastructure (Index)						
Overall	0.255***	0.307***	0.337**	0.411**	0.314***	0.401***
Gravity Model Variables:						
Geodesic Distance **(Kms)**	6046.7***	9206.8***	7073.0	4815.3***	10208.8***	7088.9***

	Africa	America	Asia	Europe	Pacific	Total
	(3499.7)	(4841.3)	(4397.8)	(3890.8)	(4930.9)	(4413.6)
Land Locked (i)—Dummy		0.0669***	0.228***	0.111***	–	0.192***
	(0.442)	(0.250)	(0.420)	(0.314)	–	(0.394)
Land Locked (j)—Dummy	0.152	0.115***	0.175***	0.177***	0.0531***	0.150***
	(0.359)	(0.319)	(0.380)	(0.382)	(0.224)	(0.358)
Index of Economic Remoteness (i)	4621.3***	4578.7***	4559.2***	3772.1***	6585.2***	4535.9***
	(2602.7)	(2495.8)	(2426.2)	(2127.9)	(4019.0)	(2512.9)
Index of Economic Remoteness (j)	0.241***	0.212***	0.156***	0.337***	0.217***	0.212***
	(0.428)	(0.409)	(0.363)	(0.473)	(0.413)	(0.408)
Trading Agreement (i)—Dummy	0.164***	0.150	0.106***	0.215	0.132***	0.146***
	(0.370)	(0.357)	(0.307)	(0.411)	(0.339)	(0.353)
Common Border—Dummy	0.0439***	0.0291***	0.0313***	0.0337	0.00421***	0.0351***
	(0.205)	(0.168)	(0.174)	(0.181)	(0.0648)	(0.184)
Common Language—Dummy	0.287***	0.212***	0.0788***	0.00650***	0.413***	0.189***
	(0.452)	(0.409)	(0.269)	(0.0803)	(0.492)	(0.391)
Colonial Relationship—Dummy	0.0156	0.0127***	0.00945***	0.0253***	0.0678***	0.0148***
	(0.124)	(0.112)	(0.0967)	(0.157)	(0.251)	(0.121)
No. of Observations	44,734	28,207	36,068	8767	2375	103,497

Mean of the Variables; Standard Dev. in Parentheses; ***, **, * indicate statistically significant difference between the values for each region (each cell) and the corresponding mean of all recipients (corresponding row, last column) at the 1, 5, and 10% levels, respectively

commodity traded, respectively, the corresponding trade costs of recipients in Africa, the Americas, and the Pacific amount to 222.3, 206, and 204%, respectively. A high degree of heterogeneity is also observed in the infrastructure endowment of the recipients ranging from 0.26 in Africa, 0.32 in the Americas, 0.34 in Asia to 0.31 in the Pacific region, and 0.41 in Europe.

The descriptive statistics of the standard proxies often included in the trade gravity model (the geodesic distance, common languages, colonial relationships, economic remoteness, access to the sea, regional trading agreements, and common border between the trading partners in addition to controlling for institutional quality) are also reported. The results reveal that the typical recipient is located about 7088 km from its typical trading partner, has an economic remoteness index of 4535, and receives about $250.7 million in total *AFT* per year. About 19% of the recipients have a common official language with their trading partners and 15% are parties to a common regional free trade agreement (*FTA*). Nearly 19% of the recipients and 39% of their trading partners are landlocked, respectively. About 3.5% of the recipients have common borders with their trade partners and 1.5% have past colonial relationships.

Following the standard trade literature, the coefficients of geodesic distance, economic remoteness, and lack of access to the sea are a priori expected to be positive, increasing trading costs. Common borders, institutional quality, official languages, regional trading agreement, and past colonial relationships are expected to be negatively related, or trade cost reducing. The raw data used for computing the linearized institutional quality measures are from (Kaufmann et al. 2014). All other variables are from CEPII (2014).

While we present the descriptive statistics of the variables for all recipients in various regions, African economies constitute the primary focus of our study. Depicting the average annual bilateral trade costs facing each of the 51 African nations included in our study, together with the average annual *AFT* inflows, both at the aggregate and by the sources (*BLT* and *MLT*), Table 2 provides a glimpse of the magnitude and the heterogeneity in *AFT* inflows and trade costs facing African economies.

For our reference period of 2004–2011, the results indicate that the average annual *AFT* inflows to African countries range from as little as 1.24 million USD in Equatorial Guinea to 808.53 million USD in Egypt at the aggregate level. By the sources, Ethiopia and Egypt stand out as the top recipients of *AFT* inflows from multilateral and bilateral sources, respectively, while Equatorial Guinea received *AFT* originating from bilateral in the amount of only 0.747 million USD) and from multilateral source in

Table 2 Average values of Aid for Trade (AFT) inflows and trade costs in Africa (2004–2011)

Countries	Aggregate AFT (in millions USD)	Bilateral AFT (in millions USD)	Multilateral AFT (in millions USD)	Total bilateral trade costs (ad valorem tariff equivalent)
Algeria	76.69	57.14	19.55	291.74
Angola	38.90	29.38	9.52	387.83
Benin	147.31	62.40	84.91	337.88
Botswana	12.78	6.43	6.36	377.43
Burkina Faso	226.71	92.85	133.86	348.48
Burundi	83.69	20.74	62.95	381.50
Cabo Verde	64.88	47.80	17.08	365.85
Cameroon	169.30	53.71	115.59	317.90
Central African Republic	34.92	11.47	23.45	384.01
Chad	64.52	11.67	52.85	466.44
Comoros	5.64	3.09	2.55	342.60
Congo, Dem. Republic	342.36	60.24	282.11	384.97
Congo, Republic	30.55	7.44	23.11	231.05
Cote d'Ivoire	112.59	13.99	98.60	272.62
Egypt, Arab Republic	808.53	599.98	208.56	273.27
Equatorial Guinea	1.24	0.75	0.49	386.96
Eritrea	51.26	8.63	42.63	310.57
Ethiopia	611.26	190.11	421.15	359.35
Gabon	26.95	18.69	8.26	314.03
Gambia, The	29.83	4.82	25.01	366.79
Ghana	421.68	203.69	217.99	305.20
Guinea	60.65	17.79	42.86	324.58
Guinea Bissau	20.27	3.37	16.90	289.64
Kenya	376.24	180.68	195.56	292.36
Lesotho	24.01	4.03	19.98	366.11
Liberia	92.39	49.40	43.00	262.72
Libya	29.53	4.40	25.13	164.21
Madagascar	209.19	46.48	162.70	386.50
Malawi	145.32	57.22	88.09	340.67
Mali	256.73	106.62	150.11	318.00
Mauritania	108.39	32.21	76.18	287.83

(continued)

Table 2 (continued)

Countries	Aggregate AFT (in millions USD)	Bilateral AFT (in millions USD)	Multilateral AFT (in millions USD)	Total bilateral trade costs (ad valorem tariff equivalent)
Mauritius	24.11	18.43	5.85	296.31
Morocco	753.25	474.54	278.71	266.53
Mozambique	403.58	218.47	185.11	305.93
Namibia	49.86	45.55	4.31	303.45
Niger	103.67	30.80	72.86	385.06
Nigeria	296.66	99.98	196.67	324.43
Rwanda	162.04	66.34	95.70	449.96
Sao Tome and Principe	8.64	2.60	6.04	316.12
Senegal	246.61	129.47	117.14	307.33
Seychelles	2.58	1.16	1.42	269.69
Sierra Leone	78.58	18.22	60.36	364.34
South Africa	186.67	157.52	29.14	235.13
Sudan	137.31	67.95	69.36	380.95
Swaziland	11.08	7.61	3.47	334.13
Tanzania	570.11	246.40	323.71	321.54
Togo	30.40	10.57	19.83	294.98
Tunisia	310.86	169.00	141.85	295.81
Uganda	369.30	125.75	243.55	372.10
Zambia	165.66	83.16	82.50	332.05
Zimbabwe	41.03	33.58	7.45	360.57

the amount of 0.493 million USD, with an average annual receipts ranging from 421.15 million to 599.97 million USD. Ethiopia and Egypt, thus, stand out as the top recipients of *AFT* inflows from multilateral and bilateral sources, respectively. In terms of their average bilateral trade costs, however, both countries received an average ad valorem tariff equivalent of 164.21% while Libya faces the lowest average bilateral trade costs, with average annual bilateral trade costs of 466.43%, Chad stands out as an African nation experiencing the highest bilateral trade cost. The data presented in Table 2 show that African countries with the highest(lowest) bilateral trade costs are not necessarily the recipients of the largest amounts of *AFT* inflows (either at the aggregate, or across the sources (bilateral and multilateral), underscoring the relevance of the empirical strategy employed in the present analysis.

4 Empirical Results

Does AFT Reduce Bilateral Trade Costs?

Table 3 reports results from the baseline estimation of our specification in Eq. (5) controlling for the structural variations of bilateral trade costs facing African countries across the five subregional geographical locations, within each sub-region, and differences across the recipients. Column (1) of Table 3 provides estimation results for aggregate trade costs. Column (2) presents the results for the trade costs of the manufacturing sector, results in column (3) depict the effect on trade costs for agricultural goods. Results presented in columns (4)–(6), and (7)–(9), respectively, present the effect of *AFT* inflows from bilateral (*BLT*) and multilateral (*MLT*) sources. Our specification in Eq. (5) includes an interaction term between our variable of interest representing the possible mediating effect of infrastructure endowment on the effectiveness *AFT* inflows in reducing trading costs.

The results from all estimations presented in columns (1)–(9) indicate that each of the control variables included in the model have the theoretically anticipated signs and are statistically significant. Greater geodesic distance between the *AFT* recipient African nation and its trading partners corresponds with higher trade costs as are the lack of access to the sea and economic remoteness of the recipients. Using the results in column (1) of Table 3 as a reference, ceteris paribus, we observe that a 10% increase in the geodesic distance between the typical *AFT* recipient African country and its trading partners, its economic remoteness, and that of its trading partners would result in a 1.32, 0.14, and 2.47% increase in the total bilateral trade costs, respectively. As compared to African nations that have access to the sea, the total bilateral trade costs of a typical landlocked African country are 2.23% $\left[\exp(0.202) - 1) * 100\right]$ higher than a recipient that has access to the sea, on the average.

Trade costs facing *AFT* recipients in Africa are 33.96, 39.77, 12.97, and 26.28% lower among African countries with a colonial relationship, share a common border, share a common official language, and belong to a trading agreement with their trading partners, respectively. Similarly, a 10% increase in the aggregate index of the institutional quality measure (computed based on the strength of corruption control, government effectiveness, the rule of law, and regulatory quality) reduces the total bilateral trade costs facing the typical African *AFT* recipient country by 1.13%, on average. These results also hold across the economic sectors considered with little variation as shown in columns (2) and (3).

Table 3 The effect of Aid for Trade on bilateral trade costs in Africa by economic sector and sources of AFT (2004–2011): results from random intercepts and random coefficients mixed effects model

	Aggregate AFT			Bilateral AFT			Multilateral AFT		
VARIABLES	(1) Total trade costs	(2) Mnf trade costs	(3) Agr. trade costs	(4) Total trade costs	(5) Mnf trade costs	(6) Agr. trade costs	(7) Total trade costs	(8) Mnf trade costs	(8) Agr. trade costs
ln geodesic distance	0.132***	0.192***	0.0683***	0.132***	0.192***	0.0685***	0.129***	0.189***	0.0651***
	(0.00504)	(0.00544)	(0.00714)	(0.00504)	(0.00544)	(0.00715)	(0.00513)	(0.00555)	(0.00729)
Land locked (*i*)	0.202***	0.235***	0.131***	0.191***	0.232***	0.125**	0.201***	0.230***	0.134***
	(0.0497)	(0.0678)	(0.0473)	(0.0484)	(0.0615)	(0.0492)	(0.0482)	(0.0621)	(0.0488)
Land locked (*j*)	0.289***	0.286***	0.196***	0.289***	0.286***	0.195***	0.288***	0.285***	0.196***
	(0.00734)	(0.00818)	(0.0119)	(0.00736)	(0.00821)	(0.0119)	(0.00745)	(0.00831)	(0.0121)
ln remoteness (*i*)	0.0144	− 0.0327	− 0.0528	0.000313	0.0596	0.0529	0.0335	0.0843	0.0387
	(0.0811)	(0.105)	(0.0821)	(0.0772)	(0.0952)	(0.0875)	(0.0816)	(0.0972)	(0.0791)
ln remoteness (*j*)	0.247***	0.208***	0.154***	0.246***	0.208***	0.154***	0.248***	0.209***	0.155***
	(0.00454)	(0.00491)	(0.00620)	(0.00455)	(0.00492)	(0.00621)	(0.00461)	(0.00498)	(0.00631)
Common border (*ijt*)	− 0.507***	− 0.479***	− 0.359***	− 0.507***	− 0.479***	− 0.359***	− 0.515***	− 0.489***	− 0.362***
	(0.0146)	(0.0161)	(0.0173)	(0.0146)	(0.0161)	(0.0173)	(0.0148)	(0.0163)	(0.0175)

	Aggregate AFT			Bilateral AFT			Multilateral AFT		
VARIABLES	(1) Total trade costs	(2) Mnf trade costs	(3) Agr. trade costs	(4) Total trade costs	(5) Mnf trade costs	(6) Agr. trade costs	(7) Total trade costs	(8) Mnf trade costs	(8) Agr. trade costs
Trading agreements (*ijt*)	– 0.305***	– 0.291***	– 0.145***	– 0.304***	– 0.291***	– 0.143***	– 0.310***	– 0.295***	– 0.151***
	(0.00910)	(0.00981)	(0.0121)	(0.00911)	(0.00983)	(0.0121)	(0.00931)	(0.0101)	(0.0125)
Common language (*ijt*)	– 0.139***	– 0.163***	– 0.0899***	– 0.139***	– 0.163***	– 0.0892***	– 0.139***	– 0.164***	– 0.0894***
	(0.00620)	(0.00673)	(0.00863)	(0.00622)	(0.00676)	(0.00865)	(0.00629)	(0.00683)	(0.00878)
Colnial relationship (*ijt*)	– 0.415***	– 0.379***	– 0.409***	– 0.414***	– 0.379***	– 0.410***	– 0.414***	– 0.376***	– 0.406***
	(0.0229)	(0.0238)	(0.0232)	(0.0229)	(0.0239)	(0.0233)	(0.0233)	(0.0243)	(0.0236)
Institutional quality (*it*)	– 0.113**	– 0.0368	– 0.0900	– 0.114**	– 0.0666	– 0.0770	– 0.113**	– 0.0596	– 0.0926*
	(0.0476)	(0.0563)	(0.0557)	(0.0471)	(0.0548)	(0.0569)	(0.0468)	(0.0531)	(0.0553)
iNFR (*it*)	– 0.126**	– 0.164***	– 0.116*	– 0.0760*	– 0.162***	– 0.0849	– 0.0901***	– 0.0595*	– 0.0425
	(0.0521)	(0.0576)	(0.0649)	(0.0444)	(0.0496)	(0.0551)	(0.0329)	(0.0343)	(0.0427)
ln AGG AFT (*it*−1)	– 0.0296***	– 0.0374***	– 0.0311***						
	(0.0104)	(0.0121)	(0.0108)						
ln AGG AFT (*it*−1) x iNFR (*it*)	– 0.0292***	– 0.0425***	– 0.0286**						
	(0.0107)	(0.0119)	(0.0121)						

(continued)

Table 3 (continued)

	Aggregate AFT			Bilateral AFT			Multilateral AFT		
VARIABLES	(1) Total trade costs	(2) Mnf trade costs	(3) Agr. trade costs	(4) Total trade costs	(5) Mnf trade costs	(6) Agr. trade costs	(7) Total trade costs	(8) Mnf trade costs	(8) Agr. trade costs
ln BLTAFT ($it-1$)				– 0.0284***	-0.0402***	– 0.0264**			
				(0.0108)	(0.0127)	(0.0104)			
ln BLT AFT ($it-1$) x iNFR (it)				– 0.0202*	– 0.0473***	– 0.0258**			
				(0.0108)	(0.0121)	(0.0122)			
ln MLT AFT ($it-1$)							– 0.0236***	– 0.0222***	– 0.0150**
							(0.00636)	(0.00660)	(0.00682)
ln MLT AFT ($it-1$) x iNFR (it)							– 0.0284***	– 0.0252***	– 0.0154*
							(0.00726)	(0.00763)	(0.00810)
Constant	2.428***	2.655***	4.570***	2.533***	2.853***	4.549***	2.821***	3.017***	4.382***
	(0.717)	(0.926)	(0.726)	(0.683)	(0.841)	(0.772)	(0.720)	(0.853)	(0.702)
Variance covariance structure:									
Random intercepts									
Sub-Regions (5)	15.8	21.58*	3.768	21.97*	14.8	3.427***	18.89*	19.90*	4.538
	(10.67)	(11.36)	(0)	(11.75)	(9.454)	(1.017)	(11.35)	(10.79)	(6.850)
Recipients	3.484***	3.235***	4.233	3.352***	3.098***	4.529***	4.301***	4.200***	4.580***

	Aggregate AFT			Bilateral AFT			Multilateral AFT		
VARIABLES	(1) Total trade costs	(2) Mnf trade costs	(3) Agr. trade costs	(4) Total trade costs	(5) Mnf trade costs	(6) Agr. trade costs	(7) Total trade costs	(8) Mnf trade costs	(8) Agr. trade costs
	(0.280)	(0.255)	(0.154)	(0.225)	(0.193)	(1.086)	(0.374)	(0.334)	(0.512)
Random coefficients									
AGG/BLT/MLT AFT ($it-1$)	– 0.987***	– 0.717**	– 10.24	– 1.032***	– 0.966***	– 1.062	– 0.374	0.204	– 9.580
	(0.328)	(0.320)	(0)	(0.289)	(0.248)	(1.323)	(0.376)	(0.399)	(1.813)
St. Dev. (Residual)	0.904***	0.880***	0.95	0.903***	0.880***	0.949***	0.905***	0.882***	0.950***
	(0.00445)	(0.00481)	(0.0034)	(0.00448)	(0.00476)	(0.00671)	(0.00453)	(0.00481)	(0.00682)
Observations	25,438	22,418	11,203	25,328	22,317	11,164	24,673	21,699	10,806
Number of countries included	45	44	44	45	44	44	44	43	43
Log likelihood	– 13213	– 12187	– 5327	– 13166	– 12138	– 5317	– 12777	– 11743	– 5134
Wald Chi-Square	12686	12018	3035	12637	11985	3018	12322	11659	2937

Turning to our main question of interest on whether the *AFT* inflow to African countries has had any discernible effect in reducing the bilateral trade costs facing them, the negative and statistically significant coefficients of the lagged aggregate *AFT* inflow variable and its interaction term with the infrastructure endowment variable, both in the aggregate trade costs and its sectoral decomposition, provide a strong evidence that suggests *AFT* inflows to African countries have resulted in a considerable reductions in trade costs, on average. Results in column (b) of Table 2 in which the baseline model is appended with lagged (one year) aggregate *AFT* inflow indicates that *AFT* has a statistically significant effect on the total bilateral trade cost reductions of the recipient countries at the aggregate level. Given that our specification involves an interaction effect and computing the marginal effects of aggregate *AFT* at the mean of the infrastructure endowment (the interacting variable), we can infer that a 10% increase in *AFT* inflows to a typical African nation is associated with roughly 0.78% decrease in the total bilateral trade costs facing the given African country, ceteris paribus.

Furthermore, since our estimation is carried out with a mixed-effects model in which we control for the structural variation of the recipients at the subregional level and utilizing the random intercepts reported at the bottom of the table and decomposing the observed average effect, we find that the corresponding effect of a 10% proportional increase in the aggregate *AFT* inflows to recipients in each of the sub-regions ranges from a 1.98% reduction in the total trade costs facing recipients in the Northern Africa to 0.51% in Eastern Africa, 0.24% in Central Africa, 0.50% in Western Africa and 1.45% and Southern Africa, respectively.

Assessing the effects across the economic sectors (manufactured goods and agricultural products), ceteris paribus, we similarly find that a 10% increase in aggregate *AFT* inflows to the typical African nation results in 0.77% decline in trade costs related manufactured goods and 1.12% in trade costs reductions involving agricultural products. For manufactured goods, these effects vary from an average of 2.37% among recipients in the Northern Africa to 0.21% in Eastern Africa, 0.12% in Central Africa, and 0.09 and 1.68% in Western Africa and Southern Africa, respectively. For agricultural goods, we compute that the corresponding effects range from 2.24% in Northern Africa to 0.61% in Eastern Africa, 0.39% in Central Africa, and 0.64% in Western Africa, and 2.46% in Southern Africa, respectively.

The Effects AFT from Bilateral and Multilateral the Sources.

Some African countries receive a significant amount of *AFT* from bilateral sources (for example Egypt), while others obtain a large proportion of their *AFT* from multilateral sources (for example, Ethiopia). Examining the effects of *AFT* inflows without accounting for the differences in the magnitude of inflows from the various sources may, thus, confound the observed effectiveness of the initiative. In addition, although the flow and magnitude of disbursements from either source (bilateral, or multilateral) might be independent, the experiences gleaned in working with aid inflows from one source may have a spill-over effect (in hindering or facilitating) on the performance of *AFT* inflows from another source. To address these problems, we first decompose the aggregate *AFT* inflows into the respective sources and estimate our specifications independently. We then interact with the *AFT* inflows from the respective sources and assess the presence, if any, of any intermediation effects.

Results from the specification in which we decompose *AFT* inflows into bilateral and multilateral sources, and the effects of the inflows from the respective sources are independently assessed are presented in columns (4)–(6) for inflows from bilateral sources and columns (7)–(9) for inflows from multilateral sources of Table 3. Accordingly, the marginal effects computed using the results presented in the corresponding columns indicate that a 10% increase in *AFT* inflows from bilateral sources is associated with a 1.33%, the effects of a corresponding 10% increase in inflows from multilateral sources is associated with only a 0.25% reductions in the total bilateral trade costs facing the typical recipient in Africa. on average.

Examining the effects across the sub-regions, we find that the observed total trade costs reduction effects of a 10% increase in *AFT* inflows from bilateral sources vary from an average of 0.22% among recipients in the Northern Africa to 0.11% in Eastern Africa, 0.09% in Central Africa, 0.12% in Western Africa, and 0.18% in Southern Africa, respectively. For *AFT* inflows from multilateral sources, the estimated effects range from 0.28% in Northern Africa to 0.02% in Eastern Africa, 0.27% in Central Africa, and 0.12 and 0.75% in Western Africa and Southern Africa, respectively.

While the relative effects of a proportional increase in *AFT* inflows across the sub-regions can be inferred, we note that the results (derived under a very strong assumption that the functionality of *AFT* originating from bilateral and multilateral sources are independent) as presented in columns (4–6) and

(7–9) suggest a straightforward comparison and statistical testing of the relative effects of a proportional percentage increase in *AFT* inflows from the respective sources cannot be asserted. There is also the possibility that either the magnitude of inflows, or the trade facilitation roles played by inflows from either of the sources may hinder, or promote the effectiveness of *AFT* inflows from the other source. We address both issues by estimating Eq. (5) of our empirical model which allows us to control and test for the presence a potential mediation in the effects of *AFT* inflows originating from bilateral and multilateral sources. Results from the corresponding estimation are presented in Table 4.

A general overview of the results presented both at the aggregate level and across the sectors considered indicate that with little variation, the signs, magnitudes, and statistical significance of the coefficients of the control variables included in the model remain stable. The coefficients (both the individual and interaction terms of the *AFT* inflow variables) are negative and statistically significant, implying that *AFT* inflows from bilateral and multilateral sources, not only do have a statistically discernible trade cost reduction effects, but also a considerable interaction effects with meaningful implications for the aid delivery and coordination of efforts. First, the statistically significant coefficient of the interaction term both at the aggregate and across the sectors considered lead us to reject the assumption of independence in the effects of *AFT* originating from the respective sources. Second, the negative signs and statistical significance of both the individual and interaction terms imply that the trade costs reduction effect of a small change in *AFT* inflows originating from one source (for example, bilateral) is higher, the higher the magnitude of *AFT* inflows from another source (for example, multilateral sources). The observation also confirms that empirical studies that examine the effectiveness *AFT* inflows at the aggregate level without controlling for the interaction effects of *AFT* inflows from bilateral and multilateral sources are prone to error.

Accordingly, comparing the average marginal effects of a proportional 10% increase in *AFT* inflows from bilateral sources with that of *AFT* inflows from multilateral sources, we find that while the given increase in *AFT* inflows from bilateral sources yields a 3.02% decline in the total bilateral trade costs facing the typical African country, the corresponding percentage increase in *AFT* inflows from multilateral sources result in a statistically significant, but much lower 0.58% total trade cost reduction effect among a typical African country, implying that the trade costs reduction effects of *AFT* from bilateral sources outweighs that of *AFT* inflows from multilateral sources. Further decomposing the observed effects across the sub-regions, we observe the

Table 4 The intermediation effects of bilateral and multilateral AFT on trade costs facing African countries: results from mixed effects model

	Intermediation effect of BLT and MLT AFT		
	(1)	(2)	(3)
VARIABLES	Total trade costs	Manufactured goods trade costs	Agricultural products trade costs
ln geodesic distance	0.137***	0.200***	0.0782***
	(0.00411)	(0.00449)	(0.00597)
Land locked (*i*)	0.214***	0.252***	0.111**
	(0.0502)	(0.0626)	(0.0490)
Land locked (*j*)	0.290***	0.282***	0.203***
	(0.00599)	(0.00673)	(0.0102)
ln remoteness (*i*)	0.150*	0.283**	0.118
	(0.0894)	(0.114)	(0.0893)
ln remoteness (*j*)	0.239***	0.196***	0.151***
	(0.00376)	(0.00412)	(0.00530)
Common border (*ijt*)	− 0.524***	− 0.500***	− 0.354***
	(0.0118)	(0.0132)	(0.0144)
Trading agreements (*ijt*)	− 0.301***	− 0.290***	− 0.145***
	(0.00727)	(0.00794)	(0.0101)
Common language (*ijt*)	− 0.120***	− 0.147***	− 0.0833***
	(0.00504)	(0.00556)	(0.00727)
Colonial relationship (*ijt*)	− 0.438***	− 0.393***	− 0.413***
	(0.0175)	(0.0184)	(0.0181)
Institutional quality (*it*)	− 0.0822**	− 0.112***	− 0.00146
	(0.0356)	(0.0432)	(0.0458)
ln BLTAFT ($it-1$)	− 0.0243***	− 0.0259**	− 0.00458
	(0.00938)	(0.0117)	(0.00959)
ln MLT AFT ($it-1$)	− 0.00444	− 0.00173	− 0.0139**
	(0.00425)	(0.00480)	(0.00613)
ln BLT AFT ($it-1$)# ln MLT AFT ($it-1$)	− 0.00209*	− 0.00246**	− 0.00459***
	(0.00122)	(0.00137)	(0.00162)
Constant	4.067***	5.013***	5.050***
	(0.791)	(1.007)	(0.793)
Variance covariance structure:			

(continued)

Table 4 (continued)

	Intermediation effect of BLT and MLT AFT		
	(1)	(2)	(3)
VARIABLES	Total trade costs	Manufactured goods trade costs	Agricultural products trade costs
Random intercepts			
Sub-regions (5)	3.426	2.757***	3.631**
	(2.174)	(0.762)	(1.521)
Recipients	3.023***	2.773***	3.417***
	(0.145)	(0.142)	(0.192)
Random coefficients			
BLT AFT (it-1)	– 1.481***	– 1.187***	– 1.696***
	(0.134)	(0.137)	(0.154)
MLT AFT (it-1)	– 0.972***	– 1.131***	– 0.734***
	(0.190)	(0.192)	(0.261)
St. Dev. (residual)	0.892***	0.881***	0.929***
	(0.00356)	(0.00390)	(0.00547)
Observations	39,487	33,042	16,777
Number of subregional groups	5	5	5
Number of African countries	50	47	49
Log likelihood	– 20974	– 17942	– 8330
Wald-Chi-Square	19256***	18275***	4616***

Standard errors in parentheses ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

average marginal trade cost reduction effects of *AFT* from bilateral sources ranges from 0.33% among recipients in the Northern Africa to 0.32% in Eastern Africa, 0.31% in Central Africa, and 0.32 and 2.79% among the recipients in Western Africa and Southern Africa, respectively. For *AFT* inflows from multilateral sources, the estimated effects range from 0.38% in Northern Africa to 0.29% in Eastern Africa, 0.11% in Central Africa, and 0.28 and 0.16% in Western Africa and Southern Africa, respectively.[3]

Results from applying the Wald test comparing the relative effects of *AFT* from bilateral and multilateral sources, overwhelmingly suggest the rejection of the null hypothesis of no difference in the marginal effects of *AFT* from bilateral and multilateral sources (at $p < 0.001$). Evaluating the same hypothesis across the sub-regions, we also observe that the effects are significantly different across the sub-regions implying that not only are the trade costs reduction effects of *AFT* inflows from bilateral sources are significantly higher than that of *AFT* from multilateral sources among recipients in Africa, but also the effects hold consistently across the sub-regions, the relative trade

costs reduction effects of *AFT* inflows from both bilateral and multilateral sources are larger among recipients in the Northern and Southern Africa, on average, as compared to specifically those in the Eastern and Central parts of Africa.

Making Use of the Intermediation Effects

Given our observation that the effect of a given percentage increase in the inflow of *AFT* inflows from bilateral sources depends on the magnitude of the *AFT* inflows to the given recipient from multilateral sources, and vice versa, we also explore the patterns of the marginal effects of a small percentage increase in *AFT* from bilateral (multilateral) sources at different levels of *AFT* inflows from multilateral (bilateral) sources.

In addition to giving us a better picture of the relative effects of *AFT* from multilateral and bilateral sources, such an analysis would help in answering two important questions: whether or not *AFT* inflows from the respective sources reduce bilateral trade costs at all levels, and if so, the threshold level at which *AFT* inflows from a given source makes the bilateral trade cost reduction effects of *AFT* inflows from another source statistically discernible. Figure 1 presents the numerical values of the marginal effects of a percentage increase in *AFT* inflows from bilateral sources at various levels of *AFT* inflows from multilateral sources together with the 95% confidence interval

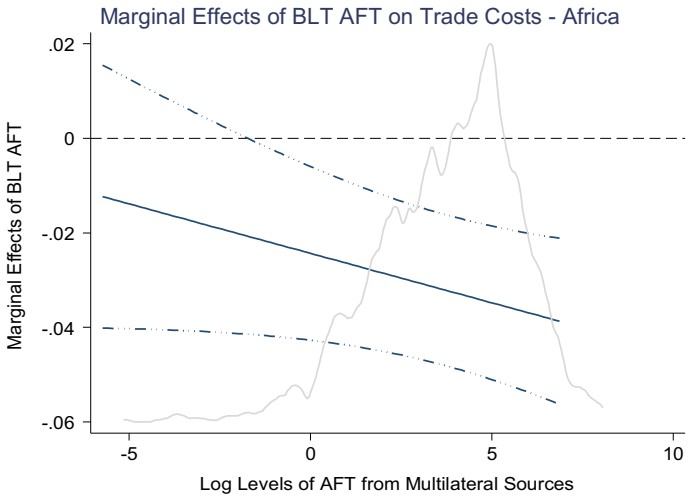

Fig. 1 Marginal effects of AFT from BLT soures on trade costs at various levels of AFT from MLT sources

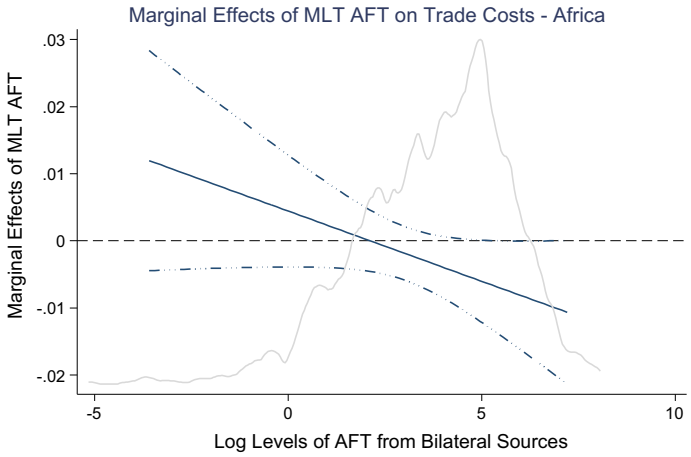

Fig. 2 Marginal effects of AFT from MLT soures on trade costs at various levels of AFT from BLT sources

estimates of the observed values. To facilitate a better understanding, we overlap the graph with the kernel density distribution of the trading partners based on the magnitude of their *AFT* inflows from multilateral sources. Figure 2 presents the corresponding effects for *AFT* inflows from multilateral sources computed at various levels of *AFT* from bilateral sources.

Values on the vertical axis of both figures represent the estimated marginal effects of a proportional 1% increase in *AFT* from bilateral (Fig. 1) and multilateral (Fig. 2) sources. As evident from the graphs, a small incremental change in *AFT* inflows from both sources do not necessarily lead to a reduction in the total bilateral trade costs at all levels, particularly at the low end of the *AFT* inflows from bilateral and multilateral sources. The marginal effects of *AFT* from bilateral sources, for example, remain positive (albeit declining), or negative, but statistically insignificant when the *AFT* inflows from multilateral sources to the given recipient is below $1. 10.69 million (a log value of 2.37 on Fig. 1), on average. Similarly, the effect of *AFT* from multilateral sources on bilateral trade costs remains positive, or negative, but statistically insignificant for levels of *AFT* inflows from the bilateral sources to the typical African country that are below 37.34 million USD (a log value of 3.62 on Fig. 2). Past the threshold levels at which the effects become negative and statistically significant, while the effect of a 10% increase in *AFT* inflows from bilateral sources to the typical recipient range from as low as –0.06 to –0.36%, and that of *AFT* from multilateral sources range from –0.03 to –0.28%. Hence, *AFT* from bilateral sources exhibits a tendency of having relatively larger effects, on average, than *AFT* from multilateral sources.

Two clear observations emerge from a careful examination of the patterns in the movement of the graphs. First, once *AFT* inflows from multilateral, or bilateral sources surpass the thresholds identified, and a statistically significant trade cost reduction effect occur, the observed effects continue to increase in magnitude with the level of *AFT* inflows from multilateral (bilateral) sources. The practical implication of this observation is that an increase *AFT* inflow from multilateral (bilateral) sources have the potential to make a small change in the *AFT* inflows bilateral(multilateral) source even more effective. Second, contrary to the general underpinning that development aid from bilateral sources are less effective than aid originating from multilateral sources, our observation points to the understanding that the extent to which *AFT* inflows from bilateral sources reduce trade costs facing African countries as being larger, on the average, than that of *AFT* inflows from multilateral sources. An indication that the *AFT* inflows may not be suffering from the pitfalls of traditional aid flows from the bilateral and multilateral sources.

The Role of Infrastructure in Shaping the Effectiveness of AFT

Consistent with the theoretical expectations and observations from the literature, we account for the presence infrastructure endowments in the *AFT* recipient African nations, we observe that better infrastructure corresponds with a fall in bilateral trade costs both at the aggregate and the economic sectors (manufactured goods and agricultural products) considered. We also observe that the infrastructure variable retains a negative and statistically significant coefficient for the interaction terms as well.

Given the results in Table 3, we estimate that a one standard deviation improvement in the overall infrastructure endowment of the typical *AFT* recipient in Africa is associated with a 1.68% decline in total bilateral trade costs. For trade costs involving manufactured goods and agricultural products, the corresponding effects were estimated at 2.75 and 2.51%, respectively. Looking at the break down of the corresponding effects on total bilateral trade costs facing African nations across the sub-regions, we find effects ranging from 2.51% among recipients in Northern Africa to 1.39% in Eastern Africa, 1.62% in Central Africa, and 0.08% in Western Africa and 1.57% Southern Africa.

While the observation that better infrastructure corresponds with a statistically significant reduction in trade costs is not at all surprising, the consistently negative and statistically significant interaction effect of the infrastructure variable has an important implication that African countries

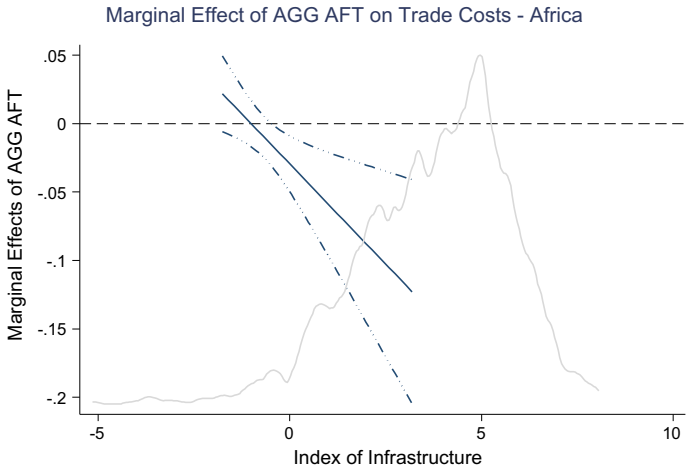

Fig. 3 Marginal effects of aggregate AFT on trade costs of African countries at various levels of infrastructure

with better infrastructure have marginally higher returns to a percent increase in *AFT* inflows extended to them. Thus, using these results, we compute the marginal effects of a 1% increase in aggregate *AFT* inflows on the bilateral trade costs of African countries at the various locus of the infrastructure contour. Figure 3 presents the numerical values of the effects computed accordingly and the graphical summary of the marginal effects together with the 95% confidence interval estimate and the kernel density distribution of the trading partners along the index of infrastructure endowment.

A policy-relevant implication that can be derived from examining the patterns of the marginal effects summarized by Fig. 3 that for the sample of African countries included in the study and the reference period (2004–2011), the degree to which improvements in infrastructure enhances the bilateral trade cost reduction effects of a 1% increase in *AFT* inflows never declines. The implication is a one USD investment in *AFT* targeted at improving the recipient countries' infrastructure may have substantially larger effects than often inferred when examining the effectiveness of *AFT* inflows.[4]

5 Conclusion

Using comprehensive bilateral trade costs data over the 2004–2011 period, we examine: We examine: (a) the impact of *aid-for-trade* (*AFT*) on trade costs borne by African countries and (b) the role that infrastructure plays in

mediating the effects, and (c) the differential impacts of *AFT* from bilateral (*BLT*) and multilateral (*MLT*) sources among African countries.

The results obtained from the estimation of a multilevel mixed-effects model in which we account for differences in the structural variation of African countries trade costs across five sub-regions and country-as well as-time specific differences, indicate that increased inflow of *AFT* invariably reduces bilateral trading costs facing African countries. Although variable in magnitude across the sources (bilateral and multilateral), the observed effects of *AFT* inflows on bilateral trade costs remain consistent across the sectors (manufactured goods and agricultural products). Comparing the subregional-specific effects of *AFT* inflows both at the aggregate level and across the sectors, we find (a) strong evidence indicating the effect of *AFT* from a bilateral source outweighs that of *AFT* from multilateral sources, and (b) African countries in the Northern and Southern sub-regions doing better than specified in the Eastern and Central parts of the continent. We also find that the infrastructure endowment of the countries alters the effectiveness of *AFT* inflows both at the aggregate level and across the sources. *AFT* is relatively more effective in reducing bilateral trade costs in African countries with better infrastructure endowments. In addition, we observe that the extent to which *AFT* inflows from bilateral(multilateral) sources reduces the trade costs facing African countries varies with the magnitude of *AFT* inflows to each country from multilateral(bilateral) sources. Taken together, our results imply that it is possible to further the effectiveness of *AFT* by targeting infrastructure and coordinating inflows from bilateral and multilateral sources.

Notes

1. AFT from bilateral sources refers to disbursements by an official bilateral donor (i.e. a state, or local government, or through an agency representing the donor's interest in the developing country); AFT from multilateral sources (MLT) refers to core disbursements made by donors through any of the five clusters of regional, or multilateral organizations without the restrictions of their aggregate uses.
2. Internal distance, when k = j, is calculated as $0.4 \times \sqrt{Land\ Mass_i}$ (Head and Mayer 2000).
3. The marginal effects are derived using the STATA procedure 'margins' after running the corresponding specifications. The procedure permits derivation of two types of measures (a) marginal effects at the mean and (b) average marginal effects together with their corresponding standard errors at various levels of the

variables included in the model. For example, at the mean of the interacting variable, the marginal effects of a *AFT* from bilateral sources can be computed as follows: $\frac{dy}{dBLT}(f(y_i)) = \alpha_{BLT} - \alpha_{MLTxBLT}(\mu_{MLT})$. However, as our results are obtained from the mixed-effects model (which is nonlinear)—a specification that involves repeated measures (countries within a region, and time periods within a country), the derivation of the corresponding marginal effects requires the use of adjusted predictions (expected values) of the dependent variable, where all independent variables are held at specified values (in our case, the mean). It is also important to note that the term 'marginal effect' as used here applies to a very small change in the given variable of interest, not to one-unit change, while it is customary to talk about these values as the effect of one-unit change, given the interaction terms.

4. Rightly so, a substantial portion of *AFT* inflows extended to developing countries is directed to building infrastructure (transportation, storage, communication, and energy). For example, in 2014, a total of nearly USD 23 billion assistance was disbursed to the broader *aid for trade* agenda of which USD 12.9 billion (56%) was allocated to build infrastructure (OECD 2016). Given that a certain percentage of *AFT* inflows to developing countries is directed at building infrastructure, there is also a concern that the infrastructure variable in our specification might be endogenous. In addition to using one-year lagged value of the AFT inflows, we employ the random intercept and random coefficient mixed effects model estimation to address the problem.

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Market Governance and Emerging Economies in Africa: A Dynamic Panel Analysis

Toussaint Houeninvo and Germain Lankoande

1 Introduction

Despite consensus on the determinants of economic growth, numerous issues—such as the finance and growth nexus—remain either contentious or unexplored (Barro 1991, 2003; Levine and Renelt 1991, 1992; Lin and Monga 2010). For emerging economies, there is still a lot to investigate. The ambiguous results of the Washington Consensus as a development model pushed African policymakers to seek alternative models (Asongu 2014; Fofack 2014; Monga 2014). This has led recently to a lively debate on the weaknesses of the dominant Washington Consensus model and to a search for a more comprehensive development framework. The Beijing Consensus puts emphasis on state regulation and prudent market reforms, while the Washington Consensus stresses liberal democracy, private capitalism, and political rights. Although liberalization and privatization policies have yielded mixed

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results, the Beijing Consensus has yielded tremendous results (Zhang 2006; Bartels et al. 2009; Darley 2012; Fofack 2014; Asongu et al. 2018). This has made the latter attractive to several African policymakers and government leaders (Zhang 2006; Asongu 2014; Fofack 2014; Asongu et al. 2018).

Since the early 2000s most of the fast-growing economies are in Africa and an "Africa rising" narrative has been associated with a wave of peace, democratization, and growth in entrepreneurship. However, compared with the experiences of emerging economies such as China, Indonesia, Korea, Malaysia, Thailand, and Turkey, Africa's experiences of economic and political liberalization seem to suggest that the key factor in rapid growth is effective market governance. This chapter contributes to the debate on the appropriate development model by investigating some of the factors related to rapid economic growth. These factors include the cost of doing business, credit to the private sector, foreign direct investment, trade openness, population growth, and school enrollment. It compares economic growth performance and patterns across regional economic communities and across countries in Africa in relation to some of these variables and uses East Asian countries as comparators.

The chapter is organized as follows: The second section discusses the literature review, and this is followed by a discussion of the methodology, stylized facts, the empirical model, an analysis of the findings, and concluding remarks and policy recommendations.

2 Literature Review

The literature on the role of markets in economic growth and development has been dominated until recently by the theory and practice of the Washington Consensus (Asongu 2014; Fofack 2014; Monga 2014; Asongu et al. 2018). There are now alternative approaches, motivated by the increasingly dominant role of China in the world economy (especially in developing countries), and the recent retraction of the United States from multilateralism (for example, withdrawing from the Paris Agreement on climate change). China's key role has been clearly brought out with the recent COVID-19 outbreak, which started in China in December 2019 and has now disrupted every sector of the world's supply chain. Asongu (2014) presented a comprehensive synthesis in a literature review of 100 empirical studies on the Washington and Beijing Consensuses. He classifies them into three categories:

- The pessimistic or neocolonial school—Chinese trade and investment are detrimental to African economies.
- The optimistic or balanced development school—Chinese trade and investment are beneficial to African economies.
- The accommodation school—Chinese firms have similar motivations to Western firms.

In reconciling the two first consensuses, Asongu indicates that the Washington Consensus puts more stress on political rights, while the Beijing Consensus focuses on economic rights—the right to vote versus the right to food.

Fosu (2013) points out that even China enjoyed strong economic growth after a series of liberalizations conducted around 1979. According to Fosu, the difference between China and African countries is that China "has not unconditionally followed the advice of international donors but has very well contextualized the rationale of its liberalization." In other words, a country's capability to capitalize on market forces—much developed under the Washington Consensus—is the biggest determinant of the outcome of economic liberalization (Barro 1991, 2003; World Bank 1994; Stiglitz and Uy 1996). From an empirical standpoint, the limitations of the Washington Consensus and the growing success of the Beijing Consensus in several emerging countries (including those in Africa), underline the need to understand the key factors that lead to high growth, independent of political and ideological views.

Existing empirical studies differ in terms of their geographical and country selection and whether they are based on panel or times series analysis (Asongu and Asongu 2018). Among the studies on emerging economies, Goel and Korhonen (2011) studied the determinants of economic growth in BRIC countries—Brazil, Russia, India, and China—using the real growth of GDP per capita as the dependent variable, and they found positive effects of investment, exports, and literacy on economic growth. Basu et al. (2013), in a similar study on BRICS—Brazil, Russia, India, China, and South Africa—used growth of real GDP per capita as the dependent variable and found that both skill formation and working-age population had a significant impact of economic growth. A study conducted by Akpan et al. (2014) on the determinants of FDI in fast-growing economies showed that market size (measured by GDP at constant prices), infrastructure development, and trade openness play the most significant roles in determining net FDI inflows (the dependent variable) and thus in turn on economic growth and socioeconomic transformation. On the other hand, a study carried out by Agrawal (2015), on the

relationship between FDI and economic growth in BRICS, where the dependent variable was GDP, found that there was a long-term causality from foreign direct investment (FDI) to economic growth. Similarly, Asongu and Kodila-Tedika (2015) did a study on the conditional determinants of FDI in fast-growing economies that considered gross and net FDI as dependent variables, and found that stock market capitalization and GDP growth drive FDI. A similar study conducted by Asongu and Nwachukwu (2015) on the drivers of FDI in fast growing developing countries, used both gross and net FDI as dependent variables, and found that economic governance, political stability, and government effectiveness play a significant role in attracting FDI.

A recent study by Asongu and Odhiambo (2018), which examines growth determinants in fast emerging economies that used both GDP growth and real GDP output as dependent variables, found that foreign direct investment, natural resources, and political stability were drivers of growth. As for country case analysis, a study conducted on China by Démurger (2001), using real GDP growth as dependent variable and provincial data, found that transport facilities are a key differentiating factor in explaining growth gap.

As far as sample of Sub-Saharan countries or subregional countries are concerned, Fosu (2012) analyzed determinants of growth in African economies with real GDP per capita growth as the dependent variable, and found that post-independence growth was affected primarily by total factor productivity. Tumwebaze and Ijjo (2015), who examined the relationship between regional economic integration and economic growth with the real per capita GDP growth as dependent variable, found that the robust drivers of growth in COMESA countries were growth in capital stock, population, world GDP, and the level of openness to international trade. Finally, Houeninvo and Lankoande (2017) in a study on the finance and growth nexus that used real GDP per capita as the dependent variable, found that credit to the private sector is a strong driver of growth in the ECOWAS countries.

Most of the above studies were based on panel data. Their models include a random effects model, a fixed effects model, and they mostly used ordinary least squares (OLS), two-stage least squares (2SLS), generalized method of moments (GMM), panel cointegration and causality tests, instrumental variable quantile regression, or instrumental variable least absolute deviations. The difference in the results of these studies are explained by the geographical coverage, the sampling, period covered, and the estimation method used.

There are two gaps in the previous studies:

- None of them has quantified the effect of the cost of doing business on economic growth.
- None of them tested the effect of the cost of doing business on economic growth through its effect on credit to the private sector.

This study aims at closing these gaps by quantifying the impact of the cost of doing business (market governance) on economic growth. Moreover, the study tests the effect of the cost of doing business on economic growth that is channeled through credit to the private sector. Finally, the study uses a different sample and the most current data.

3 Methodology and Data

Variables and Expected Effects

Drawing from the literature review, the factors that impact economic growth include: credit to the private sector (CRED), foreign direct investment (FDI), the growth of total population (GPOP), the net secondary school enrollment rate (SCHO), and trade openness (TRADE). The cost of doing business (CDB), the factor we are considering in addition to the usual growth determinants, is expected to have a negative impact on economic growth. In fact, in a high cost of doing business environment, banks and investors will foresee higher credit risks and lower returns. This in turn will reduce credit to the private sector and therefore limit investment and growth. All the remaining variables are expected to have a positive impact. CRED is expected to have a positive impact through domestic investment. However, in the presence of high CDB, the interaction between CDB and CRED will result in a negative effect on growth. Net FDI inflows are expected to complement the domestic investment effort and have a positive effect on economic growth. GPOP is expected to have a positive impact both through greater labor force supply and greater private consumption. SCHO (secondary) is expected to have a positive impact through better factor efficiency. Finally, TRADE is expected to have a positive impact through boosting exports of goods and services and importing production inputs for those goods and services. Together all of these factors should have a positive impact on economic growth.

Table 1 Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Growth of GDP per capita	192	2.84	5.39	– 12.31	33.58
Private sector credit	182	16.55	7.79	2.10	38.39
Cost of doing business	186	117.55	137.82	2.70	1316.40
Foreign direct inv	192	4.80	7.50	– 6.06	50.64
Trade	171	80.12	40.94	20.72	307.02
Pop. growth	192	2.57	0.51	1.28	3.91
School enrol	39	35.79	13.75	9.244	59.00
Interaction (Cost of D. B and Credit)	192	1584.61	1656.15	0	9825.05

Source Authors' own calculations based on WDI database, 2019

4 Source of Data and Sampling

The data are drawn from the World Development Indicators (2019) online database. They cover 12 fast-growing Sub-Saharan Africa countries from three regional integration communities—ECCA, ECOWAS, and COMESA—from 2003 to 2018. There are 192 observations in the sample. Descriptive statistics are reproduced in Table 1, and the correlation matrix showing the relationships between the variables are shown in Table 2.

5 Stylized Facts

The descriptive analysis here is based on a selection of 12 fast-growing countries or those targeted to become emerging economies across three regional economic cooperation zones: the Common Market of East and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS), and the Economic Community of West African States (ECOWAS). The countries are analyzed for the period 2003–18, and their performance is compared with select East Asian countries across the following key macroeconomic indicators: cost of doing business (CDB), credit to the private sector, foreign direct investment (FDI), inflation (INFL), growth of gross domestic product (GGDP), and employment. The cost of doing business is measured as a percentage of gross national income per capita, GDP growth is measured as the percentage change per annum in real GDP, inflation is measured as the annual change in consumer prices, FDI and credit to the private sector are measured as percentage of GDP, and employment

Table 2 Correlation matrix and relationship among the variables

	Growth of GDP per capita	Private sector credit	Cost of doing business	Foreign direct Inv	Trade	Pop. growth	School enrol	Interaction Cost D.B and credit
Growth of GDP per capita	1							
Priv. sector credit	– 0.19	1						
Cost of doing business	– 0.09	– 0.17	1					
Foreign direct inv	0.08	– 0.30	– 0.21	1				
Trade	0.11	– 0.61	0.43	0.29	1			
Pop growth	– 0.30	– 0.35	0.16	– 0.04	0.51	1		
School enrol	– 0.32	– 0.30	– 0.45	0.45	0.05	0.21	1	
Interaction (Cost D.B and Credit)	– 0.23	0.34	0.86	– 0.36	0.05	– 0.06	– 0.57	1

Source Authors' own calculations based on WDI database, 2019

Table 3 Key variables in selected African and East Asian emerging economies, average 2003–2018, in %

ECOWAS						
Countries	2003–18					
	GDP growth	Cost of doing business	Inflation	Foreign direct inv	Private sector credit	Employ
Côte d'Ivoire	4.29	91.44	2.12	1.67	18.77	57.34
Ghana	6.43	33.59	13.90	5.64	14.27	65.32
Nigeria	5.30	91.27	11.95	1.63	13.42	52.61
Senegal	4.87	75.97	1.48	2.03	21.74	44.46
Average (four countries)	5.22	73.07	7.36	2.74	17.05	54.94
ECCAS						
Countries	2003–18					
	GDP growth	Cost of doing business	inflation	Foreign direct inv	Private sector credit	Employ
Angola	5.80	307.89	22.83	1.00	15.15	68.51
Cameroon	4.30	90.16	2.09	1.66	11.82	75.23
Congo, Rep	3.35	99.34	2.86	17.10	9.56	59.57
Equatorial Guinea	5.27	99.91	4.02	6.71	7.67	56.11
Average (four countries)	4.62	150.92	8.03	6.62	11.05	64.85
COMESA						
Countries	2003–18					
	GDP growth	Cost of doing business	Inflation	Foreign direct Inv	Private sector credit	Employ
Comoros	2.93	120.32	2.94	0.64	10.40	41.01
Djibouti	6.43	192.59	3.11	9.07	23.86	55.05
Ethiopia	9.65	125.94	14.51	2.93	20.34	79.32
Rwanda	7.45	89.69	7.13	2.32	15.89	83.67

(continued)

Table 3 (continued)

COMESA						
Countries	2003–18					
	GDP growth	Cost of doing business	Inflation	Foreign direct Inv	Private sector credit	Employ
Average (four countries)	6.66	130.51	7.13	3.74	17.12	64.76
EAST ASIA						
Countries	2003–18					
	GDP growth	Cost of doing business	Inflation	Foreign direct inv	Private sector credit	Employ
China	9.23	4.58	2.59	3.09	129.98	58.09
Indonesia	5.45	41.18	6.36	1.74	28.09	62.45
Korea, Rep	3.51	15.56	2.43	0.96	134.78	59.64
Malaysia	5.13	17.1	2.36	3.36	112.61	60.16
Average (four countries)	5.84	19.43	3.45	2.27	101.20	62.62

Source Authors' own calculations based on WDI database, 2019.

is measured as employment to population ratio. All the variables are averages over 2003–18 (Table 3).

Across all the three regional economic cooperation zones over the period, countries that have a low cost of doing business seem to have low inflation, higher credit to the private sector, higher economic growth, and higher employment (Table 3).[1] For example, in ECOWAS Ghana has the lowest cost of doing business measured as a percentage of gross national income per capita (33.59), highest net inflows of FDI as a percentage of GDP (5.64), highest economic growth (6.43), and highest employment (65.32). For ECCAS countries, Cameroon has the lowest cost of doing business (90.16), the lowest inflation (2.09), and the highest employment (75.23). For COMESA countries, Rwanda held the lowest cost of doing business (89.69), the second highest economic growth (7.45), and the highest employment (83.67). Among East Asian countries, China had the lowest cost of doing business (4.58), the highest economic growth (9.23), the lowest inflation (2.59), and the highest credit to the private sector (129.98). In comparison with their peers in East Asia, the cost of doing business in West Africa (ECOWAS) (73.07) is over three times that of East Asian countries (19.43). The costs of doing business in ECCAS (150.92) and COMESA (130.51)

are almost the double of that of ECOWAS and between seven and eight-fold that of East Asia. This suggests that the high cost of doing business exerted negative effects on investment profitability in African countries, and it is one of the reasons why East Asia is a preferred investment destination for international investors.

Regarding credit to the private sector, East Asian effort (101.20) represents six-fold that of ECOWAS and COMESA effort (17) and nine-fold ECCAS effort (11.05). This low level of credit to the private sector in Africa could be attributed to the risky and costly business environment. For credit to the private sector, East Asia remains a preferred destination for investors. Generally, the cost of doing business directly affects investment in equity, but it also has indirect effects through credit to the private sector. The direct negative effect is the one that results from the high transaction costs of processing business activities—such as the costs of labor, delays, transport, and the costs of contract implementation—that increases the planned cost of activities more than expected and so reduces profitability when compared to an environment where those costs are low. The indirect negative effect is the effect that reduces the loan performance and the capacity of the borrower to repay the loan.

The outbreak of COVID-19, and the resulting restrictive measures that contribute to increasing the cost of doing business, is a good illustration of the negative effect of the cost of doing business on economic growth. Several companies, mainly in the tourism and transport sector, went into bankruptcy and fired their workers and this then exacerbates poverty. The situation is worse when these firms have borrowed to finance their businesses because this jeopardizes their ability to repay their loans. The supplement to *African Economic Perspectives*, published by the African Development Bank in July 2020, shows that in a baseline scenario Africa's real GDP growth is projected to contract by 1.7% due to COVID-19. This represents a drop of 5.6 percentage points from the January 2020 pre-COVID-19 projection. According to the report, the contraction of real GDP could reach 3.4%, down by 7.3% points from the pre-pandemic projection (AfDB 2020). Thus investments in Africa are likely to face higher costs and lower profitability than in East Asia. Based on these comparisons, African countries aspiring to become emerging economies need to put in place measures that reduce the cost of doing business and that promote credit to the private sector.

To get more insight into other factors impacting economic growth and development, we augment the above stylized facts with an econometric analysis. This allows us to introduce and control for other factors influencing the economic performance of African economies.

6 Empirical Model and Estimation Technique

Panel Unit Root and Panel Cointegration Tests

Two potential biases could arise from a dynamic panel. The first bias is related to the case where the stochastic process is not stationary. The second bias is the presence of endogenous explanatory variables as well as unobserved heterogeneity. Together those biases may lead to a spurious regression. But they can be addressed in two complementary ways. The first is to proceed to a panel unit root test and then correct for the presence of unit root by running a panel cointegration test. The second is to use a two-stage least squares analysis (2SLS) to address the weaknesses of ordinary least squares regression (OLS) when the error terms may be heterogeneously distributed and serially dependent.

To test the reliability of the data over the period 2003–18, we use an Im-Pesaran-Shin (IPS) panel unit root test. This allows for testing the null hypothesis (H_0) that all the variables contain unit roots against the alternative hypothesis (H_1) that some are stationary. The results of the test are summarized in Table 4.

The results show that, except for growth of GDP per capita (GGDPPC) and foreign direct investment (FDI), the *p* values are greater than 10 percent and therefore the alternative hypothesis applies—that is, some of the panels are stationary and others contain unit roots. Since some panels are not stationary, we proceed to the cointegration test by using the Pedroni panel-data cointegration test. This allows for testing the null hypothesis H(0) of no cointegration against the alternative H(1) of all panels are cointegrated.

Usually this yields three related tests of cointegration that work differently but come to the same conclusion. These related tests are:

- Modified Phillips–Perron test.

Table 4 Im-Pesaran-Shin (IPS) Panel Unit Root Test

Variables	*p* value
Growth of GDP per capita	0.0001
Cost of doing business	0.0838
Foreign direct investment	0.0005
Population growth	0.9771
Interaction (Cost D.B and Credit)	0.4660

Source Authors' own calculations based on WDI database, 2019. *Note* Stata could not perform the test for SCHO and CRED because of insufficient observations per panel. A least 10 observations are required per panel for the normality of the test.

- Phillips–Perron test.
- Augmented Dickey–Fuller test.

The results indicate: (i) a p value of 0.0018 for the Modified Phillips–Perron test and (ii) a p value of 0.0000 for Phillips–Perron test. Those two p values suggest rejecting H_0 and concluding that all the panels are cointegrated and that there is therefore a long-term relationship between the variables.

7 Model Specification Test

The question here is whether a random effects or fixed effects model is more appropriate.

To address this question a Hausman test was performed. The null hypothesis (H_0) is that the random effects panel is preferable to the alternative (H_1), which is a fixed effects model preferable. As the p value of the Hausman test equals 0.000, we concluded that H_0 is rejected, thus justifying a fixed effects model. As a result of this, the chapter uses a fixed effects two-stage least squares model to estimate the effects of a series of factors—including the cost of doing business—on economic growth.[2]

Based on the literature review, the corresponding econometrics of growth model in a dynamic panel can be written as follows:

$$\begin{aligned}\log GGDDPPC = {} & C + \beta_1 \log CDB + \beta_2 \log CRED + \beta_3 \log FDI \\ & + \beta_4 \log TRADE + \beta_5 \log GPOP + \beta_6 \log SCHO \\ & + \beta_7 \log CDBCRED + \in_i \end{aligned} \quad (1)$$

where:

- β_1 measures the direct effect of CDB on growth
- β_2 measures the direct effect of CRED on growth
- β_3 measures the direct effect of FDI on growth
- β_4 measures the direct effect of TRADE on growth
- β_5 measures the direct effect of GPOP on growth
- β_6 measures the direct effect of SCHO on growth
- β_7 measures the interaction terms (Interact) between the cost of doing business (CDB) and credit to the private sector (CRED). β_7 measures the indirect effect of CDB on growth through the credit to the private sector variable.

Empirical Results

The results of the model indicate that the key factors of economic growth in the emerging economies are the cost of doing business, foreign direct investment, and the interaction between the cost of doing business and credit to the private sector (Table 5). Since the estimated model is in log, the coefficients of the variables are their elasticities relative to the growth of GDP per capita. Hence, with reference to Eq. (2), obtained as a first derivative of Eq. (1) relative to CDB, the direct effect of the cost of doing business on economic growth and its indirect effect through credit to the private sector is obtained from the formula:

$$0.191 - 0.156 - 0.156\,\mathrm{LogCRED} \tag{2}$$

Table 5 Fixed effects two-stage least squares results with log of growth of real GDP Per Capita as dependent variable

Variables	TSLS (1)	TSLS (2)	TSLS (3)	TSLS (4)
Cost of doing business	0.304***	0.276***	0.203**	0.191**
	(3.09)	(2.83)	(2.18)	(2.16)
Foreign direct inv	0.156**	0.150**	0.169**	0.161**
	(2.07)	(1.99)	(2.23)	(2.16)
Trade	– 0.0809	– 0.0754	– 0.0415	
	(–1.27)	(–1.18)	(–0.66)	
Pop. growth	2.321***	2.323***		
	(2.75)	(2.76)		
School enrol	0.0829			
	(1.63)			
Interaction (Cost of doing business and Credit to private sector)	– 0.217***	– 0.202***	– 0.169***	– 0.156***
	(–3.59)	(–3.36)	(–2.89)	(–2.94)
Constant	– 0.473	– 0.446	0.463***	0.382***
	(–1.28)	(–1.21)	(2.81)	(3.28)
No. of observations	191	192	192	192
R^2	0.05	0.04	0.02	0.02
No. of countries	12	12	12	12

Note All variables are measured in natural logs. Values in the parenthesis are standard errors. A single asterisk (*) denotes significance at 10%, two asterisks (**) at 5%, and three asterisks at 1%. TSLS refers to two-stage least squares estimations. The model is a fixed effects model (p value of the Hausman test equals 0.000). Log (credit to the private sector) appeared as an omitted variable while performing the estimation.

The computed values of the coefficient of the variable CDB for selected countries are summarized in Table 6.

As shown in Table 6, for non-natural resource intensive or non-commodity exporters, the direct and indirect effects of the cost of doing business on economic growth are negative. This is the case for both Senegal and Djibouti, where the effects of a 1 percent increase in the cost of doing business are a decrease of 2.7 percent (for Senegal) and 3.2 percent (for Djibouti) of GDP per capita over the period 2003–2018.

However, as discussed in the stylized facts section above, there may be outliers and these are either oil or commodity exporters. For these countries, periods with a high cost of doing business may lead to a positive effect on economic growth during boom (or other buffer) times and a negative effect during headwind periods—for example, between 2014–2016 for oil and commodity prices or the oil price shock following the COVID–19 outbreak. These positive and negative effects were the case for Angola and Republic of Congo (both crude oil exporters), and Côte d'Ivoire and Rwanda (both primary commodity exporters). In these four countries, investment depends on oil or commodity exporting revenues. Thus, a price fall yields a revenue fall, which leads to an investment fall, which leads to a reduction of growth of GDP per capita. Moreover, the uncertainty related to future price increases leads to a delay in investment decisions and then to a negative effect on

Table 6 Coefficient of the variable log, cost of doing business

Country	Years	Coefficient of LCDB (effect of 1% increase of Cost of doing business on Growth of GDP per capita) Negative	Coefficient of LCDB (effect of 1% increase of Cost of doing business on Growth of GDP per capita) Positive
Côte d'Ivoire	2003–2010		0.018
	2011–2018	– 0.020	
Senegal	2003–2018	– 0.027	
Angola	2003–2008		0.05
	2009–2016	– 0.02	
	2017–2018		0.004
Congo, Rep	2003–2014		0.080
	2015–2018	– 0.013	
Djibouti	2003–2018	– 0.032	
Rwanda	2003–2011		0.019
	2012–2018	– 0.013	

Source Authors' own calculations based on WDI database, 2019.

growth. For countries such as Angola, the effect of a 1 percent increase in the cost of doing business was estimated as a 2 percent decrease of GDP per capita over 2009–2016 and as a slight increase estimated at 0.4 percent over 2017–2018. This may be explained by the oil price starting to improve over 2016–2018. Similarly, for Côte d'Ivoire, the effect of a 1 percent increase in the cost of doing business is estimated as a 2 percent decrease of GDP per capita over 2011–2018, while for Republic of Congo it is estimated at a 1.3 percent decrease of GDP per capita over 2015–2018. The sudden oil and commodity price drops due to COVID–19 exacerbate the vulnerability of the crude oil and commodity exporting countries.

As illustrated in the stylized facts section, investing in Africa by an investor costs 4–8 times the cost of such investment in East Asia. This means the profitability of such an investment is lower in Africa than in East Asia. The indirect effect on economic growth is the one that results from the interaction between the cost of doing business and the credit to the private sector (when the investment is made based on credit). In fact, credit to the private sector in East Asia is 4 to 8 times greater than what it is in Africa. This situation is probably the result of the more costly business environment in Africa. The high cost of doing business negatively affects the return on the investment, which in return has a negative effect on growth. Overall, the toll an economy pays due to the cost of doing businesses is the loss of growth opportunities, especially when investments are done through equity and debt (credit), which is usually the case.

Overall, for the countries in this study, the total effect of the cost of doing business is negative and significant (Table 6).

As far as the control variables of the model are concerned, net foreign direct investment shows a strong positive effect in all the equations (Table 5). To some extent, population growth and secondary school enrollment both have positive and significant effects as drivers of an emergent economy. African countries planning to become emerging economies should put more focus on policy reforms that reduce the cost of doing business and that stimulate credit to the private sector, thus reducing the negative impact of the interaction of these variables. This will help attract net foreign direct investment that complements domestic investment, thus ensuring sustainability and avoiding economic growth running out of steam. The findings presented here are among the first attempts to quantify the effect of market governance, both directly on economic growth and indirectly through credit to the private sector.

8 Concluding Remarks and Policy Implications

The empirical evidence from a sample of African countries across regional economic communities shows that reaching emerging economies status is less an ideological issue of liberalization than an issue of policies that effectively reduce the cost of doing business (market governance), improve access to credit for the private sector, and attract foreign direct investment. These factors can also contribute to loosening the credit constraint. Market governance appears to be a strong driver of higher economic growth, and thus help for countries striving to become emerging economies. Moreover, a slight increase in the cost of doing business has a strong negative impact on economic growth, channeled through credit to the private sector. African countries planning on becoming emerging economies—Angola, Côte d'Ivoire, Djibouti, Republic of Congo, and Senegal—should put more stress on policy reforms that reduce the cost of doing business, promote a business-friendly environment, offer better access to credit, and encourage more foreign direct investment.

Notes

1. Some oil exporting and resource intensive countries such as Angola, Nigeria, Republic of Congo, and Equatorial Guinea may be outliers where a low cost of doing business is not necessarily associated with higher economic growth, and some periods with a high cost of doing business are associated with high economic growth. This may be explained by the fact that the benefits of a low cost of doing business are offset by headwinds (such as the oil price shock 2014–2016) and the effect of a high cost may be compensated for by the booming effect of high oil and other commodity prices. The consequence is that this makes these countries' growth more vulnerable to the variability of oil or commodity prices.
2. Stata could not perform the Augmented Dickey–Fuller test, but the two other tests are sufficient. Before the two-stage least squares, we tried the generalized method of moments (GMM). With so few countries and the short time period, the p values of the Hansen test were high and close to 1, indicating the GMM was not appropriate. With the p value of Hausman test at 0.0000, fixed effects appear to be the best model specification.

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Africa Should Discard Mainstream Economic Theory

John Komlos

1 Introduction

The argument of this essay is that mainstream economic theory, extolling the virtues of free markets, is basically harmful for people in developing economies or for others born into disadvantage. This is the case insofar as markets have "Achilles heels" that interfere with their functioning and detract from their ability to efficiently improve the quality of life for those at the lower end of the global income distribution. These intrinsic problems—such as bounded rationality, imperfect and asymmetric information, power disparities, conspicuous consumption, monopolies, oligopolies, transaction costs, opportunistic behavior, manipulation of consumer demand, and imperfect foresight,—that are associated with the workings of *real-existing* markets, as opposed to imaginary ones—prevents real markets from working in such a way as to help poor people to flourish as they seem to do on academic blackboards.

These failings are mostly omitted from conventional economics textbooks so that the majority of students who have studied economics remember mainly such juicy quotes as "markets have remarkable efficiency properties" (Samuelson and Nordhaus 2009, p. 164), or "this invisible hand works its magic" (Mankiw 2018, p. 9); although many economists received Nobel Prize

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decades ago for stressing the importance of deficiencies in real markets. Even Paul Krugman, who has a much wider perspective as *New York Times* columnist, exudes the wonders of the market in his co-authored textbook: "markets usually lead to efficiency" (Krugman and Wells 2013, p. 16).

Thus, the important path-breaking contributions of Nobel-Prize winning economists such as George Akerlof, Kenneth Arrow, Daniel Kahneman, Paul Krugman, Thomas Schelling, Herbert Simon, Robert Shiller, Michael Spence, Joseph Stiglitz, Richard Thaler, and Oliver Williamson are ignored for most parts or, at best, relegated to obscure footnotes. Instead of including their critical ideas, most of the popular textbooks and professors teaching from them, describe a free-market utopia the relevance of which does not extend much beyond the edges of the blackboard.

As a consequence, most students fail to understand the essential features of *real* market economies in the hyper-globalized world of the twenty-first century and how it skews its benefits toward those who are already privileged, thereby putting minorities at a substantial disadvantage. Instead, they propagate a caricature of the economy at a level of abstraction that creates an essentially fantasy world, thereby distorting the student's vision. They perpetuate an ideology of laissez-faire which might sound good on the surface but fail to relay that freedom in the marketplace bestows advantages to those who are already powerful, thus fostering a dual economy that pose formidable obstacles to overcoming underdevelopment and the associated poverty trap. Hence, teachers of mainstream economics perpetuate a stereotype that markets are efficient, thereby automatically leading to a strong economy and a rising standard of living; so, they continue to sing the praises of the immense achievements of the free-market system, keeping any demurrals muted.

This implies that tens of millions of students leave their studies without having seriously reflected on the nuances, caveats, and real-world implications of the purely theoretical issues discussed (Samuelson 2019). This is especially pernicious for students living in underdeveloped countries, because those models leave the misimpression that their inability to succeed in a free world is primarily their own fault and supports the dominant ideology that they actually deserve to be at the bottom of the global hierarchy. This is not true, because the economic system is structured in such a way as to keep people and countries firmly in their place: the poor at the bottom and the rich at the top, with limited mobility between them. Only a very few countries could escape the poverty trap and catch up to the West.

This is also true for rich countries where those born into disadvantaged circumstances remain poor throughout their life. For instance, mainstream

economists claim that "the U.S. economy is in good shape" (Feldstein 2016b). But this is a Panglossian view as far as African Americans and other minorities are concerned. Mainstream economists ignore the elephant in the room, namely, that minorities are overrepresented among the disadvantaged poor by all measures. For instance, differences in median incomes by ethnicity are substantial and has not improved at all since the turn of the twenty-first century (Table 1). African Americans households' real median income is at $27,900 just 60% of whites' income, a decline from 65% in the course of the twenty-first century. That meant that they were barely eking out a living. The black-white income gap increased by some $5000 in 17 years. African Americans were the only ethnic group whose household income in 2017 was still below that obtained in the year 2000, pointing to a nearly two-decade period of stagnation (Fontenot et al. 2018, pp. 2, 5). Hispanics fared somewhat better: their gap remained unchanged.

Hence, minority incomes in the U.S. are highly concentrated in the left tail of the income distribution as a lingering heritage of the evils of slavery and of subsequent discrimination (Darity and Mason 1998). No wonder that one-fifth of the 101 million African Americans and Hispanics in the U.S. in 2017, were living in poverty and were more than 2.3 times as likely to be poor than whites (Fontenot et al. 2018, p. 12). The distribution of wealth shows even greater disparity (Darity and Hamilton 2018; Williams 2017). 38% of blacks with some college education are unable to meet their current bills compared to 18% of whites (Board of Governors 2018, p. 22).

Most economics textbooks do not even discuss such obstacles faced by disadvantaged groups. They fail to mention not only the poverty and income data cited above but also the fact that their imprisonment rate, unemployment rate, life expectancy, schooling, wealth and every other indicator of well-being is inferior to that of whites and usually by substantial margins. For instance, life expectancy among black men in the U.S. at 72.2 years is 4.4 years behind that of whites and below that of men in Algeria,

Table 1 Change in real household income by ethnicity, in '000 of 2017 Dollars

						Difference to Whites		
Year	All	White	Black	Asian	Hispanic	Black	Asian	Hispanic
2000	59.9	65.1	42.3	79.6	47.3	−22.8	14.5	−17.8
2017	61.4	68.1	40.3	81.3	50.5	−27.9	13.2	−17.7
Change	1.4	3.0	−2.1	1.7	3.1	−5.1	−1.3	0.1

Source U.S. Census Bureau, Table H-5. www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html, Accessed March 26, 2019

Cuba, Tunisia, and China (WHO 2016; CDC 2017). Overlooking the realities of the African American experience by economist is nothing less than "intellectual malfeasance" (Madrick 2015).

Despite the Civil-Rights movement, discrimination persists in the U.S.: the white-black wage gap among men in the same occupation after accounting for the usual determinants of wages such as education is about 16%; while the gap among women is smaller and statistically less significant (Rodgers and Holmes 2004). Others find that the gap is widening. In 1979 black men earned 20% and black women earned 5% less than their white counterparts, but by 2016 the gap increased to 30 and 18%, respectively (Daly et al. 2017). What is more, while a part of the gap can be explained by educational attainment, much of the gap is due to discrimination (Hamilton and Darity 2017). To be sure, differences in educational attainment are also due to discrimination and poverty (Waters and Eschbach 1995). Not at all surprisingly, discrimination also affects intergenerational mobility (Chetty et al. 2018).

The official average unemployment rate of 5.8% for African Americans (February 2020) is hopelessly biased because of hidden unemployment (not reported in the official statistics), which keeps a downward pressure on wages (St. Louis Fed, series LNS14000006). In February 2020 the true unemployment rate among African Americans was closer to 10.9%, almost twice the official rate (EPI 2020).[1] However, things were much worse than that among those without a high school degree, 23.9% of whom were actually unemployed, which provides additional insights into the actual pain experienced by minorities (EPI 2020). In January 2016 when Marty Feldstein proclaimed that the U.S. economy was "essentially" at full employment, black high school graduates without college had an unemployment rate of 21.9% (Feldstein 2016a, b; EPI 2020).

In other words, blackboard economics—a term coined by the Nobel-Prize winning economist Ronald Coase (Coase 1988, p. 19)—is toxic at street level for disadvantaged people living anywhere, insofar as it not only justifies their place in the global hierarchy but also provides intellectual support for keeping poor people in their place at the bottom of the social hierarchy even though they are trapped by the system through no fault of their own. Keynes expressed a similar sentiment this way: "Our criticism of the accepted classical theory of economics has consisted not so much in finding logical flaws in its analysis as in pointing out that its tacit assumptions are seldom or never satisfied, with the result that it cannot solve the economic problems of the actual world" (Keynes 1936, Chapter 24).

Consequently, it is time for educators to recognize and to inform their students that mainstream economics is intellectually flawed, is seriously biased against those who were born into disadvantage, and therefore, not conducive to their advancement (Samuelson 2019). This essay is an overview of the ways in which conventional economic theory supports the current socioeconomic system, devised in such a way as to skew its benefits to those who are already privileged and therefore benefiting out of proportion to their contribution to social welfare. However, a comprehensive critique of mainstream economics is outside of the purview of this essay (Komlos 2019a). Instead, it focuses on fourteen limitations, which have a biased incidence on people in developing nations and especially those born into poverty.

2 The Achilles' Heels of Markets

Society Is Omitted in Blackboard Economics

Methodological individualism of blackboard economics focuses on economic agents who hardly interact with one another. In other words, society does not exist in economic theory, which implies that the disciplines of sociology and social psychology are completely neglected (Myers 2010). Yet, we are not Robinson Crusoes. Our behavior is highly structured by cultural expectations, institutions, and social norms. We constantly interact with one another and do very little in isolation. That does make a crucial difference, because society has a value system that influences our aspirations, constrains our choices, and channels our actions (Steufert 2000). Society contributes greatly to defining our esthetic sense and the terms under which we can become full-fledged and esteemed members of the society. In short, the logic of methodological individualism on which the philosophy of mainstream economics is based is a non-starter as far as social psychologists are concerned.

The social realities put the poor at a distinct disadvantage because conforming to the established attitudes, mores, and accepted behavior prevalent in poor countries or poor neighborhoods makes it more difficult for them to escape poverty (Akerlof and Kranton 2010). Children learn from other people's actions how they should act, what they should consider important in their lives, and what will gain them respect within the social order. The role models available to underprivileged children are too frequently not those that would launch them out of poverty and into the middle class. Consequently, this perspective is propagated across generations and provides an opportunity

for people of privilege to look down on them as free riders and undeserving of society's compassion.

By disregarding the importance of culture to economic interactions, mainstream economists overlook the fact that many pressing issues cannot be solved by individuals acting in isolation but instead requires collective action.[2] Methodological individualism will not enable poor countries to provide excellent public schools in order to increase the common good. Consequently, an immense amount of human resources is wasted as a consequence of the inferior schooling systems and associated curriculum. The outcome in such cases is not only suboptimal but inefficient and immoral as well.

Power Is Absent in Mainstream Economics

Power is the ability to control either the action or thought of others. Thus, wealth translates directly into economic, political, as well as military power (Komlos 2017). Adam Smith knew that wealth provides irresistible incentives for politicians to act on behalf of people with money. There are different kinds of power: power to influence institutions and legislation in order to further economic gain; power to influence cultural norms; and power to influence buying habits. They all enhance profits and diminish our human agency.

However, power does not exist in perfectly competitive markets insofar as in such markets there are countless sellers and many buyers; hence, power to influence prices or buyers is diffused until it becomes negligible. Because mainstream textbooks focus on perfectly competitive markets, they ignore the issue of power since it does not exist in such markets. While this is the default model used in most analysis, it is obviously misleading, because one of the basic principles of free-market economics is the tendency of power to concentrate in the hands of oligopolies or monopolies. Such firms strive to avoid perfectly competitive markets like the plague and usually succeed in doing so.

In addition, powerful western institutions, including the IMF, the World Bank, and the U.S. Treasury, enforcing the Washington Consensus, impose their ideology of market fundamentalism on weaker partners, putting them at a distinct disadvantage. Moreover, advertisements of products from the developed world, by multinationals manipulates also at the unconscious level and induces people to want foreign products. This often comes at the expense of local products the demand for which diminishes and in addition supports the development of consumerism by which people substitute personal relationships for material goods. However, this fails to satisfy as people are stressed

in the process of acquiring things they are persuaded to buy. In addition, it has the implication that consumers go into debt in order to satisfy the urges implanted in them and to spend instead of saving and investing that would enable them to escape from the poverty trap over time.

These power imbalances are neglected in mainstream economics; yet, they are obviously enormously important in the real world, insofar as they skew economic advantages in favor of the wealthy. This neglect further increases their privileges, thereby, putting poor countries and minorities at a disadvantage. As the Nobel-Prize winning economist Kenneth Arrow observed, "economic power can be translated into political power by channels too obvious for mention. In a capitalist society, economic power is very unequally distributed…" (Arrow 1978, p. 479). This means that the needs of the poor and weak are not adequately represented in the political process. Under such circumstances the market's playing field will be tilted in favor of the moneyed elite.

The Perfectly Competitive Model, the Workhorse of Mainstream Economics, Is Anachronistic

The focus on the perfectly competitive model is not a benign simplification because today's real-existing economies are not made up of such firms but are dominated by oligopolies and monopolies wielding not only immense market power, but immense political power as well. Markets made up of such giants work very differently from those on which the mainstream models focus. As a consequence, oligopolistic market structure should be the default model. Designing the market system to their benefit, powerful corporations squelch competition and thereby reap monopolistic and oligopolistic profits, enhancing their influence over the political process.

The invisible hand could lead to efficient outcomes only to the extent that power is atomistic. Concentration of power works in the opposite direction and infringes on democratic processes. Thus, developing nations must compete on terms set by the powerful rather than on an egalitarian basis. Aldous Huxley, author of the dystopian novel *Brave New World*, which warned of the dehumanizing forces of totalitarianism, was of the same opinion: "obviously the passion for power is one of the most moving passions that exists in man; and after all, all democracies are based on the proposition that power is very dangerous and that it is extremely important not to let any one man or any one small group have too much power for too long a time" (Wallace 1958). We have made the mistake that we have feared primarily the

governmental power rather than seeing that the encroachment on our freedoms could come from other directions as well (Komlos 2016a). Wielding political power, oligopolies can exert added pressure on weak countries as well as disadvantaged groups within society by manipulating consumers, discriminating for loans, by opposing unions, advocating free trade, and by lobbying against raising the minimum wage.

Information Is Costly, and Not Free

One of the most overlooked laws of economics is that in the presence of imperfect information, markets are inefficient (Stiglitz and Greenwald 1986). Since this is practically always the case, the default model in economic policy applications should always include the issues associated with acquiring relevant and reliable information. Imperfect and asymmetric information poses a huge obstacle to poor people everywhere, particularly to those segments of the population which experience a bottleneck in acquiring information (Akerlof 1970, 2002; Stiglitz 2009). Good decisions require adequate information but obtaining information is costly and even costlier and takes more effort for poor people than for those with ample financial resources. The poor have much more difficulty acquiring credible information because they lack not only money, but also, the social networks that could often facilitate the smooth access to information (Chiteji and Hamilton 2002). Less information at their disposal implies that the poor are at a disadvantage in the marketplace and more vulnerable to predatory business practices and advertisements. That implies that they have a formidable task of assessing radical uncertainty, an important element in successfully mastering the art of judgment in a path-dependent globalized world.

Therefore, poor people are at a distinct disadvantage in free markets in an age in which access to information is more important than ever, thereby challenging their ability to make satisfactory decisions. Trying to do one's best is not a useful strategy if he/she does not have the means even to find out what information is needed in order to attain the desired ends.

Mainstream Economics Is Essentially Adult Economics

Children are mostly disregarded by mainstream economics. This is a harmful oversight, because people do enter the market as children, and not as adults with fully developed tastes and the market has ample time to form the consumers to their ideal image. This is crucial inasmuch as by beginning

the analysis with adults, the economics profession overlooks the immense influence market processes have on forming their utility function. They can thereby assume that tastes are exogenous, although the utility function is, in reality, endogenous to the economic system. Thus, a seemingly harmless assumption actually gives the corporate world a free hand at supporting a popular culture suitable to their interests which trivializes unprofitable aspects of life. Thus, people subject to such influence become fixated on material aspects of life, and their psychological, social, and moral development is stymied. This has a harsh impact on all but especially on poor children because they are particularly vulnerable to Pavlovian conditioning through advertisements. That is how we arrived at a culture in which people mimic the mannerisms, values, worldview, consumption habits, and styles of TV personalities and other celebrities that are projected across the screens or monitors. This is how the obesity epidemic spread and this is also how people become indebted.

This is a much bigger problem than it appears at first, because multinationals have an immense influence on children and youth and they foster a culture in which children become loyal consumers craving the products of the developed world. Poor children, at least in the developed world, also watch much more television than average, and "television often promotes lifestyles not conducive to prosperity" (Movieguide, no date). That is one reason obesity is more prevalent among the poor in the U.S. Watching five hours of TV or internet a day would affect anyone's thinking pattern. Businesses invest generously in order to sway children's wants and that plays a big role in perpetuating the mindset which emphasizes instant gratification over patience and values consumption over investment in education.

Consequently, poor children are particularly vulnerable to junk food advertisements and so become overweight, or computer game advertisements and become addicted to electronic games at the detriment of doing schoolwork (Broady and Meeks 2015). Thus, the prevalence of obesity among black and Hispanic children and youth in the U.S. is 22 and 26%, respectively, while among their white counterparts it is 14%. This is a symptom of the tragic impact of poverty on children (Hales et al. 2017, p. 4). In short, what happens to poor children during the first two decades of their life has a crucial impact on their development as well as on their life course. By the time adults enter the marketplace their character and their subconscious have been impacted substantially by the corporate world; even their aspirations and inner thoughts have been swayed to such an extent that they are no longer able to discern their own self-interest. This is important because by capturing youth culture, multinationals slowly but incessantly and incrementally are

able to establish their control over large swaths of the world's population. We are so preoccupied with fearing governmental control that we neglected to consider that thought control can come from other institutions as well (Komlos 2016a). In short, beginning economic analysis in adulthood and neglecting children is a major deficiency of mainstream economics.

Bounded Rationality Is Ubiquitous but AWOL in Mainstream Econ 101

Because of the scarcity of information and inferior schooling opportunities, those who are poor are more exposed to the problem of bounded rationality, not part of the mainstream canon (Kahneman 2003). More than half a century ago, Herbert Simon argued convincingly that rationality has its limits: people are unable to maximize a utility function in the real world, insofar as it is beyond the mind's capacity to do so (Conlisk 1996). Simon received the Nobel Prize for this insight, and since then two other economists and a psychologist received the prize demonstrating that utility maximization is out of the reach of mortals, yet mainstream economics textbooks continue to skirt this fundamental insight even though it is widely recognized that "bounded rationality is important" (Simon 1955, 1982; Thaler 2016a, b). Actually, it is so important that it should be the default model in economics instead of the more mathematically tractable expected utility constrained-optimization rational-agent model (Kahneman 2003).

According to Robert Shiller, the fourth Nobel-Prize winner in this group, "[p]sychology really matters… you can't ignore the psychology, which unfortunately, the economics profession has tended to do with recent theorizing; the so called efficient market hypothesis, which says that markets efficiently incorporate all information and work with precision, which I think is one of the most remarkable errors in the history of economic thought" (The New School 2009). Yet, efficient markets, a "most remarkable error," continues to be taught in mainstream economics to millions of students annually. Such internal inconsistency could not persist in any other discipline.

Opportunistic Behavior Is Missing from Mainstream Economics

Free markets grant freedom not only to moral law-abiding citizens, but open up a myriad of possibilities for people with few scruples to take advantage of others in an immoral, unprincipled, cunning, crafty, or deceptive manner

or with guile. They might exploit the language of vague or inadequate laws or their absence, thereby enabling them to finagle and profit in ways that was not foreseen by lawmakers. Opportunistic behavior occurs also by taking advantage of incomplete contracts, inadequate information, imperfect knowledge, or gullibility of consumers. Furthermore, businesses have an incentive to float information in an ambiguous or blatantly deceiving manner so as to entrap customers with fine print. The propensity of many people to disregard the social contract and to overreach or deceive by manipulating implies that markets desperately need oversight: we need to have constraints on greedy people's actions such that they deter them from immoral behavior.

Unregulated markets do not serve poor people well because freedom opens up a myriad of possibilities for powerful firms to take advantage of the weak. Because of less schooling and being unable to afford searching for information, the poor are more exposed to the vagaries of predatory business practices than the wealthy (Akerlof and Shiller 2015). Lack of money also means limited recourse to the legal system when deceived. Therefore, the degree of complexity in today's economic system poses a formidable challenge for poor people, because complexity opens up traps which are difficult to recognize and to avoid. Most of the important things we purchase in a modern economy are complicated and difficult to understand. For example, cell phone contracts and credit card rules often contain hidden elements, and often nearly impossible to comprehend. Hence, a laissez-faire policy enables unprincipled businessmen to entice and exploit poor people. In fact, firms hire the brightest psychologists and legal experts in order to structure complex contracts in such a way as to appeal to customers without revealing their true financial impact. This is particularly acute in the hyper-globalized world of today.

Exploitation Does Not Exist in Mainstream Economics

Since in blackboard economics all counterparties are rational and equally informed, the concept of deception does not exist. However, to the extent opportunistic behavior and asymmetric information do occur in real markets, exploitation is an important concept to understand how poor people are taken advantage of. If one party to a transaction knowingly deceives or misleads another in order to increase his/her gains, the exchange is said to be exploitative. The person who takes advantage of a counterparty in such an unfair manner is exploiting the weaknesses of the other person and acting in a predatory manner (Editorial Board 2018). Advertisements

"phishing for fools" are also predatory (Akerlof and Shiller 2015; Sberlati 2007). Without countervailing power, people with better information have an advantage in the marketplace and can use it to their benefit to the detriment of poor people. "Today, we understand that the market is rife with imperfections—including imperfections of information and competition—that provide ample opportunity for discrimination and exploitation" (Stiglitz 2018). The economically weak are more susceptible to being preyed upon by multinational corporations (MNCs). Developing countries have fewer defenses against these MNCs.

Space Is Disregarded in Econ 101

There are no neighborhoods in Econ 101, yet poverty is not evenly distributed across the landscape. Rather, it is concentrated. This is important for minorities because of the history of racial discrimination and because of the propensity of people to live near people with similar wealth status. This, in turn, implies that poor people tend to live in ethnically segregated neighborhoods which, because of the lack of tax base, are often dysfunctional (Akbar et al. 2019).

Thus, too many poor children live in slums—concentrated areas of poverty—that do not provide them with an adequate start in life, particularly in education and in socialization that are so important for their future development (Komlos 2015). In a dozen U.S. metropolitan areas the average poor black child lives in neighborhoods in which one-third of the children are poor (McArdle et al. 2007). Being exposed to such slums has long-term impact on everything that pertains to success in life including earnings and college attendance (Chetty and Hendren 2018). William Wordsworth affirmed that the adult is the product of the habits and behaviors acquired in childhood when he wrote that "child is the father of the man." So, for poor children this is a formidable hurdle to overcome because substandard educational systems mean that minorities are exposed to and absorb the concomitant attitudes which they, in turn, tend to reproduce. Subsequently, they enter the labor force at a distinct disadvantage and mediocre schooling provides the elite an opportunity to rationalize the exclusion of the poor from the labor market. In such a way, markets magnify initial disadvantages, thereby erecting a high barrier around those born into poverty that keeps them in their current state practically in perpetuity.

The high spatial concentration of poverty means, in turn, that poor children do not have access to good schools. This is also an obstacle to

accumulating soft skills as well as subsequently attaining a college education needed in the modern knowledge economy. Hence, living in slums with inferior schools is a significant factor in perpetuating poverty. No wonder that those trapped by such circumstances see no way out of their hopeless predicament, blame the system, and far too often turn to acts of desperation out of sheer frustration that often brings them into confrontation with the legal system. Consequently, "though African Americans and Hispanics make up approximately 32% of the US population, they comprised 56% of all incarcerated people in 2015" (NAACP 2019).

Consumer Protection Is Superfluous in Mainstream Economics

If information is free, opportunistic behavior is nonexistent, everyone is rational and maximizing an exogenously determined utility function, then what would be the purpose of providing government oversight and safety standards? So, in the mainstream's view of consumer behavior there is no difficult-to-ascertain quality dimension so people cannot be tricked, it would make no sense at all for the government to intervene and protect consumers. All it would do is to interfere with the consumer's freedom of choice. However, insofar as those assumptions are invalid in the real world, it would be appropriate, indeed, to provide such safeguards. So those seemingly benign assumptions and the lack of consumer protection that follows from them is against the interest of those groups who do not have easy access to information and good schools and who therefore, can be preyed upon by those who do enjoy those advantages. Thus, poor people are callously harmed by the lack of consumer protection, because they are exposed unduly to opportunistic behavior. Hence, it is incumbent upon us in academia to stress these issues from the outset before students are socialized into thinking that competitive markets have divine powers and therefore, consumer protection is unwarranted. The lack of consumer protection simply perpetuates the poverty trap.

Time Is Not of the Essence in Mainstream Economics

Time is an essential element in every economic decision insofar as most decisions are sequential, another problem ignored by the mainstream (Linder 1970). Yet, the fact that time only moves in one direction is crucial, because

it means that many essential processes are irreversible. This is significant especially for poor people because market outcomes are often inefficient because of the constraints imposed by earlier decisions. Hence, poor children's inadequate schooling locks them into an inefficient developmental path that has consequences far into the future.

Path dependence is crucial insofar as it implies that those who attend inadequate schools are constrained on a path of development that will trap them in an inefficient equilibrium of poverty indefinitely. Learning to plan sequentially is an important part of growing up to succeed in today's complex world. The strategic planning and perseverance needed to reach these goals must be learned, nurtured, and practiced over an extended period of time. Such decisions are much more complex than a typical one-period constrained optimization problem. The poor are trapped partly because they do not have the opportunity to learn these skills early in life, particularly those who grow up in dysfunctional families living in dysfunctional neighborhoods with dysfunctional school systems. That generally blocks permanently their path out of poverty and into the middle class. This is yet another reason why economists commit a major mistake by starting their analysis with adults. One must begin the economic analysis with children inasmuch as the fact that their developmental experience is affected by market processes is a crucial aspect of their adult experience in the marketplace.

Governments Are an Inextricable Part of the Solution

In perfectly competitive markets, labor, capital, managers, and CEOs receive their just rewards—their opportunity cost or the value of their contribution to the firm. There is hardly any role for a government in this fantasy economy as everything is working smoothly. Because there are no profits to wrangle over, all problems are solved conveniently and swiftly by the market. The takeaway impression that millions of students retain years after their introductory course ended is that competition solves easily and efficiently all the important economic problems.

Therefore, government guidance, regulation, and oversight are superfluous and merely lead to dead-weight losses and create inefficient outcomes. There is no destitution in these textbooks, so government transfers are unnecessary. There are no children, so taxes are not needed for school financing. There is no discrimination, so civil-rights laws are not essential. There is no society, so there is no sense in fostering trust in order to maintain social stability. There is no politics, so there is no sense in nurturing the social contract (Komlos 2019b).

The rich do not need public goods as much as the poor do so the urgency of infrastructure investments, public transportation, and public schools can be minimized. In this way, in mainstream classrooms the government is sinister who can only disturb the blissful equilibrium achieved by market processes. Taxes are inefficient. Unions and the minimum wage do more harm than good on academic blackboards. Needless to say, this is not a reasonable description of the real-existing economy made up of powerful oligopolies rather than of perfectly competitive firms. In such an economy the unions provided essential countervailing power to oligopoly and monopoly power and without them employees, especially those unskilled are put at a disadvantage (Komlos 2016b). In reality the government is an essential component of the economy.

Hence, we should emphasize that markets and governments are complementary. They need each other. Markets are incapable of creating their institutional structure, which includes the political system, ideology, and unwritten norms that govern behavior of market participants. Markets would not function at all without sufficient laws and appropriate institutions that are created by government. In sum, government is indispensable. Without government regulation, a functioning legal system, and effective enforcement mechanisms most markets would implode rather quickly. Markets cannot police themselves and are not good at providing protection of consumers, children, the environment, the weak, the poor, minority rights, or the interests of future generations. Markets have no morals and would sell cigarettes and alcohol to children. It was not until government regulation that cigarette smoking was cut in half in the U.S.

Only the government can protect minorities, the poor, the disadvantaged, and generally, those who do not have access to countervailing power. Markets in which the powerful can exploit the weaknesses of counterparties are not truly "free" for those who do not enjoy those advantages. So, a *laissez faire* approach by governments does not lead to free markets because without government oversight, power accumulates in the hands of the few and it is government's role to prevent such imbalances from becoming a threat to political, social, or economic stability. Hence, we ought not to rely on markets to create a moral socioeconomic framework and this should be emphasized from the outset of a student's economic education. Markets have limitations that affect everyone, but those limitations affect the disadvantaged the most.

3 Basic Needs Are Omitted in Conventional Economics

Mainstream economics considers demand in terms of "wants" but does not consider that some of these wants are needed for survival of the human organism and therefore should take precedence over other kinds of wants. Markets are not efficient at meeting everyone's basic needs including food, clothing, shelter, and medicine (Darity and Hamilton 2018). They are not good at alleviating hunger and other forms of deprivation. Without government safety-net programs—that provide Social Security, Medicare, Medicaid, and unemployment benefits—the poor would be squeezed to the breaking point (Broady and Meeks 2015; Arrow 1963; Deaton 2008). Without nutritional assistance programs, malnutrition and undernutrition would be rampant in the U.S. (Davis 1994). This is particularly true for female-headed households (Simms 1985). According to the mainstream economics, the invisible hand will take care of all our basic needs. However, as Stiglitz has said repeatedly, "the invisible hand is often invisible because it is not there" (Stiglitz 2002).

4 Morals Are Omitted in Mainstream Orthodoxy

According to mainstream dogma, economics is a rigorous science so there is no room in it for moralizing any more than there is in mathematics. Yet, economic theory extolls the virtues of efficiency that is not at all value neutral. This makes it sound like markets are infallible, having descended straight from heaven. According to this canon, free markets are efficient, hence above morality. So, questioning their laissez-faire premise would be a waste of ethical scruples. However, this is also a value judgment implying that efficiency or growth is more valuable than, say; sustainability, or fairness, minimizing poverty, or racial equality (Bowles 2016).

The values we should espouse are not that markets were created by divine power, but that compassion and fairness is as important as efficiency, if not more so (Hamilton 2017). Therefore, we should advocate for a system that minimizes suffering, while enhancing human dignity and self-worth. A kinder and more just economic system is possible, one that not only empowers people, but enables them to live their daily lives with less uncertainty, less anxiety, less manipulation, less exploitation of people's weaknesses, and less fear that their lives could collapse like a house of cards. As John

Maynard Keynes put it: "Our problem is to work out a social organization which shall be as efficient as possible without offending our notions of a satisfactory way of life" (Keynes 1926). And "a satisfactory way of life" should be one in which opportunity is distributed equitably, people do not need to struggle to meet their basic needs, can avoid the rat race of fierce competition just to be able to stand still, and can realize their human potential without being exploited. This also means having sufficient leisure time to participate in the community's social, cultural, and political life and become a respected member of the community.

De jure equal opportunity is insufficient for a just economy without de facto equal opportunity (Darity and Hamilton 2012). Wealth is a privilege because it provides opportunities that are unavailable to all. Babies born into poor families have less chance of living a fulfilled life than those born into wealthy ones (Hamilton and Darity 2010). Their future development will be on divergent paths determined by their initial endowments based on pure luck. Such random allocation at the start of life cannot possibly be the basis of a good society. Our goal ought to be to create a system in which children have de facto equal opportunities, and those who are disadvantaged at birth can be compensated by society for their initial bad luck.

Humans have a sense of fairness, a belief that some actions are reasonable and just. Fairness implies the adherence to social norms such as reciprocity, or a fair distribution of resources, goods, or income (Tabibnia and Lieberman 2007). Fairness conforms to the ethical rules of society. This disposition is due partly to innate human nature and is partly socially constructed and learned. In other words, market outcomes are often morally unpalatable. In experiments, people reveal their sense of fairness in dividing a windfall between two individuals. The person originally in possession of the windfall usually retains about 60% of it (Camerer 2008). This implies that we are not completely selfish but care about our gain in proportion to that of others.

5 Conclusion

The ways in which free markets disadvantage poor people in general are disregarded for the most part or at best treated as epiphenomena in mainstream economics. Being human inventions, markets ought not take precedence over our moral values. Markets are part of our cultural and ethical system, and we should organize them in such a way that they do not exploit or hurt people, and instead, distribute the fruits of the economy in an equitable fashion. If they do not lead to satisfactory outcomes, when they malfunction, they

should be modified. There are many valuable socioeconomic and moral goals that markets are incapable of achieving, such as providing for an equitable distribution of rewards, insofar as even a small early advantage can bring about substantial subsequent benefits.

Markets are not infallible and therefore should not be idolized. They are a means to an end and not an end in themselves. Thus, we should remain the masters of markets, and not vice versa. Mainstream economics provides intellectual support for keeping poor people in their place. It is time for economists who care about the plight of the disadvantaged to reject mainstream economic theory that neglects social and political issues and in which there are no children, no binding discrimination, no gender, no color barriers, no glass ceilings, no class and hence no underclass, no emotion or intuition, no real uncertainty, and neither space nor race, and hardly any time dimension. In other words, the above 14 Achilles' heels of mainstream economic theory invalidate most, if not all of the takeaways of mainstream economics, and are especially hurtful to the poor who disproportionately live in the African continent. This is no longer tenable.

In sum, instead of maximizing gain, we should think about minimizing pain, anxiety, and stress. We should end the wasting of human resources. Righteousness will not flow like a mighty stream so long as our minds are trapped in the Arrow-Debreu world of general equilibrium which might well be eloquent on academic blackboards but is harmful at the street level and especially so for groups that are disadvantaged from birth by the real-existing economy. Arrow knew this full well (Arrow 1978)[3] However, there *are* textbooks which present a more realistic view of the economy and it would behoove African economists and others who care about the plight of the disadvantaged to rely on them to a much greater degree than they do now (Friedman 2018; Goodwin et al. 2014; Hill and Myatt 2010; Komlos 2019a; Schneider 2019).

Notes

1. The true unemployment rate among Hispanics was 10.1%.
2. The word "culture" does not even appear in Mankiw's *Principles* (Mankiw 2018).
3. Paraphrasing Martin Luther King Jr.'s oft-cited quote from his letter from the Birmingham Jail.

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Sustainable Economic Growth

Madhavi Venkatesan

1 Introduction

Economic growth is a primary focus of national and global interest but arguably this has not always been so. Indeed, the perception of the economy has historically been aligned to culture. Culture is a significant contributor to what is perceived as valuable and is the determining parameter in the designations that ultimately yield to resource allocation within a society (Mokyr 2017). Given that culture is a learned behavior, culture can either promote or diminish any given society's understanding of the interconnectedness of human and planetary life, thereby determining the extent of the anthropocentric, or human-centered, perspective. The United Nations Educational, Scientific, and Cultural Organization, UNESCO, defines culture as a significant component to attaining global sustainability. The Organization asserts, "Culture shapes the way we see the world. It therefore has the capacity to bring about the change of attitudes needed to ensure peace and sustainable development which, we know, form the only possible way forward for life on planet Earth" (UNESCO 2000).

Economic outcomes in essence mimic the culture of the participants in an economic system. For this reason, the adoption of a single universal measure

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of growth may highlight variations in cultural orientation as reflected in variations in growth rates, while also promoting cultural convergence.

In the current period, economic growth has been refined, at least in discourse, to incorporate sustainability. While sustainability has no formal definition, the commonly accepted definition is that of the Brundtland Commission (1987), which notes, "sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs." Included in the Brundland discussion is a recurring theme of moral decision-making that includes the welfare of all life (51).

The Sustainable Development Goals (SDGs), which are tied in implementation to prevailing economic indicators and the definition of economic growth, also incorporate a view of moral responsibility being implicit in sustainability. The SDGs are centered on poverty eradication "in all its forms and dimensions, including extreme poverty," acknowledging that poverty is "the greatest global challenge and an indispensable requirement for sustainable development" (United Nations n.d.[a]). The Sustainable Development Goals (SDGs) are intended to be universal. They reflect the moral principles that no one and no country should be left behind, and that everyone and every country should be regarded as having a common responsibility for playing their part in delivering the global vision (Osborn et al. 2015).

The challenge for developing countries lies in the combining of economic growth with sustainability to establish the outcomes of the 17 SDGs. Though the implementation of the SDGs is nation dependent, the vehicle for an action agenda for sustainable development is economic growth, arguably the parameters of measurement aligned to the establishment of non-sustainable outcomes as most directly observed in the speed of Climate Change. The challenge for African countries, the subject of the present discussion, is found in navigating their development to ensure sustainable economic growth inclusive of the three pillars of sustainability: social justice, environmental justice, and economic equity, which also form the basis of the SDGs. In the sections that follow, the discussion will focus on the limitations of the prevailing GDP-based economic growth model as observed in the forced convergence in culture that accompanies a single view of economic growth. The discussion will highlight the relationship between measurable growth, unpaid work and gender in African countries and will conclude with an evaluation of how economic growth can be consistent with sustainability.

2 Measuring Economic Growth

In a 1934 report to U.S. Congress, Kuznets stated, "The welfare of a nation can scarcely be inferred from a measurement of national income." In spite of warnings and concerns, the calculation of Gross Domestic Product (GDP) has been used to impute the welfare of a country on an aggregate and individual basis by dividing the aggregate value of GDP by the population of a country to derive per capita GDP. Per capita GDP, as with GDP itself, has in turn been used to compare countries. Though in aggregate country comparisons, some economic observations can be made, no detail with respect to the evenness of the distribution or the relative disparity between social classes can be discerned. Therefore, based on pure assessment of the components of the indicator and how it is assembled, it can be strongly argued that GDP does not provide an appropriate assessment of well-being (Anielski 2002; Lepenies and Gaines 2016; Smith 2016).

GDP is limited to only market values and as a result the use of the indicator to measure economic progress may distort the actual status of progress (Smith 2016). GDP does not capture unpaid work, such as child rearing and it does not include the impact of externalities in the assessment of the true value of end products. In the case of unpaid work, the lack of inclusion may result in a GDP value that underrepresents the labor activities of a country and in the case of externalities, GDP may be inflated due to higher production levels than would be advised given the environmental damages caused. Islam and Clarke (2002) observe that the issue with GDP is specific to the extrapolation to the welfare of a country; the presumption as they noted the perception that economic growth equated with increased standard of living. However, as noted by Smith (2016), since GDP does not factor non-market costs, the welfare of a country, consistent with the warning of Kuznets (1934), may not parallel the change in GDP value. Islam and Clarke (2002) proposed a remedy where both costs and benefits of economic activity, defined as "social welfare" are included in the national accounting systems. As Roy (2016) states, "mainstream neo-classical and neo-liberal economic paradigms have shown themselves to be ill-equipped to successfully incorporate and prioritize the dynamic life processes and systems of the biosphere" (88).

In spite of the inherent limitations of GDP, the metric has become the standard valuation tool used to measure economic growth, which in turn has been adopted as the proxy of standard of living and quality of life attainment. However, the context that may provide credibility to the proxy is arguably not assessed. Given that context drives the ability for increases in production to

raise the general welfare across all socio-economic classifications, the omission of context in growth-focused economic policy may result in unanticipated consequences. Further, the fact that the context of the creation of GDP was one singular economy, the United States of America (U.S.), its projection as a de facto measurement tool for others should also be considered.

GDP embodies a cultural perception of the human system relative to the environmental system and the use of the metric to measure growth implicitly requires technological advancement and resource use. The latter may be inconsistent with the environmental circumstances and cultural norms outside the U.S. in general but in particular non-western countries. Western countries do share similar norms given their common origins. Therefore, differences in GDP growth rates may be attributable to both environmental factors and cultural differences, which include colonization. Further, the adoption of GDP as the target indicator to the extent that it is adopted as a focus of policy may implicitly foster cultural change consistent with material accumulation, wage labor, and proconsumption policies, all of which, arguably are inconsistent with aspects of sustainability and may be counter to more cooperative economic models. Additionally, a focus on GDP may obscure microlevel impact of economic growth. To the extent that regulation does not exist or is limited in protecting exploitation of the environment and vulnerable populations, a focus on GDP may not be to the benefit of all members of society.

3 Gender and Growth

For many developing countries, especially those who were historically subject to colonial rule, trade is central to GDP oriented economic growth (Njogu 2013). However, evidence suggests that trade-led growth can lead to an exploitive relationship between a government and its people, rationally trading off the welfare of a demographic for the aggregate growth rate of the whole. The power dynamic, level of enfranchisement, and the participatory nature of government define the domestic means for worker rights; however, in most cases, cultural and socio-economic factors that affect participatory behavior are exacerbating factors. The most vulnerable, as a result, may be the most exploited. In the case of Africa, Khadiagala (2015) notes, "some states have focused on economic development and the delivery of services at the expense of the promotion of human rights and competitive electoral politics" (14).

Further as noted by Abraham (2015), inclusion and imposition of western cultural norms and economic tools has had disintegrative effect in Africa. "The economic organisation, with its tying of reward to individual effort…have had a disruptive effect on the organisation of the family and the clan. The introduction of wage-earning activities has interfered with the traditional connections between family life, division of labour and property; family bonds have been weakened through migrations in pursuit of wages, and there has also in consequence been an increase in polygamy as wives, in general, are not taken around in the labour migrations" (165). These outcomes provide evidence of the cultural disruption of a GDP-focused growth model. In addition, the importation and access of goods into Africa due to international trade, has created yet another disintegrative outcome, that of material wants. This form of materialism has undermined traditional cultural norms as Fagunwa (2019) notes, "the neglect of communal value systems such as Ubuntu is responsible for the social ills that have enmeshed the continent" (45). Access to material wealth has also been associated with corruption and breakdown in the relationship between leadership and social best interest, as the poor are often the most exploited in daily life (Justesen and Bjørnskov 2014; Gyimah-Brempong 2002). In a 2005 study, of 18 African countries over the period 1996–2001, N'Zue and N'Guessan found a positive relationship between poverty and growth and a positive relationship between growth and corruption. These findings highlight the potential for a reliance on poverty as an input for growth but also the potential limitation of growth, given the correlation with the rise in corruption, to eliminate the rise from poverty anticipated from neoclassical economic theory.

From a sector perspective, Bhorat and Tarp (2016), highlight that the African growth model is not consistent with standard trajectories of development. The relatively limited manufacturing sector in combination with a resource dependent export led growth model is inconsistent with "standard economic development path followed by all economies that have successfully transitioned from low- to high-income country status" (31). These attributions surface the limitations of the projection of market-based perspective of economic growth. Given the resource abundance in Africa coupled with global demand for the same, it would appear that market-based growth would be significant. However, the prevalence of poverty, which in turn has limited government funding for infrastructure, has indeed only been exacerbated with a demand for resources, as those having the ability to facilitate trade have been able to leverage their financial flexibility for their own benefit, widening the income gap and promoting further opportunities for the exploitation of

the poor (Leipziger and Yusuf 2015). This has been observed both intra-country and even more so inter-country, given the unfair trading practices between the global North and Africa as well as other countries. Mawere and Madambura (2016) address the prevalence of over-regulation of African exports that have resulted in degrading the competitive stance of African exports. They reflect that Africa has remained poor under the umbrella of trade, as "Africans are subjected to import and export restrictions exposing them to higher market volatility and fewer opportunities."

Aligned to a GDP-focus, work opportunities may increase as a result of trade-driven development in developing countries but the nature of the work for income may not be consistent with the attainment of sustainability from the perspective of environmental and social sustainability. For example, there is a lack of consensus on the defining of decent work (Di Ruggiero et al. 2015; MacNaughton and Frey 2018) a component of SDG 8. As a result, a focus on wage income in the assessment of decent work may result in value-added, non-market work such as child rearing and elder care being discounted, thereby creating both the limitation in the provision of these activities and the potential for only income to be an indicator of societal valuation of an individual (Herd and Meyer 2002). This phenomenon may lead to an unintended outcome with respect to the quality of life of children and elders; and may also erode the value of the environment, by the elimination of women's unpaid subsistence activities (Kippenberg and Cohen 2013; Morin and Nadeau 2017). Though GDP may gain, society may lose, as the unpaid household chores have economic value, but that value is not included in the standard measure of GDP making these activities of secondary importance if quantitative valuation supersedes qualitative social impacts (United Nations Development Programme 2019). Some estimates reflect that the omission of unpaid work in Africa may understate GDP by nearly 50% (Mawere and Madambura 2016).

Gender-Biased Unpaid Work

As noted, economic growth as measured by GDP does not account for unpaid work, where unpaid work refers to all unpaid services provided within a household for its members, including care of persons, housework, and voluntary community work (Elson 2000). "These activities are considered work, because theoretically one could pay a third person to perform them" (Ferrant et al. 2014). The attribution of unpaid work, therefore, is based on the lack of market-based financial return from the activity. From a productivity perspective, arguably, the lack of inclusion of unpaid work in a country's evaluation

of GDP, may understate the productivity of an economy and specifically, discount the value of women in an economic system (Ferguson 1988; Daune-Richard 2005; Muñoz-Cabrera 2015). In the case of developing countries, where a larger proportion of women's labor may be categorized as unpaid work (Ferrant et al. 2014; Alonso et al. 2019) GDP may be significantly understated as a result of the prevalence of unpaid work and correspondingly, the perception of the contribution value of women in market-terms may be unfairly marginalized. As Donahoe (1999) notes, "the recognition that much of women's work in the developing world is overlooked, undercounted, and undervalued is not new. It is well established that in primarily capturing paid employment, statistics on women's work ignore unpaid domestic labor, subsistence production, family farm work, and informal income-generating activities." In Africa, women typically comprise up to 70% of informal cross border traders across Africa and are frequently the primary breadwinners of their families, despite the precarious nature of informal trade and threats to their personal safety. In the agricultural sector, women are often lowly skilled or subsistence farmers that have little access to formal markets and quality inputs. They lack the opportunity to integrate into value chains and to improve their production levels and food quality standards. Similarly, low-skilled manufacturing jobs are often staffed by women employees, who face limited opportunities to upskill and face the risk of both job redundancy and heightened poverty upon the factory's relocation to cheaper production sites in other countries (Forje 2016; Parshotam 2019).

Globally pervasive gender norms have placed the majority of responsibility for unpaid household labor on women (Steel and Kabashima 2008; UN Women n.d.). As a result, there is a direct linkage between gender-based wage inequality and expectations of women in household activities and child-rearing responsibilities. This is directly tied to reduced educational attainment for African women as well as early age pregnancy, though the causation may differ with increased granularity in assessment, the normalization of women in domestic work continues to be fostered (Mawere and Madambura 2016). Even in developed countries, throughout their lives, women devote less time to paid work because they are more often faced with career breaks and part-time work than their male counterparts. Second, their work-related incomes are lower, not only because of the time they devote to the labor market but also because they hold lower-paid jobs (Ferguson 1988; Daune-Richard 2005). Bryson (2007) asserts that many women cope with their unpaid domestic responsibilities by reducing their hours of paid employment, thereby confirming both the traditional division of labour and their economic disadvantages. This is also reinforced by Alonso et al. (2019). They note that

unpaid work leaves women with less opportunity for paid labor but the delineation between paid and unpaid work also results in an undercounting of female contribution to GDP.

The understatement of the value of unpaid work has a significant ripple impact in the perception of the value of female labor to the extent that income is the basis for determination of economic value. If women are perceived only through a wage lens, rather than a total value perspective, they have a disadvantage in promoting equality given that much of their work relative to their male counterpart is unpaid (Ferguson 1988; Daune-Richard 2005; Muñoz-Cabrera 2015) and therefore, its value is at the discretion of the beneficiary. Lack of appreciation of the societal value of unpaid work can lead to a non-representative economic value of women that in turn can influence equitable distribution of resources: investment in female education, representation of women in market-based occupations, and ultimately, wage equality for women in the labor force. The causality between societally institutionalized and gendered unpaid work, labor market participation, and the income of women has not been stated often enough, as much of the discussion on gender equality focuses on the observation of wage differences but not the basis for the disparity. Further, a large amount of discussion is focused on promoting gender parity by augmenting perceived gender roles (Forje 2016). However, what this research fails to consider are the cultural attributes related to gender, and the social impacts and unintended consequences of imposed parity. Gender norms are connected to multiple components of a society, to some extent these need to be addressed and recognized (Kranton 2016). Economic participants could gain appreciation for labor through the explicit understanding of the non-market value that labor provides.

There is indeed a perversion in the perception of unpaid work. As referenced, the limitation could be corrected through societal value of unpaid work with the view that unpaid work promotes the societal good on an inter-temporal basis. For example, Daune-Richard (2005) asks, "Does responsibility for children lie solely in the private space of the family, or to what extent and in what sense are they 'public goods'?" (216). To the extent that children are viewed as a public investment in the collective future, there is rationale for the inclusion of the value of unpaid work in childcare. Similarly, this assessment could be included for other unpaid activities, where the absence of dedicated work would be a social cost.

Gender-Based Trade

The view of labor in some developing countries as a comparative advantage, has provided workers with minimal regulatory protections or enforcement of protections where they exist (Jackson and Wedderburn [n.d.]; Radin and Calkins 2006; Rosen 2002). Further, limited ability to no ability to organize among themselves has eliminated the opportunity for worker empowerment through unions. As a result, trade for some developing countries has only exacerbated worker vulnerability (Harrison and Leamer 1997). "International trade has been criticized for leaving people behind – and among the forgotten, many are women," UNCTAD Deputy Secretary-General Isabelle Durant (United Nations Conference on Trade and Development n.d.). This issue is relevant for Africa and has been a point of discussion and critique. As noted by Warikandwa (2018), in Africa, trade is aligned neither to development nor to the welfare of workers on the continent who are largely responsible for the trade gains. Further, to the extent that trade-based growth promotes income polarization and based on the extractive nature of resource-oriented trade, fosters environmental degradation, it is opposition of sustainable economic growth and undermines the attainment of the SDGs (United Nations n.d.[b]).

Research on the impact of trade on women has highlighted the limited to nonexistent role that gender has been provided in trade agreements (Bensalem 2017; Hutchens 2010; Mengesha 2008). Given the role of women in the provision of unpaid work and the potential for women in many developing countries to have limited opportunities for educational advancement (Charles 2011), women as a group tend to be segregated to gender identified occupational pursuits and are often found in wage-based employment where the environmental conditions are adverse to their health and or the potential for economic mobility is significantly limited (Belkhir and Butler 1998; Esbenshade 2004; Ibrahim 2017; Nuwayhid 2004). This is a significant issue that is heightened if the women are also of child-bearing age as environmental factors are known to impact the maternal health and cognitive development of a fetus (UN Women n.d.). Work has physical, mental, moral, chemical, social, and economic aspects. Occupational health protection requires recognition and, if possible, integrated regulation of these factors (Gül and Atli 2015).

Hutchens (2010) notes that for the benefits from trade to be accrued to women, there needs to be fundamental recognition of women's rights as human rights and active focus on dismantling the structural issues that affect women's ability to realize them, including access to education and equity in

opportunity. The United Nations, in SDG 5, similarly articulates the need for gender equality in promoting sustainable development. Researchers have noted that there is a two-way relationship between gender and trade: international competition through trade shapes gender relations and inequalities and in turn, gender inequalities shape international competitive patterns. This can be seen in the relationship between trade openness and the feminization of labor across sectors. Women's weaker bargaining power can lead to lower wages in sectors dominated by women, which in turn can become a source of competitive advantage at the national level and can allow countries to be globally competitive and to grow. Governments therefore have little incentive to improve women's wages: in fact, they have an incentive to suppress them (Jackson and Wedderburn [n.d.]).

Trade agreements can promote gender equality to the extent that they are binding. However, as concluded by Bensalem (2017) in a review of EU trade agreements, though gender may be included in trade agreements, the focus on gender equality is not consistent enough across agreements to promote an overall standard for equitable treatment. Meyer (2006) noted that there were gains to women in developing countries resulting from trade liberalization; however, the results depicted a macro-level improvement that did not include cultural perceptions related to the role of women, the quality of the work available, or the status of the work. In an assessment of the North American Free Trade Agreement Juhn et al. (2013) found, that the relative wage and employment of women improved in lower skilled occupations (blue-collar tasks) but not in skilled positions (white collar tasks). Ihalainen et al. (2017) propose that gender be included in assessment of trade and economic growth policies as part of the Gender Policy and Action Plan (GP/GAP) from the perspective of gender-responsive policies rather than the present inclusion of gender as "ender-sensitive. Advocating for the inclusion of the SDGs in gender policy, the authors suggest that the distributions from the Green Climate Fund at minimum "identify gender-related risks associated with planned activities, and a clear set of practical and feasible measures for addressing them. This would require grant applicants to identify the major gender-related risks of their proposed project, and how they will address them. For instance, projects that are likely to disproportionately increase women's labor burden, limit women's economic opportunities, undermine their decision-making capacity, dispossess them of land and other productive resources, and increase violence against women should not be eligible for funding unless adequate safeguards are put in place" (2).

At this time, the African Continental Free Trade Area (AfCFTA) does not incorporate a specific chapter on trade and gender, although the Preamble

does reference the importance of gender equality in the context of international trade and economic cooperation. "It is worth highlighting that a gender mainstreaming approach towards trade and development already exists in many African countries' national development strategies and there is already broad support and willingness to advance gender economic empowerment. Therefore, domestication of the AfCFTA provides an important opportunity for African countries to draw on their existing national development strategies, align them to the AfCFTA's provisions, and to implement them from a gender mainstreaming perspective" (Parshotam 2019).

The research on the status of women in trade liberalization is ongoing; however, arguably assessment relies on the availability of data (Fisher and Mohun 2015). Dudwick and Kuehnast (2016) reference the need for more gender-focused data. However, an evaluation of the impact of trade by gender needs to incorporate more than just wage equality metrics. Specifically, the potential societal loss resulting from the substitution of paid labor for unpaid labor as well as the cultural impacts of changing labor force composition needs to be accounted for (Weziak-Bialowolska 2015). The exclusion of these non-market elements may distort the value of women's labor, while promoting and instilling a single view of economic growth that limits value to market outcomes.

4 Sustainable Economic Development

Agyeman (2016) stated "a truly sustainable society is one where wider questions of social needs and welfare, and economic opportunity are integrally related to environmental limits imposed by supporting ecosystems" (187). From this perspective, "integrating social needs and welfare offers us a more 'just,' rounded, equity-focused definition of sustainability and sustainable development than Brundtland, while not negating the very real environmental threats." A "just" sustainability, is therefore "[t]he need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems" (Agyeman et al. 2003, 36). Agyeman (2016) notes that "just sustainability" focuses equally on four essential conditions for just and sustainable communities of any scale. These conditions include improving the quality of life and well-being; meeting the needs of present and future generations (intra- and intergenerational equity); justice and equity in terms of recognition, process, procedure, and outcome; and living within ecosystem limits (Agyeman 2016; Ewers and Smith 2007). None of these elements can be measured by GDP,

yet GDP remains within the SDGs as a metric of measurement used in the attainment of sustainable growth.

Van den Bergh (2009) in a survey of economics notes that the widespread view among economists is that we should not get rid of GDP until a good alternative aggregate indicator is available. The use of the indicator as a default due to lack of alternatives does surface whether continued use of a faulty indicator may promote outcomes not aligned to sustainability objectives. Van den Bergh (2009) offers two counterarguments. First, he highlights that given the many efforts to develop an improved indicator of social welfare and progress show that it is unlikely that a perfect indicator will arise in the near future. All current alternatives suffer from various shortcomings, even though most of them represent a clear improvement over GDP. Second, regardless of the availability of perfect alternatives, continued use of the GDP is misleading given that it was not intended to be a measure of welfare and for this reason its use should be suspended. He notes that the use of GDP in the present period affects long-term economic structure through its influence on investment and innovation decisions by private and public agents. "Removal of such an information failure really deserves an unreservedly enthusiastic response from economists. It is possibly the largest information failure we are facing, given that GDP is a central indicator in all countries and supranational governance structures" (134). Costanza et al. (2014) survey subjective measures of well-being and note that all have potential short-comings but this should not preclude the development of a successor to GDP that would seek to integrate current knowledge of how ecology, economics, psychology, and sociology collectively contribute to establishing and measuring sustainable well-being.

Reconciling Growth and Sustainability

In a survey of GDP and other indicators, Baral and Holmgren (2015) note, "Although GDP is the most popular means of measuring economic performance, it ignores social costs, environmental impacts and income inequality." The authors suggest, "There is a clear need to identify a small set of efficient and generic parameters for determining sustainability outcomes in landscapes. This could potentially help in, inter alia, assessing performance of development projects or support finance initiatives designed to invest in sustainable land-use practices" (12).

Despite the growing consensus with respect to the limitations of GDP, the United Nations SDGs reference GDP as a performance metric for goals:

1, 7, 8, 9, 10, 11, 12, 14, and 17 (United Nations n.d.[c]). This highlights both how embedded GDP has become as an assessment tool and the need to evaluate the attainment of the SDGs relative to the rationale for their establishment within country-specific contexts that include cultural sensitivity. In the *SDG Index and Dashboards Report 2018* (Schmidt-Traub et al. 2018), the discussion is significantly macro-based with the quantitative evaluation providing little transparency with respect to improvements in quality of life and well-being on the individual level in developing countries. However, the need for data is noted, "Inequalities in economic and social outcomes require better data. Newly added indicators for OECD countries focusing on inequalities in economic, health, and education outcomes lower the SDG Index scores for some countries. This suggests significant shortfalls in ensuring that no one is left behind, which are hidden by aggregate data. Such disaggregated data are unavailable for most non-OECD countries, so greater investments are needed to fill these data gaps" (Schmidt-Traub et al. 2018).

Shettima (2016) notes, "[i]t is widely recognized that the SDGs will only succeed if they succeed in Africa" (19) and goes on to note that the present outlook for Africa with respect to attaining the SDGs by 2030 appears bleak. The potential of success rests heavily on the status of women and their status is tied to the access and availability of education. Jaiyesimi, R. (2016), offers a more optimistic outlook and highlights the need for a multipronged approach stating that "high level of political support, ownership by the countries, institutional and human capacity development, inclusive of development process, mutual accountability, and policy reform" are all needed to meet the objectives of the 17 SDGs. However, if GDP is the basis for the measurement of attaining the SDGs, as discussed, an increase in income-led growth may be at the cost of unpaid work. This in turn could adversely affect the observable implementation of the SDGs, establishing an inconsistency between measurement and reality.

5 Conclusion

The quantitative evaluation of economic growth excludes cultural variations and may by implementation implicitly be fostering a single perspective of economic growth and employment, which in turn, may reduce and or even eliminate cultural variation with respect to economic system diversity over time. Further, data limitations impact both quantitative and qualitative assessment of the SDG progress, particularly for developing countries

(Schmidt-Traub et al. 2018). Additionally, resource limitations in developing countries may result in a focus on some SDGs and not others. As Edouard and Bernstein (2016) highlight in their discussion of measuring progress of SDGs specific to reproductive health, the SDGs are interdependent and indivisible and resource limitations may skew the outcome of domestic SDG progress based on individual national objectives. Finally, as noted by the United Nations (n.d.[d]), "the Sustainable Development Goals (SDGs) are intended to be universal in the sense of embodying a universally shared common global vision of progress towards a safe, just and sustainable space for all human beings to thrive on the planet. They reflect the moral principles that no-one and no country should be left behind, and that everyone and every country should be regarded as having a common responsibility for playing their part in delivering the global vision." The moral aspect of the SDGs justifies a need to evaluate the objectives outside a market-based perspective.

Morality and ethics are values that guide economic preferences but are not characteristics that can be instilled through economic incentives (Gössling 2003). The reliance on morality for the value and implementation of the SDGs fosters a need to promote more than a neoclassical framework to ensure their implementation. Values that promote local, national, and global perception of community and a sense of a shared commons, which can be facilitated through education, appear from this perspective to be the foundation for successful SDG implementation. Salamat (2016) states, "sustainable development actions by governments or the private sector should be undertaken as a result of an innate *duty*, and not simply out of *self-interest*. In other words, such actions should not be taken only because they will reduce costs, increase revenues, create jobs or increase GDPs. Rather, they should also be taken to achieve the SDGs because, as rational human beings, preserving Earth's environment and protecting the welfare of society as a whole are morally the right and the good things to do" (4).

On the surface, the SDGs may appear to be direct, clear, and understandable goals. However, in disaggregating economic growth with respect to unpaid work and trade along with nation-specific dynamics of the labor force and economic growth, differences in cultural norms, and need for moral cohesion related to the promotion of the intent of the goal surface the complexity of implementation. Successful implementation will rely on cultural sensitivity related to economic policy to ensure that developing countries retain the ability to develop economic systems that align to both SDGs and cultural norms. Overall, the SDGs will require more than economic ratios; the goals represent a paradigm shift that incorporates a foundation

in morality and an associated understanding of the responsibility for all to share in the stewardship of our common resources.

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Exchange Rate Volatility and Tax Revenue Performance in Sub-Saharan Africa

Isaac Kwesi Ofori, Camara Kwasi Obeng, and Peter Yeltulme Mwinlaaru

1 Introduction

Sustained economic growth remains a key development objective for policymakers in both emerging and advanced countries. This is linked to the relevance and achievement of the Sustainable Development Goals (SDGs), which require that the global economy grows at a rate of at least 3% per annum. To realize the SDGs, both developed and developing countries require concerted efforts to generate enough resources for development. In fact, the World Bank and the International Monetary Fund (IMF) recognize that mobilizing adequate resources remain the backbone of SDGs, which generally seek to end poverty, lessen inequality and injustice as well as combat climate change by 2030 (United Nations 2015; OECD 2020). To this end, the role of taxation in developing countries like those in Sub-Saharan Africa

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(SSA) has been emphasized as an instrument for sustained economic growth and development (De Paepe and Dickinson 2014).

Generally, since tax revenues are usually low, policymakers in SSA rely on foreign aid (official development and concessional loans) as well as miscellaneous sources such as seigniorage to fund developmental projects. It is for this reason that the 2002 Monterrey Consensus stressed the need to mobilize adequate resources domestically and internationally for development. For developing economies, long-term problems of debt sustainability associated with concessional loans, macroeconomic instability associated with seigniorage, and unreliable inflow of official development assistance mean that these economies are left with the options of improving tax revenue collection, or slowing down on capital expenditure—the latter obviously with its own deleterious growth implications. For SSA, mobilizing adequate resources in the form of taxes is, thus, crucial for state building, the provision of public services, infrastructure development as well as the creation and reinforcement of 'fiscal social contract' between policymakers and citizens. For instance, the IMF recommends that developing countries raise their level of tax as a percentage of GDP to at least 20% (IMF 2018). Unfortunately, most of the countries in SSA still fall short of this target (De Paepe and Dickinson 2014). Indeed information gleaned from the 2019 edition of OECD tax revenue statistics indicates that tax revenue performance in SSA rose marginally from 15% of GDP in 2015 to only 15.1% in 2018. This, clearly, is one of the lowest in the world—falling short of Latin America and the Caribbean (22.8%), the OECD (34.1%), Asia and Pacific (24%), Europe (37.2%), and the world (26.2%). The low revenue performance means that aid from donor countries will have to rise significantly if SSA is to achieve the SDGs. It is in the light of this that donor countries committed to increasing their official development assistance up to 0.7% of their GDP (OECD 2014).

While policymakers in SSA can do little to change the structural drivers of tax revenue in the short-run, they can influence long-run tax revenue performance by revising economic policies, fighting corruption, and improving the efficiency of tax systems. The bottom-line is that SSA countries can improve their tax efforts or reduce tax revenue instability by tackling structural and institutional bottlenecks (see, Ebeke and Ehrhart 2012). If concerted efforts are not made to improve the tax systems in SSA, the implications could be dire. It can further impoverish the masses, and above all, hamper inclusive growth efforts as it limits policymakers' ability to allocate or redistribute resources equitably. A poor tax system can thus fuel poverty and inequality which entrenches the power of a narrow elite and sustain them in patterns of public policy and administration. In Fig. 1, we present tax revenue-to-GDP

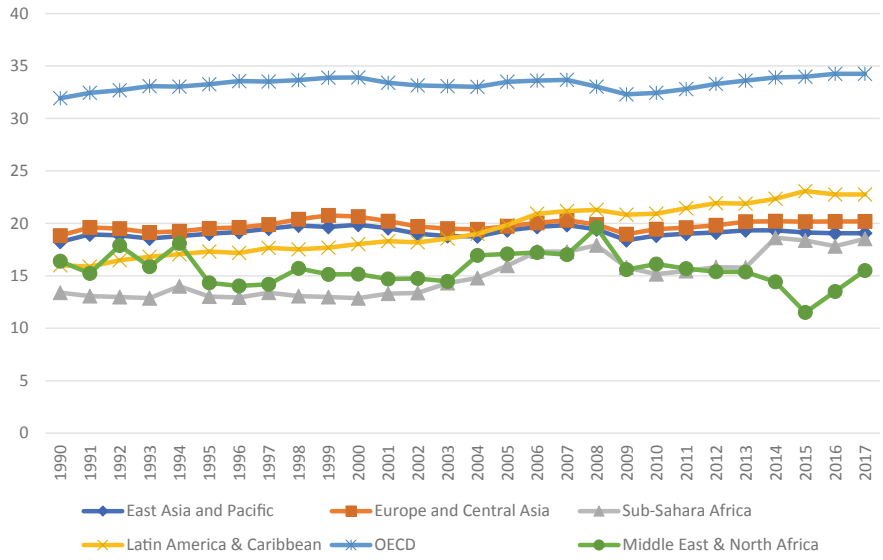

Fig. 1 Trend of Tax Revenue (%GDP) by Region (1990–2017) (*Source* Authors' construct based on International Monetary Fund, Government Finance Statistics Yearbook, World Bank and OECD data, 2020)

across regions, putting the tax revenue performance of SSA into perspective.

Figure 1 shows that over the past decade, the only region SSA outperforms in terms of tax revenue mobilization is the Middle East and North Africa. It is also clear from Fig. 1 that, since 2003, the SSA continues to remain within a performance range of 15.1 and 16.8%. This clearly shows a region with slow growth in tax revenue performance. The trend for SSA over the last two decades has not only been slow but unstable if compared to that of Europe and Central Asia, and the Latin America and Caribbean. Also, Fig. 1 that from 2003 to 2017, SSA falls short of the performance by the Latin America and Caribbean (LAC) by 2 percentage points. More revealing is the fact that the LAC is a region with similar structural and institutional settings as that of the SSA, suggesting that there are a number of structural and institutional impediments that need to be streamlined. But what could be accounting for this low tax revenue performance in SSA? In addition to the traditional drivers of tax revenue such as the depth of the informal sector, economic growth, trade, foreign aid, among others, we identify one macroeconomic issue, exchange rate volatility, that affects tax revenue generation but remains unexplored.

Exchange Rate Volatility and Tax Revenue in Sub-Saharan Africa

Among the key components of tax revenue is international trade taxes, which include import duties, export duties, profits of export or import monopolies, exchange profits, and exchange taxes. Theoretically, all these components of trade tax revenue are affected by trade policies—tariff and non-tariff policies. Aside these traditional factors affecting the flow of goods and services across borders are trade uncertainties. One of such uncertainties that has gained attention in the trade and finance literature in recent times is exchange rate volatility. Exchange rate volatility is the tendency of the real exchange rate to rise or fall sharply within a short period of time. This implies that exchange rate volatility can create uncertainty in macroeconomic policy formulation, investment decisions, and international trade flows. Evidence shows that for small open economies like those of SSA, the effect of exchange rate risk on trade is high (Obeng 2018; Wang and Barrett 2007; De Vita et al. 2004; Tchokote et al. 2015).

Further, the effect of exchange rate volatility on trade can be direct (through uncertainty and adjustment costs), and indirect (through its effect on the structure of output, investment, and government policy). The effect is, however, dependent on the degree of risk aversion of trade players. De Grauwe (1988) argues that for risk neutral trade players, exchange rate uncertainty does not affect their decisions. Even in the case of risk-averse trade players, theory does not allow one to conclude that exchange rate volatility leads to a reduction in cross-border trade as it depends on the magnitudes of the substitution and income effects. The former compels trade players to reduce trade participation while the latter lowers the expected total utility from trade compelling commodity arbitrageurs to devote more resources to trade in order to make up for revenue losses (Ofori et al. 2018). For import-dependent economies like those of SSA, exchange rate volatility can thus reduce the tempo of economic activities causing firms to raise their prices. The move, more often than not, results in drop in sales making it difficult for firms to meet their tax obligations. In fact, most businesses collapse in the process or layoff workers, harming social progress in the process. In Fig. 2, we present the average exchange rate volatility and tax revenue performance in SSA.

It is evident from Fig. 2 that from 1984 to 2002 where exchange rate volatility was downward—an indication of falling average exchange risk, tax revenue rose steadily. Also, from 2003 to 2017 where the average exchange rate volatility was largely high and persistent, tax revenue performance was

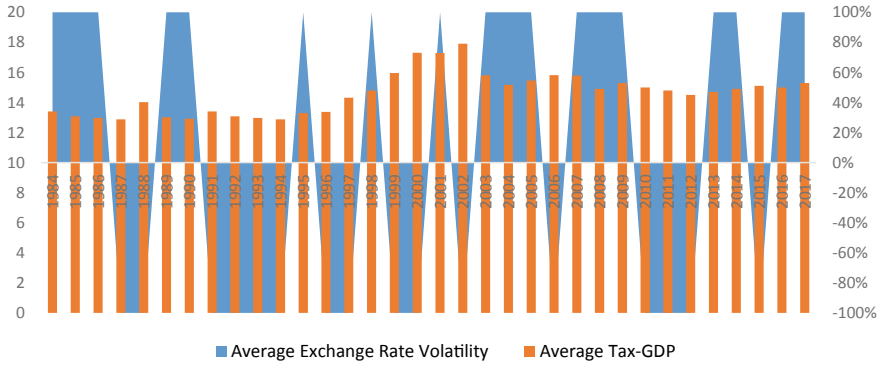

Fig. 2 Trend of Average Exchange Rate Volatility and Tax Revenue (%GDP) in Sub-Saharan Africa (1984–2017) (*Source* Authors' calculations based on International Financial Statistics, International Monetary Fund data, 2020)

generally low and unstable. This gives an indication of a possible drag effect from exchange rate volatility to tax revenue performance. This we reckon to be one of the challenges which policymakers in SSA can address to raise tax revenue by the 3–5% of GDP (US$500 billion equivalent) the IMF suggested in 2019.

Chapter Objectives

The implications of the substitution and income effects of exchange rate volatility on trade/investment means that exchange rate volatility can have both contemporaneous and long-term effects on tax revenue. This Chapter therefore contributes to the extant scholarship on tax revenue performance in Africa by: (1) estimating the direct effect of exchange rate volatility on tax revenue performance in SSA, and (2) exploring the existence or otherwise of an indirect pathway through which exchange rate volatility affects tax revenue in SSA.

2 Literature Survey on Tax Efforts and Tax Revenue Performance

The extant literature provides some important drivers of tax revenue in SSA. Among others, these drivers comprise structural factors (such as sectoral contribution to GDP, trade liberalization, inflation, foreign aid, government expenditure, foreign direct investment), and institutional factors (corruption,

political instability/risk and democratic accountability) (see, Castaneda and Pardinas 2012). For instance, as Morrissey (2015) observes, a large proportion of aid to developing countries is given directly to governments either in the form of project-specific support or budgetary support. This underscores the direct impact of foreign aid on expenditure, taxation, and borrowing behavior of policymakers in SSA. The impact of aid on tax efforts is thus controversial in that: (1) aid in the form development assistance/grants can reduce tax efforts as it is substituted for tax revenue generation (Thornton 2014); and (2) aid in the form of concessional loans induces greater tax efforts and fiscal management due to repayment conditions attached to it (see, Cordella and Ulku 2007; Benedek et al. 2014). On sectoral contribution to tax revenue performance in SSA, the literature shows that the agricultural sector hinders tax efforts as the sector is highly informal (Chaudhry and Farzana 2010; Emran and Stiglitz 2005). However, the industrial and service sectors contribute favorably to tax efforts as companies usually keep records of their activities making it easier to tax. Furthermore, the level of economic development is often regarded as one of the main reasons SSA is unable to generate adequate revenues for development. There is empirical evidence that rising levels of per capita income—an indicator for economic development matters for tax revenue performance. Rising per capita income signifies improved capacity of the masses to spend which improves the capacity of the state to levy and collect taxes (Teera and Hudson 2004; Brafu-Insaidoo and Obeng 2012). Aside the traditional argument that foreign direct investment affects tax revenue efforts of developing economies, there is also the notion that trade liberalization depending on the form it takes can affect tax efforts (see, Zucman 2015). This stems from the argument that trade liberalization accelerates growth by enhancing productivity through the transfer of capital resulting in high employment and increased private spending (see, Ahmed and Muhammad 2010; Agbeyegbe et al. 2006). For instance, tax revenue may increase provided that trade liberalization occurs through tariffication of quotas, eliminations of exemptions, reduction in tariff peaks, and improvement in customs procedure (Brafu-Insaidoo and Obeng 2012). Furthermore, liberalization in the form of tariff-cut can cause revenue losses on the one hand, but can also amount to an increase in the volume of imports and, hence, increased trade tax revenue on the other hand. A number of research has identified institutional factors such as corruption, political risk, and democratic accountability as significant drivers of tax revenue generation (see, Bird et al. 2008; Garcia and von Haldenwang 2016). For instance, Garcia and von Haldenwang (2016) argue that political regimes matter for

tax performance—with full autocracies and full democracies collecting significantly higher shares than political regimes located between both margins. Particularly, Baskaran and Bigsten (2013) provide evidence to show that, in SSA, democracy induces revenue generation efforts. One of the main impediments to tax efforts in SSA is widespread corruption which includes, but not limited to bribery, extortion, influence peddling, nepotism, fraud, and embezzlement (see, Klitgaard 1998; Chand and Moene 1997). There is a general consensus that a number of factors fuel fiscal corruption in SSA. These factors encompass complicated tax laws, undue discretionary power entrusted to tax administrators, the necessity for frequent contacts between taxpayers and tax officials, weak legal and judicial systems, lack of accountability and transparency in the tax administration, and low salaries in the public sector. This, in effect, incentivizes corrupt tax and custom officials who allocate a proportion of their working hours to: (1) collecting bribes in exchange for alleviating the tax burdens of taxpayers offering these bribes; and (2) complicating procedures for taxpayers who refuse to participate in the bribery scheme, thus, forcing them out of business, or into the informal sector. The end result is that investment is discouraged, economic growth is hampered while the tax base is weakened.

3 Methodology

Modeling Exchange Rate Volatility

Unlike some macroeconomic variables, exchange rate volatility is not directly observed over time. The literature offers techniques such as the moving average, the arithmetic deviation, the standard deviation, and the Generalised Autoregressive Conditional Heteroscedasticity (GARCH) as ways of calculating exchange rate volatility. We opt for the GARCH (1, 1) method put forward by Bollerslev (1990) since it allows variances of errors in the real effective exchange rate to be time dependent. To do this, we model the GARCH (1, 1) process with the mean equation allowing for changes in the real effective exchange rate to be dependent on its lagged values as seen in Eq. (1). The error term from the estimated mean equation is normally distributed with zero mean and variance, h_{it}. The GARCH (1, 1) process is then specified with one ARCH term and one GARCH term (see, Eq. 2)

$$\Delta(lnEXH)_{it} = c_1 + \beta\Delta(lnEXH)_{i,t-1} + e_{it} \quad (1)$$

$$e_{it} \approx N(0,\ h_{it})$$

$$h_{it} = c_2 + \alpha_0 e_{i,t-1}^2 + \alpha_1 h_{i,t-1} \tag{2}$$

where: $\Delta(lnEXH)$ = log difference of the real effective exchange rate from period t to $t-1$.

$h_{i,t}$ = variance of the error term, e_{it}, capturing volatility.

$e_{i,t-1}^2$ = the ARCH term.

$h_{i,t-1}$= the GARCH term.

The dependent variable, h_{it}, represents the conditional variance (volatility) while α_0 and α_1 represent the lagged squared error term (ARCH effect) and conditional volatility (GARCH effect) respectively.

Empirical Strategy

The empirical thrust of the Chapter stems from the behavioral approach to tax revenue mobilization. The approach requires a number of preliminary tests—stationarity test, cross-sectional dependence test, and cointegration test. The essence of the cross-sectional dependence test is to ascertain whether the variables share similar developments across panels, providing the impetus to adopt one stationarity test or the other. Whereas the stationarity test is worthwhile as it provides evidence of the statistical properties of the series, the cointegration test provides evidence as to whether there is a cointegration among the variables. Turning our attention to the main empirical strategy, we follow the behavioral approaches advanced by Ofori et al. (2018) and Gaalya (2015). We begin by specifying two bivariate panel models to establish the link between exchange rate volatility and tax revenue; and exchange rate volatility and trade tax revenue as seen in Eqs. (3) and (4), respectively.

$$lnTR_{it} = \delta_0 + \delta_1 EXV_{it} + \varepsilon_{It} \tag{3}$$

$$lnTT_{it} = \beta_0 + \beta_1 EXV_{it} + \varepsilon_{It} \tag{4}$$

where TT denotes trade tax revenue, EXV is exchange rate volatility, ε_{It} captures country-specific effect and the error term. TR is tax-to-GDP ratio, δ_0 and δ_1 are the intercept and slope coefficient of the tax revenue—exchange rate volatility equation while β_0 and β_1 capture the intercept and slope coefficient of the trade tax revenue—exchange rate volatility equation.

Next, in estimating the effect of exchange rate volatility on tax revenue, we find the panel autoregressive distributed lag (ARDL) estimation technique appropriate on three counts. First, the technique is able to capture both short-run and long-run effects. Second, the method is efficient with large cross-sectional and short time periods, usually more than 20 years. Third, the technique is appropriate irrespective of whether the underlying regressors are purely integrated at order zero or one. Following Pesaran et al. (2001), we specify a heterogenous panel ARDL $(\rho,\ q_1 \ldots . q_k)$ model as seen in Eq. 5.

$$Y_{it} = \gamma_i + \sum_{j=1}^{\rho} \emptyset_{ij} Y_{i,t-j} + \sum_{j=0}^{q} \beta_{ij}^{'} X_{i,t-j} + \varepsilon_{it} \tag{5}$$

where 'ρ' is the lag of the outcome variable and 'q' captures the lags of the regressors; $i = 1, 2, \ldots, N$ is the number of cross-sections; $t = 1, 2, \ldots, T$ captures the time dimension; X_{it} is $k \times 1$ vector of regressors; $\beta_{ij}^{'}$ is $k \times 1$ coefficient vectors; $\emptyset_{ij}$ is scalars; γ_i is the country-specific effect and ε_{it} is error term. The next step is re-parameterizing Eq. (5) into an error-correction form in order to capture short-run to long-run speed of adjustment following a shock to (5) as seen in Eq. (6).

$$\begin{aligned} Y_{it} = {} & \gamma_i + \alpha_i (y_{i,t-1} - \delta_i^{'} X_{it}) + \sum\nolimits_{j=1}^{\rho-1} \emptyset_{ij}^{*} \Delta Y_{i,t-j} \\ & + \sum\nolimits_{j=0}^{q-1} \beta_{ij}^{'*} \Delta X_{i,t-j} + \mu_{it} \end{aligned} \tag{6}$$

where $\delta_i = \frac{\sum_{j=0}^{q} \beta_{ij}^{'}}{1 - \sum_{j=1}^{p} \emptyset_{ij}}$ and $\alpha_i = -\left(1 - 1 - \sum_{j=1}^{\rho} \emptyset_{ij}\right)$. The term $\left(y_{i,t-1} - \delta_i^{'} X_{it}\right)$ captures the long-run cointegrating relationship among the outcome variable and the regressors while Δ is the first difference operator. Also, δ_i captures the long-run elasticities with $\emptyset_{ij}^{*}$ and $\beta_{ij}^{'*}$ denoting the short-run elasticities of the lagged values of the outcome variable and regressors. For the sake of efficiency checks, we estimate our models based on the mean group (MG) and pooled mean group (PMG). First, we specify a baseline model on the drivers of tax revenue in SSA (see, Eq. 7). Finally, we specify the panel ARDL model in line with the hypothesized tax revenue—exchange rate volatility relationship as seen in Eq. 8.

$$\begin{aligned} \Delta lnTR_{it} = {} & \alpha_i (lnTR_{i,t-1} - \delta_{oi} - \delta_{1i} lnGPC_{it} + \delta_{2i} INF_{it} \\ & - \delta_{3i} OPEN_{it} - \delta_{4i} AGRIC_{it} - \delta_{5i} lnFDI_{it} \end{aligned}$$

$$- \delta_{6i} lnAID_{it}) + \beta_{1i} lnGPC_{it} + \beta_{2i} lnINF_{it} + \beta_{3i} lnOPEN_{it} + \beta_{4i} lnAGRIC_{it} + \beta_{5i} lnFDI_{it} + \beta_{6i} lnAID_{it} + \varepsilon_{it} \quad (7)$$

$$\Delta lnTR_{it} = \alpha_i (lnTR_{i,t-1} - \delta_{oi} - \delta_{1i} lnGPC_{it} + \delta_{2i} INF_{it} - \delta_{3i} OPEN_{it} - \delta_{4i} AGRIC_{it} - \delta_{5i} lnFDI_{it} - \delta_{6i} lnEXV_{it} - \delta_{7i} EXV * lnOPEN_{it}) + \beta_{1i} lnGPC_{it} + \beta_{2i} lnINF_{it} + \beta_{3i} lnOPEN_{it} + \beta_{4i} lnAGRIC_{it} + \beta_{5i} lnFDI_{it} + \beta_{5i} lnAID_{it} + \beta_{6i} EXV_{it} + \beta_{7i} EXV_{it} * lnOPEN_{it} + \varepsilon_{it} \quad (8)$$

where TR = Tax-to-GDP ratio; GPC = GDP per capita; INF = inflation; $AGRIC$ = agricultural sector's contribution to GDP; FDI is foreign direct investment; AID is foreign aid; EXV is exchange rate volatility; *(EXV*lnOPEN)* is exchange rate volatility and trade openness interaction. Also, δ_{1i}, δ_{2i} , δ_{3i} , δ_{4i}, δ_{5i}, δ_{6i} and δ_{7i} measure long-run elasticities; $\beta_{1i,}$ δ_{2i}, $\beta_{3i,}$ β_{4i}, $\beta_{5i,}$ β_{6i} and β_{7i} measure the contemporaneous elasticities; while δ_{0i} and ε_{it} capture country-specific intercepts and error term respectively.

Variable Description, Justification, and Data Sources

The dataset underpinning the analysis is entirely macro and spans 33 years (1984–2017) for 21 countries. The outcome variable, tax revenue performance is measured as the overall central government tax revenue as a ratio of GDP. The variable of interest, exchange rate volatility, is generated. With the control variables, we consider trade openness since the substantial flow of goods and services across borders are taxed. Trade openness is captured as the ratio of the sum of export and import to GDP (Gupta 2007). Similarly, per capita income matters for tax revenue as it suggests rising economic wellbeing of the populace which improves the central government's capacity to levy and collect taxes (Chelliah 1971). Per capita income is measured as the ratio of national income to the overall population at 2011 purchasing power parity. One of the controversial ways of generating revenue has to do with inflation tax. In low-income countries, seigniorage is sometimes used to raise revenue for developmental purposes. This move puts the working class into an illusionary high-income group benefiting central governments of inflation tax (see, Alavirad 2003). We capture inflation as the end-of-period consumer price index. Further, we control for the real sector of the

economies in question as the growth of the service and industrial sectors are favorable to tax efforts since by law, firms keep records of their activities as compared to the agricultural sector which is largely for subsistence (Karagöz 2013; Baunsgaard and Keen 2010; Teera and Hudson 2004). We use the share of agricultural sector in GDP to control for the economic structure of the study area. Also, as Franco-Rodriguez et al. (1998) and Mahdavi (2008) argue, foreign aid can reduce tax efforts as it can be substituted for tax revenue therefore its inclusion in the models. Foreign aid is captured as net official development assistance inflows ($ billions). Also, foreign direct investment can boost the productive capacity of recipient countries and consequently tax revenue efforts (see, Reynolds and Wier 2016; Zucman 2015). Foreign direct investment is measured as net inflow of direct investment as a ratio of GDP.

4 Results and Discussions

Summary Statistics

The presentation of the result starts with summary statistics, followed by the preliminary tests for stationarity, cointegration, and cross-sectional dependence. The summary statistics gives perspectives to the location and variability of the data (see, Table 1). For instance, the average tax-to-GDP ratio of SSA is a modest 16.9%. Also, the average GDP per capita measured at

Table 1 Summary Statistics

Variable	Observation	Mean	Std. Dev	Minimum	Maximum
Tax-to-GDP	693	16.942	8.567	0. 905	58.407
GDP per capita	693	2283.811	3297.985	193.861	20,333.941
Agricultural sector	693	25.003	16.412	0.891	79.042
Foreign aid	693	6.490	8.400	−1.450	11.40
Inflation	693	46.333	920.367	−35.836	24,411.037
Trade openness	693	79.474	42.106	20.964	351.105
Trade taxes	693	0.355	0.522	−0.943	3.569
Exchange rate volatility	693	−0.002	0.187	−1.372	1.922
Foreign direct investment	693	3.626	9.092	−28.624	161.821

Note Std. Dev refers to Standard Deviation
Source Authors' Construct Based on Data from the International Financial Statistics, International Monetary Fund, and World Development Indicators, 2020

Table 2 Evidence of Exchange Rate Volatility in Sub-Sahara Africa

Variable	Coefficient	Standard error	Z-score
ARCH (1)	0.701***	0.055	12.522
GARCH (1)	0.355***	0.013	25.957
Constant	1.209***	0.123	9.819
ARCH (1) + GARCH (1)	1.056		

Note Three asterisks (***) denotes 1% significance level. ARCH refers to Autoregressive Conditional Heteroskedasticity while GARCH denotes Generalized Autoregressive Conditional Heteroskedasticity

2011 purchasing power parity is US$2283.8. Further, the data shows that in SSA, the average net official development assistant amounts to $6.49 trillion while the sectoral contributions of agriculture to GDP stands at 25%.

Evidence of Real Exchange Rate Volatility in Sub-Saharan Africa

In Table 2, we provide evidence of the presence of exchange rate volatility in SSA via the GARCH (1, 1) technique. The magnitude of the ARCH and GARCH terms add up to 1, suggesting high levels of volatility in the sub-region. Finally, with the ARCH LM test statistics of 0.189 and *p*-value of 0.671, we show the absence of serial correlation in the residuals of the real effective exchange rate series.

Cross-Sectional Dependence Test Results

As suggested by Pesaran (2004), we first test for cross-sectional dependence among the variables to determine whether the variables share similar developments in the SSA. There is strong empirical evidence to show that on a whole, the variables exhibit similar developments (see, Table 3). This suggests that shocks to these variables, for instance, instability in aid, would possibly have similar impacts in all the economies in this chapter.

Panel Unit Root Test Results

Per the results of the cross-sectional dependence test, we rely on the second generational unit root tests such as Cross-Sectionally Augmented Dickey Fuller (CADF) and Cross-Sectionally Augmented Im Pesaran (CIPS) tests to ascertain: (1) the stationarity properties of the variables; and (2), establish the

Table 3 Results for Cross-sectional Dependence Test in Sub-Saharan Africa

	CD-test statistics	Correlation	Abs (correlation)
Tax-to-GDP	4.496***	0.053	0.363
GDP per capita	6.072***	0.072	0.175
Inflation	54.327***	0.644	0.750
Trade openness	11.323***	0.134	0.380
Agriculture	27.625***	0.327	0.513
Exchange rate volatility	13.728***	0.162	0.680

Note A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. H_0: cross-sectional independence among panel units against H_1: cross-sectional dependence among panel units. CD is Cross-sectional Dependence; Abs which computes the average absolute value of the off-diagonal elements of the cross-sectional correlation matrix of the residuals

Table 4 Unit Root Test Results for the Variables at Levels

Variables	Constant		Constant and Trend	
	CADF (Z-t-bar)	CIPS	CADF (Z-t-bar)	CIPS
Tax-to-GDP	−0.179	−2.293**	0.508	−2.526
GDP per capita	−7.432***	−4.280***	−6.141***	−4.524***
Inflation	6.084	−1.310	3.508	−2.211
Trade openness	1.087	−1.667	0.414	−2.271
Agriculture	−2.453***	−2.363**	−1.747**	−2.771**
Foreign direct investment	−2.721***	−3.243***	−3.044***	−4.065***
Foreign aid	−5.003***	−3.359***	−4.190***	−3.626***
Exchange rate volatility	3.233	−0.843	4.390	−1.313

Note A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. Both CADF & CIPS test the H_0: All panels contain unit root against H_1: Some panels are stationary. CADF means Cross-sectionally Augmented Dickey–Fuller while CIPS refers to Cross-sectionally Augmented Im Pesaran Shin

absence of I(2) variables. This is essential as it establishes whether the panel ARDL technique can be applied.

The results from the stationarity tests at levels and first difference are reported in Tables 4 and 5, respectively. But for inflation, trade openness, and exchange rate volatility, all the variables are stationary at levels. However, after first difference, all the variables containing unit root become stationary. This suggests that the variables are only integrated at levels or first difference.

Table 5 Unit Root Test Results for the Variables at First Difference

Variables	Constant		Constant and Trend	
	CADF (Z-t-bar)	CIPS	CADF (Z-t-bar)	CIPS
Tax-to-GDP	−10.443***	−5.517***	−7.814***	−5.543***
GDP per capita	−17.859***	−6.146***	−16.600	−6.358***
Inflation	−5.500***	−4.311***	−4.154***	−4.564***
Trade openness	−11.314***	−5.756***	−9.505***	−5.883***
Agriculture	−13.511***	−5.463***	−12.026***	−5.535***
Foreign direct investment	−14.846***	−5.985***	−12.982***	−6.145***
Foreign aid	−12.519***	−5.958***	−10.200***	−6.078***
Exchange rate volatility	−2.413***	−2.847***	−1.194	−3.124***

A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. Both CADF & CIPS test the H_0: all panels contain unit root against H_1: Some panels are stationary. CADF means Cross-sectionally Augmented Dickey–Fuller while CIPS refers to Cross-sectionally Augmented Im Pesaran Shin

The absence of I(2) variables means that the Panel ARDL technique can be applied.

Panel Cointegration Test Results

To establish whether there is cointegration among the variables, we apply the Westerlund (2007) cointegration test. The strength of this test is that, it allows for heterogeneous vectors and hence, do not impose a common-restriction factor. More importantly, the test is normally distributed and accommodative of unit specific short-run dynamics, trend, slope parameters and cross-sectional dependence. The Westerlund (2007) test of cointegration relies on the group mean and panel statistics from the cross-section. The group mean statistics ($G\tau$ and $G\alpha$) test the alternative hypothesis of cointegration for at least one cross-sectional unit in the panel whereas the panel statistics ($P\tau$ and $P\alpha$) tests the alternative hypothesis of cointegration for the whole cross-section. Table 6 reports the results of the panel cointegration test.

Results from Table 6 are premised on the null hypotheses of no cointegration among the variables from both the group mean and panel statistics. However, it is evident from the level of significance that there is strong cointegration among the variables.

Table 6 Westerlund Cointegration Test Results

Cointegration statistics	Values	Z-value
$G\tau$	−2.633*	−1.505
$G\alpha$	−7.735	2.882
$P\tau$	−12.740***	−3.499
$P\alpha$	−11.220**	−1.710

Note A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. $G\tau$ and $G\alpha$ are group mean statistics while $P\tau$ and $P\alpha$ refer to panel

Baseline Results on Drivers of Tax Revenue in Sub-Saharan Africa

The interpretation of the baseline results in Table 7 is based on the Hausman (1978) test on the efficiency of the MG and PMG estimates.

We find that the growth of SSA economies proxied by per capita income induces tax revenue performance both in the short-run and long-run. The result is, however, only significant in the long-run. The result shows that a 1% increase in per capita income improves tax revenue performance by 0.1%. The finding supports the argument by Gupta (2007) and Brafu-Insaidoo and Obeng (2012) that economic growth improves the capacity of the populace to spend and thus the capacity of policymakers to levy and collect taxes. Further, there is evidence that in SSA, trade openness reduces tax revenue performance in the short-run while it improves tax revenue mobilization in the long-run. Intuitively, tax revenue performance falls in the short-run following the removal of tariffs however, in the long-run, tax revenue performance increases due to improved tax revenue receipts from indirect taxes (see, Gupta 2007). In addition, we show that foreign aid is harmful to tax revenue generation in SSA in both the short-run and long-run implying that development assistance is used as a substitute for tax revenue in SSA (see, Bird et al. 2008; Gupta 2007). As expected, inflation proved favorable to tax revenue performance in SSA. There is empirical evidence that in the long-run, a 1% increase in inflation levels improves revenue generation by 0.02%. Raising tax revenue through seigniorage is not surprising in developing economies where fiscal authorities exercise domineering powers over monetary authorities. However, the macroeconomic instability associated with this approach makes it an uneconomical way of generating revenue. Also, in conformity with our apriori expectation, we find that the agricultural sector suppresses tax revenue generation both in the short-run and long-run. The predominant informal agricultural sector of SSA is difficult to tax as records of activities are not usually kept (Chaudhry and Farzana 2010; Gupta 2007). Moreover,

Table 7 Baseline Results on Drivers of Tax Revenue in Sub-Saharan Africa [Dependent variable: (Log of Tax-to-GDP)]

Variables	MG Tax-to-GDP (SR)	MG Tax-to-GDP (LR)	PMG Tax-to-GDP (SR)	PMG Tax-to-GDP (LR)
GDP per capita	0.094	0.201	0.048	0.106***
	(0.061)	(0.130)	(0.054)	(0.035)
Trade openness	0.046*	− 0.053	− 0.487	0. 034***
	(0.023)	(0.087)	(0.502)	(0.008)
Foreign aid	− 0.662	− 1.427	0. 046***	− 1.080***
	(0.785)	(2.137)	(0.016)	(0.351)
Inflation	0.048	0.052	− 0.032	− 0. 023***
	(0.041)	(0.055)	(0.042)	(0.007)
Agricultural sector	− 0.035	− 0.298	− 0.009	− 0.213***
	(0.078)	(0.258)	(0.081)	(0.065)
Foreign direct investment	− 0.283	0.210	− 0.312*	− 0. 085***
	(0.219)	(0.292)	(0.156)	(0.032)
Exchange rate volatility	–	–	–	–
Exchange rate volatility*trade openness	–	–	–	–
Error correction term	− 0.523***	–	− 0. 210***	–
	(0.061)		(0.039)	
Constant	8.449	–	8.336***	–
	(9.587)		(1.747)	
Number of panels	20	20	20	20
Hausman X^2 statistic			1.161	
[*P*-value]			0.884	

Note All variables with the exception of exchange rate volatility are measured in natural logs. Values in parenthesis are standard errors. A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. MG is Mean Group; PMG is Panel Mean Group; SR is Short-run, and LR is Long-Run

Table 8 Bivariate Results on Effect of Exchange Rate Volatility on Tax Revenue (%GDP), and Trade Taxes

[Dependent variable in (1) & (2): (Log of Trade Tax-to-GDP)] [Dependent variable in (3) & (4): (Log of Tax-to-GDP)]				
Variables	Trade taxes (SR)	Trade taxes (LR)	Tax-to-GDP (SR)	Tax-to-GDP (LR)
Exchange rate volatility	−0.163***	−0.168***	−0.382***	−0.351***
	(0.047)	(0.047)	(0.089)	(0.089)
Constant	3.325***	3.350***	4.432***	4.278***
	(0.227)	(0.238)	(0.424)	(0.436)
Observations	693	693	693	693
Hausman	25.73		25.20	
Prob > *F*	0.000		0.000	
Number of panel	20	20	20	20

Note A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. SR is Short-run while LR is Long-Run

there is empirical evidence to show that the short-run and long-run effects of foreign direct investment on tax revenue mobilization in SSA are negative. The effect is, however, pronounced in the short-run relative to the long-run. Overall, there is a 20% adjustment speed toward long-run equilibrium following a shock to the model.

Bivariate Results

The essence of the bivariate estimation is to show if there is empirical evidence that exchange rate volatility is deleterious to tax revenue performance (Table 8).

The results show a strong negative effect of exchange rate volatility on both trade tax revenue and overall tax revenue in SSA. The effect is, however, pronounced on overall tax revenue than it is on trade tax revenue.

Contemporaneous Effect of Exchange Rate Volatility on Tax Revenue in SSA

The short-run results show that exchange rate volatility is detrimental to tax revenue performance (see, Table 9). The result has both theoretical and empirical justification. Theoretically, exchange rate volatility can cause risk-averse international trade players to reduce the volume of transaction thereby causing revenue shortfalls.

Table 9 Main Results on Effect of Exchange Rate Volatility on Tax Revenue in Sub-Saharan Africa [Dependent variable: (Log of Tax-to-GDP)]

Variables	MG Tax-to-GDP (SR)	MG Tax-to-GDP (LR)	PMG Tax-to-GDP (SR)	PMG Tax-to-GDP (LR)
GDP per capita	0.076	0.761	0.048	0.043***
	(0.080)	(0.582)	(0.054)	(0.014)
Trade openness	0.069*	– 0. 027	– 0.487	– 0.138**
	(0.041)	(0. 094)	(0.502)	(0.067)
Foreign aid	– 1.059	1.898	– 0.369	– 0. 108
	(1.059)	(24.897)	(0.489)	(0. 086)
Inflation	0.163*	0.113*	0.032	0.085***
	(0.066)	(0.066)	(0.042)	(0.012)
Agricultural sector	– 0.073	0.366	– 0.009	– 0.098***
	(0.075)	(1.249)	(0.081)	(0.0461)
Foreign direct investment	– 0.364*	– 0.164	– 0.313*	– 0.049***
	(0.205)	(0.364)	(0.156)	(0.013)
Exchange rate volatility	– 1.823	– 1.516	– 2.114**	– 6.498*
	(6.873)	(1.136)	(4.641)	(0.486)
Exchange rate volatility*trade openness	– 0.060	2.229	0.111	0.038***
	(0.142)	(1.448)	(0.106)	(0.016)
Error correction term	– 0.194	– 0.194	– 0.107**	–
	(0.155)	(0.155)	(0.046)	–
Constant	20.923	–	4.204**	–
	(13.153)	–	(2.009)	–
Number of panels	20	20	20	20
Hausman X^2 statistic	–	–	8.551	–
[*P*-value]	–	–	0.382	–

Note All variables with the exception of exchange rate volatility are measured in natural logs. Values in the parenthesis are standard errors. A single asterisk (*) denotes significance at 10% level, two asterisks (**) at 5% level, and three asterisks (***) at 1% level. MG is Mean Group; PMG is Panel Mean Group; SR is Short-run, and LR is Long-Run

Further, we provide empirical evidence to show that, in the short-term, foreign direct investment is harmful to revenue generation in SSA. The result indicates that a 1% increase in inflows of direct investment results in a 0.3% shortfall in tax revenue generation though there is no empirical support for it. Plausibly, this is due to tax holidays they firms enjoy or transfer pricing strategies they adopt (see, Reynolds and Wier 2016). The economic structure of SSA has often been considered as one of the main reasons behind the sub-region's low revenue generation efforts. Though there is no empirical evidence for this result, the sign indicates that the growth of the agricultural sector is

harmful to tax revenue generation. One variable that has generated debate in terms of its effect on tax revenue performance has been trade openness. Though there is no empirical support, we find a negative effect of trade openness on tax revenue generation. This is plausibly due to the gradual reduction in tariffs, weak border controls, or corruption at the borders. In addition, we show that economic growth is tax revenue inducing. Generally, an expansion of the economy creates additional employment and expenditure which further fuel both direct and indirect revenue generations (Brafu-Insaidoo and Obeng 2012).

Long-Run Effect of Exchange Rate Volatility on Tax Revenue in SSA

In line with our short-run results, exchange rate volatility hinders tax revenue performance also in the long-run (see, Table 9). The result is statistically significant at 10% suggesting that a 1% increase in exchange rate volatility results in 0.06% shortfall in tax revenue. The theoretical underpinning of the result is that, in small open economies like those of SSA, short-term trade risk posed by exchange rate volatility causes trade players or investors to substitute domestic markets for foreign markets. The end result is the direct loss of trade tax revenue as prolonged planning and adjustment cost results in the folding up or floundering of businesses. Further, we find that, there is an indirect pathway from exchange rate volatility to tax revenue performance through trade openness. We provide strong empirical support to show that given exchange rate volatility, the more SSA liberalizes trade, the more the region loses tax revenue.

$$\begin{aligned} lnTR = {} & 0.0435lnGPC + 0.0848lnINF - 0.1383lnOPEN \\ & - 0.0979lnAGRIC - 0.0494lnFDI \\ & - 0.1082lnAID - 6.4984EXV + 0.0379(EXV * lnOPEN) \end{aligned}$$

$\frac{\partial(lnTR)}{\partial(lnOPEN)} = -0.1383 + 0.0379\overline{EXV}$, from the descriptive statistics, $\overline{EXV} = -0.0023$

$\frac{\partial(lnTR)}{\partial(lnOPEN)} = -0.1383 + 0.0379(-0.0023)$

$\frac{\partial(lnTR)}{\partial(lnOPEN)} = -0.1383$

Thus, in the presence of exchange rate volatility, policies aimed at opening up SSA economies to trade by 1% lead to a decline in tax revenue performance by approximately 0.14%. We test for and find statistical evidence for this interaction term at 1% (F-statistics = 32.727; p-value = 0.000). The result is not farfetched per the structure of the economies of SSA as trade in SSA revolve around commodity arbitrage in which trade players hardly

make use of hedging facilities or forward contracts. The long-term effect of persistent exchange rate risk is high planning and adjustment cost which have dampen effect on trade and indirect taxes. This, in effect, hinders tax revenue mobilization in SSA.

Again, we sought to determine the extent to which exchange rate volatility affect tax revenue given the current state of openness to trade in SSA.

$lnTR = 0.0435lnGPC + 0.0848lnINF - 0.1383lnOPEN - 0.0979lnAGRIC - 0.0494lnFDI - 0.1082lnAID - 6.4984EXV + 0.0379(EXV * lnOPEN)$

$\frac{\partial(lnTR)}{\partial(EXV)} = -6.4984 + 0.0132\overline{lnOPEN}$, from the data, $\overline{lnOPEN} = 2.2729$

$\frac{\partial(lnTR)}{\partial(EXV)} = -6.4984 + 0.0379(2.2729)$

$\frac{\partial(lnTR)}{\partial(EXV)} = -6.4122$

From the net effect, we show that, given the current state of trade openness in SSA, a 1% increase in exchange rate volatility results in a 0.064% decline in tax revenue mobilization. The evidence for this interaction term is an F-statistics of 32.727 and a p-value of 0.000. Also, there is empirical evidence to show that trade openness has a harmful effect on tax revenue mobilization in SSA. The result suggests that a 1% increase in trade openness results in approximately 0.14% reduction in tax revenue generation. Plausibly, the regional integration laws of free movement of goods and services, and corruption at the various ports and custom units in SSA account for this. The finding corroborates that of Gupta (2007). The results suggest that given that the economies of SSA adhere to regional trade laws, then fiscal authorities of the various countries must brace themselves for tax revenue shortfalls. To address this, policymakers can adopt a gradual approach to the implementation of free trade; discourage border corruption through provision of better conditions of service; and ensure the prosecution of corrupt officials. Also, we provide strong empirical support for the argument that the growth of the agricultural sector has a suppressing effect on tax revenue mobilization. This partly explains the resolve on the part of policymakers in SSA to industrialize their economies since manufacturing enterprises/companies are easier to tax (see, Agbeyegbe et al. 2006; Ahmed and Muhammad 2010). The implication of this is that the establishment of new enterprises, sustainability of existing firms, and support for manufacturing industries has the potency of improving tax revenue performance. Moreover, there is evidence that foreign direct investment has a harmful effect on tax revenue generation in the long-run. In conformity to the finding of Beck and Chaves (2011), we show that a 1% increase in inflow of direct investment reduces tax revenue performance by 0.1%. Also, we find that the growth of SSA economies are tax revenue

inducing. We show that for every 1% improvement in the economic performance of SSA, tax revenue rises by approximately 0.04%. The result leans itself to the argument that rising levels of economic growth are associated with higher levels of private spending (Teera and Hudson 2004; Brafu-Insaidoo and Obeng 2012). This shows the need for policymakers in SSA to strive to expand their economies. Also, inflation proved to be tax revenue inducing suggesting that printing of monies, a common means of raising revenue fuels inflation tax in SSA (see, Alavirad 2003).

5 Conclusion

In this Chapter, we looked at the tax revenue performance of 21 SSA countries[1] from 1984 to 2017. Like other developing regions of the world, the SSA faces a number of structural and institutional constraints in its tax mobilization efforts. In this Chapter, we contribute to knowledge by looking at how a major risk factor to trade and investment—exchange rate volatility—affects tax revenue generation in a region where forward contracts and hedging facilities are rarely used. Recognizing the fact that theory posits both short-run and long-run effects of exchange rate volatility on trade and tax revenue, we rely on a heterogenous panel ARDL estimation technique to estimate the pathways through which exchange rate volatility affect tax revenue. First, we find that exchange rate volatility has a direct deleterious effect on tax revenue performance in SSA. Second, we establish the presence of an indirect pathway of exchange rate volatility to tax revenue performance through trade openness. Therefore, stabilizing the real effective exchange rate is crucial to improving revenue generation in SSA. We, therefore, recommend that monetary authorities in SSA intensify efforts to reduce exchange rate volatility. Further, we recommend that monetary authorities (Central Banks) in SSA collaborate with financial institutions to provide trade players affordable forward contracts or hedging facilities. Lastly, we recommend that policymakers in SSA adopt a gradual approach when signing on to trade liberalization agreements.

Note

1. Botswana, Burundi, Cape Verde, Cameroon, Comoros, Congo, Congo DR, Cote d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, The Gambia, Guinea Bissau, Ghana, Kenya, Lesotho, Mozambique, Sierra Leone, Tanzania, Uganda, Zambia.

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The Effects of Conflict on Trade: Do Internal Conflicts Impede Shifts to Manufacturing and Technology Transfer?

John Verner and Matthew Clance

1 Introduction

The widespread effects of the 2008 global financial crisis showed how integrated the world economy has become. In the past few decades, many developing countries have become more open to international trade and financial markets (see Fig. 1). During this period, however, the number of internal conflicts in these countries has also been increasing. Are these two trends related? The growing literature on the relationship between trade, or globalization and internal conflicts sheds some light on this question. The relation between trade and conflict has received more attention in the political sciences than economics.[1] Here, the question was whether trade could promote inter-state peace. Recently, however, attention has shifted to look at the relation between international trade, (or globalization) and internal conflict. This is important because internal conflicts are far more relevant.

A study by Collier et al. (2003) points out that while international conflicts attract great media attention, they have become short-lived and infrequent.

[1] For a review of the literature in political sciences, see Barbieri and Schneider (1999). Blattman and Miguel (2010) review the economic literature on civil war.

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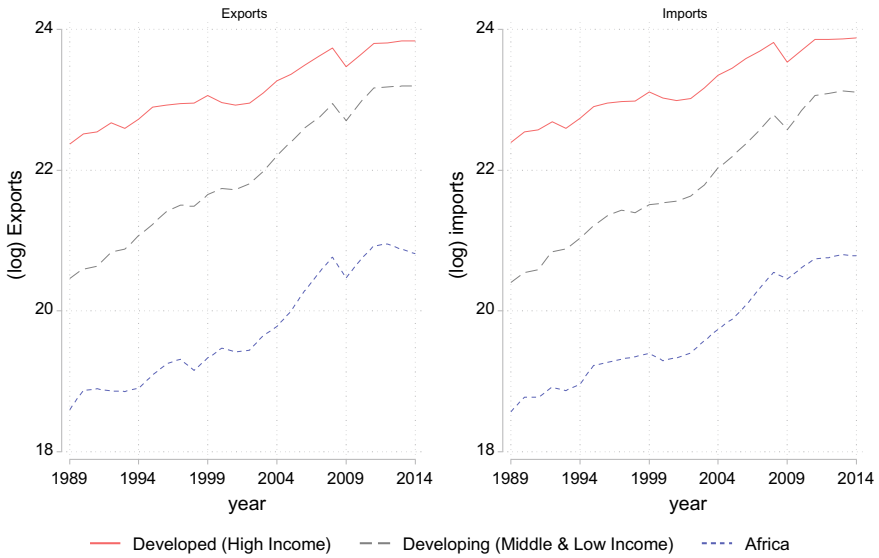

Fig. 1 Exports and imports 1989–2014 (*Source* Author's calculations using UN COMTRADE trade data [https://comtrade.un.org] and World Bank income classifications)

The authors note that in contrast, internal conflicts attract far less coverage, but have become more frequent, usually last years, and can be just as devastating as international conflicts. Noting that most countries have experienced an internal armed conflict and a third have experienced civil war since 1960, Blattman and Miguel (2010) argue that civil war should be central in the study of economic development. Furthering this argument, Collier and Hoeffler (2004) find that economic variables which relate to the viability of rebellion have considerably more explanatory power for civil wars than political and social variables related to grievances; greed rather than grievances motivate wars. Nevertheless, until recently, the topic has been given little attention by economists (Blattman and Miguel 2010).

Internal conflicts undoubtedly damage the local economy, but also have global consequences. Collier et al. (2003) explains that costs to actual combatants of a civil war account for only a fraction of the total cost; the damages include human displacement, mortality, and poverty inflicted on non-combatants. Neighboring countries also face an influx of refugees, increased disease risk, lower growth rates, and higher military expenditure. Furthermore, these conflicts create areas outside the rule of any recognized government, where drug manufacturers and terrorists can set up operations.

These wars also yield "conflict traps," a cycle whereby conflicts lower income which raises the probability of future conflicts (Collier et al. 2003).

Indeed, Blattman and Miguel (2010) note that the relationship between income per capita and conflict propensity is "one of the most robust empirical findings in the literature." Dependency on primary resource exports and natural resource wealth may also contribute to conflict, otherwise known as the "resource curse." Renner (2002) explains that natural resources may be exploited by either side to help fund war efforts and that groups may engage in conflict, not to topple a government, but also to gain control of lucrative resources, "one of the few sources of wealth and power in poorer societies." Indeed, Ross (2004) finds evidence that oil and non-fuel minerals may cause conflict.

A study by Mehlum et al. (2006) highlights the importance of institutions for the "resource curse." It argues that the resource curse is only relevant for developing countries, which tend to have weak institutions and greater dependency on primary resources, relative to developed countries. It is plausible that internal conflicts are more relevant for developing countries. For example, Collier et al. (2003) finds that the risk of civil war is about 15 times higher for low-income countries and four times higher for middle-income countries, compared to the negligible risk faced by developed countries in the Organisation for Economic Co-operation and Development (OECD). As the authors state; "war retards development, but conversely, development retards war." Figure 2 provides evidence for this assertion and Fig. 3 emphasizes the concentration of conflicts in the developing world.

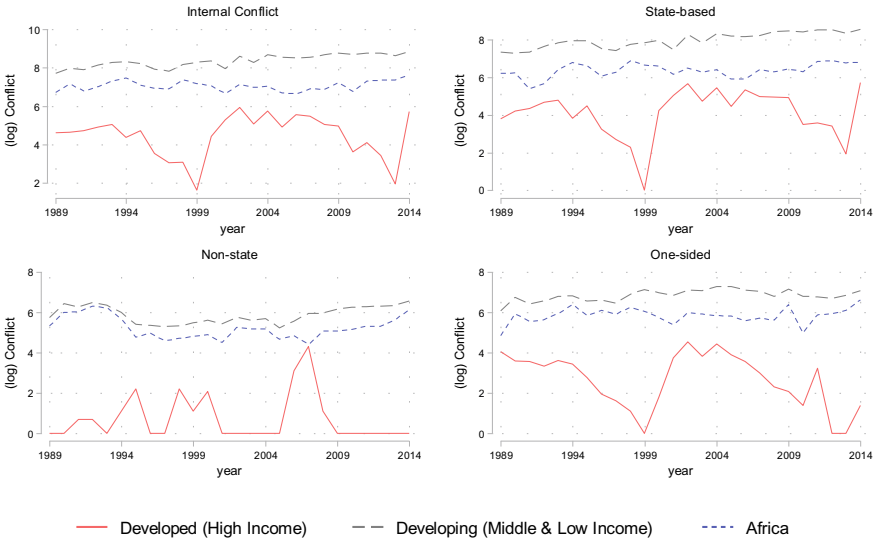

Fig. 2 Internal conflicts 1989–2014 (*Source* Author's calculations using UCDP GED conflict data [Sundberg and Melander 2013; Croicu and Sundberg 2017] and World Bank income classifications)

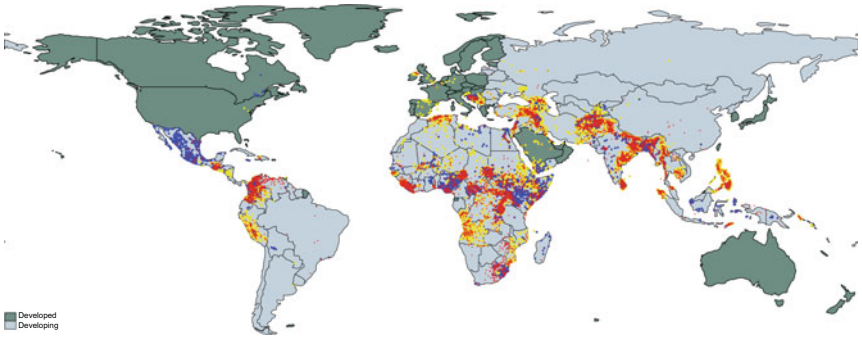

Fig. 3 All conflicts 1989–2014 (*Source* Author's calculations using UCDP GED conflict data [Sundberg and Melander 2013; Croicu and Sundberg 2017], World Bank income classifications and Natural Earth map data [http://www.naturalearthdata.com]. *Note* Figure maps the occurrences of state conflict [yellow], non-state conflict [blue] and one-sided violence [red])

Given the relevance of internal conflict for developing countries and the fact that development retards conflict, it would be beneficial for developing countries to shift away from primary resource dependence toward manufacturing.[2] As Renner (2002) points out, reliance on natural resource wealth may lead countries to allocate inadequate capital to other sectors, fail to diversify the economy and develop human capital, and may also discourage innovation. Moreover, the growth that does occur is typically undesirable: capital-intensive extraction industries provide limited jobs, many of which go to skilled technicians from developed countries. This creates small pockets of wealth with few benefits for the wider population, especially if resources are exported without any form of processing (Renner 2002). By shifting to manufacturing, increasing the amount of processing, and producing higher technology goods,[3] developing countries would not only be able to move away from resource dependence, but would be able to provide more jobs, develop greater human capital, and achieve higher growth. This is because higher technology export structures have higher growth potentials (Lall 2000). Furthermore, by taking advantage of globalization, growth could further be enhanced, leading to economic development and mitigating the chance of future conflicts.

[2] An interesting question that one may ask is how do countries transition from primary resources to manufacturing? While in this chapter we are not trying to explain how countries can shift to complex goods, we provide an analysis on how conflicts inhibit their ability to do so. Nevertheless, one might be able to see this in the import technology categories, where countries that import high technology experience less conflict. Such analysis follows from technology transfer growth models.

[3] High technology goods refer to value-added products whose manufacture uses advanced technical knowledge and methods, such as computer products and laser-optic equipment.

It is almost unthinkable to consider growth in the modern world without considering globalization. While globalization may have some negative implications for conflict (as discussed in Sect. 2), it has many positive implications for growth. Indeed, Jones and Romer (2010) identify globalization as one of the new Kaldor facts of growth and Dollar and Kraay (2004) emphasize that the belief that openness to international trade fosters growth is one of the most widely held in economics, with consensus among economists of competing ideologies. Emphasizing this point, Wacziarg and Welch (2008) find that post-liberalization growth rates were about 1.5 times greater than pre-liberalization rates for countries that liberalized their trade regimes. Lall (2000) reiterates that globalization has enhanced, rather than inhibited the ability of developing countries to integrate into the world economy and stresses the importance of export performance.

According to Jones and Romer (2010), the greater connectivity of nations and increased competition in markets resulting from globalization have not only allowed the scaling of existing ideas and technologies over greater markets, but also a greater generation of new ideas and technologies. Globalization, therefore, expands both market size and accessibility, enabling developing countries to access ideas and technologies at the frontier to foster their own growth and development. The importance of ideas and technologies for growth and development is at the heart of endogenous growth and technology transfer models. Nevertheless, as Lall (2000) argues, most conventional trade theories assume technological activity has no effect on the comparative advantages of developing countries; they imply that there is no difference between the technologies to which these countries have access, and the technologies for which they have the necessary infrastructure and human capital to implement successfully in the short run. In reality, it is often both risky and costly for firms to acquire and use new technologies and higher-level technologies tend to require greater intervention to help firms cover coordination problems and learning costs (Lall 2000).

From the preceding analysis, it seems that conflict prone developing countries may adopt policies to move away from resource dependence and into processing and manufacturing to pursue export- led growth in higher technology products. As Lall (2000) argues, trade (and export performance, in particular) is a primary means of obtaining foreign exchange, attaining economies of scale, specialization, and accessing new technologies, and increasing openness and international trade. Furthermore, it acts as an indicator of the efficiency of the industrial sector which faces more intense and direct competition because of globalization. As discussed above, wars retard development, while development retards wars, and it is likely that the

conflicts these countries face are themselves a barrier to this process. The question is, to what extent?

This chapter hopes to add to the literature on trade and internal conflicts by examining the effect that conflicts have on developing countries' export and import structures. Two hypotheses are tested:

H_1 Internal conflicts impede a shift to manufacturing

As both Renner (2002) and Ross (2004) point out, conflicts may produce resource dependence because manufacturing sectors can relocate, while resource sectors are location specific and unable to relocate. Therefore, conflicts, not only directly disrupt economic activities but, over time, may also force manufacturers to relocate which would increase resource dependence and prevent a shift to manufacturing.

Furthermore, as explained by Magee and Massoud (2011), internal conflicts raise the risks and costs of trading by disrupting trade routes and increasing insecurity. This means that countries will be less willing to trade with countries experiencing an internal conflict and would rather seek alternative markets, particularly, for higher technology goods which tend to be costlier and, thus, represent a greater risk. This blocks the transfer of ideas and technologies, further inhibiting a shift to manufacturing and leading to the second hypothesis:

H_2 Internal conflicts reduce the willingness to send complex goods to the countries experiencing conflict

The results find some support for the first hypothesis; there is some evidence that internal conflicts may impede a shift to manufacturing in Africa. For the second hypothesis, there is strong evidence internal conflicts reduce imports (and thus the willingness of exporters to send goods to countries in conflict) across all technological categories, and some evidence that the effect on complex goods is greater in developing countries.

The rest of the chapter proceeds as follows: the next section presents a brief review of literature followed by an explanation of methodology and data, then a discussion of the results for developing and African countries, respectively. The final section concludes.

2 Literature Review

As mentioned in the opening paragraph, the literature on trade and conflict first attracted interest in the political sciences. Hegre et al. (2003) summarize the two main arguments on the relationship between globalization and internal conflict. The "liberal" (pro-global) argument that an open economy leads to greater economic development, which leads to peace. On the contrary, the "structural" (or anti-global) argument is that open economies are more likely to experience conflict because trade and foreign direct investment (FDI) transfer profit back to imperial centers by exploiting local human and natural resources which promote poverty, inequality, and social disarray in the developing world.

Examining several channels through which globalization causes conflict, Barbieri and Reuveny (2005) highlight the complexity of the relationship between trade and conflict. Firstly, trade may promote development by ensuring efficient resource allocation, however, if foreign forces exploit local human and natural resources in developing countries, trade could instead foster underdevelopment.

Secondly, trade may reduce income inequality in developing countries through factor price equalization.[4] But trade could also raise income inequality as incomes in export sectors grow faster than in import-competing sectors, or if rent seeking behavior benefits the elite at the expense of the masses, or if there is pressure from multinational corporations (MNCs) to keep wages and employment benefits low in developing countries.

Thirdly, since trade generates economic benefits, the potential loss of these benefits should reduce the likelihood of conflict, but since not all domestic actors gain equally from trade, losers may incite conflict. In fact, Bussmann and Schneider (2007) find that discontent over the process of globalization increases the chance of conflict, while the level of trade openness and FDI reduce the likelihood of conflict, even if losers are compensated financially. Martin et al. (2008) concur that if trade gains are put at risk, this should deter conflict, but add that if international trade can substitute for domestic trade, it may also act as an insurance during conflict.

Lastly, since trade and FDI bring technology and knowledge, which aid diversification, trade could reduce the chance of conflict by reducing exports of primary products. Dependence on exports of primary products raises the

[4] By raising labour earnings (returns to the relatively abundant factor) and reducing capital earnings (returns to the relatively scarce factor) as the country specializes in the products of its comparative advantage (those whose production requires a greater proportion of the countries relatively abundant factor).

risk of conflict because the presence of natural resources may be a source of conflict since different groups compete to control the economic rents accruing from these resources (Renner 2002; Ross 2004; Mehlum et al. 2006). Nevertheless, trade may also increase exports of primary products by forcing developing countries to focus on their (current) comparative advantage. As Garfinkel et al. (2008) show, conflicts can distort the pattern of comparative advantage, as labor resources that would otherwise be employed in the production of other commodities are instead allocated to conflict. This places a positive bias on the country's net exports of the contested resource and suggests that trade patterns are not invariant with respect to internal conflicts.

The above discussion shows the complexity of the relationship between trade and conflict; thus, trade may increase, or reduce conflict depending on various factors. Overall, there is far more empirical evidence that globalization is pacifying (Hegre et al. 2003; Barbieri and Reuveny 2005; Bussmann and Schneider 2007). As Barbieri and Reuveny (2005) point out, the opposing arguments are backed by theory and, thus, should not be ignored; globalization might foster peace, on average, but may instigate conflict in particular cases. In addition, as with development and conflict, trade does not only affect conflict, but conflict also affects trade. This reverse causal effect is, perhaps, of more interest to economists because the question here is about the economic consequences of war, rather than the potential pacifying effect of economic integration.

Fortunately, the effect of conflict on trade is far less ambiguous. Conflict is expected to reduce trade. Not only do conflicts disrupt economic activity directly through damages to life and property, and by reallocating resources away from productive activities, but they also increase the risks involved in trading with the country in conflict which damages imports, as trade partners seek alternative destinations for their goods. Therefore, while it is plausible that conflicts may lead to greater imports of certain goods,[5] on average, conflicts should reduce both exports and imports.

Empirical evidence supports the negative effect of conflicts on trade. Martin et al. (2008) find civil wars cause a large and persistent reduction in trade. They find a contemporaneous reduction of around 25% and that trade levels remain at about 40% lower than normal, even 25 years after the

[5] One might expect imports of goods such as weaponry and basic necessities, to increase initially as disruptions in the domestic market force firms and consumers look to international markets for goods. The likelihood of this happening, however, is reduced by the fact that import prices are likely to increase as the nation's currency deteriorates and the risks of sending goods to the country rise. Also, while states may procure arms through legal channels, the small arms most often used in internal conflicts are often acquired through illicit channels (Renner 2002).

conflict began. Similarly, Bayer and Rupert (2004) find that civil wars reduce trade by about a third. Magee and Massoud (2011) give further support to the relevance of the effect of conflicts on trade. Using IV and full information maximum likelihood (FIML) methods to account for the endogeneity between openness and internal conflict, they find that while economic openness has a negligible effect on trade,[6] there is robust evidence that internal conflicts reduce openness by over 13%.

3 Data and Methodology

To test the two hypotheses mentioned above, Eqs. (1) and (2) below are estimated:

$$\begin{aligned} &lnExports_{ki,t} \\ &= lnConflict_{ji,t-1} + lnGDPpc_{i,t-1} + lnPop_{i,t-1} + lnEduc2_{i,t-1} \\ &+ lnPolity2_{i,t-1} + lnOpen_{i,t-2} + \alpha_i + \lambda_t + \mu_{it} \end{aligned} \tag{1}$$

$$\begin{aligned} &lnImports_{ki,t} \\ &= lnConflict_{ji,t-1} + lnGDPpc_{i,t-1} + lnPop_{i,t-1} + lnEduc2_{i,t-1} \\ &+ lnPolity2_{i,t-1} + lnOpen_{i,t-2} + \alpha_i + \lambda_t + \mu_{it} \end{aligned} \tag{2}$$

where the variable *lnConflict* is the log of conflict, the variable of interest. The equations also use standard control variables from the literature which are: GDP per capita (*lnGDPpc*), population (*lnPop*), secondary education enrollment rates (*lnEduc2*), polity score (*lnPolity2*), and trade openness (lnOpen).[7] The variable GDP per capita is a proxy for income while the population is a proxy for market size. Together they represent the size of the economy and level of development for each country. Secondary education enrolment is a measure of education level, which is a measure of human capital. Polity score is index measure of the level of autocracy or democracy in a country ranging from −10 (full autocracy) to 10 (full democracy), which is used as a proxy for institutions. Openness is a measure of how open a country is to international trade.

[6] A result they attribute to the ambiguities in the theoretical effects of openness on conflict; since trade may either reduce, or increase conflicts, these effects appear to cancel each other out.

[7] Note all variable are logged in the model.

The subscript $k = 0, 1, \ldots, 5$ is the technological category of exports/imports. These categories are taken from Lall (2000) and the value of k refers to all products, primary products, resource-based manufactures, low technology manufactures, medium technology manufactures, and high technology manufactures, respectively.[8] Since developing countries tend to export lower volumes of higher technology goods, categories 4 and 5 (medium and high technology goods) were combined when looking at exports. The subscript $j = 0, 1, 2, 3$ is the type of conflict and refers to aggregate conflicts, state-based conflicts, non-state conflicts, and one-sided violence, respectively. The motivation for examining different types of conflicts is that they represent different types of problems and the policies needed to deal with violent militia groups are probably not the same as those required to rein in a heavy-handed state. The variables α_i and λ_t are fixed effects used to control for country- and time-specific effects, respectively. μ_{it} is the error term.

Trade data for exports and imports are from UN COMTRADE[9] and are organized by SITC Revision 2. The data were then aggregated into country level exports and imports for the technological categories according to Lall (2000), as well as aggregate exports and imports. Data for GDP, population, and secondary school enrolment rates are from the World Bank. The polity score is the PolityIV variable from the Polity Project.[10] Openness was calculated as $\frac{Exports + Imports}{GDP}$.

Conflict data are from the Uppsala Conflict Data Program's (UCDP) geo-referenced events dataset (Sundberg and Melander 2013; Croicu and Sundberg 2017).[11] In the data, an event is defined as "an incident where an armed force was used by an organized actor against another organized actor, or against civilians, resulting in at least 1 direct death at a specific location and on a specific date" (Croicu and Sundberg 2018). Conflict events datasets rely on media sources which have drawn criticism. For example, only events that are reported appear in the data and the data often lack details (e.g.: of exact location). Nevertheless, as Eck (2012) points out, "news reports are the only source of conflict data that are global in scope." Additionally, while

[8] For the interested reader, detailed descriptions of these categories can be found in Lall (2000). The United Nations Conference on Trade and Development (UNCTAD) also provide a description on their data website: https://unctadstat.unctad.org/en/Classifications/DimSitcRev3Products_Ldc_Hierarchy.pdf.

[9] https://comtrade.un.org.

[10] http://www.systemicpeace.org/polityproject.html.

[11] http://www.ucdp.uu.se.

UCDP does verify media reports with case-specific sources where possible, the lack of raw data on conflicts limits the availability of alternative sources (Eck 2012).[12] The issue of details is of little consequence in this analysis because the data are aggregated to the country level, by counting the total number of conflicts (and of different types of conflicts) that occurred within a country's borders, so, details like exact locations are not required.

The UCDP GED dataset has three different types of conflict: state-based conflict (between a recognized government and named group using armed force), non-state conflict (between two named groups using armed force), and one-sided violence (armed force against civilians by a recognized government/named group) (Croicu and Sundberg 2018). These are all "civil" conflicts in that they occur within a country's borders and are perpetrated by named groups belonging to the country. Events such as terrorist attacks that occur across borders are not considered. The data provide a "low," "high," and "best" estimate of the true number of deaths resulting from a conflict; although at least one death is required, conflicting or unreliable sources may result in the inclusion of an event where the best estimate is no deaths, but the high estimate is one death. This is important because the data allow the analysis of both the number of conflicts as well as the number of deaths resulting from each conflict which provide a measure of the conflict's severity. Since a fatality marks a significant change in the severity of a conflict and a more severe conflict is more likely to influence decisions of exporters and importers, the conflict variable used in Eqs. (1) and (2) is the number of conflicts for which the death count of the "best" estimate was greater than one.[13]

The data are assembled into a 25-year (unbalanced) panel from 1989 to 2014[14] and Eqs. (1) and (2) are estimated for 105 developing countries (classified as middle-, or low-income countries by the World Bank[15]) using a Fixed Effects (FE) regression. Country and year fixed effects are employed to control for unobserved heterogeneity across countries and years, as well as to help account for statistical endogeneity. To help account for the endogeneity between trade and conflict, variables on the right-hand side are lagged by one

[12] Blattman and Miguel (2010) highlight this point by concluding their review of the literature on civil war with an appeal for new and better data.

[13] This should ensure that the actual number of fatalities was at least 1 and means the fatality is more likely to have been intended.

[14] 1989 was chosen because the conflict data begin in 1989.

[15] https://datahelpdesk.worldbank.org/knowledgebase/articles/906519.

period as is standard in the literature (Bayer and Rupert 2004; Barbieri and Reuveny 2005).[16] Rather than lagging the dependent variable to control for path dependence, economic openness was used since the variables are likely to be highly correlated[17] and the literature links economic openness and dependence on trade, rather than the level of trade to conflict. Openness is lagged by an additional period to mitigate simultaneity with the conflict variable. Thus, as in Bayer and Rupert (2004), the dependent variable is in time t, conflict and the other independent variables are in time $t - 1$ and openness is in time $t - 2$.

Many of the countries in the sample trade little, while a few account for a large proportion of all trade. As a robustness check and to account for the presence of these extreme values, a quantile regression was used following the procedure suggested in Machado and Silva (2019) for estimating quantile regressions with fixed effects to control for country- and time-specific effects. The results for the quantile regressions were almost identical to the results of the Fixed Effects regressions suggesting that outliers do not affect the results.[18]

4 Results

Conflict and Export Structure

Table 1 shows the estimated results for the effect of conflicts on export structure. The first column shows the results using aggregate exports as the dependent variable and columns 2–5 each use a disaggregated technological category of exports. For brevity, the control variables are not included in the table, but their signs are generally in line with theoretical expectations.[19] In general, countries that are more open, more democratic, with larger and more educated populations and with higher incomes export more.[20]

[16] Barbieri and Reuveny (2005) state that "the simultaneity of globalization and civil war involves at least four continuous variables and one dichotomous variable. To our best knowledge, the estimation algorithms required for this analysis are not yet available."

[17] Including both resulted in openness losing significance, but did not, otherwise, alter the story of the results.

[18] Since the results for the quantile regressions do not deviate from the Fixed Effects regressions, they are not included in this chapter. Should the reader wish to see them, they can be made available by request to the authors.

[19] Full tables are provided in the appendices.

[20] In the case of primary exports, secondary education is found to have negative effects which might be explained by the fact that countries with higher average levels of education are able to shift to

Table 1 Exports and conflict regressions based on Fixed Effects (FE) estimation technique

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
Aggregate conflicts	−0.0387***	−0.0266**	0.0010	−0.0245	−0.0092
	(0.0114)	(0.0133)	(0.0171)	(0.0174)	(0.0187)
State-based Conflicts	−0.0357***	−0.0256	0.0011	−0.0162	−0.0084
	(0.0135)	(0.0159)	(0.0201)	(0.0206)	(0.0221)
Non-state conflicts	−0.0183	−0.0002	−0.0026	−0.0148	−0.0417*
	(0.0140)	(0.0170)	(0.0186)	(0.0201)	(0.0244)
One-sided violence	−0.0404***	−0.0109	0.0063	−0.0312	0.0019
	(0.0144)	(0.0166)	(0.0220)	(0.0252)	(0.0257)
Controls	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Obs	1615	1615	1615	1615	1615

Each column represents a different dependent variable: column 1 is aggregate exports and columns 2–5 are disaggregated exports
Each row represents the different conflict variable used in the equation: row 1 is aggregate conflicts and rows 2–4 are disaggregated
All variables are in logarithmic form
Robust standard errors in parenthesis: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Other controls are omitted for brevity (GDP pc, population, secondary education, polity and openness)

Full tables are provided in the appendices The effect of conflicts, the variable of interest, on aggregate exports (column 1) is negative and significant for all types of conflict except for non-state conflicts which are not significant. On average, a 1% increase in aggregate conflicts (with an estimated death toll above one) reduces exports by roughly 0.04%. The average number of aggregate conflicts per year was 52.75 for developing countries so this translates to a 2.11% decline in exports each year for these countries.[21]

processing and manufacturing (higher technology goods), and thus use their primary products for their own manufacturing rather than exporting them.

[21] The true effect is likely to be greater, as more severe conflicts will likely have greater impacts. For example, Martin et al. (2008) and Bayer and Rupert (2004) find civil wars reduce trade by more than 25%.

The findings also show that aggregate conflicts reduce primary goods exports while non-state conflicts have a negative and marginally significant effect on medium/high technology goods exports. For primary goods exports, these sectors may represent "lootable" resources which are more likely to be contested (Renner 2002; Ross 2004). Garfinkel et al. (2008) note that countries with contested resources tend to allocate more personnel and funds to these sectors by diverting them from other sectors. This inefficient allocation of funds and personnel means these countries tend to over-export contested resources. Trends in the data also show that developing countries tend to have lower exports in technology-based goods. These two facts might explain the lack of significant results for exports in Table 1.

For the effect of non-state conflicts on medium and high technology goods, which is marginally significant, this might suggest a reduced ability to shift to higher technology manufacture in countries, with this type of conflict. With respect to Table 1 overall; all types of conflict have the expected negative effects on aggregate conflicts (column 1) indicating that the first hypothesis mostly holds for aggregate conflicts. There is less evidence for disaggregated conflicts, although the sign generally remains negative across the technological categories (columns 2–5), the results are mostly insignificant. This may imply that it is the cumulative effect of conflicts, not the type of conflict, that matters for exports.

Conflict and Import Structure

Table 2 shows the results for aggregate imports in column 1, while columns 2–5 show the results for imports of goods with varying technological intensity (primary, resource-based, low-, medium- and high-technology). Control variables are omitted for brevity, but generally conform to expectations[22]; countries with higher incomes, larger populations, and greater levels of openness and democracy tend to import more.[23]

In the breakdown of different types of conflicts, all coefficients have the expected negative sign and almost all are statistically significant. This indicates that trading partners that export to countries in conflict react similarly

[22] Full tables are provided in the appendices.

[23] There is a significant negative effect of secondary education on imports of low technology manufactures. Given that the data considers only low- and middle-income countries, this may suggest that countries with higher average levels of education are more likely to produce these goods themselves, rather than import them.

Table 2 Imports and conflict regressions based on Fixed Effects (FE) estimation technique

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
Aggregate conflicts	−0.0554***	−0.0410***	−0.0428***	−0.0619***	−0.0557***	0.0534***
	(0.0103)	(0.0135)	(0.0117)	(0.0122)	(0.0114)	(0.0114)
State-based conflicts	−0.0543***	−0.0287*	−0.0422***	−0.0569***	−0.0578***	−0.0607***
	(0.0120)	(0.0150)	(0.0138)	(0.0142)	(0.0132)	(0.0130)
Non-state conflicts	−0.0441***	−0.0453**	−0.0202	−0.0554***	−0.0452***	−0.0236
	(0.0144)	(0.0216)	(0.0143)	(0.0150)	(0.0160)	(0.0186)
One-sided violence	−0.0699***	−0.0296	−0.0509***	−0.0798***	−0.0699***	−0.0774***
	(0.0142)	(0.0197)	(0.0163)	(0.0150)	(0.0151)	(0.0153)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	1615	1615	1615	1615	1615	1615

Each column represents a different dependent variable: column 1 is aggregate exports and columns 2–5 are disaggregated exports
Each row represents the different conflict variable used in the equation: row 1 is aggregate conflicts and rows 2–4 are disaggregated
All variables are in logarithmic form
Robust standard errors in parenthesis: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Other controls are omitted for brevity (GDP pc, population, secondary education, polity and openness)
Full tables are provided in the appendices

regardless of the type of conflict. The effects on technology-based manufacturing goods are slightly larger compared to the effects on primary and resource-based manufacturing goods for all types of conflicts. In other words, all conflicts increase the risk of trading for countries that export to countries in conflict thus reducing exports to these countries and the effect is larger for more complex (increasing technology) goods. This causes these exporters to look for alternative markets (Magee and Massoud 2011). The effects tend to be larger for one-sided violence and state-based conflicts compared to non-state conflicts for technology-based manufacturing imports, especially

high technology manufacturing goods. One-sided violence and state-based conflicts typically garner more ill-will in foreign countries, while non-state conflicts typically occur in more isolated regions away from economic centers. There are relatively higher effects for non-state conflicts on primary goods imports compared to other types of conflicts. If the fighting for these types of conflicts is mostly in rural areas, conflicts could reduce agricultural production increasing the need for agricultural imports, but agricultural goods are homogeneous goods. Thus, alternative markets are easier to find for such goods, exporters are more likely to search for markets with less risk for their products or countries not experiencing non-state conflicts.

5 Africa

As shown in Figs. 2 and 3, developing countries are disproportionately impacted by internal conflicts and a significant portion of conflicts occur in Africa. Africa is a continent rich in natural resources which should benefit African economies, unless, as in the case of the "resource curse," these resources become a source of conflict. Africa also has a relatively recent colonial history, that likely limits African manufactures, since colonies primarily exported raw materials back to Europe to support their own manufacturing processes. This was especially true in central Africa, where the climate was not conducive to European settlements, so colonial institutions focused solely on extracting resources, and even promoted conflicts by supporting local warlords (Acemoglu and Robinson 2012). Africa would likely gain from the importation of complex goods and technologies, as the continent continues to build and expand their manufacturing and technological capabilities. Africa, therefore, seems to be a great subsample on which to test the hypotheses of this chapter.

African Conflict and Export Structure

Table 3 shows the results for the effect of conflict on African exports. Column 1 shows the effect on aggregate exports, whilst columns 2–5 show exports for disaggregated technological categories. The other controls are included in the regressions but are omitted from the tables for brevity as in the previous section.[24]

[24] Full tables are provided in the appendices.

Table 3 Exports and conflict in Africa regressions based on Fixed Effects (FE) estimation technique

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
Aggregate conflicts	−0.0583***	−0.0307	−0.0093	−0.0750**	−0.0416
	(0.0216)	(0.0280)	(0.0365)	(0.0373)	(0.0431)
State-based conflicts	−0.0655***	−0.0398	−0.0340	−0.0287	−0.0523
	(0.0249)	(0.0331)	(0.0414)	(0.0434)	(0.0491)
Non-state conflicts	−0.0038	0.0072	0.0361	−0.0121	−0.0908
	(0.0358)	(0.0441)	(0.0435)	(0.0537)	(0.0670)
One-sided violence	−0.0208	0.0361	−0.0145	−0.0932*	−0.0098
	(0.0257)	(0.0301)	(0.0390)	(0.0478)	(0.0511)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Obs	642	642	642	642	642

Each column represents a different dependent variable: column 1 is aggregate exports and columns 2–5 are disaggregated exports
Each row represents the different conflict variable used in the equation: row 1 is aggregate conflicts and rows 2–4 are disaggregated
All variables are in logarithmic form
Robust standard errors in parenthesis: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Other controls are omitted for brevity (GDP pc, population, secondary education, polity and openness)
Full tables are provided in the appendices

The results in Table 3 are broadly similar to those of Table 1 for all developing countries. The effects of aggregate conflicts (row 1) are negative and imply that, on average, a conflict (with an estimated death toll above one) reduces exports by about 0.06%. The average number aggregate conflicts per year is 33.53 for African countries so this translates to a 1.95% decline in exports each year. Looking across technology categories, aggregate conflicts only effect low technology exports which are negative and significant while all other categories are not significant. Notably, the effect on low technology exports is larger in absolute value than the effect on aggregate exports. This suggests conflicts may impede African countries from shifting away from primary and resource-based manufacturing.

Looking at the disaggregated effects across different types of conflicts in Table 3 (rows 2–4), the results show that state-based conflicts have a significant negative effect on aggregate exports and similarly for one-sided violence on low technology exports. Similar to the results for all developing countries (Table 1), the effects on disaggregated export categories are mostly insignificant (only the marginally significant effect of one-sided violence on low technology manufactures), but all types of conflict have the expected negative effects on aggregate exports (column 1). This indicates that the first hypothesis mostly holds for aggregate conflicts, which may imply that it is the cumulative effect of conflicts, not the type of conflict, that matters for exports.

African Conflict and Import Structure

Table 4 shows the results of conflicts on aggregate African imports (column 1) and across disaggregated technological import categories (columns 2–5). Controls were omitted from the table for brevity, but their coefficients fall in line with theoretical expectations[25]; African countries with higher incomes, larger populations, and greater levels of openness and democracy tend to import more.

In column 1, the expected negative and significant effect on aggregate imports are observed for aggregate conflicts, state-based conflicts, and one-sided violence. Across technology categories (columns 2–5), there is a notable difference from Table 2 (full sample) since no significant effects on medium and high technology manufactured imports due to aggregate conflicts are found. The effects of aggregate conflicts are highest on low technology imports and appear to be quite consistent across conflicts types.

This could be important because many African countries are trying to diversify their production and export portfolio to produce more value-added higher technology manufactures; a critical component for promoting sustainable growth and economic transformation in African countries (Elhiraika and Mbate 2014). An important part of this process is technology transfer, whereby countries import higher technology goods to improve their manufacturing and to learn to replicate these technologies. Thus, the results suggest a reduced willingness to send goods to African countries when conflicts occur, owing to increased risk. This may limit African countries' ability to make use

[25] Full tables are provided in the appendices.

Table 4 Imports and conflict in Africa regressions based on Fixed Effects (FE) estimation technique

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
All conflicts	−0.0475**	−0.0520*	−0.0369*	−0.0567***	−0.0335	−0.0269
	(0.0187)	(0.0279)	(0.0216)	(0.0179)	(0.0205)	(0.0196)
State-based conflicts	−0.0547***	−0.0510*	−0.0364	−0.0604***	−0.0454**	−0.0381*
	(0.0206)	(0.0301)	(0.0238)	(0.0186)	(0.0226)	(0.0220)
Non-state conflicts	−0.0031	−0.0159	0.0182	−0.0222	−0.0038	0.0396
	(0.0319)	(0.0518)	(0.0327)	(0.0300)	(0.0326)	(0.0356)
One-sided violence	−0.0442**	−0.0263	−0.0377	−0.0611***	−0.0227	−0.0312
	(0.0222)	(0.0323)	(0.0239)	(0.0228)	(0.0243)	(0.0239)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	642	642	642	642	642	642

Each column represents a different dependent variable: column 1 is aggregate exports and columns 2–5 are disaggregated exports
Each row represents the different conflict variable used in the equation: row 1 is aggregate conflicts and rows 2–4 are disaggregated
All variables are in logarithmic form
Robust standard errors in parenthesis: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$
Other controls are omitted for brevity (GDP pc, population, secondary education, polity and openness)
Full tables are provided in the appendices

of technology transfer in order to shift their production to higher technology manufactures and contribute to the relatively large negative effect of aggregate conflicts on low technology exports in Africa.

Among the effects of disaggregated conflicts, it is worth noting that state-based conflicts have a significant negative effect on medium and high technology manufactured imports. This negative effect for state-based conflicts seems to be decreasing in absolute value across increasing technology imports. Non-state conflicts appear to have no relevant impact on African imports, as the results are not significant. The overall results indicate that state-based

conflicts and one-sided violence increase the risk of exporting to African country thus decreasing a country's willingness to export their manufactured goods to the continent. This appears to be especially true for African countries that have state-based conflicts and the effect filters into medium and high technology exports to the region.

6 Conclusion

This chapter adds to the literature on trade and internal conflict by examining the effects of internal conflicts on the export and import structures of developing countries. Two hypotheses were tested: that internal conflicts impede shifts to manufacturing and that they reduce the willingness to send higher technology goods to countries experiencing internal conflicts. Using a 25-year (unbalanced) panel data set on middle- and low-income countries. The empirical results find that conflicts reduce aggregate exports and find some evidence that they impede shifts to manufacturing in Africa. There is also strong evidence that conflicts reduce imports of all technological categories and some evidence that this effect may be greater for complex goods. Internal conflicts reduce willingness to send goods of all technological categories, but there is only weak evidence that this effect is greater for more complex goods. The effects were broadly similar across the different types of conflicts. The results suggest conflicts are inhibiting technology transfer in the developing world, and export-led growth in Africa, thus blocking important avenues for development.

From a policy perspective, it is recommended that countries focus on achieving stability first since development retards war (Magee and Massoud 2011). A stable environment would enable countries to shift to manufacturing and foster openness and growth. Furthermore, from a regional and international policy perspective, it would benefit regional and global communities to aid countries experiencing internal conflicts. This is because the spill-overs from local conflicts have international consequences and, as Collier et al. (2003) argues, these countries may be trapped in a cycle of low development and conflict, thereby unable to help themselves.

Appendix A

See Tables 5, 6, and 7.

Table 5 List of countries used in regressions

Albania	Dominican Republic	Lesotho*	Russia
Algeria*	Ecuador	Liberia*	Rwanda*
Angola*	Egypt*	Libya*	Senegal*
Armenia	El Salvador	Madagascar*	Sierra Leone*
Azerbaijan	Equatorial Guinea*	Malawi*	Solomon Islands
Bangladesh	Eritrea*	Malaysia	South Africa*
Belarus	Ethiopia*	Mali*	Sri Lanka
Benin*	Fiji	Mauritania*	Sudan*
Bhutan	Gabon*	Mauritius*	Suriname
Bolivia	Gambia*	Mexico	Swaziland*
Botswana*	Georgia	Moldova	Tajikistan
Brazil	Ghana*	Mongolia	Tanzania*
Bulgaria	Guinea*	Morocco*	Thailand
Burkina Faso*	Guinea Bissau*	Mozambique*	Togo*
Burundi*	Guatemala	Myanmar	Tunisia*
Cambodia	Guyana	Namibia*	Turkey
Cameroon*	Honduras	Nepal	Uganda*
Cape Verde*	India	Nicaragua	Ukraine
Central African Republic*	Indonesia	Niger*	Uzbekistan
Chad*	Iran	Nigeria*	Venezuela
China	Jamaica	Pakistan	Vietnam
Colombia	Jordan	Papua New Guinea	Yemen
Comoros*	Kazakhstan	Paraguay	Zambia*
Costa Rica	Kenya*	Peru	Zimbabwe*
Cuba	Kyrgyzstan	Philippines	
Democratic Republic of Congo*	Laos	Republic of Congo*	
Djibouti*	Lebanon	Romania	

105 countries classified as low- and middle-income by the World Bank were used. Countries in the African subsample are marked with a *

Table 6 Hausman specification test

Exports	Hausman Test *p*-value
Aggregate Conflicts	0.000
State-Based Conflicts	0.000
Non-State Conflicts	0.000
One-Sided Violence	0.000
Imports	*Hausman Test p-value*
Aggregate Conflicts	0.000
State-Based Conflicts	0.000
Non-State Conflicts	0.000
Exports, One-Sided Violence	0.000
RE is consistent only under the null hypothesis	
FE is consistent under both the null and the alternative hypotheses	

Since the *p*-value indicates a rejection of the null hypothesis at all standard significance levels, the tests indicate FE is the preferred framework for all models

Table 7 Stationarity tests

Variable	*P*-value
Exports	0.000
Imports	0.000
Conflict	0.000
GDP pc	0.000
Population	0.000
Secondary Education	0.000
Polity	0.000
Openness	0.000
Null hypothesis: All panels contain a unit root (non-stationary)	
Alternative hypothesis: At least one panel is stationary	
Note: All variables are in logarithmic form	

The test used was the Fisher IPS (Dickey Fuller) test, with 3 lags. Since the panel is unbalanced, variables could not be tested for all panels. Nevertheless, all variables could be tested. The *p*-values indicate that there is evidence for stationarity in at least one panel for all variables

Appendix B—Full Regression Tables for Developing Countries

Exports and Conflict Regressions Based on Fixed Effects (FE) Estimation Technique

See Tables 8, 9, 10, 11, 12, 13, 14, and 15.

Table 8 Exports and aggregate conflicts

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
Aggregate conflicts	−0.0387***	−0.0266**	0.0010	−0.0245	−0.0092
	(0.0114)	(0.0133)	(0.0171)	(0.0174)	(0.0187)
GDP per capita	1.0030***	1.2487***	0.5470***	0.8363***	0.9874***
	(0.0822)	(0.1504)	(0.1296)	(0.1372)	(0.1323)
Population	0.5424***	0.5383	0.2256	1.0428***	0.5962*
	(0.1944)	(0.3318)	(0.3604)	(0.3495)	(0.3458)
Secondary Education	0.0967	−0.1958*	0.0052	0.0689	0.1791
	(0.0782)	(0.1014)	(0.1257)	(0.1264)	(0.1403)
PolityIV	0.0581	0.1241*	0.0848	0.1433*	−0.0717
	(0.0536)	(0.0709)	(0.0674)	(0.0736)	(0.0640)
Openness (lag)	0.3675***	0.3646***	0.4473***	0.4566***	0.2477***
	(0.0373)	(0.0472)	(0.0505)	(0.0431)	(0.0482)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.968	0.949	0.941	0.961	0.950
Obs	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 9 Exports and state-based conflicts

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
State-based conflicts	−0.0357***	−0.0256	0.0011	−0.0162	−0.0084
	(0.0135)	(0.0159)	(0.0201)	(0.0206)	(0.0221)
GDP per capita	1.0093***	1.2527***	0.5469***	0.8424***	0.9889***
	(0.0820)	(0.1497)	(0.1292)	(0.1374)	(0.1320)
Population	0.5598***	0.5508*	0.2251	1.0506***	0.6002*
	(0.1947)	(0.3319)	(0.3608)	(0.3511)	(0.3469)
Secondary Education	0.0938	−0.1980*	0.0053	0.0686	0.1785
	(0.0786)	(0.1017)	(0.1261)	(0.1268)	(0.1404)
PolityIV	0.0589	0.1243*	0.0848	0.1455**	−0.0714
	(0.0537)	(0.0710)	(0.0673)	(0.0734)	(0.0642)
Openness (lag)	0.3677***	0.3647***	0.4473***	0.4571***	0.2477***
	(0.0374)	(0.0473)	(0.0505)	(0.0432)	(0.0481)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.968	0.949	0.941	0.961	0.950
Obs	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 10 Exports and non-state conflicts

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
Non-state conflicts	−0.0183	−0.0002	−0.0026	−0.0148	−0.0417*
	(0.0140)	(0.0170)	(0.0186)	(0.0201)	(0.0244)
GDP pc	1.0188***	1.2610***	0.5462***	0.8459***	0.9868***
	(0.0814)	(0.1488)	(0.1287)	(0.1377)	(0.1325)
Population	0.5484***	0.5378	0.2267	1.0479***	0.6115*
	(0.1957)	(0.3319)	(0.3605)	(0.3501)	(0.3460)
Secondary education	0.1024	−0.1917*	0.0050	0.0725	0.1801
	(0.0779)	(0.1012)	(0.1255)	(0.1263)	(0.1400)
PolityIV	0.0712	0.1314*	0.0849	0.1520**	−0.0635
	(0.0536)	(0.0708)	(0.0679)	(0.0735)	(0.0637)
Openness (lag)	0.3697***	0.3664***	0.4471***	0.4579***	0.2475***
	(0.0375)	(0.0474)	(0.0506)	(0.0433)	(0.0483)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.968	0.949	0.941	0.961	0.950
Obs	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 11 Exports and one-sided violence

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
One-sided violence	−0.0404***	−0.0109	0.0063	−0.0312	0.0019
	(0.0144)	(0.0166)	(0.0220)	(0.0252)	(0.0257)
GDP per capita	1.0078***	1.2575***	0.5486***	0.8376***	0.9922***
	(0.0818)	(0.1495)	(0.1297)	(0.1368)	(0.1318)
Population	0.5356***	0.5362	0.2266	1.0377***	0.5963*
	(0.1952)	(0.3320)	(0.3602)	(0.3488)	(0.3450)
Secondary education	0.1018	−0.1919*	0.0052	0.0720	0.1806
	(0.0775)	(0.1012)	(0.1255)	(0.1261)	(0.1401)
PolityIV	0.0603	0.1291*	0.0858	0.1435*	−0.0688
	(0.0536)	(0.0710)	(0.0677)	(0.0737)	(0.0637)
Openness (lag)	0.3705***	0.3665***	0.4471***	0.4585***	0.2483***
	(0.0373)	(0.0473)	(0.0506)	(0.0433)	(0.0483)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.968	0.949	0.941	0.961	0.950
Obs	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 12 Imports and aggregate conflicts

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
Aggregate conflicts	−0.0554***	−0.0410***	−0.0428***	−0.0619***	−0.0557***	−0.0534***
	(0.0103)	(0.0135)	(0.0117)	(0.0122)	(0.0114)	(0.0114)
GDP per capita	0.6318***	0.4597***	0.5278***	0.6433***	0.7508***	0.6403***
	(0.0694)	(0.1103)	(0.0867)	(0.0833)	(0.0817)	(0.0986)
Population	0.3083*	0.2324	0.2251	0.2396	0.2864	−0.0955
	(0.1764)	(0.2530)	(0.2002)	(0.1999)	(0.2125)	(0.2104)
Secondary education	−0.1054	−0.0804	−0.0433	−0.2959***	−0.1026	−0.0522
	(0.0650)	(0.0930)	(0.0758)	(0.0723)	(0.0755)	(0.0730)
PolityIV	0.0845	0.0392	0.1089*	0.1408**	0.0880	0.0135
	(0.0563)	(0.0851)	(0.0645)	(0.0588)	(0.0551)	(0.0563)
Openness (lag)	0.3802***	0.4356***	0.3839***	0.3922***	0.3865***	0.3187***
	(0.0348)	(0.0516)	(0.0396)	(0.0343)	(0.0368)	(0.0351)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.965	0.950	0.947	0.955	0.957	0.962
Obs	1615	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12 Imports and state-based conflicts

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
State-based Conflicts	−0.0543***	−0.0287*	−0.0422***	−0.0569***	−0.0578***	−0.0607***
	(0.0120)	(0.0150)	(0.0138)	(0.0142)	(0.0132)	(0.0130)
GDP per capita	0.6398***	0.4693***	0.5338***	0.6534***	0.7577***	0.6452***
	(0.0696)	(0.1104)	(0.0869)	(0.0837)	(0.0813)	(0.0990)
Population	0.3348*	0.2461	0.2457	0.2673	0.3147	− 0.0656
	(0.1770)	(0.2535)	(0.2011)	(0.2011)	(0.2126)	(0.2107)
Secondary education	−0.1103*	−0.0812	−0.0472	−0.3005***	−0.1084	−0.0591
	(0.0653)	(0.0930)	(0.0762)	(0.0728)	(0.0758)	(0.0733)
PolityIV	0.0848	0.0425	0.1090*	0.1421**	0.0873	0.0115
	(0.0564)	(0.0853)	(0.0645)	(0.0589)	(0.0552)	(0.0564)
Openness (lag)	0.3802***	0.4364***	0.3839***	0.3925***	0.3863***	0.3182***
	(0.0349)	(0.0517)	(0.0396)	(0.0344)	(0.0368)	(0.0351)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.965	0.950	0.947	0.955	0.957	0.962
Obs	1615	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 14 Imports and non-state conflicts

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
Non-state conflicts	−0.0441***	−0.0453**	−0.0202	−0.0554***	−0.0452***	−0.0236
	(0.0144)	(0.0216)	(0.0143)	(0.0150)	(0.0160)	(0.0186)
GDP per capita	0.6523***	0.4734***	0.5452***	0.6656***	0.7713***	0.6622***
	(0.0694)	(0.1098)	(0.0869)	(0.0833)	(0.0806)	(0.0995)
Population	0.3236*	0.2484	0.2318	0.2590	0.3021	−0.0878
	(0.1791)	(0.2537)	(0.2031)	(0.2035)	(0.2148)	(0.2132)
Secondary education	−0.0974	−0.0746	−0.0370	−0.2870***	−0.0946	−0.0443
	(0.0658)	(0.0932)	(0.0764)	(0.0731)	(0.0762)	(0.0736)
PolityIV	0.1057*	0.0566	0.1234*	0.1653***	0.1094**	0.0314
	(0.0562)	(0.0847)	(0.0642)	(0.0585)	(0.0554)	(0.0562)
Openness (lag)	0.3830***	0.4374***	0.3863***	0.3952***	0.3893***	0.3218***
	(0.0353)	(0.0518)	(0.0398)	(0.0352)	(0.0374)	(0.0356)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.964	0.950	0.947	0.954	0.957	0.962
Obs	1615	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 15 Imports one-sided violence

	Dependent variables					
	Imports	Primary	RB Manu	Low Tech	Med. Tech	High Tech
One-sided violence	−0.0699***	−0.0296	−0.0509***	−0.0798***	−0.0699***	−0.0774***
	(0.0142)	(0.0197)	(0.0163)	(0.0150)	(0.0151)	(0.0153)
GDP per capita	0.6348***	0.4690***	0.5311***	0.6462***	0.7539***	0.6399***
	(0.0690)	(0.1104)	(0.0868)	(0.0829)	(0.0809)	(0.0984)
Population	0.2967*	0.2271	0.2167	0.2264	0.2748	−0.1081
	(0.1766)	(0.2532)	(0.2006)	(0.2003)	(0.2129)	(0.2102)
Secondary Education	−0.0982	−0.0747	−0.0377	−0.2879***	−0.0954	−0.0455
	(0.0649)	(0.0930)	(0.0756)	(0.0724)	(0.0753)	(0.0724)
PolityIV	0.0852	0.0443	0.1101*	0.1412**	0.0887	0.0121
	(0.0562)	(0.0850)	(0.0644)	(0.0588)	(0.0552)	(0.0561)
Openness (lag)	0.3846***	0.4386***	0.3873***	0.3972***	0.3909***	0.3231***
	(0.0348)	(0.0516)	(0.0395)	(0.0346)	(0.0369)	(0.0350)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.965	0.950	0.947	0.955	0.957	0.962
Obs	1615	1615	1615	1615	1615	1615

All variables in logarithmic form. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix C—Full Regression Tables for African Countries

Exports and Conflict in Africa Regressions Based on Fixed Effects (FE) Estimation Technique

See Tables 16, 17, 18, 19, 20, 21, 22, and 23.

Table 16 Exports and aggregate conflicts in Africa

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high Technology
Aggregate conflicts	−0.0583***	−0.0307	−0.0093	−0.0750**	−0.0416
	(0.0216)	(0.0280)	(0.0365)	(0.0373)	(0.0431)
GDP per capita	1.3110***	1.7377***	0.4194**	0.7260***	1.2754***
	(0.1085)	(0.1412)	(0.1806)	(0.1728)	(0.1674)
Population	3.4536***	2.3742***	1.4291	4.3156***	2.9480***
	(0.4362)	(0.6763)	(0.9501)	(0.6571)	(0.8185)
Secondary education	0.0811	−0.3242**	0.1647	0.4448***	−0.0360
	(0.1102)	(0.1442)	(0.2118)	(0.1622)	(0.2260)
PolityIV	0.2460***	0.1418	0.2634*	−0.1584	−0.1222
	(0.0864)	(0.1116)	(0.1440)	(0.1097)	(0.1289)
Openness (lag2)	0.0410	−0.0049	0.3853***	0.0277	−0.0831
	(0.0599)	(0.0742)	(0.0898)	(0.0719)	(0.0940)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.952	0.940	0.908	0.949	0.889
Obs	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 17 Exports and state-based conflicts in Africa

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufacturing	Low technology	Medium and high technology
Conflict	−0.0655***	−0.0398	−0.0340	−0.0287	−0.0523
	(0.0249)	(0.0331)	(0.0414)	(0.0434)	(0.0491)
GDP per capita	1.3182***	1.7400***	0.4138**	0.7513***	1.2790***
	(0.1089)	(0.1401)	(0.1800)	(0.1752)	(0.1679)
Population	3.4969***	2.3994***	1.4463	4.3472***	2.9814***
	(0.4387)	(0.6778)	(0.9540)	(0.6586)	(0.8257)
Secondary education	0.0736	−0.3290**	0.1598	0.4440***	−0.0422
	(0.1108)	(0.1444)	(0.2126)	(0.1643)	(0.2265)
PolityIV	0.2487***	0.1416	0.2566*	-0.1378	−0.1220
	(0.0872)	(0.1122)	(0.1446)	(0.1095)	(0.1298)
Openness (lag2)	0.0405	-0.0050	0.3859***	0.0255	−0.0833
	(0.0598)	(0.0741)	(0.0894)	(0.0724)	(0.0939)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.952	0.940	0.908	0.948	0.889
Obs	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 18 Exports and non-state conflicts in Africa

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufacturing	Low technology	Medium and high technology
Non-state conflicts	−0.0038	0.0072	0.0361	−0.0121	−0.0908
	(0.0358)	(0.0441)	(0.0435)	(0.0537)	(0.0670)
GDP per capita	1.3371***	1.7515***	0.4235**	0.7595***	1.2941***
	(0.1097)	(0.1386)	(0.1785)	(0.1754)	(0.1671)
Population	3.4723***	2.3747***	1.3944	4.3472***	3.0518***
	(0.4414)	(0.6789)	(0.9603)	(0.6644)	(0.8229)
Secondary education	0.0838	−0.3224**	0.1667	0.4480***	−0.0378
	(0.1108)	(0.1441)	(0.2116)	(0.1645)	(0.2254)
PolityIV	0.2691***	0.1535	0.2655*	−0.1284	−0.1018
	(0.0866)	(0.1111)	(0.1436)	(0.1095)	(0.1272)
Openness (lag2)	0.0386	−0.0059	0.3863***	0.0242	−0.0882
	(0.0608)	(0.0741)	(0.0900)	(0.0727)	(0.0944)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.951	0.940	0.908	0.948	0.889
Obs	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 19 Exports and one-sided violence in Africa

	Dependent variables				
	Aggregate exports	Primary goods exports	Resource-based manufactures	Low technology	Medium and high technology
One-sided violence	−0.0208	0.0361	−0.0145	−0.0932*	−0.0098
	(0.0257)	(0.0301)	(0.0390)	(0.0478)	(0.0511)
GDP per capita	1.3243***	1.7736***	0.4147**	0.7025***	1.2881***
	(0.1103)	(0.1385)	(0.1813)	(0.1719)	(0.1647)
Population	3.4556***	2.4044***	1.4225	4.2772***	2.9526***
	(0.4391)	(0.6793)	(0.9487)	(0.6518)	(0.8120)
Secondary Education	0.0814	−0.3183**	0.1634	0.4372***	-0.0351
	(0.1104)	(0.1438)	(0.2118)	(0.1622)	(0.2261)
PolityIV	0.2627***	0.1647	0.2627*	−0.1569	−0.1087
	(0.0871)	(0.1123)	(0.1446)	(0.1104)	(0.1283)
Openness (lag2)	0.0390	−0.0067	0.3852***	0.0261	−0.0846
	(0.0606)	(0.0740)	(0.0899)	(0.0717)	(0.0943)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.951	0.940	0.908	0.949	0.889
Obs	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20 Imports and aggregate conflicts in Africa

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
Aggregate conflicts	−0.0475**	−0.0520*	−0.0369*	−0.0567***	−0.0335	−0.0269
	(0.0187)	(0.0279)	(0.0216)	(0.0179)	(0.0205)	(0.0196)
GDP per capita	0.6833***	0.2989**	0.4435***	0.7493***	0.8376***	0.5646***
	(0.0838)	(0.1273)	(0.1036)	(0.0921)	(0.1067)	(0.1326)
Population	2.4003***	1.6626***	1.9140***	2.3343***	2.8782***	2.4462***
	(0.3671)	(0.4999)	(0.4367)	(0.3879)	(0.4163)	(0.3771)
Secondary Education	0.0960	– 0.0636	0.1743*	0.0845	0.1161	0.1741*
	(0.0953)	(0.1317)	(0.1048)	(0.0861)	(0.1170)	(0.0995)
PolityIV	0.1220*	−0.0623	0.0068	0.2975***	0.1206	0.1784**
	(0.0671)	(0.1005)	(0.0749)	(0.0746)	(0.0758)	(0.0715)
Openness (lag2)	0.1202*	0.1781*	0.1257	0.1534***	0.0502	0.0797
	(0.0622)	(0.0907)	(0.0814)	(0.0571)	(0.0703)	(0.0552)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.944	0.922	0.909	0.946	0.932	0.943
Obs	642	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21 Imports and state-based conflicts in Africa

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
State-based conflicts	−0.0547***	−0.0510*	−0.0364	−0.0604***	−0.0454**	−0.0381*
	(0.0206)	(0.0301)	(0.0238)	(0.0186)	(0.0226)	(0.0220)
GDP per capita	0.6888***	0.3074**	0.4495***	0.7572***	0.8395***	0.5656***
	(0.0842)	(0.1275)	(0.1043)	(0.0923)	(0.1063)	(0.1329)
Population	2.4363***	1.6980***	1.9393***	2.3750***	2.9065***	2.4696***
	(0.3699)	(0.5061)	(0.4402)	(0.3923)	(0.4174)	(0.3797)
Secondary Education	0.0897	−0.0691	0.1703	0.0777	0.1105	0.1694*
	(0.0955)	(0.1318)	(0.1053)	(0.0861)	(0.1171)	(0.0998)
PolityIV	0.1237*	−0.0576	0.0100	0.3011***	0.1197	0.1772**
	(0.0670)	(0.1007)	(0.0746)	(0.0749)	(0.0757)	(0.0716)
Openness (lag2)	0.1198*	0.1775*	0.1253	0.1528***	0.0502	0.0797
	(0.0623)	(0.0910)	(0.0815)	(0.0572)	(0.0703)	(0.0553)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.944	0.922	0.908	0.946	0.932	0.943
Obs	642	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 22 Imports and non-state conflicts in Africa

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium. technology	High technology
Non-state conflicts	−0.0031	−0.0159	0.0182	−0.0222	−0.0038	0.0396
	(0.0319)	(0.0518)	(0.0327)	(0.0300)	(0.0326)	(0.0356)
GDP per capita	0.7046***	0.3221**	0.4600***	0.7746***	0.8526***	0.5766***
	(0.0835)	(0.1259)	(0.1044)	(0.0927)	(0.1048)	(0.1317)
Population	2.4157***	1.6922***	1.9048***	2.3716***	2.8907***	2.4124***
	(0.3733)	(0.5134)	(0.4426)	(0.3964)	(0.4200)	(0.3799)
Secondary education	0.0983	−0.0617	0.1769*	0.0864	0.1176	0.1771*
	(0.0961)	(0.1325)	(0.1052)	(0.0868)	(0.1173)	(0.0993)
PolityIV	0.1408**	-0.0411	0.0205	0.3207***	0.1339*	0.1872***
	(0.0664)	(0.0994)	(0.0738)	(0.0742)	(0.0752)	(0.0703)
Openness (lag2)	0.1182*	0.1754*	0.1249	0.1503***	0.0488	0.0802
	(0.0626)	(0.0913)	(0.0815)	(0.0576)	(0.0706)	(0.0555)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.943	0.921	0.908	0.946	0.932	0.942
Obs	642	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 23 Imports and one-sided violence in Africa

	Dependent variables					
	Aggregate imports	Primary goods imports	Resource-based manufactures	Low technology	Medium technology	High technology
One-sided violence	−0.0442**	−0.0263	−0.0377	−0.0611***	−0.0227	−0.0312
	(0.0222)	(0.0323)	(0.0239)	(0.0228)	(0.0243)	(0.0239)
GDP per capita	0.6775***	0.3060**	0.4370***	0.7372***	0.8387***	0.5575***
	(0.0830)	(0.1256)	(0.1031)	(0.0934)	(0.1066)	(0.1321)
Population	2.3851***	1.6596***	1.9002***	2.3110***	2.8728***	2.4338***
	(0.3663)	(0.4983)	(0.4356)	(0.3884)	(0.4161)	(0.3748)
Secondary education	0.0930	– 0.0642	0.1715	0.0799	0.1150	0.1716*
	(0.0956)	(0.1325)	(0.1051)	(0.0860)	(0.1175)	(0.0992)
PolityIV	0.1274*	-0.0497	0.0100	0.3014***	0.1270*	0.1796**
	(0.0668)	(0.1000)	(0.0746)	(0.0742)	(0.0756)	(0.0712)
Openness (lag2)	0.1190*	0.1764*	0.1248	0.1520***	0.0493	0.0791
	(0.0622)	(0.0909)	(0.0812)	(0.0571)	(0.0704)	(0.0550)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.944	0.921	0.908	0.946	0.932	0.943
Obs	642	642	642	642	642	642

All variables in logarithmic form. Standard errors in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

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