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Economic Growth and Financial Development

Effects of Capital Flight in Emerging Economies

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We would like to dedicate this book to our parents, teachers and all those who have supported us throughout our careers.

Preface

Financial Development, Economic Growth and Capital Flight in the Era of Financial Crisis

The most recent financial crisis of 2008/2009 marks an opportunity to reassess the relationship between financial development and economic growth. The financial crisis brought to light the significance of capital flight in the economic growth process and the prospect of a potential capital flight transmission channel in that process. With the ever-increasing cross-country synchronization of financial markets and economic activity and the fact that the health of emerging markets determined by the ups and downs in developed economies' financial markets explain the subsequent emerging markets' financial turmoil and recession. The scale of volatile capital flight is a cause of concern in emerging economies, particularly for their negative and destabilizing effect on financial stability and economic growth. Capital flight can deprive the economies of desperately needed financial resources which leads to multiplied effect on the entire economy. Episodes of capital flows related financial and economic crisis, such as the Asian financial crisis of 1997/1998, further heighten such concerns. Capital flight might be caused by not only economic and financial crisis but also political turmoil—Argentina, for instance, has persistent capital flight for many years due to a hyperinflation and a depreciating domestic currency. The low-interest rate environment which involves borrowing in low-interest rate currencies and investing in possibly higher-return financial assets and derivatives such as emerging market equities and below-investment level bonds can also trigger capital flight.

In contrast to the generally negative perception of the role that capital flight plays in the growth process, there seems to be a split between researchers on the channel by which capital flight affects the entire financial system and economic growth. The question remains unanswered is the mechanism by which capital flight affects financial development and economic growth. A large and sudden reduction in the demand for assets located in a country to avoid country-specific risks could

potentially have impact on interest rates and the stability of domestic currency as well as other host of macroeconomic indicators. Considering the heterogeneous nature of capital flows, it may not be rationale to group them together in investigating the impact of capital flight on the financial system and particularly on economic growth. Direct investment and portfolio investment are basically different types of investment and different from foreign debt which creates liabilities that must be repaid. Therefore, there is no rationale why different types of capital flight have the same effect on the financial system and economic growth.

For that reason, we consider it necessary to advance in this line by introducing a new book, in order to collect fresh theoretical insight and empirical evidence. This book is seeking to present a wide group of theoretical and empirical studies focused on the relationship between financial development and economic growth with capital flight in the era of financial crisis. This book explores the relationship between financial development, economic growth and the possibility of a potential capital flight in the transmission process. This book is interested in exploring the important role that financial institutions, financial markets and country-level institutional factors play in economics growth and their impact on capital flight in emerging and developing economies. The main benefit of book is to provide new insights into the relationship between financial development, economic growth with empirical evidence not only to economists but also to policy and decision-makers.

Beijing, China — Muhammad Shahbaz
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About the Book

The 12 chapters included in this book have explored different issues relating to financial development, economic growth and capital flight. Chapter "Financial Inclusion in Developing Countries: Applying Financial Technology as a Panacea" examines the role of financial technology in resolving the problem of financial inclusion that the traditional banks failed to address in developing countries such as Kenya, Uganda, South Africa and Nigeria. The chapter investigates the extent to which the adoption of these financial technologies has assisted in promoting financial inclusion in the region, suggesting that financial technology should be used as a means of driving financial development in developing countries as it offers a more sustainable and cost-effective solution to the problem of financial inclusion. Chapter "Revisiting the East Asian Financial Crises: Lessons from Ethics and Development Patterns" offers a conceptual contribution to development economics and financial development literature by reviewing the East Asian development path through an ethical interpretation. The chapter reviews the policies and historical bases of development path of East Asia, outlining its determinants by emphasizing the importance of ethics in the development process of the Far East.

Chapter "Financial Development and Natural Resources Rents-Human Capital Nexus: A New Approach" examines the major impact of financial development which has been neglected during the process of accessing resource-based sustainable economic growth. Human capital is a critical precondition for economic development. This chapter is focused on human capital accumulation among other types of capital in Iran (as one of the major resource-rich countries) and whether the development of financial system improves the effect of natural resources rents on human capital accumulation in Iran. Chapter "Financial Inclusion Leads to Export Market Penetration: A Panel Study on Asian and African Countries" investigates how financial inclusion can increase the export markets internationally, benefit the poor who cannot use formal financial services. Financial inclusion is an intrusion policy that inquires to control the market friction that hampers the markets from working in support of the poor and neglected. This chapter examines the effect of financial inclusion on export market penetration for the panel of 31 developing Asian and

African countries during the period 2004–2015. The chapter also estimates the effect of other relevant macroeconomic factors like economic development, employment, inflation and regulatory quality of institutions on export market penetration simultaneously.

Chapter "Is Finance-Growth Nexus Nonlinear: Evidence from Linear and Nonlinear Causality Analysis" assesses the finance-growth nexus which has widely been theoretically and empirically debated in existing literature for the context of developed and developing countries. There have been different views on the importance of financial development on economic growth. But the most popular view is that an efficient financial system can deliver the desired level of economic growth. This chapter examines the direction of causality between financial development and economic growth in 44 developed and developing countries for the period of 1965–2016 by incorporating the income level and inflation level for studying finance-growth nexus in a linear and nonlinear causality testing framework. Chapter "Effectiveness of Macroprudential Policies: Panel Data Evidence on the Role of Institutions, Financial Structure and Banking Regulations" explores the effectiveness of macro-prudential policies to mitigate credit cycles and reduce capital flow volatility that is at the centre of policy debates. This chapter investigates the factors which influence the effectiveness of macroprudential tools by focusing on institutions, financial structure and banking sector regulations.

Chapter "Financial Liberalization, Economic Growth and Capital Flight: The Case of Pakistan Economy" takes a historical overview of financial liberalization and its subsequent impact on economic growth in Pakistan. An assessment of foreign capital flight in the context of financial liberalization between 1972 and 2015 and its association with economic growth is introduced in this chapter. In addition, the evolution of Pakistan's exchange and trade control regimes during different phases is reviewed offering specific policy recommendations. Chapter "Financial Liberalization, Capital Movements, and Economic Growth in Asia: A Panel Structural VAR Approach" explores how foreign capital flows are recognized as one of the most important channels of financial globalization and as the engine of economic growth. Due to their large externalities in both developing and developed countries, financial globalization has been strongly increasing and causing worldwide growth This chapter analyses the impact of capital flows on the economies of certain Asian countries by examining whether capital flows promote the economic performance of these Asian countries.

Chapter "Financial Development-Economic Growth Nexus: Theoretical Underpinnings, Empirical Evidence and Critical Reflections" draws evidence from extant literature to discuss the nexus between FD and EG and provides insights on underlying theories, empirical evidence, methodologies adopted in prior studies that investigate and explain the relationship. The chapter also contextualizes the nexus in terms of the Islamic Banking Sector and provides a comparison of the contextualization in Conventional Banking System. Chapter "New Insights on the Trading Volume-Return Relationship: Evidence from the Three Largest Stock Exchanges" uncovers new insights on the dynamic volume–return relationship. This chapter examines whether non-informational or informational trading can

explain the volume–return relation in the three largest stock exchanges. The cross-quantilogram approach is applied in this chapter to investigate the directional predictability from volume to returns across different market states,

Chapter "Corporate Social Responsibility Practices of Multinational Companies and Sustainable Development: An Economic Perspective" explores the conception of CSR practices and its contribution in sustainable development through effective utilization of natural reserves by MNCs, it justifies the need for sustainability and environmental change in society. Therefore, this chapter highlighted the crucial connotations of CSR, sustainable development and its alignment with the agendas of a triple bottom line to achieve the wider impact of CSR. Finally, Chapter "Investigating the Impact Natural Resource Abundance on Capital Flight: Evidence from African Countries" aims to investigate the impact of natural resource abundance on capital flight in 10 African countries. For this purpose, the effects of natural resources rents, corruption index, total external debt stocks and exchange rate on capital flight are examined between 1990 and 2015 using second-generation panel data methodologies to take into account the possible cross-sectional dependence among selected African countries.

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Financial Inclusion in Developing Countries: Applying Financial Technology as a Panacea

Araniyar Isukul and Ben Tantua

1 Introduction

The traditional banking business is focused on dispensing long-term loanable funds through the issuance of short-term dated deposits, a process that is aptly described as borrowing short with the intention of lending long (Edward & Mishkin, 1995). In more recent years, economic forces have weakened the traditional role played by banks as financial intermediators. Consequently, deposits have continued to decrease in importance as a source of funds for financial intermediaries (Wagner, 2012). Furthermore, profits of traditional banks earned from business lending have steadily declined in recent years. In developing countries, the traditional banking business tends to be out of reach for the rural poor as operating functional bank business offices is not a profitable and viable option (Visconti, 2016). Banking offices tend to need a significant amount of investment in capital, resources, equipment, and logistics to run efficiently. All these come at a great cost, and as such banks in developing countries tend to shun rural and suburban areas. To make matters worse, the traditional banking system tends to be unfit for the men and women in developing countries who are semiliterate and poor with no resources to guarantee loans, if the need to obtain one from a bank arises (Benamati et al., 2010).

The limited outreach of traditional banks in rural and suburban areas is largely as a result of inadequate infrastructure, low levels of income, high levels of illiteracy, inflationary challenges, governance challenges, and high transaction costs as well as limited competition amongst the banking industry (Edward & Mishkin, 1995;

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Visconti, 2016). Currently, financial exclusion figures for developing countries in Africa are shocking. In total, only an estimated 25% of adults in Africa own an account in a formal financial institution. This figure is not unilateral, within Africa, there appears to be a large variation in formal account ownership ranging from 44% in South Africa to 8% in Central Africa. In the Central African Republic and the Democratic Republic of Congo, more than 93% of adults are unbanked (i.e., do not have a bank account at a formal financial institution). In North Africa, a similar disparity occurs with an estimated 24% of adults having an account in a formal financial institution with regards to the range, 40% in Morocco to 11% in Egypt. Men appear to be more likely than women to own a bank account at a financial institution (Demirgüç-Kunt et al., 2018).

Policymakers in developing countries have been increasingly worried about the rates of financial exclusion in developing countries and have devoted time and effort to find meaningful solutions to economic stagnation and a lack of economic growth and development, financial inclusion is seen as the panacea to resolve these problems. Ouma et al. (2017) maintain that financial inclusion is a key pillar of development policy in most developing countries around the world and this is as a result of the realization that an inclusive financial system is crucial for reducing extreme poverty, promoting sustainable inclusive growth, boosting shared prosperity, and enhancing economic development. An inclusive financial system will allow for the poor to save and borrow, enables them to build financial assets, invest in business and entrepreneurial ventures (Isukul et al., 2019). Furthermore, the poor and less privileged can smoothen their consumption and insure against socioeconomic threats and vulnerabilities.

Financial inclusion can be described as the use of formal financial services and financial products that include but is not limited to the following deposit of cash or cheques, access to loanable funds, insurance, consumer protection, and payment systems (Isukul & Dagogo, 2018). Improvement of access to financial services is one element of financial inclusion; others include risk mitigation, fostering financial stability, and developing an efficient financial structure that acts as a conduit to connects small scale businesses privilege by ensuring they have access to capital to grow their business through greater involvement in the financial system (Demirguc-Kunt & Klapper, 2012). As surprising as it may sound, despite the low penetration in rural areas by traditional banks, a significant amount of the population still finds ways to save in an informal way in developing countries. This is usually done through the use of fairly sophisticated methods with the sole intention of managing their finance and ensuring they plan for the future. Thus far, available evidence suggests the application of several saving behaviors by most poor families. These include the following: keeping monies under the mattresses, in small cans, beneath the carpet, inside a hole in the grounds, accumulating savings with traditional credit associations and savings with rotating savings and credit associations, and giving loans to others (Rutherford, 2003; Collins, 2005; Zimmerman & Bargee, 2009).

The inability of traditional banks to influence a change in informal channel saving mechanisms of poor households is attributed in part to weak bank product designs that are not effective in targeting specific saving behavior of a significant number of

poor households. There is also the problem of a rigid or inflexible design that does not allow for clients to tailor using of bank accounts to meet their peculiar saving needs. It is only in recent times that the use of financial technologies applications in mobile phones, laptops, and iPads has become ubiquitous in the African market, providing a more effective method of integrating the financially excluded and unbanked population into mainstream financial infrastructure. Financial technological advances such as digital mobile transfers, savings, credit and payments, and creation of new delivery channels such as the usage of banking services through third-party agents are playing an important role in the provision of greater financial access to developing countries in Africa.

In reality, the advances made in financial technology, more specifically smart mobile phones banking mobile applications, blockchain technology such as Bitcoin and Gemini and financial software have in no small measure have transformed and revolutionized financial service. It is estimated that about 12% of the adult population in sub-Saharan African have a mobile phone money account compared to only 2% worldwide (Demirgüc-Kunt et al., 2014). Financial technology application services are cheap, reliable, secure, and accessible and have enabled the majority of the low-income earners and poor to expand their financial service platforms to include agency banking, mobile phone banking, and other types of financial services. To be precise, the extensive use of mobile phone technology has aided in the opening of new markets across sub-Saharan Africa and has enabled financial services to reach consumers in inaccessible areas where financial and banking services are lacking (Fanta & Makina, 2019). In this context, this chapter examines the role of financial technology in resolving the problem of financial inclusion that the traditional banks failed to address in developing countries such as Kenya, Uganda, South Africa, and Nigeria. More specifically, the study investigates the extent to which the adoption of these financial technologies has assisted in promoting financial inclusion in the region.

2 Theoretical Perspective

2.1 Financial Inclusion

In the finance and growth literature, the theory on the relationship between finance and economic growth is based on the premise that financial markets and financial institutions are capable of achieving the following economic and financial objectives: (1) increase domestic productive investments (Ikhide & Alawode, 2001), (2) strengthen the growth of capital accumulation (Levine & Michalopoulos, 2015), (3) mitigate information asymmetry problems that exist in financial markets (Morales, 2003), (4) improve efficiency in investment productivity (Akinlo & Egbetunde, 2010), (5) provide the necessary liquidity that allows for capital accumulation, economic productivity, and growth (Demirguc-Kunt & Peria, 2011), and (6) reduce income inequality, improve basic infrastructure, and decrease

unacceptable levels of poverty in developing countries (Claessens & Laeven, 2005). As stated earlier, the theoretical literature on finance and economic growth has argued that the financial sector development is a necessary and important mechanism for increasing economic growth and attaining economic development. Previous literature stress that financial liberalization through the allowance of market forces determine interest rates and exchanges are essential and conductive for increment in economic growth path as opposed to the alternative which would involve implementing policies of financial repression which involve exchange and interest rate ceilings, reduction in market competition in financial markets and institutions. The resultant effect or consequence of financial repression would be increasing levels of market inefficiencies and transaction costs and facilitation of risk (Shaw, 1973; Stigliz & Weiss, 1981). Other finance theories have maintained that a developed financial sector has the capacity to broaden and increase accessibility to funds, this can easily be done through efficiently allocating capital across various investment options including entrepreneurial innovation and production technology (King & Levine, 1993; Banerjee & Newman, 1993), pooling of funds and mitigating risk management, as well as diversification which will lead to increased asset liquidity (Levine, 1991, 2004). More importantly, the empirical literature on financial inclusion, financial development, and economic growth suggest that there a link between financial sector development and the level of financial inclusion (Beck & Demirguc-Kunt, 2008; Dupas & Robinson, 2009).

A meticulous review of the literature on financial inclusion, financial development, and economic growth maintains that increasing/enhancing financial inclusion at the macro and institutional levels can have a positive effect on economic growth. At the macro and institutional levels, weak financial infrastructure, absence of the rule of law, and poor regulatory institutions are all evident in developing countries that have poor levels of financial inclusion. The opposite holds through in countries where there is an efficient financial infrastructure, strong presence of the rule of law, and effective regulatory institutions; in such countries, the rate of financial inclusion is usually high. Allen et al. (2012) examined several factors that influenced financial inclusion using data from 123 countries; the findings of the researchers reveal that there is a positive relationship between a conducive environment that enables people to access financial services; for example, lower costs in operating bank accounts and increased proximity to financial service are positively correlated to the rate of financial inclusion. In their conclusion, they recommended policies that are designed to encourage individuals to own bank accounts through the elimination of unnecessary documentation requirements, removal of pointless barriers such as excessive bank charges for usage and ownership of bank accounts, and removal of administrative bottlenecks that hamper individuals from owning accounts.

Also, Allen et al. (2014) investigate financial development and financial inclusion gaps in developing countries and find that bank penetration continues to remain low in low income and sparsely populated areas; however, advancement in financial technology such as mobile phone banking has resolved the proximity problem by enabling users of financial services to be located far distances, away from their banks, and other financial institutions. This has provided means of facilitating

financial development and financial inclusion in developing countries in rural and nonurban settlements that are sparsely populated. While the success in mobile banking has proved useful within the context of receiving money and sending money, the issue of increase in savings products, usage of credit and other financial services have remained largely unchanged. To address this issue, financial services providers would have to find new methods that are simple, effective, and can easily be used by financial services customers. Finally, Park and Mercado (2018) assess country-specific macroeconomic factors influencing the rate of financial inclusion in 37 African countries. Their research reveals that enforcement of the rule of law, implementing financial regulation oversight, the level of per capita income, and strict adherence to financial contracts tend to positively influence financial inclusion in Asian countries. At the microeconomic level, the number of bank branch networks, banking sector penetration, automated teller machine penetration, information communication technology infrastructure, financial infrastructure, and ownership of financial institutions are usually associated with better accessibility to financial services and better rates of financial inclusion.

2.2 Financial Inclusion in Developing Countries

After a painstaking review of the literature on financial inclusion in developing countries, the following themes emerge from a detailed evaluation of the literature: determinants of financial inclusion (Demirguc-Kunt & Klapper, 2013; Park & Mercado, 2018), eliminating constraints that are hindering the growth of financial inclusion (Aro-Gordon, 2016; Zins & Weill, 2016), reduction of poverty through financial inclusion (Claessens, 2006; Chiba, 2009), the usage of financial technology to increase financial inclusion (Isukul & Dagogo, 2018; Isukul et al., 2019), and using financial inclusion as a means of enhancing economic growth (Ikhide, 2015). In developing countries, it is important for both the private and public sector to create an enabling environment that supports financial inclusion. Demirguc-Kunt and Klapper (2013) evaluate gender differences in the usage of financial services using data from 98 developing countries; the findings of their research revealed that in countries where women are faced with legal restrictions in their ability to work, in deciding where to live, receiving an inheritance, heading households, women are less likely to own a bank account, relative to men and are less likely to save and borrow. The results also explain that manifestations of gender norms, such as the incidence of early marriage for women and the level of domestic violence against women, are contributory factors in explaining variations in the usage of financial services between women and men - after controlling for other country and individual characteristics. In concluding, they observe that the low usage of financial products and services by women may expose their vulnerability to save, invest and plan for tomorrow and they recommend that to improve women's access to financial products and services, legislative reforms need to be initiated to ensure more equitable outcomes under the law.

Guieze (2014) argues that to improve access to financial products and services in developing countries, there is the need to address the problem of a country's characteristics or structural constraints such as rising levels of poverty and inequality, increasing surge in public debts, inadequate financial infrastructure, and poor levels of financial literacy. These constraints hamper financial inclusion and there is the need to address them. Oji (2015) observed that there are individual characteristics or non-structural constraints that are peculiar to a country, also have to be addressed. For example, some banks and financial institutions in developing countries have unnecessary administrative bottlenecks such as excessive documentation requirements by financial institutions, request for loan balances unnecessary fees, and minimum deposit requests before an account can be officially opened (Beck et al., 2008). These administrative bottlenecks act as an unnecessary hindrance and result in financial exclusion for many persons living in developing countries.

As previously suggested, financial inclusion is seen as a tool to address rising levels of income inequality and poverty in developing countries. Beck et al. (2007) investigate the impact of financial development on income inequality and poverty using a cross-country study. Their findings show that there is a faster increase in the income share of the poor and a faster decrease in income inequality as measured using the Gini index, over a period of 45 years. Furthermore, the research revealed that developing countries with deeper financial systems attained a faster reduction in the share of persons living on less than $1 dollar a day. This relationship was found to be both statistically and economically significant: an estimated 35% of cross-country variation in the change in poverty rates could be explained by the changes in financial development. Koomson et al. (2020) reach the same conclusion as Beck et al. (2007) for Ghana. Their results are in twofold: first, an increment in financial inclusion is associated with a reduction in the household's exposure to poverty by an estimated 27%. Second, financial inclusion is instrumental in preventing a household's exposure to poverty by 29%. Moreover, female-headed households have a greater opportunity of experiencing a significant reduction in income inequality, poverty, and vulnerability to poverty through an increase in financial inclusion than do male-headed households. The increase in financial inclusivity by reducing income inequality and poverty is not the only means through which an increment in financial inclusion can be attained.

An emerging area of research interest is the use of financial innovation, and financial technology to increase financial inclusion, especially in developing countries where the structural constraints have made the use of financial innovation and financial technology an important and crucial determinant of financial inclusion. Lee et al. (2019) describe financial innovation as an activity that is used with the sole purpose of creating new financial technologies and they can be classified into three distinct types: institutional, product, and processes. The benefits of financial innovation for financial inclusion are twofold: it greatly enhances the provision of financial services and also improves accessibility to financial services, especially in developing countries where traditional methods of financial inclusion have failed to reach the suburban and rural areas as a result of escalating costs of business operations (Fanta & Makina, 2019). In Fig. 1, an evolution of mobile phone

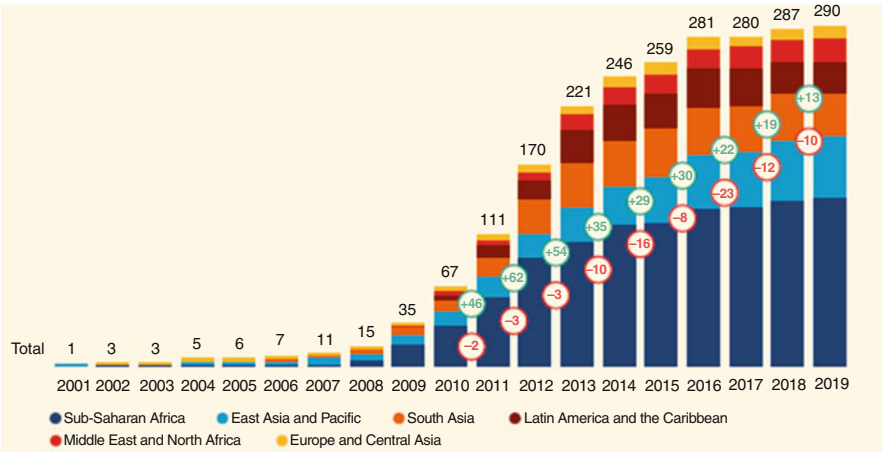

Fig. 1 Global Mobile Money Landscape 2009–2019. Source: Global System Mobile Association (2019)

penetration reveals that in a period of 10 years, Africa has garnered 470 million mobile connections, representing 47% of 1 billion registered mobile money account users (GSMA, 2019). According to the Global System Mobile Association (GSMA), the total amount of digitalized money transactions by mobile money agents globally was $176 billion, which is more than the total value of international remittance flow to sub-Saharan Africa, Caribbean, and Latin America combined (GSMA, 2019). The number of mobile money agent outlets across the globe has tripled in the past 6 years, reaching 7.8 million in 2019 (GSMA, 2019). The proportion of agents active on a 30-day basis also increased to 54% during this period. Mobile money agent outlets in rural and difficult-to-reach terrain have been instrumental in enhancing financial inclusion as they provide broader geographical coverage than traditional banking channels. A mobile money agent has 7 times the reach of automated teller machines and 20 times the reach of the traditional banking channels. Meanwhile, the density of commercial bank branches in the same market did not change substantially between 2014 and 2018, averaging 10 per 100,000 adults. However, there are some drawbacks of financial innovation to financial inclusion. It hinders mobile payments and credit loans which are not only closely related to financial inclusion but are also relevant to institutional and process innovations within financial innovation. The strength of institutional and process innovation lies in their ability to expand both penetration and coverage of financial services, but the downside of these types of innovation are that they not market-driven, but governance driven; and can easily be manipulated by the government in developing countries (Fanta & Makina, 2019b). Furthermore, Zhang and Guo (2019) maintain that although institutional and process financial innovation can provide business firms with high-quality modern financial services through usage of new payment tools (mobile payments and internet banking), enhanced efficiency, and improved convenience, most firms in developing countries do not have the resources and so,

cannot afford the huge costs of setting up mobile payment systems. Several studies confirm that there is a positive relationship between financial innovation and economic growth, but whether it has the capacity to drive firms' sale growth remains uncertain and yet to be seen (Laeven et al., 2015; Beck et al., 2016).

2.3 *Financial Technology as a Tool to Enhance Financial Inclusion Through Nontraditional Bank Methods*

The preponderance of financial exclusion in developing countries as identified by Kendall et al. (2010) who stated that despite an estimated 6.1 billion bank accounts in the world, an unequal number of the accounts 3.5 per adult is situated in the developed economies, as compared to approximately 0.8 per adult in developing countries. To make matters worse, they also find that close to 75% of adults in the developing economies do not have bank accounts (Demirguc-Kunt & Klapper, 2012). A genuine reason for this occurrence is that traditional methods of banking have been unable to reduce the cost of servicing small-value customers and to find a solution to the problem of providing credit to those with irregular incomes living in suburban and rural areas in developing countries (Fanta & Makina, 2019). This enormous challenge has been resolved through the advent of the internet, computers, laptops, automated teller machines, mobile telephones, and wider accessibility has enabled the reduction in the cost of information processing.

However, it appears the application of financial technology to banking has been able to resolve some of these problems to an extent, previous studies (Andrianaivo & Kpodar, 2012; Honohan & King, 2012; Jack & Suri, 2014; Oskarsdottir et al., 2020) have examined financial technology and its effect on reduction of transaction costs of mobile money and financial inclusion in Kenya. The findings showed that the mobile phone-based money transfer service, microfinance service, and payments users (M-PESA) were in a better position to absorb significant negative income shocks (such as job loss, severe ailment, livestock death, and business or harvest failure) without any significant reduction in household consumption. However, a household without access to M-PESA suffered greatly from the negative income shocks as consumption in these households on the average fell by 7.5%. The combining of mobile phone and information communication technology has produced a viable solution for enhancing financial inclusion because it resolves the problem of setting up operational business offices or branch networks by banking in suburban and rural areas. Consequently, increasing mobile phone penetration in these suburban and rural locations in developing countries increases financial access (Andrianaivo & Kpodar, 2012; Beck et al., 2011). Thus, it allows for banks and other financial institutions to improve efficiency through the usage of multiple channels that work effectively as an integrated and interconnected system. In a nutshell, technology has facilitated branchless banking which is a banking innovation that allows for the delivery of financial services without the usage of traditional banking

methods, but utilizing the services of non-bank agents and information communication technologies (Donovan, 2012; Senyo & Osabutey, 2020).

Prior studies on financial inclusion and financial technology (Osei-Assibey, 2015; Baganzi & Lau, 2017; Narteh et al., 2017) tend to focus on technological predisposing factors that and have ignored the role of financial technology plays in improving financial accessibility to regions where traditional banks have failed to reach. In part, this has been the result of the research on financial inclusion and financial technology focusing on the larger issues such as bank concentration, economic growth, and economic development. Consequently, other research in the field of financial inclusion, and financial technology which are equally important such as the role financial technology is playing in changing the financial inclusion narrative have been largely underexplored. Thus, it is imperative that the research on financial inclusion and financial technology gives significant priority to the role financial technology is playing in mitigating some of the problems traditional banks have been unable to resolve in developing countries (Oskarsdottir et al., 2020). Financial innovation in financial technology markets in developing countries has enabled mobile phone users to make financial transactions such as money transfers, bill payments, savings, purchase of products, and loan acquisition (Donovan, 2012). However, in comparison, there are significant differences between the use of mobile payments and traditional banking services.

First, the registration process is so much easier and less cumbersome when compared with opening a traditional bank account. Any person can simply have access to a mobile money account with a valid national identity card and a registered mobile phone—these processes can be completed within 7 min (Mugambi et al., 2014). Second, mobile phone services technology is widely available in developing countries—this has enhanced accessibility to remote regions; enabling participation without the need for traditional banking business offices (Demirgüç-Kunt et al., 2018). Moreover, the use of mobile phone technology platforms in banking offers the following advantages reduced transaction cost, convenience, and wider accessibility (Maurer, 2012) as transactions can be performed at any time, from anywhere, and at sensible service charge. It is pertinent to stress that there are dissenting voices, those who hold a different position on the effect of financial technology and financial inclusion on developing countries. Mader (2018) dismisses the argument that financial inclusion enables broader development outcomes, as he claims it is based on weak evidence and weak economic logic. Second, he is doubtful that financial inclusion reduces poverty and maintains that poor people do not necessarily benefit from financial inclusion as empirical evidence suggests that impact is superficial. Third, he questions the idea of the business case for financial inclusion, suggesting that the business case for financial inclusion is weak and elusive. Nothing can be further from the truth, these assertions made by Mader (2018) are not only misleading, but are also factually incorrect. While research on the link between financial technology and financial inclusion can be regarded to be in the infancy stage and there are limited time series data on both financial inclusion and financial technology, there is substantial, overwhelming, and consistent evidence to suggest that developments in financial technology and financial technology have been extremely

beneficial to developing countries (Demirguc-Kunt et al., 2020; Koomson et al., 2020; Churchill & Marisetty, 2020).

Of course, financial technology alone is not sufficient to broaden financial inclusion in developing countries (Honohan & King, 2012; Demirguc-Kunt & Klapper, 2012). To consolidate on the gains of financial inclusion from improved financial technology—mobile phone services and the internet can only drive financial inclusion when the necessary infrastructure is available. Physical infrastructure such as mobile networks and constant electricity is key. In developing countries, people will not be encouraged to use digital payments when network outages, security issues, and other technical problems undermine their efficiency. Technological infrastructure is also needed. This includes adequate physical networks and adequate payment systems built and effectively designed to deliver payments to both urban and rural areas, as well as all corners of the economy. More importantly, banks and other financial institutions can use agent banking and build a partnership with retail shops and post offices to deliver financial services to customers, since it is not cost-effective to open traditional brick-and-mortar banking branch offices in every location that has a large unbanked population.

3 Methodology

The research methodology is a very crucial element of the research process and the purpose of the research methodology is to explain the research philosophy, research strategy, and research methods. The choice of research methodology used in conducting research was determined by the following: the research question the research intended to examine, the researcher's world view, and the researcher's philosophical understanding of the nature of reality, and the nature of the data collected to address the research question. In conducting the research, the researchers have applied a positivist methodological stance in addressing the research question. Positivism is a western philosophical school of thought that advocates for the use of scientific methods in conducting research, it maintains that scientific knowledge is easily verifiable. This is not the case with issues that bother on superstition, dogmatism, and speculation which cannot objectively be verified, since they are subjective and tend to base on the experience of the individual. For positivism, the emphasis is on an objective approach to knowing things or an objective approach to creating knowledge based on facts. And as such, any data collected for this chapter would be data that can be measured, quantified, and analyzed in such a way that conclusions can be drawn from the data (Fay, 1996).

The adoption of positivism simply implies that primary data collected with the intent of knowing an individual's experience would not be suitable for this research. For positivism tends to lend itself to the use of secondary data. It must be emphasized that the nature of the research question the researchers are intent on answering informs the nature of secondary data collected, the research methods applied and the research instruments used to analyze the data. In using secondary data, the most

important benefit is; it saves an enormous amount of time and money that would have been spent in collecting data, since the data can easily be downloaded from statistical websites or collected from other public sources such as government agencies (Cowton, 1998). Financial "inclusion data has traditionally been separated into supply and demand-side information" (AFDB, 2013: 32). Supply-side data comes from providers of financial services, while demand-side data involves interviews with end-users of products: individuals, households, and firms. Central Banks often collect some supply-side data as part of their supervision duties for regulated institutions, and this can be a good source of information at the national level. However, supply-side data provided by central banks or supervisory bodies on the number of accounts and Automated Teller Machines (ATMs) in a country is not detailed enough to provide information about how many people have accounts (due to multiple accounts held by some individuals) and how access varies by region, income level, and other variables. In some countries, central bank data may not provide a useful level of granularity about financial access. The data employed for this research was downloaded from the international monetary fund database. A relatively short period of time was examined 2014–2018. The financial access survey is a supply-side dataset on access to and use of financial services aimed at supporting policymakers to measure and monitor financial inclusion benchmark progress against peers. The financial access survey is based on administrative data collected by central banks and other financial regulators.

4 Empirical Results

Traditional banking businesses have struggled to cope with the increasing demand for financial services and financial products in developing countries particularly in suburban and rural areas where the local population has low income and earning capacity. Thus, it would not create the necessary incentives for traditional banking businesses to run profitable banking operations in such locations. Consequently, traditional banking businesses tend to neglect these regions. The inability of traditional banks to provide sufficient financial services for the teeming population in developing countries is a serious concern to public policy officer holders who are wrestling with the problem and are actively thinking of sensible measures that can be taken in the long term to resolve and address the problem.

A cursory examination of the tables on financial service access for Ghana, Kenya, Nigeria, Rwanda, and South Africa has important implications for developing countries in Africa. The results may be of genuine concern for policymakers in developing countries. All the countries in the study with the exception of Ghana recorded a reduction in the number of traditional banking business offices in the 4-year period of the study. For instance, Uganda, Nigeria, and Kenya all saw a decline in the number of traditional banking branch offices over the period. Uganda and Nigeria reduced their banking operations by 16.2% and 30.4%. Kenya happened to be the least affected, its traditional banking offices declined by 9.6%. On the

contrary, as earlier stated, Ghana saw a surge in the number of traditional banking offices over the period by an estimated 43.7%. This is in spite of the fact that the number of depositors to commercial banks per 1000 adults for Rwanda, Nigeria, and Ghana has recorded significant improvement. For Rwanda and Nigeria, the increase in the number of commercial bank depositors in the period in question was 56.4% and 55.1%.

For Rwanda, a small country with a population of 12.5 million, that increase in the number of depositors could easily be absorbed by the traditional banks. But surely, in the case of Nigeria with a population of more than 206 million people, an increase in the number of depositors by 55.1% would result in increasing pressure on the existing facilities of the traditional banks whose banking infrastructure is already being stretched beyond the intended capacity. Ghana is the only country in the study that had an increment in the number of commercial bank depositors and the number of commercial bank branch offices. One would have expected that the other countries would have followed the example set by Ghana. That is, to increase the number of commercial branch offices as the number of commercial bank depositors increased over the period. The decline in traditional banking operations should be offset by the introduction of financial innovation and financial technology in the financial sector in developing countries. However, some of the findings of the research are not consistent with the expectation. For instance, the introduction of the automated teller machines (ATM) was meant to be a game-changer, as they enabled commercial banks to introduce machines that could easily dispense cash to bank customers when commercial banks have closed for business.

Again, the findings appear to be similar, Ghana is the only country that recorded a significant increase in the number of ATMs within the period. South Africa saw some marginal increase in the number of automated teller machines; however, Kenya, Nigeria, and Uganda all saw some decline in the number of ATMs within the period. Nigeria recorded a 15.4% decrease, the largest drop in the number of ATM machines. Kenya's ATM usage declined by 8.75%, Nigeria saw a decline in the number of ATMs by 4.13% in 2015, and by 2018 the number of ATMs had increased to its previous level in 2014. This is surprising, as one would expect that the number of automated teller machines used in developing countries over the period would increase, as they are relatively cheaper to set up and maintain when compared to a commercial bank. In setting up a commercial bank, operational costs, including costs of maintaining staff and payment of rent for use of building space out-weight any costs used in maintaining and servicing an ATM. Yet, ATMs did not significantly increase in number over the period in time. However, as the results in Tables 1, 2, 3, 4, 5, 6 reveal, a significant number of people in the countries selected are embracing alternative financial innovative products that are at their disposal. The surge in the preference for branchless banking instead of traditional banking option has enabled millions of people who would have been financially excluded from the formal financial system to actively perform financial transactions in an affordable, reliable, and secure manner. The tremendous success story of Uganda and Rwanda in the number of mobile accounts and the number of registered mobile agent outlets between 2014 and 2018 cannot be ignored. For example, the number of mobile

Table 1 Ghana

	2014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	7.98	9.99	10.92	11.29	11.51
Number of commercial banks branches per 100,000 adults	5.94	6.98	6.98	8.42	8.54
Number of depositors with commercial banks per 1000 adults	491.93	583.91	543.57	614.09	725.21
Number of borrowers from commercial banks per 1000 adults	45.60	46.66	43.78	48.37	40.91
Financial system deposit (% of GDP)	24.67	24.93	22.52	24.67	
Number of registered mobile money agent outlets per 1000 adults	118.17	350.47	601.08	855.62	1742.99
Number of registered mobile money accounts per 1000 adults	427.55	762.23	1117.19	1322.50	1742.99
Value of mobile money transactions (during this year as % of GDP	7.80	19.65	36.50	60.72	74.25

Table 2 Kenya

	2014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	9.64	9.69	9.16	9.43	9.15
Number of commercial banks branches per 100,000 adults	5.48	5.59	5.37	5.21	5.00
Number of borrowers from commercial banks per 1000 adults	160.39	220.48	269.48	237.41	232.03
Financial system deposit (% of GDP)	36.25	36.17	34.11	32.17	
Number of registered mobile money agent outlets per 1000 adults	217.35	252.92	291.51	320.61	361.50
Number of registered mobile money accounts per 1000 adults	931.10	1128.63	1205.89	1248.01	1251.12
Value of mobile money transactions (during this year as % of GDP	43.90	44.81	47.78	44.67	44.74

money accounts in Uganda and Rwanda grew by 133.5% and 307% over the 4-year period, respectively. Kenya and Ghana also experienced some sensible growth of 34.3% and 51.8% in the number of mobile money account users within the period. Unfortunately, Nigeria did not have the same kind of success that Uganda and Rwanda had, it did have as many as 100 million mobile account users in 2015, and that number dipped by an estimated 50% in 2016, but the good news is, by 2018, it had returned to 77 million mobile account users, this was slightly higher than the 2014 numbers.

A similar result was attained with the number of mobile agent outlets in the countries in the study. It is only logical that as the number of mobile account users increased, the number of mobile agent outlets should increase to accommodate the increase in demand for branchless banking and third-party financial transactions. Again, Ghana appeared to achieve impressive results in the number of mobile agent

Table 3 Nigeria

	2014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	16.91	16.21	16.74	16.33	16.93
Number of commercial banks branches per 100,000 adults	5.61	4.98	4.74	4.44	4.30
Number of depositors with commercial banks per 1000 adults	653.35	667.46	813.92	923.23	1013.71
Number of borrowers from commercial banks per 1000 adults	31.08	29.88	23.81	21.79	18.55
Financial system deposit (% of GDP)	17.91	17.69	17.27	16.29	
Number of registered mobile money agent outlets per 1000 adults	21.71	23.15	15.24	12.33	45.47
Number of registered mobile money accounts per 1000 adults	71.41	106.43	51.74	39.03	77.20
Value of mobile money transactions (during this year as % of GDP	0.38	0.46	0.74	0.96	1.53

Table 4 Rwanda

	2014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	5.62	5.63	5.74	5.66	5.19
Number of commercial banks branches per 100,000 adults	5.94	6.22	6.28	6.18	5.77
Number of depositors with commercial banks per 1000 adults	169.75	148.02	191.87	206.57	266.29
Number of borrowers from commercial banks per 1000 adults	34.80	35.83	29.65	19.92	27.53
Financial system deposit (% of GDP)	16.46	17.73	17.82	17.44	
Number of registered mobile money agent outlets per 1000 adults	1161.90	1640.33	2430.16	3385.93	4372.03
Number of registered mobile money accounts per 1000 adults	987.18	1134.58	1398.10	1265.99	1498.76
Value of mobile money transactions (during this year as % of GDP)	12.65	18.32	15.59	18.23	22.09

outlets in the 4-year period of study. For Ghana, a 1074% growth in mobile agent outlets is an exceptional and outstanding result. Uganda and Rwanda also attained some commendable results in the 4-year period, as the growth in the number of mobile bank agent outlets increased by 133.5% and 276.2%. Sadly, Nigeria and South Africa do not achieve the kind of growth in the number of mobile money agent outlets as Uganda and Rwanda, growth in the number of mobile money outlets for Nigeria and South Africa, are modest when compared with Uganda, Rwanda, and Ghana. More importantly, the growth in the number of mobile money accounts and the number of mobile money agent outlets also increased a crucial economic indicator that is the value of mobile money transactions as a percentage of GDP. It turns out that the increase in both the number of mobile money accounts and the

Table 5 South Africa

	2014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	65.50	68.79	68.96	67.75	66.95
Number of commercial banks branches per 100,000 adults	10.83	10.42	10.13	10.40	10.16
Outstanding deposits with commercial banks (% GDP)	41.62	43.95	43.76	44.13	44.81
Financial system deposit (% of GDP)	58.32	59.52	59.25	57.92	
Number of registered mobile money agent outlets per 1000 adults	9.75	5.58	0.56	NA	NA
Number of registered mobile money accounts per 1000 adults	112.56	172.59	127.17	NA	NA
Value of mobile money transactions (during this year as % of GDP	0.05	0.05	0.03	NA	NA

Table 6 Uganda

	2014	2015	2016	2017	2018
Number of ATMs per 100,000 adults	4.46	4.64	4.54	4.20	4.15
Number of commercial banks branches per 100,000 adults	3.05	3.03	2.88	2.67	2.58
Number of depositors with commercial banks per 1000 adults	201.22	210.23	252.86	364.29	292.30
Number of borrowers from commercial banks per 1000 adults	20.78	25.04	32.62	30.95	69.35
Financial system deposit (% of GDP)	16.45	16.48	17.09	17.35	
Number of registered mobile money agent outlets per 1000 adults	393.99	545.87	662.96	796.88	920.25
Number of registered mobile money accounts per 1000 adults	984.34	1061.40	1040.48	1049.39	1079.08
Value of mobile money transactions (during this year as % of GDP	34.72	42.79	52.75	61.62	71.02

number of mobile money agent outlets also translated into significant source revenues for the selected countries examined in this chapter.

Uganda and Nigeria seem to have benefited immensely from revenues and earnings that have accrued in terms of the value of mobile transactions as a percentage of GDP. In just a short period of 4 years, the value of mobile transactions as a percentage of GDP had increased from 38% in 2014 to 153% of GDP in 2018. In the case of Uganda, the growth in value of mobile phones as a percentage of GDP was more modest, the increase from 34.72% in 2014 to 71% in 2018. South Africa had the worst earnings with regards to the value of mobile transactions as a percentage of GDP. In 2014, the value stood at 0.03% and in 2016, it marginally increased to 0.05% and for the years 2017 and 2018, there are no available figures. As earlier stated, the traditional banking businesses did not enjoy the same amount of success and the tremendous growth that mobile telephone operators achieved over

the 4-year period. As the table reveals, a comparative analysis of the growth, in terms of density of traditional bank branches pales in comparison to the growth in registered mobile money account. And the reason is obvious, establishing a bank branch requires a significant amount of resources that the bank shareholders have to put together, but more importantly, the establishment of a new branch can only be done when the shareholders are certain it would make a profit. This is not to say, that telecommunication investors do not have significant operational costs. Yes, there is the need for the telecommunication investors to build the infrastructure, which they do; but the costs of maintenance of telecommunication mast and other equipment is far cheaper than running a traditional bank branch outlets (Table 7).

5 Conclusion

The chapter sought to investigate how financial technology and financial innovations are used as tools to solve the problem of financial inclusion in developing countries that traditional banking businesses have found immensely difficult to address. Six countries in Africa were selected and the following indicators were used in the analysis: number of ATMs per 100,000 adults, number of commercial bank branches per 100,000, the number of registered mobile money agent outlets per 1000 adults, the number of registered mobile money accounts per 1000 adults and the value of mobile money transactions as a percentage of GDP. The findings of this research are consistent with the works of Andrianaivo and Kpodar (2012), Honohan and King (2012), Jack and Suri (2014), Fanta and Makina (2019), Oskarsdottir et al. (2020). Traditional banking has not been effective in resolving the problem of financial exclusion in six countries. More importantly, there appears to be some decline in the number of traditional branch offices for most of the countries, with the exception of Ghana. The introduction of financial technology and innovation in developing countries' landscape has been a game-changer; however, the introduction of ATMs did not record the kind of successes the registered mobile money account and the mobile money agent outlets attained. However, countries like South Africa which had a sound financial system did not achieve the kind of growth in mobile market penetration in terms of the number of registered mobile money accounts and mobile money agent outlets.

The success of branchless banking in developing countries would not have been attained without the introduction of third-party or agent banking that allowed for banking penetration to access satellite towns, rural areas, and difficult locations. This enabled millions of financially excluded persons to gain access to financial platforms that allowed them to perform financial transactions in an affordable and convenient manner. The findings of this chapter have serious policy implications for developing countries, but more importantly, it brings to the fore the importance of financial innovation and financial innovation as important tools for improving and strengthening financial inclusion in developing countries. Therefore, it is crucial for policymakers in developing countries to focus on the removal of administrative

Table 7 Revenue from mobile industry

	Mobile money account (% age 15+)	Mobile money account, male (% age 15+)	Mobile money account, in labor force (% age 15+)	Mobile money account, out of labor force (% age 15+)	Mobile money account, female (% age 15+)	Mobile money account, young adults (% age 15–24)	Mobile money account, older adults (% age 25+)	Mobile money account, primary education or less (% age 15+)	Mobile money account, secondary education or less (% age 15+)	Mobile money account, income, poorest 40% (% age 15+)	Mobile money account, income, richest 60% (% age 15+)	Mobile money account, rural (% age 15+)
Ghana 2014	13%	14%	12%	15%	12%	16%	12%	7%	18%	10%	15%	12%
Ghana 2017	39%	44%	42%	33%	34%	37%	40%	33%	46%	32%	44%	35%
Kenya 2014	58%	62%	62%	44%	55%	52%	62%	51%	67%	52%	63%	57%
Kenya 2017	73%	77%	78%	52%	69%	70%	74%	57%	84%	59%	82%	73%
Nigeria 2014	2%	3%	2%	3%	2%	2%	3%	2%	2%	2%	3%	2%
Nigeria 2017	6%	7%	6%	4%	4%	5%	6%	1%	9%	3%	7%	3%
Rwanda 2014	18%	20%	21%	10%	16%	12%	21%	16%	30%	7%	26%	17%
Rwanda 2017	31%	37%	32%	26%	26%	32%	31%	27%	58%	15%	42%	30%
South Africa 2014	14%	15%	18%	9%	14%	10%	16%	6%	18%	9%	18%	14%
South Africa 2017	19%	19%	25%	9%	19%	17%	20%	12%	22%	12%	24%	19%
Uganda 2014	35%	41%	39%	23%	29%	27%	41%	28%	46%	21%	44%	34%
Uganda 2017	51%	59%	55%	35%	43%	51%	50%	39%	66%	40%	58%	50%

bottlenecks that could hamper the use of financial technology to improve financial exclusion rates in developing countries. Also, it is important for the research on financial inclusion to examine the different models applied by various countries to broaden financial inclusion through technology. A lot of attention should be paid to what has worked, why countries like Kenya and Ghana have been so successful in the adoption of financial innovation and financial technology in the banking sectors, and why countries like South Africa appear not to have benefited immensely from financial innovation and financial technology revolution in Africa.

"With a sizable but sparse population, sub-Saharan Africa leads the world in the adoption of mobile banking" (IMF, 2016: 31). In the context of a predominantly rural population, it is important to note that traditional bank intermediaries do not reach remote areas, while the costs of their services are frequently prohibitive for low-income households and small businesses. The recent surge in mobile money observed in many sub-Saharan African countries has been facilitated by a strong increase in mobile phone subscriptions, supported by the expansion of network coverage, and technological adaptation to support financial services. Moreover, the declining prices of mobile devices and a growing variety of mobile 'payments and banking innovations have also contributed to this trend (IMF, 2016: 31).'

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Revisiting the East Asian Financial Crises: Lessons from Ethics and Development Patterns

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1 Introduction

The global financial crises that occurred since the early part of the 1990s have highlighted the need for a re-discussion of existing economic and social paradigms. In this optic, a thorough analysis of the structure and regulation of financial markets became vital (Stiglitz, 2002), also in consideration of capital flight and recent financial collapses and market manipulations (Busato & Gatto, 2019). This latter objective matches a vision based on economic, social, environmental, and institutional sustainability, having the purpose of improving the quality of life (Gatto, 2020; Nussbaum & Sen, 1993). The integration of international markets has succeeded in bringing great advantages and opportunities to many world economies. In East Asia, economic globalization led to financial development, boosted via the institutional quality increase channel, being confirmed a causality of those factors with real GDP per-capita and financial reforms (Sadik-Zada and Gatto, 2021a, 2021b; Gatto et al., 2021; Law et al., 2014). However, some economies became

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reliant on foreign capital and vulnerable to capital flight (Schneider, 2003). The policy recommendations of the international community guaranteed growth and development for large parts of the world, as confirmed by the results achieved in light of the Millennium Development Goals and eventually from the Sustainable Development Goals (Sadik-Zada and Gatto, 2021a, 2021b; Agovino et al., 2018; Berkhout et al., 2010).

One of the major development policies put forward for these scopes has been the elaboration of tailored industrial policies that allowed for equal development pathways and the overcoming of the efficiency-equity dichotomy (Stiglitz, 2012, 1996). This is the case of some East Asian countries, where the regional economy gained momentum from flexible protectionism and the transition toward progressively more open export-led policies (Gatto, 2020; Stiglitz, 2001). These consisted of two steps: a first stage, whereby domestic economies were oriented on local industry enhancement, and a second phase that foresaw export-led policies (Chang, 2006a). This development approach has been often juxtaposed to the import substitution industrialization (ISI) policies, notably recommended by several dependency theorists and implemented mostly in Latin America (Baer, 1972; Schmitz, 1984). The aftermath of the 1997–1998 crises, foreign capital flight, and capital shortage, occurred in East and South-East Asia—notably in South Korea, Indonesia and Thailand. These facts led to the disruption of the success of the East Asian developmental state policies, that started being severely argued (Sadli, 1999; Phongpaichit & Baker, 1999). Pressing questions on the regional policy responses and the international consequences commenced being raised. The latter were accompanied by capital shortage and decreased trust attributed to financial markets, imputable to moral hazard (Sarno & Taylor, 1999). A consistent part of the literature imputes the major responsibilities to the Asian crises started in the 1990s to the regulatory reforms yield by the international financial organizations—notably the International Monetary Fund (IMF) (Grenville, 2004). This approach interprets the structural reforms imposed by the IMF to have had a detrimental impact to the local development—especially if collated to the undertaken regional development policies; such policies were able to undermine financial and economic systems otherwise deemed resilient. The financial crises that subsequently happened worldwide—in Latin America, North America, and Europe—imposed a re-interpretation of the causality of these phenomena. The issue is worthwhile being analyzed making use of an ethical approach (Sen, 1993, 1999). The development process that took place in East Asia constitutes an important lesson, whereby the social and entrepreneurial ambient and the setting of economic aggregates showed significant evidence (Stiglitz, 2001; Stiglitz & Yusuf, 2001).

This book chapter proceeds as follows: Section 2 reviews on policy and historical bases of the development path of East Asia, outlining its determinants. Section 3 emphasizes the importance of ethics in the development process of the Far East. Section 4 concludes and sketches prospective scenarios on the topic.

2 East Asian Development: Miracle, Myth, or Success?

East Asian development model has been able to propose a new type of government: the developmental bureaucratic state. Based on learning and work, it found expression in the application of the ethical and ecological principles of the ancient Asian philosophies. The success achieved by these economies since the post-World War II—first from Japan, then from South Korea, Taiwan, Singapore, and Hong Kong—reached scientific interest for the speed of growth and the goodness of the social results achieved (Gatto, 2020; Chang, 2006a, 2006b). This happened in particular from the 1950s to the 1980s, while the results of the 1990s are controversial: from that moment, deviations within the region were registered, these being determined by phenomena such as the Japanese Lost Decade and the financial crises started in 1997. In the preceding three decades, the countries experienced high rates of production growth, associated with a balanced distribution of income and social development that led to forging the *Asian miracle* conceptualization (World Bank, 1993). The results highlighted the development paths of the five states and the actual achievement of the economic and technological catching-up of the first generation (Japan) and the second generation (South Korea, Taiwan, Singapore, and Hong Kong) of East Asian economies toward the Western countries (Abramovitz, 1986).

After World War II, the Asian Tigers' development was still lagging behind: poverty was widespread, literacy still lacking despite the Japanese learning footprint, the average per-capita income was incomparable to the Western standards. In 30 years' time, these countries succeeded in reversing these trends, ensuring sustained and stable increases in per-capita income to their populations and decreased inequality rates (Perkins, 2013). In this time frame, the main public policy rationale was devoted to progressively reaching export-led growth policies and strategies based on fostering education, innovation, and industrial investments. This way, Japan and then the four Asian Tigers—Taiwan, South Korea, Singapore, and Hong Kong—managed to increase their incomes up to eight times their original value, catching the industrialized Western economies in the early 1990s and consolidating internationally the technological industrial sector (Gatto, 2020; Wang, 2007; Chang, 2006a). The development achieved by the East Asian economies since the second post-war period has aroused scientific interest for the speed of growth and the quality of the social results attained. In these regions, the ethical approach was coupled with strategic industrial policies, aimed at technological expansion and flexible protectionism, along with a growing focus on increasing the quality of life and reduced inequality. The support to local industrial champions was followed by the incentive attributed to exports, aiming at the protection of the nascent industry. This fact yielded internal production growth and regional wealth that led, over the years, to widespread well-being (Chang, 2006b).

Common features in the Asian development model included close synergies between the public and private sector and the cooperation between companies; these characteristics turned to be a fundamental strategy for the implementation of both the networks and the investments, forging the increase in technology and

innovation. These results passed through a local development approach that facilitated the creation of clusters, industrial districts, special economic areas, science and industrial parks that in many of the East Asian countries were driven nationally with the strong support of private capital (Gatto, 2020). Agricultural reforms and industrial policies aimed at pushing national products and enterprises and supporting the technological catch-up, fundamental drivers for the long-run development (Abramovitz, 1986), turning toward policies of flexible protectionism as preliminary theorized and partially proved by the flying-geese model (Kasahara, 2004; Akamatsu, 1961, 1962). Prioritizing education investments, the modernization of the production system, and the growth of the technological industry, the implementation of social development in East Asia led to improved rates of quality of life. The crisis occurred in the late 1990s, however, exposed the Asian group to criticism of the *myth* (Krugman, 1994).

It shall be noted that the economic openness of an emerging economy is always a controversial subject, being its applicability and magnitude borderline, as the East Asian capital flight showed (Moghadam et al., 2003). The sudden financial collapse of some of the countries seemed to amaze even the IMF. Some of the Asian economies—notably Thailand, Indonesia, and South Korea—paid for the dependency on foreign credit and debt (Sadik-Zada & Gatto, 2021b). A typical dynamic was the increase of capital shortage following the flow of foreign capital (Rajan & Zingales, 1998). These pieces of evidence led some scholars to argue whether financial development promotes economic growth, in a wider rethinking of the role of regulation and financial controls and supervision (Gatto, 2019; Zhang, 2003). In South Korea, the business groups typical of the closed conglomerates played an important role, albeit they were indicated as an expression of the crony capitalism (Kang & Kang, 2002)—an evidence occurred to other East Asian countries too. This affection due to the typical large business groups revealed to be linked to clientelism problems, a factor that has gradually diverted the great Japanese and Korean conglomerates from the ethical setting of the Eastern economies, lending itself to the risk of running into the cronyism issue.

Rather than the structural problems typical of these economies, the logic of the structural reform was often indicated as a major limit to the East Asian development pattern success and completion. According to Joseph Stiglitz (2001, 2002) and a large number of scholars, the Asian crisis has to be attributed to the huge deregulation of the financial sector imposed, *de facto*, by the IMF, and motivated by the liquidity needs of the Western credit sector. The guidelines showed to be in open contrast with the development policies since the Asian developmental government did not support a reduction of its role. This step is usually considered as necessary to comply with the IMF reforms and thus to obtain the disbursement of funds. For some of the Asian economies, the post-1997 meant passing through a severe crisis: strong economic players such as Japan and South Korea affirmed in the international context, had to re-discuss their positions and accept profound policy changes with the spread of the crisis. This happened despite the effectiveness of the antecedent economic policies and the goodness of the economic performances and indicators—up to the period preceding the crisis, South Korea maintained the most regular

growth rates in East Asia, close control of inflation and unemployment, and one of the largest schooling in the region, confirming the model stability that allowed the State to rank amongst the most stable industrialized economies in macroeconomic terms.

Once the crisis took place, it led to unemployment rate increases, falling welfare, and uncertainty amongst the investors. The growth of the Korean GDP, which in 1996 was around 6%, fell to 3.7% in 1997, plunge to −7.5% in 1998; in Indonesia, the troughs got to even twice this magnitude. The unemployment, which in 1996 afflicted only 2% of the population, reached 7% after 2 years. Despite the structural reforms, inflation rose from 5 to 7.5%, while in Indonesia, in 1998 it reached a dramatic figure of 58.4% (IMF, 2011).

3 An Ethical Capitalism

East Asian development was characterized by large public and private investments, supported by foreign direct investments (FDI), and international market integration (Kant, 1996). The entrepreneurial model overcame the simply productive dynamics: linking its socio-economic development to ethical principles (Morishima, 1984), the region centered the success of modeling on a loyalty, strategic and collaborative approach (Masahiko, 2008). This evidence found its highest expression in the code of conduct at work, a spur to the regional entrepreneurial ferment, coupled with the increases in technology and productivity. In this context, values attached to social capital and trust, such as respect, honesty, and social relations assumed a central role. According to the Confucian interpretation, in humankind there are positive moral qualities that have, though, to be cultivated through study and self-discipline, in observance of the behavior and in accordance with tradition. The link between social commitment and moral virtue finds its synthesis in the epistemological process: from this baseline, the association between the enunciated items with the historical propensity of the Oriental governments and culture to education zeal emerges (Tu and Du, 1996). Knowledge, learning and innovation were further pivotal elements for the affirmation of East Asian development success. In East Asian development strategies, economies of learning were triggered through external economies and knowledge spillovers. Over the years, these have continued to be a cornerstone of East Asian development policy, along with investments in business and product innovation. Exploring the cases of Japan and South Korea, despite the crises 1997 and 2008 crises, investments in R&D have always been consistent: in the 2008–2012 period, the two countries never allocated a share of GDP lower than 3.35% in R&D, ranking within the top five world investors (WB, 2017; Wang, 2007). Investments have been crucial for the implantation of technological districts, especially in Taiwan, with the science parks of Taipei and Hsinchu (Gatto, 2020).

The association between the spread of education and sustained socio-economic development has been widely recognized. In the 30 years of the great development, the implementation of external economies and knowledge spillovers spread over,

particularly in the first development stages, when local structures were lacking (Gatto, 2020). The priority given to literacy and education revealed to be an effective driver of growth, economic sustainability, and development; this is due to the fact that the creation of social occasions favors the direct expansion of human capacities (Anand and Sen, 2000), ensuring a better quality of life that leads to the advancement of components such as security, (primary) education and the health system. These factors are leading drivers of long-term development, of paramount importance in the first stages of development, that can be favored by low labor costs and low capital requirements typical of these phases. The effects produced by human development showed a much longer trajectory if compared to economic growth (Sen, 1999, 2000a, 2000b; Stiglitz, 2012; Fitoussi & Stiglitz, 2012). It is discussed within the literature the contribution drawn from the Eastern classical philosophies, especially from Confucius' taughts: the openness to democratic systems and European culture, typical of the re-interpretation of contemporary Confucianism, led to the *Confucian capitalism*, with reference to the mix between capitalist economy and Asian ethics. The product of Oriental philosophy, by drawing alternative socio-economic schemes at both the theoretical and empirical level, went beyond the traditional GDP results and economic growth, confirming the importance of intangible resources, well-being and quality of life improvement within the development pathway (Gatto, 2020; Lew et al., 2011; Hofstede and Bond, 1988).

Once regional policies were corrupted by the new, pushed-down, generalistic development prescriptions imposed by the international community, the East Asian pattern saw a structural inversion to its astonishing trends. The causes included several factors. On the one hand, the difficulties that took over with vast bureaucracy, the dependence on foreign capital, and the imbalance of private investments. On another hand, the chimeras exhibited by the structural reforms pushed most of the Asian economies to demolish the developmental states and abandon the development policies that were previously put forward. The crisis, reverberated in various countries of East and South-East Asia, generated a deep re-discussion of the development policies undertaken, that were often translated into a profound revision of the entire economic system. The *Asian miracle* criticism diminished the success of the development process undertaken and the results achieved, with the debasement of the *success* in the so-called *Asian myth* (Krugman, 1994). This common scholarly misinterpretation showed to not have taken into account the multifaceted development implications carried by the Asian development experience(s), suggesting a multitude of lessons and novel policy strategies within a pluralistic approach (Gatto, 2020; Henderson, 1993; Stiglitz & Yusuf, 2001). Most of the policy responses and research formulations also neglected the local differences in terms of national connotations, models and practice of the specific development pathways—that in some cases were, indeed, deeply divergent (Perkins, 2013). Similarly, diverse, articulated interpretations of the Asian crises should have been considered, consisting of a controversial economic and development policy quest (Wade, 1998).

4 Concluding Remarks and Prospective Scenarios: Reforms, Development, and Ethics

East Asian growth and social change marked the success of the regional development process, displaying the importance of governance and institutions in promoting financial, trade, agricultural, and industrial reforms for long-run development. Japan and the Asian Tigers were able to reach high standards of development without facing strong inequalities due to the combination of social development, industrial policies boosting, targeting the local enterprises and a progressive opening to the international trade—a typical feature of flexible protectionism. East Asian growth was achieved by consolidating well grounded economic and technological bases, preliminary elements for the implementation of advanced production sectors. There, the developmental state was able to nudge the markets and cooperate with the private sector, dosing protectionism and liberalization policies. In this way, in addition to supporting the conduct of economic activity amongst its actors, high levels of human development were guaranteed to the entire region, along with the eradication of widespread poverty, the increase in schooling rates, and a balanced distribution of income, ensuring macroeconomic stability, low unemployment rates, and, generally, low inflation rates.

The analyzed development pathways were far from being perfect—common characteristics were the flight of foreign capitals and deep financial crises. Since 1997, most of the countries pertaining to the East Asian region faced a severe recession. For South Korea, the tipping point was the launch of IMF structural reforms—these being subordinated to the disbursement of loans package. On November 24, 1997, the collapse of the Korean bonds took place, forcing to revise the exchange rate of more than double its value. As a response to the crack, the collapse of many *chaebols* occurred, triggering huge effects on the national public debt. Anticipating successive crises, the Asian crises confirmed the ineffectiveness of de-contextualized deregulation and reforms. The development practice also showed that, despite the need for competitiveness and regulatory simplification, financial markets require controls and supervision, especially for short-term movements. In short, the reforms needed to rejuvenate a model affected by crony capitalism ended up hurdling development possibilities and performance.

Asian development brought an important lesson: the ethical approach of the economy and entrepreneurship was the driving force of development, creating the oxymoronic experience of *Confucian capitalism*. Getting rid of the ethical approach that distinguished the development policies and the flexible protectionism, many countries suffered severe crises and recessions, leading to the mistaken questioning of the Asian development patterns and the myth equivoque. The East Asian development lesson offers an important testimony on the crucial nature of ethics in the economy and in business processes to be preserved and applied in the future for research, policymaking, and practice.

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Financial Development and Natural Resource Rents–Human Capital Nexus: A New Approach

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1 Introduction

Financial system development, as a key issue in economic growth and development of countries, has received growing attention of early economists such as Bagehot (1973) and Schumpeter (1911). They have argued that the financial system has a pivotal role in economic growth in all economies. One of the primary logics behind this assertion is that the development of financial system can lead to an optimal allocation of financial resources in an uncertain environment (Levine, 1997: 691). It is worth noting that economic growth and financial development are of paramount importance in countries that are rich in natural resources as they often face shocks that may wield considerable influence on their levels of income and production. Therefore, the economic fluctuations resulting from these shocks act as a barrier to sustainable development (Tiwari et al., 2012). According to Anderson and Canuto (2011), resource-rich countries generally face lower levels of financial development, which makes them vulnerable to shocks caused by the volatility of natural resource revenues.

In fact, the development of financial system can lead to the growth of national wealth by influencing the mechanism of allocating windfall revenues obtained from sales of natural resources and converting them into other types of capital. Actually, national wealth comprises both tangible (foreign, physical, and natural) and intangible capitals (human and social). In recent decades, the latter form of capital has

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accounted for a significant share (more than 60%) of national wealth in upper-middle- and high-income countries (Anderson & Canuto, 2011). However, in resource-rich developing countries, a significant proportion of national wealth comes from natural capitals, which may aggravate economic dependency on revenues derived from the sale of natural resources. Actually, to achieve sustainable development in such countries, natural capital (hereafter referred to as natural resource rents) must be transformed into other types of capital. It is claimed that financial development can influence how natural resource rents affect other types of capital accumulation. Particularly, we have focused on human capital accumulation among other types of capital in Iran (as one of the major resource-rich countries). Thus, the main question raised is "Can the development of financial system improve the effect of natural resource rents on human capital accumulation in Iran?"

It should be noted that due to the crucial role of banks in the financial system of Iran, in order to distinguish the financial structure from financial development, this chapter focuses on seven financial system indices in the banking sector. Each of these indicators reflects the extent of development in one particular dimension of this system. Moreover, this chapter, by employing a multilateral index that consists of the above indicators, investigates the role of the multilateral financial development index in Iran from 1970 to 2014 and its impact on natural resource rents, which in turn has affected human capital accumulation during this period. To this end, the Rolling Regression technique with fixed windows coupled with Autoregressive Distributed Lag (ARDL) has been recruited. Our findings suggest that monitoring financial depth and the vital role of deposit money banks in financing long-run investments can reveal the potentials of financial system development in the economy of Iran in the long run. However, we do not find any improving effect from the multilateral financial development index in the short run and long run and this may come from the fact that all aspects of financial development have not been considered by policymakers in Iran. Generally, based on our empirical results, we could say that financial development should be considered as an economic development strategy in Iran. Also, it should be noticed that the main innovation in the chapter stem from the fact that *first*, we have focused on the impacts of financial development on natural resource rents–human capital nexus in short run and long run. It is in contrast to previous studies which ignore the impact of financial system on the way how natural resource rents convert to human capital as a crucial capital in order to achieve sustainable economic growth in resource-rich countries. *Second*, more precisely, we have used multilateral and individual financial indices to study the most important aspects of financial system in the banking sector in Iran. This may help policymakers to consider the aspects which can help to improve the financial system in the long run.

The rest of this chapter is organized as follows: Section 2 provides the review of literature underlying the effect of natural resource rents on human capital accumulation and the impact of financial development on this relationship. In Sect. 3, the methodology and empirical model are briefly discussed and Sect. 4 shows the results of model estimation and its analysis. Finally, conclusions are drawn in Sect. 5.

2 Review of Literature

In this section, we first discuss the literature on the mechanism through which resource rents influence the human capital accumulation and then elaborate on the important role of financial development with regard to the relationship between natural resource rents and human capital accumulation.

2.1 The Impact of Resource Rents on Human Capital Accumulation

Human capital, or the quality of human resources and the institutionalized knowledge of mankind, has been an important area of research and a contentious issue among economists in the last decades. Indeed, by the early 1950s, it appeared that the root cause of backwardness in developing countries was a lack of physical capital. Therefore, these countries began to adopt diverse methods of fund-raising. Today, however, economists have underscored the role of human capital in improving productivity and expediting economic growth and development through expanded production, revenues, and social welfare. For example, Kuznets (1971) argued that the concept of capital, which only included physical, was a flawed and inadequate concept. He asserts, "The capital of a developed country is not its equipment and machines but the stock of knowledge obtained from experiments and the skill of individuals in that country in putting this knowledge into action." Lucas (1988) in his neoclassical growth model points to human capital (which he considered as a kind of renewable capital) as determinants of economic growth. Furthermore, the experience of developed countries demonstrates that the economic growth rate cannot be explained only through physical capital and the number of employed people, but multiple other factors should be considered that improve the economic growth of these societies. These factors, known as surplus or residual factors, are the main impetus for boosting capital and human resource productivity. A majority of economists contend that the residual factor, which is considered an indispensable part of the economic growth in developed countries, is directly or indirectly linked to the quality of education.

In general, researchers have introduced various channels through which natural resources affect the economic performance of countries. One of these channels is human capital. Recent studies about the effect of natural resources on economic growth through human capital channels can be divided into three general categories. Sachs and Warner (1995, 1999) and Gylfason (2001) identified a negative relationship between the abundance of natural resources and human capital by exploring how natural resources can transform into curses (Coulibaly, 2013; Suslova & Volchkova, 2012; Stijns, 2006; Manning, 2004; Papyrakis & Gerlagh, 2003; Sen, 1999; Asea & Lahiri, 1999). Indeed, they illustrate the transition from natural resources to an undesirable economic performance by exploring the effect of natural

resources on economic growth through the human capital channel (Philippot, 2010). In general, many empirical studies have confirmed the undesirable economic performance of resource-rich developing countries through the injection of revenues derived from natural resources.

To explain this adverse effect, these studies claim that when economic agents benefit from the revenues of natural resources, they underestimate the value of education in the long run. In fact, natural resources represent the underlying factor that hampers them from serious consideration of educational needs of their children (Gylfason, 2001). Therefore, natural resources in resource-rich countries are the bane of human capital and lower the levels of human capital in these countries in comparison with countries that are bereft of such resources. Accordingly, reliance on the revenue generated from the sale of natural resources and disregard for human capital training is the driving force behind the limited budget allocated to education and low registration rate at different levels (Brunnschweiler & Bulte, 2008). The model designed by Goderis and Malone (2011) demonstrates that during an economic boom, wages of unskilled workers in resource-rich countries rise in comparison with skilled workers due to temporary shrinkage of income inequality, which leads to impaired quality of human capital accumulation.

The second group of studies such as Davis (1995) and Stijns (2006) reveals that natural resources do not have a negative impact on human capital accumulation. Davis (1995) posited that indicators of human capital accumulation in resource-rich countries are greater than those of nations without natural resources. Davis and Cornado (2013) reported that performance indicators in mineral and oil-producing countries are far better than countries that are deprived of such resources. Amuzegar (1999), in his study on 13 members of OPEC, concluded that per capita income in these countries soars by rising oil revenues. According to this group of studies, high resource rents can create economic opportunities and promote the possibility of economic growth in these nations. Finally, the third group of studies such as Philippot (2010) contends that the adverse effect of natural resources on human capital accumulation is not a rule, as it largely depends on how the above variables are calculated. To sum up, there are three main categories for estimating human capital which can be summarized as follows:

1. Government expenditures and investment in education, the rate of registration at schools and in higher education institutes along school years, which are all the criteria of literacy in the society (Barro & Lee, 1993; Davis, 1995; Gylfason, 2001).
2. Costs of investment in education for each individual (Dae-Bong, 2009).
3. Productivity of people in labor market which is measured by the output of people in their area of expertise (Mulligan & Martin, 2000).

In fact, natural resource rents, which are often seen as windfall revenues derived from the sales of natural resources, can generate revenue for the government (as a public and state entity) and the people (as the private sector). To the extent that these revenues are spent on this channel, they can encourage human capital accumulation in society. It should be noted that the methods of computing human capital are as

important as the infrastructures underpinning the relationship between natural resource rents and this kind of capital. So, in the next part, we have explained more about the crucial role of financial development as the main infrastructure in this issue.

2.2 *Financial Development, Natural Resource Rents, and Human Capital Accumulation*

Financial development represents an array of factors, policies, and institutions that contribute to the development of financial intermediaries, and efficient financial markets as well as extensive and profound access to capital and financial services (World Economic Forum, 2012). The results of recent studies suggest that countries with an efficient financial system can expect higher growth rates (Lin & Liang, 2019; Ganioğlu, 2016; Nabi & Suliman, 2009). Although, economists hold divergent views regarding the influence of financial system on economic growth, theoretical and empirical evidence reveal that financial development has a positive impact on economic growth. The primary function of financial system is the optimal allocation of financial resources. As Levine (1997) explains, the primary function of financial system can be broken into five basic functions:

1. Allocating financial resources
2. Mobilizing savings
3. Managing risks
4. Facilitating exchange of goods and services
5. Monitoring managers and exerting corporate control

In order to shed light on the relationship between financial development and human capital, two experimental observations about education and income should be taken into consideration. Firstly, there is a positive correlation between education and income. On average, people with a higher degree of education tend to earn greater incomes. Secondly, there is a positive association between parents' income and children's education. Thus, well-off parents tend to invest more in their children's education, which in turn is crucial for earning higher incomes in the future (Levine & Rubinstein, 2013(. These two empirical evidences have raised this question among social scientists that if the return on education is high, why do children in low-income households have a lower level of education compared with high-income households? If higher education is the path to earning greater incomes in the future, what factors do restrict the access of children in low-income families to higher education? One approach focuses on costs: lower-income families cannot afford the expenses of education and the cost of borrowing is exorbitant (Kane, 1994, Kane & Rouse, 1999, Belley & Lochner, 2007, Brown et al., 2012). From this perspective, financial reforms to bring down interest rates can boost the rate of

college enrolment among children of disadvantaged families who cannot afford to attend college (Levine & Rubinstein, 2013).

A second view is centered upon benefits: the return of higher education for children of poor families is fairly low, and therefore they make limited investment in the education sector (Cameron & Heckman, 2001; Shea, 2000; Keane & Wolpin, 2001; Carneiro & Heckman, 2002; Kane, 2003). That is, children of low-income households are less likely to visit and experience school environment and community, and thus their cognitive and noncognitive skills are less developed than children from higher-income households. For this reason, their expectation of higher income from attending schools is lower. Consequently, when students are to decide whether to work or go to college, their childhood environments determine their expected benefits of attending college. From this point of view, financial reforms that lessen the cost of credit will have a minor effect similar to the benefits that disadvantaged families expected of college. To evaluate these two perspectives, numerous studies have adopted indirect methods to examine whether interest rates shape people's educational choices subjectively (Levine & Rubinstein, 2013).

According to results of studies in this field, domestic bank deregulation makes people with specific family characteristics or learning abilities attend college. In particular, bank deregulation does not have any effect on students who are in the lower one-third of learning ability distribution. However, bank deregulation expands the likelihood of attending students in the upper two-thirds of the learning ability distribution. According to Levine and Rubinstein (2013), five years after bank deregulation, the attendance of capable students at school rose by 13%. In addition, alleviating credit constraints has the highest impact on capable students from families with relatively low levels of education (less than 12 years of schooling). Moreover, bank deregulation has the greatest impact on disadvantaged families so that five years after deregulation, the attendance of capable students from disadvantaged families in college rose by 20%. Shahbaz and Islam (2011) argued that financial development, by eliminating borrowing constraints that used to deter deprived families from accessing markets for financing human capital, leads to the growth of human capital accumulation. Access to credit is key financial support for deprived families, allowing them to invest in their children's education. This accumulation of human capital in turn improves income distribution and the advancement of technology through innovation and expansion of economic growth. Also, access to credit enables the poor to regulate their consumption and thus reduce their vulnerability to external shocks and create human capital.

In addition, financial intermediation facilitates investment in human capital. When financial markets are complete, investment decisions (including investment in human capital) are made solely based on the rate of return. However, when markets are incomplete, it is difficult to distinguish consumption and investment decisions in human capital and the time dedicated to education will be influenced by family resources (Becker & Tomes, 1986). In underdeveloped economies that are characterized by low and irregular incomes, the impact of an incomplete market on human capital accumulation is potentially great. Nevertheless, the relationship between financial markets and educational investment is largely unknown in

empirical studies. Considering that the main function of a financial system is the optimal allocation of financial resources, if the appeal of savings rises, it should provide an opportunity for re-borrowing funds on the society. The access to credit can help the indignant by enabling them to invest in different sectors (e.g., investment in education and health), or other enterprises that might be difficult to accomplish by families based on their normal income, but paves the way for earning a higher income in the future. Access to credit and other financial services can reduce the ratio of low-risk and low-return assets (e.g., gold), which are retained by the disadvantaged for precautionary purposes. It also urges them to invest in higher-risk assets with higher profits in the long run (e.g., education) (Department for International Development (DFID), 2004) which can also increase human capital accumulation. The other functions of the financial sector, including risk management, information access, and monitoring managers, and exerting corporate control also reinforce the allocation of savings.

Accordingly, financial development can pave the way for human capital accumulation over time, which is one of the major channels affecting economic growth. Although extensive studies have examined the role of financial development in resource-rich countries (Iheanacho, 2016; Elhannani et al., 2016), there is a paucity of studies on quantitative analysis of the role of financial development in resource-rich countries. Additionally, these studies have chiefly focused on the effect of financial development on the economic growth of such countries. One of these studies was conducted by Badeeb and Lean (2017), who investigated the role of development in banking system in the natural resource curse over the 1980–2012 period in Yemen using Autoregressive Distributed Lag (ARDL) technique. They have found that natural resource dependence that underpins resource curse, lowers productivity with the negative impact of natural resources on productivity. However, this adverse effect will decrease as a result of banking development. In fact, the adverse effects of natural resources begin to deteriorate after strengthening the financial development of banking sector. It should be noted that they adopted two indicators of financial depth index and domestic credit to the private sector as a benchmark to evaluate financial sector development.

Van der Ploeg (2011) delved into this issue of whether natural resources, function as a blessing or curse for resource-rich countries. According to their study, the windfall profits increase the real exchange rate, hamper industrialization, and portray a bleak economic outlook, and these adverse effects are especially prominent in countries with dramatic economic fluctuations and underdeveloped financial systems. By citing empirical evidence of resource-rich countries and using the correlation between financial depth index and economic growth, he explains that the resource curse is relieved in countries with a higher degree of financial development.

Van der Ploeg and Poelhekke (2009) assert that countries with less developed financial systems are more likely to have volatile economies. The initial values of the financial development index (ratio of given credit to private sector by financial system) had been regressed to natural resources export (as an index of resource dependency) and economic growth. The results exhibited that the deleterious effect of revenues generated from natural resources on economic growth of resource-rich

countries with developed financial systems was lower. However, the analysis method of this chapter has been questioned as the analysis of financial development index is based on the initial financial development of countries in 1970, and this method cannot be applied to developing countries with significant fluctuations in their financial development process. Also, what is meant by financial development index in this chapter is only one of the aspects of financial development.

Bakwena and Bodman (2010) in a study on 14 resource-rich countries inspected whether financial development can reduce the natural resource curse and through which channels it can counter the potential effects of natural resources on economic growth. According to the results of these two studies, the development of financial institutions may help alleviate natural resource curse in these countries. They posit that financial development wields influence on the investment efficiency and economic performance of these countries. It should be noted that the results of the above researches indicate that mature financial institutions contribute to the efficient exploitation of financial resources in comparison with less developed financial institutions. However, these studies have only investigated the direct effect of financial development index on economic growth. Moreover, they have only considered three financial variables of banking sector as financial development indicators, examining their direct effect on economic growth separately (for 14 resource-rich countries) in the form of a panel data model. Other studies in this field have highlighted the importance of financial development in the economy of countries. For instance, Beck and Poelhekke (2017) indicated that financial system should serve as an important absorption tool for windfall gains, such as arising from natural resources. Hattendorff (2013, 2014) and Kurronen (2012) showed empirically that resource-rich countries appear to have a less developed financial system. Based on a number of descriptive studies, Van der Ploeg (2010) concluded that natural resource curse applies to countries in which the fluctuations of GDP per capita are over 2.45%. Van der Ploeg and Poelhekke (2009) also argued that one of the problems in developing resource-rich countries is related to their natural resource revenues that have a detrimental effect on their economy. Aghion et al. (2009) asserted that macroeconomic fluctuations triggered by trading sector shocks and the price of goods may deter economic growth and innovations in countries with less developed financial institutions. For more precisely, they argue that the effect of real exchange rate volatility on productivity growth depends critically on a country's level of financial development.

Nili and Rastad (2007) posit that for resource-rich economies, there is a need for financial institutions to nurture the flow of credit to private investors. The dominant role of the government in attracting investment, as much as the limited role of the private sector, is responsible for the low quality of financial institutions, which leads to lower growth and investment in these economies. There are two important points in these studies that set them apart from the present study. *Firstly*, financial development as a multilateral concept has been overlooked. To analyze the effectiveness of this variable (financial development), all dimensions of this variable should be taken into account so that the accuracy of results could be verified. *Secondly* and more importantly, none of the previous studies has addressed the mediating role of financial development in the association between natural resource rents and human

capital accumulation in resource-driven countries. Indeed, exploring the impact of a substructure (financial development) on how a decisive variable (natural resource rents) influences another variable (human capital) is an inherent feature that distinguishes this chapter from previous studies. As a result, it is worth noting that despite the growing interest of economists in the role of financial system development in natural resource-dependent economies, few quantitative studies have investigated the impact of a multilateral financial development index on the mechanism through which a natural resource rents affect human capital accumulation in such economies.

3 Methodology

The empirical model corresponding to the theoretical considerations relates human capital (HC) to financial development (FD), natural resource rents (NRR), trade openness (OPEN), GDP growth (G), physical capital (PC), foreign capital (FC), and social capital (SC):

$$HC_t = \alpha_0 + \beta_1 FD_t + \beta_2 NRR_t + \beta_3 OPEN_t + \beta_4 G_t + \beta_5 PC_t + \beta_6 FC_t + \beta_7 SC_t + \varepsilon_t \quad (1)$$

Human capital (HC): it is average years of schooling. This indicator is calculated as follows: the total number of individuals in a specific age group (Group one: 15–19 years old, Group two: 20–24 years old... and the last Group: 75 years old and above) is divided by the total number of people aged 15 years and older, multiplied by the number of schooling years that this particular age group has received, including primary, secondary and high school, as well as people who have never received any schooling.

It should be noted that this index, which was developed by Barro and Lee (2013) (based on UNESCO datasets, Eurostat, national intelligence agencies, etc.), provides a proper indicator of human capital accumulation for a wide range of countries. The above index determines access to educational facilities for different age groups (over 15 years old) based on gender segregation and in 5-year age groups. Besides new calculations of mortality and supplementary rates related to age and the level of education, it provides an exhaustive indicator of human capital. According to this method, which is based on UNESCO's classification table, people can be assigned to seven categories based on their level of education: non-formal education, incomplete elementary education, complete elementary education, lower secondary education, upper secondary education, incomplete high school and complete high school education. To calculate this index for all age groups, first, the demographic share of the first age group ($a = 1$) is considered in the total population (l_t^a) and then, the schooling years of that group are determined. In the next step, the second age group is considered ($a = 2$) and this process continues until the last age group. Finally, the final index is calculated according to this formula ($S_t = \sum_{a=1}^{A} l_t^a s_t^a$). In the past, a permanent inventory method was used to calculate the human capital index. It used census-based observations and surveys of adult participation in education for age

groups of 15 or 25 years as an indicator of human capital stock. For individuals who have just started schooling, it is seen as a flow that is added to this human capital with a time lag. In this method, human capital flow draws on data related to the school enrolment ratios and population structure over time. Due to the inaccuracy inherent in the estimation of enrolment ratios and benchmark censuses, it leads to bias. However, in the new human capital calculation method, measurement error has been reduced by observations at 5-year intervals. Also, Barro and Lee (2013) offered a new estimation of fertility and mortality rates based on age and education coupled with a new estimation of complementary proportions based on educational participation and age group, which contribute to the improvement of measurement accuracy.

Foreign Capital (FC): Net foreign assets, which is calculated annually by deducting total assets from total debts which is divided by GDP. Physical Capital (PC): Gross capital formation accumulated as a percentage of GDP. Social Capital (SC): The measure of social capital used in this study is generalized trust. It reflects the trust between strangers and is not limited to trusted friends and family members (Baliamoune-Lutz, 2011). The above index is (HCIM[1]) that is calculated as the ratio of time, savings, and foreign currency deposits to broad money. This indicator implies a commitment for the period to maturity (Fabricius, 1998). That is:

$$\text{HCIM} = \frac{M_2 - M_1}{M_2}$$

Indeed, trust between financial intermediaries (such as banks) and financed entities in the relation-based banking systems (such as Iran) reflects social capital. Hence, the above index can explain the trust between the two important sectors (people and financial intermediaries) in the economy. It is worth noting that some researchers have attempted to use CIM as an index of social capital. However, the main point in applying this indicator is that HCIM is more sensitive to institutional differences than CIM[2] (Fabricius, 1998). Generally, all kinds of capital (foreign, physical, natural, human, and social capital) comprises total national wealth and they may have a significant mutual effect on each other (Anderson & Canuto, 2011). Although, most researches have focused only on the effects of natural capital on human capital, it seems that there may be significant influences from other kinds of capital on it (Graca et al., 1995; Alpaslan, 2015). Due to the existence of such a shortcoming in previous studies, the accumulation of human capital that may be taken from other forms of capital is considered.

Financial Development (FD): Due to the bank-based financial system of Iran, the emphasis of this study is on financial development indicators in the banking sector. Seven indicators used as criteria of assessing financial system performance of the banking sector are:

[1]Highly Contract-Intensive Money.

[2]Which is considered as an index of social capital in some of researches (e.g., Dollar & Kraay, 2003; Fleitas et al., 2011).

1. Private credit by deposit money banks and other financial institutions to GDP
2. Deposit money banks assets to (deposit money + central) bank assets
3. Central bank assets to GDP
4. Deposit money bank assets to GDP
5. Liquid liability to GDP
6. Financial system deposits to GDP
7. Bank credit to bank deposit (see Beck et al., 2000)

All of these are confirmed by the Global Financial Development Report (2018). We have constructed a combined index created by Principal Component Analysis (PCA) method. Finally, the multilateral financial development is the weighted average of seven major indices that are calculated by the Principal Component Analysis (PCA) method based on the covariance matrix.

Natural Resource Rents (NRR): Ratio of natural resource rents to GDP (World Bank Data, 2018);

GDP growth (G): Annual GDP growth rate in constant prices. Aggregates are based on constant 2010 U.S. dollars (World Bank Data, 2018).

Openness (OPEN): is the sum of exports and imports of goods and services measured as a share of gross domestic product (World Bank Data, 2018). The more a country is open to trade, the faster its economy develops (Ay et al., 2017), which facilitates the accumulation of human capital. It is worth mentioning that the data related to human capital and social capital indices are extracted from Penn World Table (2018) and International Financial Statistics Database (2018), respectively. Also, the data related to financial development indices that are used in regression Eq. (1) are extracted from World Bank Dataset (2018).

To answer the main question, the regression Eq. (1) has been estimated using the rolling regression technique (with fixed windows) based on the ARDL method over the period 1970–2014. To do so, first, the initial regression equation is estimated with a sufficient observation level, and then in the next steps, one observation is deducted from the beginning of the observation level in the previous stage and added to its end. Thus, the length of observations in each step will be the same. Hence, according to the time period, first, the equation is estimated using the ARDL method during the period of 1970–1999, and then by adding one observation to the end and deducting one from the beginning of the desired period of time, the equation is estimated once again by the above method. In this way, the last time period for estimation equation regression (1) is 1985–2014. Finally, to answer the main research question, the evolutionary trend of resource rents coefficient is illustrated by rolling out the financial development index using the rolling regression technique with windows of fixed-length observations. In this way, the results allow to analyze the impact of financial development indicators on the mechanism underlying the effect of resource rents on human capital accumulation.

Table 1 KPSS unit root test analysis

Variable	Calculated KPSS statistics	Critical value of KPSS statistics (1%)	Result
FC	0.08	0.21	Stationary
FD	0.18	0.21	Stationary
G	0.12	0.21	Stationary
HC	0.19	0.21	Stationary
OPEN	0.13	0.21	Stationary
PC	0.14	0.21	Stationary
SC	0.19	0.21	Stationary
NRR	0.11	0.21	Stationary

Source: estimated by authors

4 Empirical Results

First, the results of the stationarity test performed by KPSS statistics (which was introduced by Kwiatkowski et al. (1992) are introduced by considering intercept and evolutionary trend for all variables in the regression (1). According to Table 1, all the variables are stationary at a level due to the acceptance of the null hypothesis of not having unit root at 5% significance in the KPSS test.

In order to find the impacts of financial development on resource rents–human capital nexus, first, we have estimated the model using the ARDL with fixed windows of 30 observations length in order to extract resource rents–human capital nexus coefficients in short run and long run. Afterward, we have rolled the level of financial development index (at the end of each window) on these coefficients. So, the pair of estimated regressions coefficients[3] with financial development index (FD) are plotted both in the short and in the long run. Therefore, we can find out the effect of FD on Rent-HC nexus (Fig. 1a–h). In what follows, the effect of the multilateral financial development index on natural resource rents coefficients in regression Eq. (1) is described. Moreover, as mentioned earlier, to provide deeper insights on this issue and explore the effect of these seven financial development indices, ARDL rolling regression was implemented separately for each of these individual indicators.

First, in order to determine the effect of multilateral financial development index on natural resource rents coefficient in Eq. (1) based on rolling regression technique, the diagram of ordered pairs distribution (the estimated NRR coefficients in Eq. (1) (β_{NRR}) and the value of multilateral financial development index in the last year of the period) should be depicted with a linear trend. In fact, using this method, the financial development index is rolled on β_{NRR} in each equation, during studied intervals to determine the mechanism of its effect.

Figure 1a shows that the slope of linear trend obtained from ordered pairs drawn for multilateral financial development index (FD) and β_{NRR} is negative in the long

[3]Which are statistically significant.

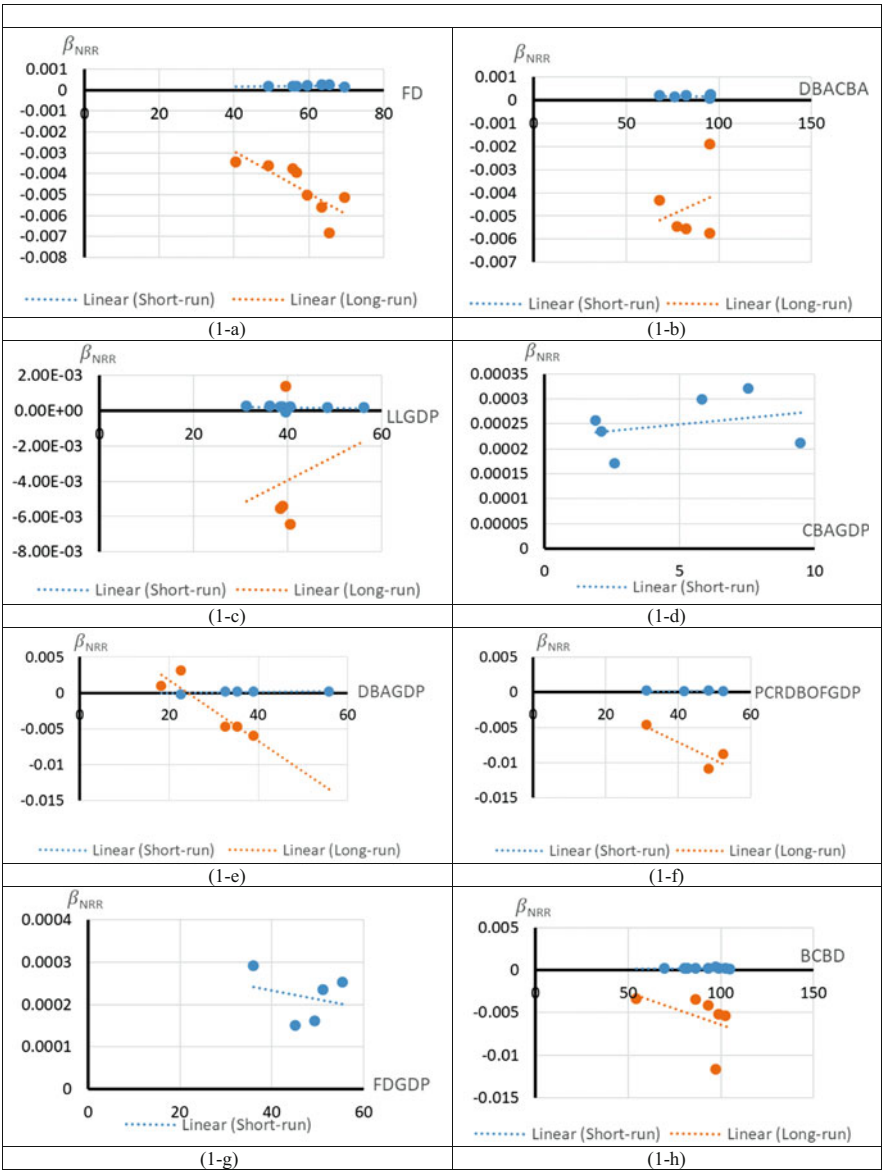


Fig. 1 The Impacts of Financial Development Indices on β_{NRR}. Source: estimated by authors

run. The negative slope of this graph indicates that by the rising level of financial development in Iran, the adverse impact of natural resource rents on human capital accumulation in regression Eq. (1) has aggravated. Also, as shown in Fig. 1a, the slope of the graph is almost zero in the short run, indicating that financial development has not wielded influence on improving or mitigating the effectiveness of

natural resource rents on human capital accumulation in Iran. In fact, the reason that the multilateral financial development index has failed to have an improving effect on natural resource rents-human capital nexus is related to low levels of financial innovations in Iran (as one of the main channels for financial system development). Also, it should be noted that due to the lack of comprehensive financial supervision over the financial system, along with high financial risks, the banking sector cannot provide suitable loans for people with a great stock of human capital who have minimal collateral.

It seems that the escalating moral hazard of banks is due to a decrease in the real interest rate that has always retained a negative value (except from late 2007 to early 2009) (Central Bank of Iran, 2016). It means that the inflation rate has always been higher than the interest rate in Iran. After 2006, with dictated adjustments of interest rate (because of financial repression) and high volatility of inflation rates, relative prices between financial and real sector underwent extreme fluctuations. Therefore, the ability and incentive of the banking system to distinguish good borrowers from bad ones dropped sharply. In this situation, people and projects for whom the ratio of human resources to nonhuman resources is lower will have lower access to credits. In this period, the dictated reduction of interest rate and the rise in inflation to more than 25% rendered the real interest rate negative (−13.4%) (Central Bank of Iran, 2016). Also, the negative value of the real interest rate increased the number of applicants for banking, making it difficult for banks to accurately evaluate projects that are in urgent need of financing. This situation can raise the systemic risk of the banking network in which the financial system fails to implement some of its functions properly. Therefore, the natural resource rents entering the banking system of the country will not reach those who have the potential to carry out innovative projects in the field of knowledge and technology.

On the other hand, our findings for individual financial development indicators in long run suggest that, with a rise in two indices of "deposit money bank assets to central bank assets" Fig. 1b, and ratio of "liquid liabilities to GDP" Fig. 1c, the effect of natural resource rents on the human capital index has improved in Iran. In other words, with an increase in the above two indicators, the negative impact of natural resource rents on human capital accumulation drops. According to the results, it can be concluded that: (1) by improving the function of deposit money banks compared to central bank and other financial institutions by granting facilities and accreditation in long run, the impact of natural resource rents on human capital accumulation in Iran can be improved. (2) Parallel to the financial deepening of banking system in Iran, revenues derived from the sale of natural resources in the country will contribute to the improvement of human capital accumulation. According to the results of long-run analysis, with an increase in three indices of the ratio of "depositary banks' assets to GDP," Fig. 1e; the ratio of "Private Credit by the Deposit Money Banks and Other Financial Institutions to GDP," Fig. 1f; and ratio of "bank credits to bank deposits," Fig. 1h; the effect of resource rents on human capital index will not be improved in long run. So, the escalation of these three indicators can exacerbate the negative impact of natural resource rents on human capital in the regression Eq. (1). This indicates that with expanding the size of deposit money banks (as a financial

intermediary) in the economy of Iran, increasing ratio of private credit by the deposit money bank and other financial institutions to GDP (as a criterion for measuring primary activities of financial intermediaries) and the ratio of bank credit to bank deposit (as a criterion of bankability in money creation), the negative impact of resource rents on human capital accumulation has aggravated in the long run.

The short-run results of our study suggest that with accelerating the ratio of "central bank assets to GDP[4]" Fig. 1d, the impact of natural resource rents on human capital index has been improved. On the contrary, with an increase in the ratio of "financial system deposits to GDP" Fig. 1g, the effect of resource rents on human capital has not been improved in Iran in the short run. Also, short-run results for other indicators exhibit that with improvement of such indices: the "multi-lateral financial development index" Fig. 1a; "ratio of deposit money bank assets to central bank assets" Fig. 1b; "liquid liabilities to GDP" Fig. 1c; "deposit money bank assets to GDP" Fig. 1e; "private credit by the deposit money banks and other financial institutions to GDP" Fig. 1f; and ratio of "bank credit to bank deposit" Fig. 1h; the natural resource rents coefficient in regression Eq. (1) has not changed considerably.

It should be noted that the stability of the parameters in all equations (related to multilateral and also individual financial development indices) are checked by using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ). In fact, these tests are the powerful methods for studying the stability over time of regression equations are considered that were introduced by (Brown et al., 1975). In fact, the cumulative sum test helps to show if coefficients of the regression are changing systematically over time. Moreover, the cumulative sum of the square test is helpful in showing if the coefficients of the regression changing suddenly. In both tests, the point at which the plots cross the confidence lines gives some indication of value(s) of ordering variable associated with parameter change (Miller, 1982). Meanwhile, Monte Carlo simulations indicate that the CUSUMSQ is the more powerful of the two tests (Garbade, 1977). However, our findings for both CUSUM and CUSUMSQ plots showed strong evidence of the stability of parameters in all regressions.[5]

5 Conclusion

Given the importance of human capital accumulation in all economies, and especially in resource-rich developing countries, this chapter has emphasized the mechanism through which natural resource rents become a blessing in accessing sustainable economic growth by accelerating human capital accumulation. In fact, greater attention to human capital, which accounts for a large part of the wealth generated in successful economies, can help achieve economic development goals.

[4]Which shows the growing in size of central bank in financing the economy.

[5]The results are illustrated in the appendix.

In this regard, it should be noted that a large share of revenues in resource-rich countries (such as Iran) comes from the sales of these resources, which ultimately find its way to the financial system. So, the financial system should be able to allocate these windfalls optimally to different economic and social activities. From this perspective, it can be posited that one of the key infrastructures underlying the effect of natural resource rents on different types of capital (such as human capital) is financial system. Indeed, financial development has the potential in allocating these resources optimally and exploits them properly to achieve sustainable economic growth.

Based on the vast literature on the key role of financial development in resource-rich countries, this chapter organized to answer this crucial question: "Can financial development improve the effect of natural resource rents on human capital accumulation?" In order to answer it, first, the regression model was designed for human capital accumulation and the coefficients of this equation for 16 times windows with identical observation length were estimated using the ARDL estimator both in the long run and short run. After that, in order to find the impacts of financial development indices on the effects of natural resource rents on human capital accumulation, the rolling regression technique with fixed windows has been used. Our findings in the multilateral financial development index sector, illustrate that the level of financial system development in Iran's banking sector has failed to improve the long-run impact of natural resource rents on human capital accumulation. Also, the short-run results of this index demonstrate that financial development in the banking system has failed to play an integral role in improving the effect of resource rents on human capital in Iran. Thus, it can be posited that financial development (as a multilateral index) has failed to capitalize on its potential for improving the impact of natural resource rents on human capital accumulation.

As far as the individual financial development indices are concerned, the results reveal that among the seven individual indicators, two indicators of the ratio of "liquid liability to GDP" and "deposit money bank assets to central bank assets" exerted an ameliorative effect. This implies that with the escalation of the above indicators, the effect of natural resource rents on human capital accumulation can be improved. Therefore, monitoring the financial depth and vital role of deposit money banks in financing long-run investments can reveal the potentials of financial system development in the economy of Iran in the long run.

Also, the results in the short run, in most of the financial development indicators studied in this chapter (each measuring one aspect of financial system development), indicate that the impact of financial development on the effects of natural resource rents on human capital accumulation is negligible in Iran (except for two of individual indices). Accordingly, it seems:

1. All aspects of financial development have not been considered by policymakers in Iran.
2. A coherent strategy has not been executed for financial system development.

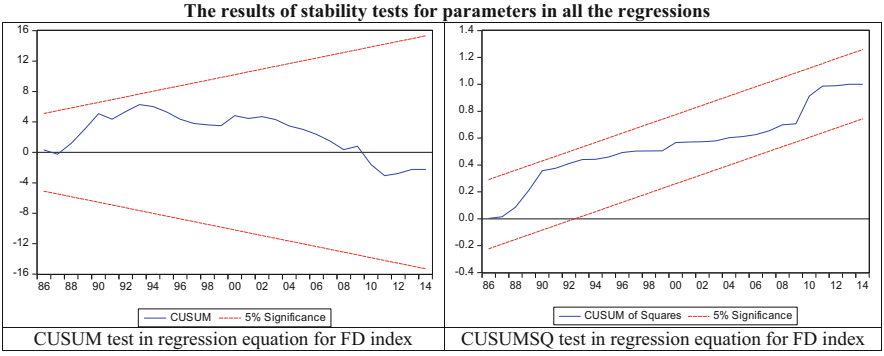
3. Financial development, as an economic development strategy, has failed to establish itself as a defensible shared theoretical understanding among Iranian rulers, policymakers, and economists.

In light of the above, it is suggested that:

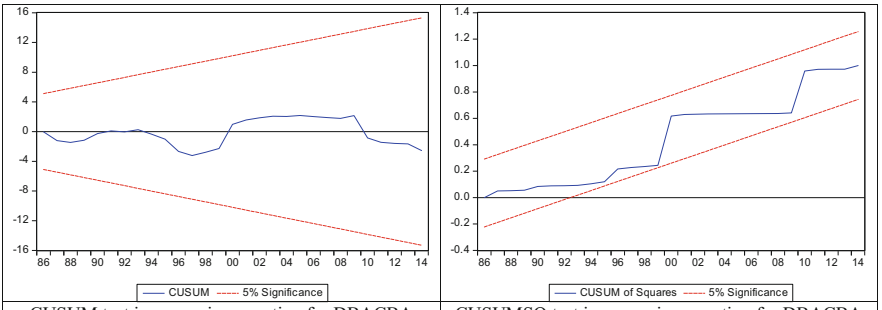
1. Financial policies should be design based on balanced financial development (including simultaneous and concurrent development through all four channels of financial liberalization, financial depth, risk management, and financial innovation).
2. More importantly, a dominant development strategy should be adopted to expand the financial sector so that all components of this system are improved in keeping with specific purposes.
3. Above all, financial development should be considered as an economic development strategy in the country.

Appendices

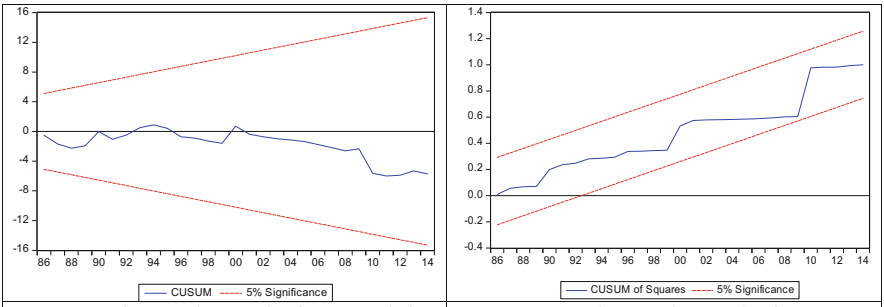
The results of stability tests for parameters in all the regressions



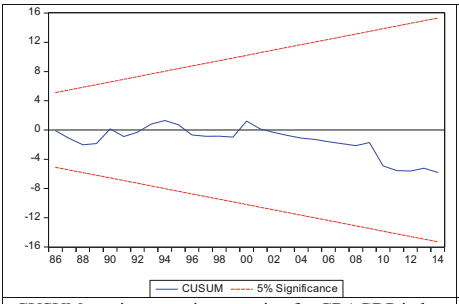
CUSUM test in regression equation for FD index | CUSUMSQ test in regression equation for FD index



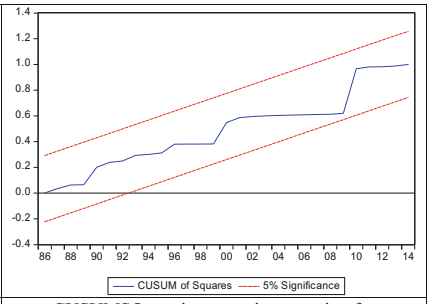
CUSUM test in regression equation for DBACBA index | CUSUMSQ test in regression equation for DBACBA index



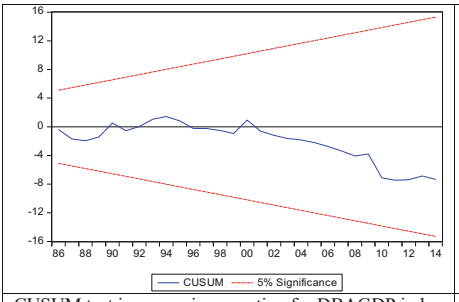
CUSUM test in regression equation for LLGDP index | CUSUMSQ test in regression equation for LLGDP index



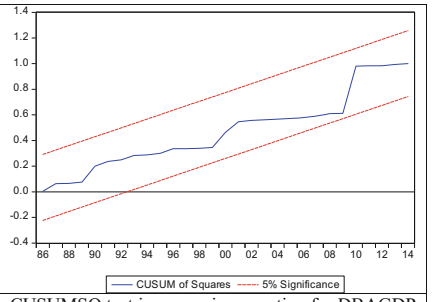
CUSUM test in regression equation for CBAGDP index



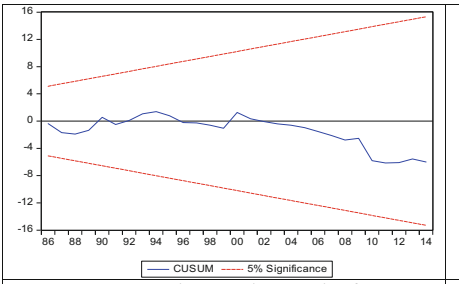
CUSUMSQ test in regression equation for CBAGDP index



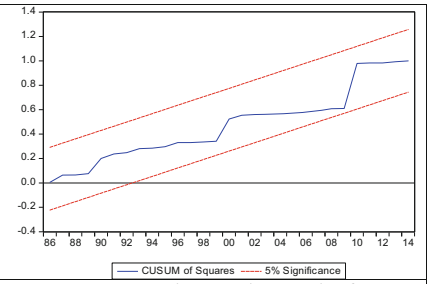
CUSUM test in regression equation for DBAGDP index



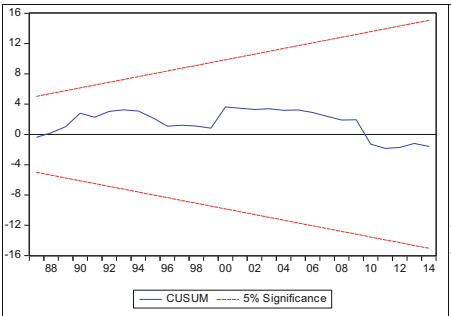
CUSUMSQ test in regression equation for DBAGDP index



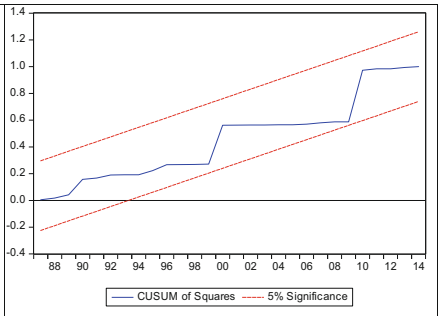
CUSUM test in regression equation for PCRDBOFGDP index



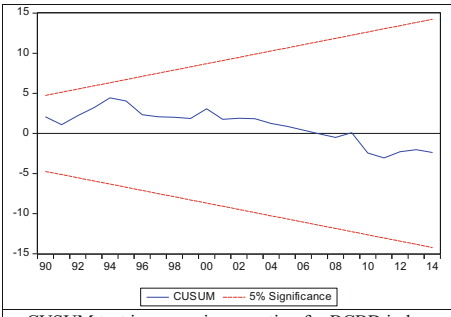
CUSUMSQ test in regression equation for PCRDBOFGDP index



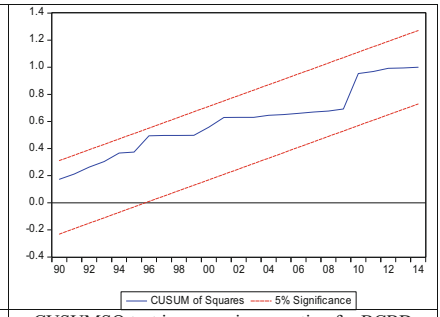
CUSUM test in regression equation for FDGDP index



CUSUMSQ test in regression equation for FDGDP index



CUSUM test in regression equation for BCBD index



CUSUMSQ test in regression equation for BCBD index

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Financial Inclusion Leads to Export Market Penetration: A Panel Study on Asian and African Countries

Shaista Aam and Ayesha Khatoon

1 Introduction

In recent decades, export competitiveness is a vital part of the growth and development policy debate in the world. Drawing upon the lessons from the experience of the most flourishing exporters in the developing world, which comprise: the "original Asian tigers" (Hong-Kong, South Korea, Singapore, and Taiwan), the "New Asian tigers" (Indonesia, Malaysia, and Thailand), as well as China, India, Argentina, Brazil, Chile, Mexico, and Turkey. While exports are considerably important for the growth and development of an economy, developing economies have been facing the challenge of growing and penetrating their export baskets further than their prime goods (Fischer, 1993; Bheenick & Schapiro, 1989). On the basis of research conducted in the recent decade, it is now well recognized that export market penetration and financial development into international markets are essential ingredients of victorious development plans; and advanced and consistent economic growth is connected with export growth (Dollar & Kraay, 2004). Exports are very important for the developing countries to generate revenue and consequently, increase economic growth and development, especially in Asian and African countries. Following the establishment of the significance of exports and its relevant topics like export development, export diversification, export competitiveness, export promotions, export performance, and export comparative advantage, the chapter moves forward to export market penetration. Export Market Penetration represents the successful export of a good or service in a particular market, and it is considered as the quantity of sales volume of a good or service out of the total target market for that good or service. It is a measure of export competitiveness that corresponds to the comparative potency of a specific exporter against a number of

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other exporters. The export market penetration index is the ratio of a country's total exports to the world's total exports.

Now we come to the most important indicator from which export market penetration can be increased and that factor is investment. Those countries which have high foreign direct investment are growing so faster than others. The reason is that if countries have high investment, they produce more. Therefore, they fulfill their domestic consumption demand and the rest exports in the international market. In the case of low-income countries, small and medium exporters could not avail high domestic and foreign investment. In this case, financial inclusion facilitates them to saving and transfer services and provision of credit and insurance at an affordable cost. Financial inclusion is a system in which borrowing and deposits from commercial banks are included. If more people deposit their money in commercial banks, banks will further regulate that money in terms of the loan. Automatically more commercial banks will come into existence and it is calling financial inclusion which will help to increase our production level. As the deposits increase, more firms can come for loans and boost their production. Small and medium enterprises will get most of the benefit from financial inclusion because from financial inclusion these firms can get short-term and long-term loans to start and increase their production, business, and exports. Financial inclusion is an essential circumstance for financial deepening, which assists to deal with the fundamental matter of development with justice (Sarma, 2008; Mbutor & Uba, 2013). Financial inclusion is a step toward inclusive development. Financial inclusion is a situation in which all citizens have the right to use suitable, preferred financial products and services to manage their money effectively (Leyshon & Thrift, 1996; Sarma & Pais, 2011).

The objectives of financial inclusion are to increase the export markets internationally, benefit the poor who cannot use formal financial services. Financial inclusion is an intrusion policy that inquires to control the market friction that hampers the markets from working in support of the poor and neglected. Financial inclusion offers incremental and harmonizing solutions to deal with poverty, to support inclusive development, and to tackle Millennium Development Goals (Sarma, 2008). It intends at depicting the people who cannot access banks in the formal financial system so that they can access financial services including savings, payments, and transfers to credit and insurance. In the light of the above discussion, the chapter reaches to the conclusion that one most important role of financial inclusion is to expand export market penetration. Table 1 shows the indices of export market penetration and financial inclusion of Asian and African countries. Arkolakis (2010) studied about costs of market penetration and the new consumers' margin in International Trade. This chapter gives a new theory of marketing penetration cost. This cost initiates an extensive margin of new customers in the firm's sales. These forecasts are on the French data, but jointly generate a dilemma for models with a fixed cost of exporting, such as those of Melitz (2003) and Chaney (2008).

The objective of the chapter is to analyze the impact of financial inclusion and other relevant macroeconomic factors on export market penetration in the case of Asian and African countries. The chapter used the export market penetration index as a measure of export performance. The main macroeconomic variable is financial

Table 1 Export market penetration index and financial inclusion index of Asian and African countries

Asian countries	Index of export market penetration			Index of financial inclusion			African countries	Index of export market penetration			Index of financial inclusion		
	2004	2010	2015	2004	2010	2015		2004	2010	2015	2004	2010	2015
China	41.67	53.1	49.1	4.29	4.33	0.045	Kenya	2.91	3.31	3.45	0.26	0.11	0.55
Turkey	16.18	20.6	22.41	0.96	0.04	0.16	Nigeria	2.57	2.74	2.75	2.13	0.72	0.4726
Thailand	16.15	18.3	16.8	1.57	0.55	0.99	Ghana	2.36	2.44	2.6	0.05	0.32	0.99
Singapore	13.08	13.3	12.1	0.12	0.51	0.59	Senegal	2.032	2.15	2.152	0.13	0.5	0.99
Israel	8.58	9.53	9.35	0.5	0.69	6.59	Namibia	1.65	1.98	2.035	0.01	0.28	0.95
Philippines	7.2	7.85	7.91	1.04	0.23	0.99	Uganda	1.66	1.83	1.91	0.7	0.57	0.98
Pakistan	6.58	7.55	7.49	0.72	0.49	0.55	Zimbabwe	2.27	1.87	1.81		0.2	0.34
Bangladesh	4.35	5.42	5.42	0.11	0.36	0.55	Zambia	1.64	1.77	1.695	0.02	0.27	0.21
Saudi Arabia	4.56	5.24	4.78	0.03	0.6	0.95	Togo	1.69	1.65	1.64	0.16	0.6	0.403
Qatar	1.85	2.58	2.818	0.63	0.17	0.45	Mali	1.59	1.62	1.61	0.06	0.34	0.93
Georgia	1.81	2.21	2.55	0	0.4	0.98	Burkina Faso	1.43	1.44	1.5	0.07	0.33	0.99
Afghanistan	1.70	1.67	1.68	1.01	0.52	0.39	Niger	1.39	1.42	1.46	0.16	0.42	0.97
Azerbaijan	1.53	1.56	1.59	0.21	0.25	0.03	Madagascar	1.29	1.39	1.45	0.05	0.56	0.76
Yemen, Rep.	1.61	1.63	1.41	0.03	0.51	0.55	Benin	1.41	1.42	1.4	0.26	0.45	0.99
							Rwanda	1.28	1.33	1.33	0.01	0.48	0.702
							Comoros	1.34	1.21	1.3	0.22	0.18	0.85
							Burundi	1.28	1.23	1.21	0.1	2.47	9.15

Source: Data for Index of Export Market Penetration is collected from World Integrated Trade Solutions (WITS), of World Bank. Index of Financial Inclusion is the author's own calculation from data compiled from World Bank by using Sarma (2008) methodology

inclusion which increases export market penetration by enhancing a firm's productivity. The other macroeconomic variables utilized in this chapter are economic growth, population growth, foreign direct investment, trade openness, employment rate, inflation rate, and regulatory quality of institutions. For this purpose, the present chapter employed panel data of 31 developing countries in which 17 are African and 14 are Asian countries. To estimate the effect of financial inclusion and other relevant variables on export market penetration, the chapter employed pooled ordinary least square and dynamic system generalized method of the moment. The contributions of the present chapter are diverse: The main contribution of this chapter is to estimate the financial inclusion index (by using Sarma, 2008, first developed for India) for each of the countries included in the panel. The second contribution is the use of the export market penetration index as a proxy of export performance. Although many research can be found on export competitiveness, export comparative advantage, export promotion, export performance, etc., on export market penetration, still no research can be found; so it is going to be our contribution. The third contribution of the chapter is to analyze the effect of financial inclusion on export market penetration, which is also a novelty of this chapter. Earlier no study found that analyze the effect of financial inclusion on export performance or export market penetration. After that chapter will be able to recommend some policy plans to increase the export market penetration, so that economy will boost.

The structure of the chapter is organized as: Section 2 provides previous literature and their finding; Sect. 3 presents theoretical framework, model specification and data sources. Section 4 presents econometric methodology. Section 5 discusses the results and finally Sect. 7 offers conclusions and policy implications.

2 Review of Literature

An immense amount of studies have discussed the role of financial development in economic growth (Bas & Berthou, 2012; King & Levine, 1993; Rajan & Zingales, 1998). A part of literature also found facts on the impact of financial development on exports. There is no study found that conducted research on the impact of financial inclusion on export promotion or export performance. The current chapter is first to analyze the impact of financial inclusion on export market penetration. Therefore, we do not have exactly relevant literature on our topic. Hence, we include literature on the effect of financial development, financial constraints, financial frictions, and financial system on export performance, export promotion, and export participation. After a preliminary study by Kletzer and Bardhan (1987), a large amount of literature has established that financial development provides a comparative advantage, when industries required capital and machinery. By employing firm-level data for 56 economies, Beck (2003) explains that economies with a greater degree of financial development display a bigger contribution of export and be likely to concentrate in industries with a greater degree of external financing requirements. Hur et al.

(2006) find that well operating financial system is a factor of international trade patterns, mainly for industries with bigger parts of intangible assets. Similarly, Svaleryd and Vlachos (2005) support the association amid financial systems and the patterns of international trade, for OECD economies. The existing literature frequently employs private credit as a percentage of GDP provided by financial system as a proxy for financial development. This considers as same way to access external finance for firms within a country (Minetti & Zhu, 2011).

The fresh wave of literature has been focused on the effects of financial constraints on international trade at the firm level. The significance of financial constraints for exporting firms may be evaluated in diverse methods. As exports usually required more time from production to receipt of export revenues, as compared to the domestic sellers due to the reason that exporters face larger liquidity constraints. International activities acquire also greater risks. These activities are usually more risks associated with deficient information on the foreign customers. Additionally, activities related to exports involve more fixed costs earlier than entering the international market. The costs comprise market searching and the formation of subsidies in the international markets. Similarly, Melitz (2003) investigates these costs and offers a model in which entering the export market needs the compensation of up-front costs that may be considered as an investment. By reviewing the literature it is confirmed that the financial fitness of firm affects its investments (Aghion et al., 2010). As a result, firms' export choices and performances could be tributary of their financial conditions. Taking into account the significance of these opinions, Manova (2013) initiated liquidity constraints in a model of heterogeneous firms. She argues that exporters should have a loan from financial institutions and should present securities.

The extensive (export participation) and intensive (export performance) margins of trade affected by financial frictions. The effects are prominent for firms in various sectors with higher requirements of external financing, particularly for the nations of deprived financial institutions. Chaney incorporates credit frictions as a factor of exports at the industry level and believes that liquidity constraints are associated with the efficiency of industry: a more efficient industry earns greater profits and then is less constrained. Regardless of these differences, Manova (2013) have a weight of firm's characteristics in the duration of liquidity constraints they might face. Therefore, they have the spotlight on the demand side of credit restrictions. Employing panel data of UK's manufacturing firms for the period 1993–2003, validate that firms' financial fitness is a necessary condition for exporting choices. Muûls (2008) demonstrates that credit constraints affect manufacturing exports of Belgium. The findings reveal that the firms which show greater efficiency and less liquidity constraints are expected to export more.

Berman and Hericourt (2010) present facts that liquidity constraints affect exports in emerging economies. Similarly, Bricongne et al. (2010) explain the export of French firms during the global crisis and found that French firms dependent on external finance were more affected by the global crisis. Manova et al. (2008) employ comprehensive data on the Chinese firms and discover that financial market

susceptibility has a negative effect on exports and shrinks the number of target markets. Minetti and Zhu (2011) found similar results. They conducted a survey of small and medium Italian firms in order to get information on credit constraints and export volumes. Their findings confirmed that the effects of credit rationing on the participation to export and total sales differ across firms and sectors.

Paravisini et al. (2012) study the credit supply and considered the effect of shortages of bank funds on the export performances of associated firms. The study employed a model to separate the effects of credit supply by banks and credit demand by firms, on export activity. The study used data on Peruvian banks and firms and estimates the elasticity of exports to credits. They found that a reduction in credit supply by the Peruvian banking system leads to a decrease in export volume, while the extensive margin of trade does not change. The literature highlighted the significance of the financial development and the heterogeneity of sectors in terms of external finance dependence, in firms' access to credit. While financial development refers to the supply side of credit, sectors' characteristics may affect both sides of credit. For instance, industries with higher R&D expenses are more dependent on external finance which positively affects their demand for credit. Simultaneously, the financial system might recognize it as less risky to lend money to firms in "Growth" sectors (Rajan & Zingales, 1998) as they display low liquidity constraints.

Excluding financial variables, the literature has proof of other relevant variables to the export performance. Riedel et al. (1984) and Sharma (2000) examined the determinants of Indian exports for yearly time series data over the period 1968–1978 and 1970–1998, respectively. Using simultaneous equation framework, Sharma found that demand for Indian exports boost when export price reduces as compared to world prices. In addition, the real appreciation of Indian currency unfavorably affects Indian exports. The relative price of export is directly associated with export supply and domestic demand is negatively related to export supply. Foreign investors emerge statistically insignificant impact on export performance, while FDI has shown a positive sign. Funke and Holly (1992) claim that most of the earlier studies have highlighted demand factors. Similar studies have normally been relatively ineffective in providing evidence about long-run trends in export performance. The research considers both supply- and demand-side variables and employed the model on the West German manufacturing sector by utilizing quarterly data from 1961Q1 to 1987Q4. The outcomes of the study suggest that supply-side variables have crucial importance for explaining export performance than demand-side factors.

Mao and Zhang (2015) showed that China's export market penetration growth has significantly slowed from 2002 to 2014. The chapter analyzed whether this slowdown is due to only the global financial crisis or it is due to changes in other factors. The study utilized export market penetration rate as a measure of competitiveness and found production and trade cost are the major determinants of market penetration rate, while productivity and exchange rate appreciation have limited effect. Alam (2015) empirically investigated the Pakistan bilateral export performance and trade integration effect on it from 2003 to 2010. The study measured export performance with respect to the value of exports, number of exporters, and

number of products exported to bilateral export partners. The study analyzed the effect of other internal and external factors on Pakistan's exports as well. The results revealed that SAFTA and bilateral agreements with China, Malaysia, and Iran emerge beneficial for Pakistan's exports. The value of exports as well as number of exporters both indicators demonstrate considerable improvement to export with SAFTA and the above-mentioned bilateral PTAs.

3 Theoretical Framework, Model Specification, and Data

3.1 Theoretical Framework and Model Specification

This chapter plans a framework to estimate the factors that affect export market penetration in Asian and African countries. The chapter estimates the effect of financial inclusion, inflation, employment, economic development, and quality of institutions. We develop the following model:

$$\mathrm{EMPI}_{it} = \beta_0 + \beta_1 \mathrm{IFI}_{it} + \beta_2\, \mathrm{GDPC}_{it} + \beta_3\, \mathrm{INF}_{it} + \beta_4\, \mathrm{EMP}_{it} + \beta_5\, \mathrm{IQ}_{it} + \mu_{1it} \quad (1)$$

where i stands for country i ($i = 1, 2 \ldots 31$), and t represents time ($t = 2004 \ldots 2015$).

EMPI_{it}	Export Market Penetration Index
IFI_{it}	Index of Financial Inclusion
GDPC_{it}	Gross Domestic Product per capita as a measure of development of a country
INF_{it}	GDP Deflator is used as a proxy of inflation
EMP_{it}	Employment Rate
IQ_{it}	Institutional Quality (study used regulatory quality of institutions as measure of institutional quality)
μ_{1it}	Stochastic error term

The construction of variables and relationship of independent variables with the dependent variable is discussed as under.

3.1.1 Export Market Penetration Index

This index quantifies the degree of a country's exports markets already achieved. It estimates the ratio of the number of countries to which the reporter exports a product and the number of countries that reporter imports the product that year. A small index shows the occurrence of barriers to trade that avoid firms from expanding the number of markets to which they export.

$$\text{Export market penetration index} = \frac{n_{x,ik}}{n_{m,ik}} \tag{2}$$

where, n_x is the number of countries to which country i export the product k, and n_m is the number of countries that import to country i product k. Its ranges from 1 to 100, in which 100 value shows that it captures the all countries export market which means that all countries import a product from that country whereas 1 value indicates that single country still does not capture as such other countries market.

3.1.2 Financial Inclusion Index

The chapter follows the methodology of Sarma (2008) for constructing the financial inclusion index. For this purpose, the chapter used five indicators namely number of ATMs per 100,000 adults, Borrowers from commercial banks per 1000 adults, depositors with commercial banks per 1000 adults, commercial banks branches per 100,000 adults, and domestic credit to GDP ratio. Given below is the specification of Sarma (2008), first step to calculate financial inclusion is to find its element by the following procedure:

$$Ei = \frac{a_i - m_i}{M_i - m_i} \tag{3}$$

where a_i is the actual value of indicator i, m_i is the minimum value of indicator i, and M_i is the maximum value of indicator i. The index of financial inclusion for country j is estimated by normalizing inverse of euclidean distance id point E_i computed in Eq. (3), from the ideal point which is equal to 1. Specifically, the formula is given as follows:

$$\text{FII}j = 1 - \frac{(1 - \text{E}_1)^2 + (1 - \text{E}_2)^2 + (1 - \text{E}_3)^2 + \ldots\ldots\ldots (1 - \text{E}_n)^2}{\sqrt{n}} \tag{4}$$

whereas the term E_i used in Eq. (4) is the element that we calculate in Eq. (3). By using this formula, we can find the financial inclusion index and its value lies from 0 to 100. A higher value indicates the high financial inclusion in the country and low value of index shows the low financial inclusion.

3.1.3 Economic Development

The improved export performance depends greatly on the level of economic development of a country. The level of development is measured by gross domestic product per capita (GDPC). The higher per capita income shows the developed infrastructure n the country which is the main source of export growth because improved or developed infrastructure can facilitate exports to access international

markets. The augmented growth of exports generates foreign exchange earnings in the country. Therefore, this chapter anticipates a positive and favorable impact of economic development on exports (Kumar, 1998).

3.1.4 Employment Rate

In an empirical study, Pfaffermayr (1996) estimated the favorable effect of labor force participation on export growth. This study proved that a trained and qualified labor force is the basis of competitiveness in production processes and lowers the cost of production. Several emerging economies achieve the benefits of a trained labor force for competitiveness in the export sector. Simultaneously, many other emerging economies have an untrained and semi-trained labor force. The untrained labor force deteriorates competitiveness in the export sector. Hence, the study can test empirically this issue. In the opposite direction, discovered that export growth has a tendency to reduce employment and pointed out the question of whether export-related labor productivity may play a role. Moreover, an empirical study of Kilkenny and Partridge (2009) has the same opinion with similar studies that show "the relationship between the export sector employment and growth is *negative*."

3.1.5 Institutional Quality

The variations in institutional quality are the foundation of comparative advantage, and differences in the quality of institutions across countries are vital factors of trade patterns (Levchenko, 2004). Anderson and Marcoullier (2002) conclude that the institutional quality of trading countries has a positive effect on bilateral trade volumes. Rajan and Lee (2003) pointed out a unique aspect of institutions that is enforcement of contracts and its effect on the volume of international trade. By employing the gravity model approach, Depken and Sonora (2005) quantify the effects of economic freedom on U.S. consumers, exports, and imports for the years 1999 and 2000. They established that improved institutional quality of the partner country has a constructive effect on the volume of exports from the USA to that country. Now we consider the effect of financial inclusion, export market penetration, inflation, and unemployment on economic growth. The formulated model is as under:

$$EG_{it} = \beta_0 + \beta_1\, IFI_{it} + \beta_2\, IEMP_{it} + \beta_3\, INF_{it} + \beta_4 LGDPC + \beta_5 IQ + \mu_{2it} \qquad (5)$$

where.

EG_{it} Economic growth (natural log of gross domestic product millions $)
IFI_{it} Index of Financial Inclusion
$IEMP_{it}$ Index of Export Market Penetration

INF_{it} Inflation rate (measured as GDP deflator)
LGDPC natural log of GDP per capita (measure of development level)
IQ_{it} Institutional Quality (we used regulatory quality of institutions as measure of institutional quality)
μ_{2it} Stochastic error term

The expected sign of export market penetration is positive, because higher export market penetration generates greater revenues in the country to finance imports and imports boost production capacity in the country. This will boost economic growth in the country (Iqbal et al., 2012).

3.2 Data Sources

In this chapter, data for a panel of 31 counties including 14 Asian countries and 17 African countries (see Table 4 in Appendix). The chapter covers the time period from 2004 to 2015. Time series data for Export Market Penetration Index of the sample countries are obtained from World Integrated Trade Solution (WITS), while the financial inclusion index is estimated by authors by using Sarma (2008) methodology. For the construction of financial inclusion index the chapter used five indicators including the number of ATMs per 100,000 adult persons, borrowers from commercial banks per 1000 adult persons, depositors with commercial bank per 1000 adult persons, commercial banks branches per 100,000 adult persons, and domestic credit to GDP ratio. All the indicators for estimating financial inclusion index and other explanatory variables namely GDP deflator (proxy for inflation), foreign direct investment (as percentage of GDP), employment, trade openness (trade as percentage of GDP) at constant 2010 US dollar, GDP growth rate and population growth rate are obtained from World Bank online database. On the other hand, data for regulatory quality of institutions are collected from World Governance Indicators (World Bank).

4 Econometric Methodological Framework

4.1 Dynamic Panel Data Model Estimator

The generalized method of moments (GMM) is a general method for estimating parameters in panel data models. Generally, it is an application of semi-parametric models, where the parameter of interest has limited dimension, whereas the full shape of the data's distribution function may not be known, and therefore, maximum likelihood estimation technique is not applicable. The GMM requires a definite number of *moment conditions* that are specified in the model. These moment conditions are functions of the model parameters and the data, such that their

expectation is zero at the parameters' true values. The GMM then minimizes a specific type of the sample averages of the moment conditions. The GMM estimators are known to be consistent, asymptotically normal, and efficient in the class of all estimators that do not use any extra information away from that contained in the moment conditions.

5 Empirical Analysis

As discussed earlier, following Ullah et al. (2018), the chapter employed Dynamic Generalized Method of Moments (GMM) estimation to resolve the endogeneity issue in heterogeneous panel data. Furthermore, we employed pooled ordinary least square technique simultaneously for the robustness check. The result of the export market penetration model is reported in Table 2. The results demonstrate that the index of financial inclusion, development level of a country, and employment rate have positive and significant effects on export market penetration in the case of Asian and African countries. These results suggest that if financial inclusion increases in the country then small and medium exporters will also penetrate in the international export market. Similarly, the improvement in the development level of a developing country will further boost the export market penetration. As far as employment level concern, the higher employment level will lead to higher economic activity in the country and ultimately will enhance export market penetration. The results also reveal that domestic inflation and institutional quality have an adverse effect on export market penetration. These findings suggest that institutional quality is very poor in developing countries. The estimation results of the economic growth model are presented in Table 3. The results show that export market

Table 2 Results of export market penetration model

Variables	Pooled OLS/Dynamic GMM Coefficient
IFI	2.30* (7.61)
LGDPC	1.57* (12.81)
EMP	0.08* (2.97)
IQ	−147.78* (−6.85)
LlINF	−1.69* (−3.69)
R-Square	0.411
F-Statistic	51.11
Prob. (F-statistics)	0.00

Note: * shows significance at 1% level. Figures in parenthesis are t-statistics

Table 3 Results of gross domestic product model

Variables	Pooled OLS/Dynamic GMM Coefficient
IFI	0.07 (1.52)
IEMP	0.09* (11.67)
LINF	−0.20* (−3.00)
IQ	−26.82* (−8.20)
LGDPC	0.33* (17.61)
R-Square	0.740
F-statistic	208.59
Prob. (F-statistic)	0.00

Note: * shows significance at 1% level. Figures in parenthesis are t-statistics

penetration and development level of the economy have favorable effects on economic growth in the case of a panel of Asian and African developing countries under consideration. The increased export market penetration generates revenue and consequently expands economic activities in the country, to boost economic growth. The higher level of development also carries on and speeds up the process of economic growth. Table 3 further reveals that domestic inflation and quality of institutions play a negative role against economic growth. The current chapter also finds that financial inclusion has a positive but not considerable effect on economic growth.

6 Conclusions and Policy Implications

The present chapter investigates the effect of financial inclusion on export market penetration for the panel of 31 developing Asian and African countries during the period 2004–2015. The chapter also estimates the effect of other relevant macroeconomic factors like economic development, employment, inflation, and regulatory quality of institutions on export market penetration simultaneously. The chapter examines the effects of export market penetration and financial inclusion with other macroeconomic variables on economic growth. To estimate the export market penetration and economic growth models, the chapter employs Pooled Ordinary Least Square and Dynamic System Germanized Method of Moment Techniques.

The chapter found that financial inclusion, level of development of the country, and employment level in the country have favorable effects on export market penetration while inflation and regulatory quality of institutions in the developing countries under consideration have negative effects on export market penetration.

The chapter further estimates the effect of export market penetration, financial inclusion, inflation rate, level of development, and regularity quality of institutions on economic growth in case of the sample countries. The results demonstrate that economic growth is positively affected by export market penetration and level of development and is negatively affected by inflation and regulatory quality of institutions in the case of Asian and African countries. The estimates of export market penetration suggest that financial inclusion leads to expansion of the participation of small and medium size producers in economic activity to increase their production and then ultimately penetrate the international market. The chapter recommends that the development of infrastructure also facilitates the exporters to save their transportation costs and to reduce their production costs. These savings make the exporters able to increase the production of exportable goods and penetrate the international market.

Appendix

Table 4 List of countries

S. No	Asian countries	S. No	African countries
01.	Afghanistan	01.	Benin
02.	Azerbaijan	02.	Burkina Faso
03.	Bangladesh	03.	Burundi
04.	China	04.	Comoros
05.	Georgia	05.	Ghana
06.	Israel	06.	Kenya
07.	Pakistan	07.	Madagascar
08	Philippines	08	Mali
09.	Qatar	09.	Namibia
10.	Saudi Arabia	10.	Niger
11.	Singapore	11.	Nigeria
12	Thailand	12	Rwanda
13.	Turkey	13.	Senegal
14.	Yemen	14.	Togo
		15.	Uganda
		16.	Zambia
		17.	Zimbabwe

Table 5 Descriptive statistics

	IEMP	IFI	GDP (Million $)	GDP/Cap ($)	GDP-Deflator	RQ	EMP
Mean	5.67	0.70	302439.20	6383.89	272.18	0.18	44.51
Median	1.98	0.41	20048.26	19.96	121.09	0.18	42.48
Maximum	53.09	10.07	11064665.00	72670.96	4182.74	0.25	75.66
Minimum	1.20	0.00	368.14	0.74	30.84	0.15	11.42
Std. Dev.	9.38	1.27	1218584.00	15000.06	594.91	0.02	16.50
Observations	372.00	372.00	372.00	372.00	372.00	372.00	372.00

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Is Finance–Growth Nexus Nonlinear? Evidence from Linear and Nonlinear Causality Analysis

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1 Introduction

The finance–growth nexus has widely been theoretically and empirically debated in existing literature for the context of developed and developing countries (Levine, 2004; Cooray, 2010; Samargandi et al., 2015; Ductor & Grechyna, 2015; Stolvbov, 2016; Durusu-Ciftci et al., 2016). There have been different views on the importance of financial development on economic growth. But the most popular view is that an efficient financial system can deliver the desired level of economic growth. In this way, financial institutions like banks play a significant role in supplying funds to the economic system. Early theoretical work like Hamilton (1781) argued that banks are an important device to spur economic growth. In a seminal work, Schumpeter (1911) pointed out that a well-functioning of banks can determine economic growth via technological innovations and productivity. Bagehot (1873) and Hicks (1969) argued that financial system has a significant role in mobilizing capital for industrialization. Some of the empirical studies like Cameron (1967), Goldsmith (1969), and McKinnon (1973) find a significant correlation between financial development and economic growth. According to them, banks play a vital role in the innovation and development of enterprises. These financial intermediaries transfer savings to the needy sector and ensuring efficient allocation of resources by minimizing risks. Moreover, King and Levine (1993a) and Levine (1997) suggested a positive relationship between financial development and economic growth. In other words, the development of financial intermediaries can be a good predictor of future growth

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prospects in an economy which is often referred to as supply-side hypothesis (King & Levine, 1993b; Neusser & Kugler, 1998; Rousseau & Wachtel, 2002; Rajan & Zingales, 1998; Jayaratne & Strahan, 1996; Beck et al., 2000; Bell & Rousseau, 2001; Stolvbov, 2016; Fowowe, 2017). This implies that the countries with vast and efficient banking system will have good economic growth compared to those which do not have such system (Demirguc-Kunt & Maksimovic, 1998).

However, there are some opponents who do not support the finance–growth nexus. They either supported growth-finance nexus or did not support any such nexus as important. Existing studies believing in growth-finance nexus argue that economic growth leads to financial development which is often referred to as demand-side hypothesis. Their argument is that an increase in economic growth leads to demand for a better financial system and hence, financial system responds to it (Robinson, 1952; Demetriades & Hussein, 1996; Arestis et al., 2002; Odhiambo, 2010; Akinci et al., 2014). However, Lucas believed that financial development is being overemphasized for playing a strategic role in economic growth. He had an opinion that this nexus is not so important for economic development. Chandavarkar (1992), Patrick (1996), and Ang and McKibbin (2007) have supported the view of Lucas. Moreover, Arcand et al. (2012) and Mehrotra and Yetman (2015) pointed out about the existence of a negative relationship between financial development and economic growth. They argued that the rapid credit expansion without any regulation can disrupt financial stability and hence, economic growth. Interestingly, recent literature has observed nonlinearity between the level of financial development and country's economic growth. Some early theoretical studies (Greenwood & Jovanovic, 1990; Acemoglu & Zilibotti, 1997; Khan, 2001; Deidda, 2006) have asserted that financial development can have a possible nonlinear influence on economic growth. This nonlinearity has been further supported in empirical studies (Deidda & Fattouh, 2002; Shen & Lee, 2006; Masten et al., 2008; Huang & Lin, 2009). The justifications for nonlinearity in finance–growth nexus reveal that the effect of financial development on economic growth is not uniform over time and across different countries. The relationship gets changed across different macroeconomic and institutional conditions in different countries. A country at low level of financial development can influence economic growth differently than the country which is at high level of financial development. So, the level of financial development can influence asymmetrically the finance–growth nexus (Rioja & Valev, 2004). Further, it is argued that financial development in the presence of low intuitional quality may not deliver significant benefits to economic growth. When the countries are in a transition phase the institutional development in financial market may be different from the period they have earlier. For instance, the intuitional development may be at infant stage in early stage of financial development but better economic growth improves the intuitional arrangement in financial development (Robinson, 1952). This shift in financial arrangement may have different impact in the presence of financial development, which further influences economic growth. The quality of financial regulation and the rule of law make these differences in causality (Demetriades & Andrianova, 2004). Similarly, high level of inflation can have a different impact on finance–growth nexus than a low level of inflation. High inflation

adversely affects the operations of financial market leading to insignificant growth effect of financial development. So, the level of inflation can lead to asymmetric impact of financial development on economic growth (Rousseau & Wachtel, 2002). Further, nonlinearity from economic growth to financial development can be explained by Huang and Lin's (2009) argument. They viewed that the entrepreneurs participate in new economic activities or extend the capacity of their already existing business by borrowing from other sources and investing in their facilities if they expect a good performance of the aggregate economy in the future. Such entrepreneurs would invest more when the country is performing well rather than when an economy is expected to perform poorly in future. This type of behavior from entrepreneur creates asymmetric demand for financial development. They encourage more demand for borrowing when the economy is performing well and discourage demand for credit when country is not underperforming. So, this type of behavior raises possibility of nonlinearity from economic growth to financial development.

There are several empirical studies at cross-country level, individual country level, and industry level. Cross-country regression results show that there is a significant positive association between financial development and economic growth. But there involve serious problems in this method as it fails to control cross-country heterogeneity in the regression and may suffer from inconsistent estimation of the parameters (Ram, 1999; Shahbaz, 2012). This cross-country regression approach assumes entire groups as a single group and thus, neglects individual characteristics such as different levels of financial development and different institutional settings in each country. Moreover, there are few panel studies which accounts individual group effect and time effect, but couldn't establish a strong Granger-causal relationship between financial development and economic growth. Recently, Khan and Senhadji (2003) show that certain banking development indicators become statistically insignificant when growth equations are estimated with panel frameworks. Recently researchers are preferring extensive application of time-series over panel data methods in assessing finance–growth Granger-causal linkages (Luintel et al., 2008; Arestis et al., 2002). There are some studies at individual country level examining the Granger-causal relationship between financial development and economic growth but neglected the nonlinear aspects of Granger-causality. The recent increasing literature has observed the possible nonlinearity in finance–growth nexus using some threshold regression approach and nonlinear causality. However, their method fails to give robust measure of nonlinearity as there involves some potential biasness in the methodology itself (Diks & Panchenko, 2006). Moreover, their studies were limited to the use of single indicator variable representing financial development. For instance, the ratio of broad money to GDP is most popularly used in existing applied economics literature to measure financial development. But it is argued that simply using the ratio of broad money to GDP may give misleading results (Pill & Pradhan, 1995). This suggests that there is a need for addressing these issues by using a set of other financial variables and employing a recent robust methodology for individual countries. In doing so, this chapter makes an attempt to test finance–growth nexus using both linear and nonlinear causalities for a set of both developed and developing

countries. The Toda and Yamamoto (1995) VAR-based Granger-causality is used to test the linear causality and to test the nonlinear causality, Diks and Panchenko (2006) test is employed. Further, instead of using a single variable to measure financial development, we have used several measures of bank-based indicators of financial development and stock market-based indicators of financial development. The bank-based financial developments are measured through Liquid liabilities (LL), Bank Credit (BC), and Private Credit (PC). Similarly, stock market-based financial development is measured through the ratio of the value of listed shares to real GDP (MK) and ratio of the total value of shares traded on the stock exchange to real GDP (VT). This is done to get a comprehensive idea of the Granger-causal relationship using overall aspect of financial development. There are very few studies that examine nonlinear causality for such a large set of developed and developing countries. Further, few studies have tested nonlinear causality in finance–growth nexus but those have not incorporated varying levels of income and inflation. Hence, in our chapter we have incorporated the income level and inflation level for studying finance–growth nexus in a linear and nonlinear causality testing framework.

The rest of the chapter is organized as the following: Section 2 discusses the theoretical framework related to this chapter. Section 3 describes review of past literature. Section 4 discusses the methodology of linear and nonlinear causality. Section 5 gives descriptions of data and variables. Empirical results are discussed in Sect. 6. Section 7 presents robustness check. Finally, concluding remarks are offered in the last section.

2 Theoretical Framework

In the eighteenth century, Hamilton (1781) discussed the importance of financial sector development on real economy followed by Bagehot (1873). But Schumpeter (1911) documented the finance–growth nexus in a more systematic way. There are two ways through which financial development can generate more output in an economy, i.e., technological innovations and capital accumulation. Schumpeter (1911) documented that the first channel is technological innovations. According to him, a well-functioning bank promotes technological innovations and productivity, which determines economic growth. He argued that financial system delivers services where capital is allocated to its highest value use minimizing potential loss such as transaction cost, adverse selection and moral hazard. This process alters the mode of production by encouraging innovation in enterprises which leads to an increase in productivity and hence, output growth. But Hicks (1969) had opined that financial development can influence economic growth via capital accumulation. Hicks (1969) argued that the main ingredient of industrialization is capital market liquidity instead of technological innovations. He pointed out that liquidity transformation diverts savings into capital market in the form of purchasing financial assets such as stocks and demand deposits where capital market further converts it into the

long-term capital investment and hence, industrialization takes place, which stimulates economic growth. This indicates that finance leads to economic growth and hence supports the supply-side hypothesis. Robinson (1952) argued that economic growth leads to financial development and not the other way around. According to him, economic growth leads to financial development not the otherwise. He documented that an increase in economic growth can demand for a developed financial system and financial sector will follow it. This way, growth leads and finance follows and hence provides support for the demand-side hypothesis. Apart from these two hypotheses, there is another theoretical argument which says that the finance–growth nexus is overemphasized and viewed that finance does not matter for economic growth.

3 Literature Review

The most popular finance–growth nexus has been studied extensively in existing applied economics literature. There are some studies, both theoretical and empirical, arguing that finance leads and growth follows. Early theoretical works of Hamilton (1781), Bagehot (1873) and Schumpeter (1911), Hicks (1969) supported the finance–growth nexus. They noted that a well-developed financial system can deliver good growth rate through technological innovation, increased productivity, and capital accumulation, respectively. However, Robinson (1952) had a contrasting view on the linked nexus. He argued that economic growth can influence financial development thus providing support for the growth-lead finance hypothesis. However, there are studies which argue that finance–growth nexus is overemphasized and viewed that financial development does not matter for economic growth. In the following subsections, we summarize the literature review for each of the above-stated arguments.

3.1 Finance–Growth Nexus: Cross-country and Panel Studies Evidence

Supporting the finance–growth nexus theory, some early cross-country empirical studies analyzed the association between financial development and economic growth (Cameron, 1967; Goldsmith, 1969; Mckinnon, 1973; Zhang et al., 2012; Ductor & Grechyna, 2015). They show that development in financial institutions has a positive correlation with economic growth. The argument put forward to support the above-mentioned hypothesis is that better financial services attract capital investment in productive avenue and economic growth takes place. But it is pointed out that a simple correlation does not indicate causality between financial development and economic growth. So, in a noted work, King and Levine (1993a) dealt with this

through a causality problem. Using *a post hoc, ergo propter hoc* approach, they show that financial development can significantly predict economic growth. King and Levine (1993a, 1993b, 1993c) argue that the credit advanced to private sector could increase real per capita GDP. Moreover, estimating a cross-country regression, they observed that the average growth of per capita capital stock and productivity are significantly related to the level of financial development. So, they argued that financial depth can predict average growth, per capita capital stock, and productivity. Rajan and Zingales (1998) show that, in a well-developed financial system, industries that are heavily dependent on external finance tend to grow relatively faster than other industries. Demirguc-Kunt and Maksimovic (1998) show that firms in countries with better developed financial systems grow faster than they could have grown without this access. Pasali (2013) shows that the financial intermediation can cause economic growth through proper distribution of capital and risk across the groups. In a similar line, Stolvbov (2016) measured the relationship between credit depth and economic growth in OECD countries. Using private credit as a proxy for credit depth, he found a causal relation running from credit depth to economic growth. Beck et al. (2000) analyze a cross-country sample of 63 countries to find the causality between financial development and economic growth. They find that financial intermediaries' causes total factor productivity growth which in turn causes economic growth. On the other hand, Demetriades and Hussein (1996) argued that it is not always true that the direction of causality runs from financial development to economic growth. For a sample of 16 countries, they show that economic growth leads financial development supporting Robinson's (1952) argument of demand-side effect. However, some empirical studies have shown a bidirectional causality between financial development and economic growth (Apergis et al., 2007; Pradhan et al., 2014, 2016). Apergis et al. (2007) show that the financial development in the form of bank credit to private sector and total private sector credit, leads to increases in per capita GDP and vice-versa. Similarly, Mehrotra and Yetman (2015) argued that financial development leads to decline in economic growth. They show that credit to private sector, measured as financial depth, has a negative impact on output growth. The swift credit advanced without any regulation can disrupt the financial stability by creating a bubble in the markets and drags down the economic growth.

Apart from taking bank-based indicators of financial development, several studies have confirmed the important role of stock market-based indicators of financial development in promoting economic growth. Stock market provides different services through banks to promote economic growth. Levine and Zervos (1998) show that stock market liquidity positively predicts economic growth, capital accumulation, and productivity improvements in both developed and developing countries for the period 1976–1993. Using cross-country regression model, Rousseau and Wachtel (2000) and Beck and Levine (2002) show that stock market development is strongly correlated with growth rates of real GDP per capita. Harris (1997) finds that financial development in the form of stock market activity has a strong relationship in developed countries but not in developing countries. Others studies that supported the stock market correlation with economic growth are Atje and Jovanovic (1993), Caporale et al. (2002), Enisan and Olufisayo (2009), etc.

3.2 *Finance–Growth Nexus: Time Series Evidence*

One must notice from the extensive review of literature is that these studies are either based on cross-country regression or panel data in nature. It is evident from some empirical studies that using cross-country regression may neglect the individual cross-country heterogeneity in the regression which may lead to inconsistent estimation of the parameters (Ram, 1999). This cross-country regression approach assumes entire groups as homogeneous entities and thus, neglects individual characteristics such as different levels of financial development and different institutional settings in each country (Demetriades & Hussein, 1996; Bell & Rousseau, 2001; Hondroyiannis et al. 2005; Samargandi et al., 2015; Stolvbov, 2016). So, it is suggested that the time series method might be more appropriate than cross-country regression. Further, Kara et al. (2011) used panel causality approach to a set of countries and found no clear-cut conclusion on the direction of causality between financial development and economic growth. Instead, they pointed out that the results are country specific. This indicates that the time-series approach might prove to be right approach to tackle the causality problems. Using time-series data for an individual country, Bell and Rousseau (2001), Bhattacharya and Sivasubramanian (2003), Seetanah (2008) show that financial development causes economic growth but not vice-versa. Shahbaz (2012), Shahbaz and Rahaman (2012), and Uddin et al. (2013) found a long-run relationship between financial development and economic growth. However, Arestis et al. (2002), Odhiambo (2010), and Akinci et al. (2014) observed that financial development is promoted by the rise in economic growth and no feedback exists. Moreover, there are some studies that found a bidirectional causality between financial development and economic growth (Ang & McKibbin, 2007; Demetriades and Luintel 1997; Luintel & Khan, 1999; Singh, 2008; Shahbaz et al., 2008, 2013, 2014; Shahbaz & Rahaman, 2012). However, Nain and Kamaiah (2014) provided no evidence of causality between financial development and economic growth in either direction in India. These different results may be attributed to the use of different sets of proxy variables measuring financial development. Another explanation can be the existence of a possible nonlinear relationship between financial development and economic growth which linear causality approach is unable to capture. The early theoretical studies like Greenwood and Jovanovic (1990), Acemoglu and Zilibotti (1997) and Khan (2001) have argued that the finance–growth nexus may be nonlinear. For example, Rioja and Valev (2004) verified the finance–growth nexus with different levels of financial development. Their result revealed that the region which achieves highest growth rate was in a medium level of financial development but the relation becomes worse at higher levels of financial development. In a similar note, Lee and Wang (2010) viewed the finance–growth nexus as nonlinear in Asian economies. They show that the countries at higher level of financial development cause economic growth but the same countries at low level of financial development experience negative investment and economic growth. Masten et al. (2008), using both macro- and industry-level data reveal that there is evidence of significant nonlinearity in finance–growth nexus.

They show that low income countries in Europe tend to gain more from financial development. Rousseau and Wachtel (2002) show that finance–growth nexus is robust below a particular level of inflation. They show that inflation threshold below 6 to 8 percent level has a positive impact on economic growth. Huang et al. (2010) argue that there is nonlinearity in the finance–growth nexus in the presence of inflation. They observed that when the inflation is below the threshold level of 7.31 to 7.69 percent there is a significant impact running from financial development to economic growth but such effect disappears once the inflation goes above the threshold level. Similarly, Yilmazkuda (2011) shows that high level of inflation leads to low benefits from finance–growth nexus. Similarly, they show that low trade openness in advanced countries causes finance–growth nexus strongly than the developing countries. Gazdar and Cherif (2015) also found nonlinearity in finance–growth nexus in the presence of institutional quality. They observed that when the institution quality is high there is evidence of strong positive effect in finance–growth nexus. But without this factor, there is negative impact between financial development and economic growth.

4 Econometric Methodology

4.1 Linear VAR Granger Causality

The Granger causality in a bivariate system is said to be present if one variable is able to predict the future value of another variable given some set of information about its past values and present. Granger (1969) in a pioneering work developed this test to determine the direction of causal relationship between two variables. But due to several limitations in the method, this chapter considers using Toda and Yamamoto (1995) procedure in testing causality between financial development and economic growth. We have selected this method for two reasons. First, in this method variables are considered for test at level and hence, avoid the possibility of differencing the series. By doing so, it retains the long-run information incorporated in the original data. Second, this method avoids biasness arising from pre-testing process.[1] Toda and Yamamoto (1995) argue that F-statistic used to test for traditional Granger causality tend to follow nonstandard distribution when the time series data is integrated or cointegrated. To solve this problem, Toda and Yamamoto causality test applies a modified Wald (MWALD) test statistic in testing zero restrictions on the lagged coefficient of the original VAR (k) model (Zapata & Rambaldi, 1997; Wolde-Rufael, 2004, 2005).

The Toda and Yamamoto testing procedure basically involves two steps. Firstly, an original VAR (k) model is estimated with an augmentation of maximum order of

[1]Toda and Yamamoto (1995) argued that the unit root test loses power against alternative hypothesis.

integration, say $d_{\max}$. Here, k stands for maximum lag length obtained from different information criteria such as AIC and SBC for the original VAR model. Finally, Wald test applies zero restrictions on only k coefficients (coefficients of lagged $d_{\max}$ are not included) in deciding the direction of causality. The test ensures that the computed statistics follows an asymptotic chi-square distribution with k degrees of freedom. In a bivariate VAR model Toda and Yamamoto (1995) non-causality test can be specified as follows:

$$X_t = \alpha_0 + \sum_{i=1}^{k} a_{1i} X_{t-i} + \sum_{j=k+1}^{d_{\max}} a_{2j} X_{t-j} + \sum_{i=1}^{k} \delta_{1i} Y_{t-i} + \sum_{j=k+1}^{d_{\max}} \delta_{2j} Y_{t-j} + \mu_{1t} \quad (1)$$

$$Y_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} Y_{t-i} + \sum_{j=k+1}^{d_{max}} \beta_{2j} Y_{t-j} + \sum_{j=1}^{k} \varnothing_{1i} X_{t-j} + \sum_{j=k+1}^{d_{max}} \varnothing_{2j} X_{t-j} + \mu_{2t} \quad (2)$$

where, X_t stands for economic growth and Y_t strands for financial development. Real GDP is taken as a proxy for economic growth. To measure financial development three different proxies such as ratio of M_3-to-real GDP, ratio of total private sector credit-to-GDP, and percentage of bank credit-to-private sector-to-total GDP are utilized. μ_{1t} and μ_{2t} are two residuals of the regressions Eqs. (1) and (2), respectively. The null hypothesis is no Granger causality against the alternative of Granger causality can be tested as follows: Y Granger cause X if $\delta_{1i} \neq 0$, for $i = 1, 2, 3. \ldots .k$. Similarly, if X Granger cause Y then $\varnothing_{1i} \neq 0$, for $i = 1, 2, 3, \ldots .k$. These equations are estimated through a seemingly unrelated regression (SUR) testing procedure.

4.2 Nonlinear Granger Causality

The growing literatures have documented that the traditional causality is not able to capture nonlinear causality between two variables. So, this chapter chooses a nonparametric test of nonlinear causality developed by Diks and Panchenko (2006) (hereafter DP test). This method has some important superiority over other nonlinear causality tests such as Baek and Brock (1992) and Hiemstra and Jones (1994). The DP test argues that the Himestra and Jones (1994) is prone to over rejection problems as it does not allow conditional distribution to vary with increase in sample size. They pointed out that the Hiemstra and Jones's (1994) method does not compatible with the definition of Granger causality which may lead to spurious rejections of null hypothesis. So, to better handle the over rejection problem, Diks and Panchenko (2006) have proposed a nonparametric test to capture nonlinear causal relationship between variables. The DP test can be described as following. Under null hypothesis of no Granger causality can be specified as follows:

$$H_0 : Y_{t+1} \mid \left(X_t^{l_x}; Y_t^{l_y}\right) \sim Y_{t+1} \mid Y_t^{l_y} \tag{3}$$

where $X_t^{l_x} = (X_{t+1}. \ldots . \ldots . X_t)$ and $Y_t^{l_y} = (Y_{t+1}. \ldots . \ldots . Y_t)$ are two delay vectors and $(l_x l_y \geq 1)$ are the lag length of X and Y variables. The $\sim$ indicates the equivalence in distribution. For two stationary time series, Eq. (3) considers the invariant distributions vector $W_t = (X_t^{l_x}, Y_t^{l_y}, Z_t)$ with $(l_x + l_y + 1)$ dimension, where $Z_t = Y_{t+1}$. By avoiding time index and assuming $l_x = l_y = 1$, the null hypothesis says that the conditional distribution of Z given $(X,Y) = (x,y)$ is equal to that of Z give $Y = y$. In the form of ratio of joint distribution, null hypothesis in Eq. (3) is changed into the probability density function $f_{X,\ Y,\ Z}\ (x,\ y,\ z)$, and its marginal must satisfy the following relationship:

$$\frac{f_{X,Y,Z\ (x,\ y,\ z)}}{f_{Y\ (y)}} = \frac{f_{X,\ Y\ (x,y)}}{f_{Y\ (y)}} * \frac{f_{Y,Z\ (\ y,\ z)}}{f_Y(y)} \tag{4}$$

The Eq. (4) implies that X and Z are independent to each other conditioning upon $Y = y$ for each fixed value of y. Then Diks and Panchenko (2006) show that this revised null hypothesis can take the form as follows:

$$q \equiv \left[\, f_{X,Y,Z}(X,Y,Z) f_Y(Y) - f_{X,Y}(X,Y) f_{Y,z}(Y,Z) \right] = 0 \tag{5}$$

Then Diks and Panchenko (2006) let $\widehat{f}$ w (W_i) be a local density estimator of a d_w—variate random vector W at W_i defined by $\widehat{f}$ w $(W_i) = (2\varepsilon_n)^{-d_w}(n-1)^{-1} \sum_{j,j\neq i} I_{ij}^W$, where $I_{ij}^W = I\left(\left\| W_i - W_j \right\| < \varepsilon_n\right)$ with I (.) the indicator function and ε_n the bandwidth dependent upon sample size. Given this estimator, the test statistics is a scaled sample version of q in Eq. (5):

$T_n(\varepsilon_n) = \frac{n-1}{n(n-2)} \sum_i \widehat{f_{XYZ}}(X_i, Y_i,\ Z_i) \widehat{f_Y}(Y_i) - \widehat{f_{X,Y}}(X_i, Y_i\ )\ \widehat{f_{Y,Z}}(Y_i, Z_i\ ))$.

For $l_x = l_y = 1$ when $\varepsilon_n = cn^{-\beta}$ $(C > 0,\ \beta \in \left(\frac{1}{4}, \frac{1}{3}\right))$

Diks and Panchenko (2006) verified that this test statistics "C" follow an asymptotic distribution of the form:

$$\sqrt{n}\frac{S_n(\varepsilon_n) - q)}{S_n} \xrightarrow{D} N(0,1) \tag{6}$$

where $\xrightarrow{D}$ indicates convergence of distribution. S_n is an estimator of the asymptotic variance of T_n (.). The test statistics in Eq. (6) should be applied to VAR residual after extracting the linear predictive components from the residual.

5 Data and Variables Description

This chapter deals with annual time series data for 44 countries both from developed and developing countries covering the period from 1965 to 2016. To measure bank-based financial development, three proxy variables are considered in this analysis. The first one is the liquid liabilities of the financial system (LL) measured as the ratio of M3-to-real GDP. This is the broadest measure of financial depth used, since it includes all types of financial institutions (central bank, deposit money banks, and other financial institutions). The second indicator, bank credit (BC), is defined as the credit given by banks to the private sector as a percentage of real GDP. The third one, private sector credit (PC), which is defined as the credits given by banks and other financial institutions to the private sector as a percentage of real GDP. Real GDP is taken as a proxy for economic growth. All the variables are transformed into logarithms. All the data are collected from World Development Indicators (CD-ROM, 2017). The length of the sample period has been chosen on the basis of time-series data available for all variables and for all countries.

6 Empirical Results

6.1 Linear Granger Causality

In order to determine the maximum order of integration, to be used in testing Granger causality, Augmented Dickey and Fuller (1979) unit root test is employed. The results of unit root test reported in Table 1 show that most of the variables are integrated of order one, i.e., I (1). This indicates that VAR causality test can be augmented up to the maximum order of 1 lag. The Schwarz (1978) information criterion (SIC) is used to determine the appropriate lag lengths for the VAR models. The result of linear Granger causality test reported in Table 2 shows that there are five countries which show financial development leads to economic growth. All three proxies used for financial development are significantly correlated with economic growth as the t-statistics value rejects the null hypothesis of no causality from financial development to economic growth. These countries are Algeria, Argentina, Central African Republic, Egypt, and Turkey which are supporting the leading role of financial development. This finding can be explained by Boyd and Prescott (1986) model where it is pointed that banks play a critical role in easing information frictions and therefore in improving resource allocation. The empirical evidence indicates that a unidirectional causality is running from financial development to economic growth. Our result supports the theoretical argument of Bagehot (1873), Schumpeter (1911) and Hicks (1969) and some empirical findings of King and Levine (1993b), Rajan and Zingales (1998), Beck et al. (2000), Bell and Rousseau (2001), Stolvbov (2016) and Fowowe (2017). The findings support the argument of supply-side hypothesis. However, most of our results support the demand following

Table 1 Augmented Dickey-Fuller unit root test

Intercept and trend				
Country	LL	BC	PC	Real GDP
Algeria	I(1)	I(1)	I(1)	I(0)
Argentina	I(0)	I(1)	I(1)	I(1)
Australia	I(1)	I(1)	I(1)	I(1)
Benin	I(1)	I(0)	I(0)	I(1)
Bolivia	I(1)	I(1)	I(1)	I(1)
Brazil	I(1)	I(1)	I(1)	I(1)
Burkina Faso	I(1)	I(1)	I(1)	I(1)
Burundi	I(0)	I(1)	I(1)	I(1)
Cameroon	I(1)	I(1)	I(1)	I(0)
Central Africa R.	I(1)	I(1)	I(1)	I(0)
Chile	I(1)	I(1)	I(1)	I(1)
Colombia	I(1)	I(1)	I(1)	I(1)
Congo Rep.	I(1)	I(1)	I(1)	I(1)
Costa Rica	I(1)	I(1)	I(1)	I(1)
Dominican Rep.	I(1)	I(1)	I(1)	I(1)
Ecuador	I(1)	I(0)	I(0)	I(1)
Egypt	I(1)	I(1)	I(1)	I(1)
EI Salvador	I(1)	I(1)	I(1)	I(1)
Ghana	I(1)	I(1)	I(1)	I(1)
Guatemala	I(1)	I(1)	I(1)	I(1)
Honduras	I(1)	I(1)	I(1)	I(1)
Iceland	I(1)	I(1)	I(1)	I(1)
India	I(1)	I(0)	I(0)	I(1)
Israel	I(1)	I(1)	I(1)	I(0)
Korea	I(1)	I(0)	I(0)	I(1)
Madagascar	I(1)	I(1)	I(1)	I(1)
Malawi	I(1)	I(1)	I(1)	I(1)
Malaysia	I(1)	I(1)	I(1)	I(1)
Mexico	I(1)	I(1)	I(1)	I(1)
Nepal	I(1)	I(0)	I(0)	I(1)
Nicaragua	I(1)	I(1)	I(1)	I(1)
Niger	I(1)	I(2)	I(2)	I(1)
Peru	I(1)	I(1)	I(1)	I(1)
Philippines	I(1)	I(1)	I(1)	I(1)
Singapore	I(1)	I(1)	I(1)	I(1)
South Africa	I(1)	I(1)	I(2)	I(1)
Sweden	I(1)	I(1)	I(1)	I(1)
Thailand	I(1)	I(1)	I(1)	I(1)
Togo	I(1)	I(1)	I(1)	I(1)
Trinidad & Tobago	I(1)	I(1)	I(1)	I(2)
Turkey	I(1)	I(1)	I(1)	I(0)

(continued)

Table 1 (continued)

Intercept and trend				
Country	LL	BC	PC	Real GDP
United Kingdom	I(1)	I(1)	I(1)	I(1)
United States	I(1)	I(1)	I(1)	I(1)
Uruguay	I(1)	I(1)	I(1)	I(1)

Notes: Test statistics significantly different from zero at 5 percent level of significance. The optimal lag length is chosen using Schwarz Bayesian information criterion

role of financial development. There are 13 countries in our sample which show that the economic growth causes financial development. The evidence from the United Kingdom and Sweden show that financial development is caused by economic growth. The result holds for all three indicators of financial development. In Benin, Bolivia, Burkina Faso, Chile, Colombia, Costa Rica, EI Salvador, Guatemala, Korea, Malawi, and Malaysia, we find evidence of a unidirectional causality running from economic growth to financial development. This result supports the theoretical argument of Robinson (1952) and few empirical studies by Demetriades and Hussein (1996), Arestis et al. (2002), Odhiambo (2010), and Akinci et al. (2014). The findings support the argument of demand-side hypothesis.

Apart from this, there are some countries that show evidence of a bidirectional causality between financial development and economic growth. This indicates that financial development can improve the forecast performance economic growth and vice versa. More importantly, the US economy is showing bidirectional causality between financial development and economic growth. Other countries which support this idea are Australia, Burundi, Dominican Republic, Ghana, and Nepal. This empirical evidence is consistent with the findings of Luintel and Khan (1999) who argued that financial development and economic growth are interdependent which may lead to bidirectional causality. Moreover, our empirical findings come in line of Demetriades and Luintel (1997), Luintel and Khan (1999), Ang and McKibbin (2007), Singh (2008) and Hou and Cheng (2010), Shahbaz et al. (2014), and Pradhan et al. (2016). The evidence of bidirectional Granger-causality found in both developed and developing countries do not support the argument of Deyshappriya (2016) who shows that bidirectional causality holds only in developed countries, not in the developing countries.

But an interesting fact is that the finance–growth nexus depends upon the proxies used in measuring financial development. There are some countries that show financial development can cause economic growth in a particular proxy of financial development. For instance, Ecuador is a country that shows mixed results. We find significant causality running from financial development to economic growth when M_3 is used as a proxy for financial development. But this inference changes when we consider additional two proxies as the measure of financial development. When we use BC and PC as the proxies for financial development it is found that the causality runs in the opposite direction. Similarly, in India we find a significant causal relationship in the direction of financial development to economic growth when

Table 2 VAR linear Granger causality

Country	Finance—› Growth			Growth —› Finance		
	LL	BC	PC	LL	BC	PC
Algeria	6.20(0.10)*	10.40 (0.00)***	10.11 (0.00)***	0.53(0.91)	3.18(0.20)	2.21(0.33)
Argentina	5.66(0.05)**	16.64 (0.00)***	18.14 (0.00)***	2.64(0.24)	3.19(0.20)	3.97(0.13)
Australia	11.45 (0.00)***	9.80(0.00)***	10.43 (0.00)***	11.51 (0.00)***	5.79(0.05)**	4.72(0.09)*
Benin	0.51(0.77)	3.97(0.55)	3.85(0.57)	4.27(0.11)	9.52(0.08)*	9.63(0.08)*
Bolivia	3.16(0.20)	0.47(0.78)	0.56(0.75)	4.62(0.09)*	5.78(0.05)**	5.85(0.5)**
Brazil	3.68(0.29)	0.83(0.65)	1.34(0.51)	3.96(0.26)	5.38(0.06)*	0.14(0.93)
Burkina Faso	2.86(0.58)	2.84(0.58)	2.92(0.57)	11.24 (0.02)**	9.18(0.05)**	8.76(0.06)**
Burundi	6.72(0.08)*	10.31 (0.01)***	9.90 (0.01)***	2.48(0.47)	8.56(0.03)**	7.91(0.04)**
Cameroon	3.53(0.47)	4.69(0.31)	4.69(0.32)	9.50(0.04)**	5.81(0.21)	5.80(0.21)
Central Africa R.	0.73(0.69)	4.51(0.10)*	4.54(0.10)*	2.55(0.27)	1.83(0.40)	1.92(0.38)
Chile	0.56(0.75)	3.33(0.34)	3.33(0.34)	8.05(0.01)***	14.26 (0.00)***	14.26 (0.00)***
Colombia	1.21(0.54)	2.78(0.24)	0.27(0.87)	10.64 (0.00)***	5.76(0.05)**	10.14 (0.00)***
Congo Rep.	0.63(0.72)	1.83(0.39)	1.83(0.40)	1.70(0.42)	1.78(0.40)	1.77(0.41)
Costa Rica	1.42(0.69)	2.70(0.43)	2.74(0.43)	5.10(0.16)	11.26 (0.01)***	11.03 (0.00)****
Dominican Rep.	1.16(0.76)	9.69(0.02)**	9.00(0.02)**	4.80(0.18)	7.55(0.05)**	6.99(0.07)*
Ecuador	7.90(0.01)***	1.23(0.74)	1.19(0.75)	3.05(0.21)	11.28 (0.01)***	10.48 (0.01)***
Egypt	15.47 (0.00)***	13.04 (0.01)***	13.21 (0.01)***	6.99(0.13)	2.50(0.64)	2.64(0.61)
EI Salvador	3.95(0.55)	2.71(0.74)	2.04(0.84)	9.28(0.09)*	24.58 (0.00)***	28.41 (0.00)***
Ghana	0.54(0.76)	8.53(0.03)**	8.53(0.03)**	5.12(0.07)	6.57(0.08)*	7.78(0.07)*
Guatemala	1.12(0.56)	0.91(0.63)	0.85(0.65)	2.04(0.36)	6.37(0.04)**	6.08(0.04)**
Honduras	9.40(0.02)**	3.12(0.37)	3.14(0.36)	8.23(0.04)**	7.57(0.05)**	7.94(0.04)**
Iceland	15.56 (0.00)***	2.59(0.45)	2.54(0.46)	9.75(0.04)**	5.88(0.11)	5.49(0.13)
India	5.33(0.06)*	0.66(0.71)	0.66(0.71)	23.06 (0.00)***	14.41 (0.00)***	14.41 (0.00)***

(continued)

Table 2 (continued)

Country	Finance—› Growth			Growth —› Finance		
	LL	BC	PC	LL	BC	PC
Israel	1.61(0.44)	1.98(0.37)	1.98(0.37)	6.15(0.04)**	1.01(0.60)	1.01(0.60)
Korea	5.57(0.23)	0.86(0.92)	0.74(0.91)	11.03 (0.02)**	10.47 (0.03)**	9.95(0.04)**
Madagascar	0.18(0.91)	5.79(0.05)**	5.79(0.05)**	9.78(0.00)***	0.80(0.66)	0.80(0.66)
Malawi	1.16(0.88)	2.55(0.63)	1.85(0.76)	12.70 (0.01)***	13.15 (0.01)***	14.90 (0.00)***
Malaysia	0.31(0.85)	1.69(0.79)	1.95(0.74)	3.04(0.21)	9.97(0.04)**	11.17 (0.02)**
Mexico	0.19(0.90)	0.58(0.74)	0.74(0.69)	2.80(0.24)	2.91(0.23)	1.37(0.50)
Nepal	11.54 (0.01)***	7.40(0.02)**	7.72(0.02)**	4.07(0.13)	6.42(0.04)**	5.60(0.06)*
Nicaragua	2.53(0.63)	1.46(0.69)	1.46(0.69)	2.72(0.60)	4.87(0.18)	5.60(0.13)
Niger	1.24(0.53)	1.22(0.54)	1.04(0.59)	2.04(0.35)	0.31(0.85)	0.29(0.86)
Peru	0.40(0.93)	6.33(0.09)*	0.98(0.80)	18.40 (0.00)***	13.45 (0.00)***	21.04 (0.00)***
Philippines	15.94 (0.00)***	4.12(0.24)	4.16(0.24)	4.74(0.19)	8.81(0.03)**	8.13(0.03)**
Singapore	10.65 (0.00)***	3.16(0.20)	3.16(0.20)	6.16(0.04)**	10.61 (0.00)***	10.60 (0.00)***
South Africa	0.72(0.69)	0.87(0.64)	6.74(0.03)**	17.51 (0.00)***	7.68(0.02)**	2.43(0.29)
Sweden	3.54(0.16)	0.03(0.98)	0.02(0.98)	3.54(0.16)	9.13(0.01)***	9.01(0.01)***
Thailand	6.03(0.04)**	0.13(0.93)	0.54(0.76)	7.87(0.01)***	10.42 (0.00)***	9.15(0.01)***
Togo	0.33(0.84)	0.12(0.93)	0.08(0.95)	1.62(0.44)	3.09(0.21)	3.34(0.18)
Trinidad & Tobago	0.57(0.75)	1.18(0.53)	0.16(0.92)	5.01(0.08)*	0.27(0.87)	0.84(0.65)
Turkey	9.74(0.00)***	9.26(0.00)***	6.80(0.03)**	4.57(0.10)	3.80(0.14)	3.65(0.16)
United Kingdom	0.51(0.77)	0.24(0.88)	0.24(0.88)	11.96 (0.00)***	6.19(0.04)**	6.22(0.04)**
United States	2.20(0.33)	7.82(0.04)**	28.23 (0.00)***	3.41(0.18)	7.93(0.04)**	9.39(0.02)**
Uruguay	2.65(0.24)	3.60(0.16)	3.70(0.15)	1.38(0.49)	3.53(0.17)	2.00(0.36)

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively. Value in parenthesis represents *t*-value

we use M_3 as the variable measuring financial development. This result is in line with Bhattacharya and Sivasubramanian (2003) who found a similar result using M_3 for India. But as we have pointed out that the use of a single variable can be biased. So, two additional proxies are included to verify the robustness of our findings.

However, as expected, this result changes when other two indicators such as total private sector credit (PC) and Bank credit to private sector (BC) are accounted as additional proxies for financial development. Considering these two variables, we find that the causality is running from economic growth to financial development. This causal direction is statistically significant at the 1 percent level. The result indicates that using a single indicator of financial development may lead to incorrect inference about direction of causality. Similarly, other countries like Peru, Madagascar, the Philippines, Singapore, South Africa, Thailand, and Iceland have shown mixed results. Iceland is little different from these countries because it shows there is significant causal relationship running from financial development to economic growth only when M_3 is accounted as the proxy for financial development. In other two proxies, it shows no causality between financial development and economic growth. Moreover, we find strong causality running from economic growth to financial development in Singapore. But when we consider M_3 as the measure of financial development, we find bidirectional causality between financial development and economic growth. Similarly, Philippines shows that there is a unidirectional causality running from financial development to economic growth only when M_3 is taken as the proxy for financial development. But the causal direction changes showing economic growth causes financial development when other two proxies are considered in the analysis. South Africa also shows some different results regarding directions of causality. It is found that causality from financial development to economic growth holds only when total private credit (PC) is chosen as proxy for financial development. But when the other two such as M_3 and bank credit to private sector (BC) are considered as the proxies for financial development, then the direction of causality runs from economic growth to financial development. Moreover, there are 4 such countries that support the argument of causality between financial development and economic growth but in a very negligible manner. Consider the case of Brazil, economic growth leads to financial development only when bank credit to private sector is used as a proxy for financial development. In no other proxies, the causal relationship is statistically significant in this country. Similarly, Cameroon, Israel, and Trinidad &Tobago are three countries that have similar problems. In their case, economic growth causes financial development only when M_3 is accounted as the proxy for financial development. When other two proxies such as BC and PC are considered, no causality observed between financial development and economic growth.

In addition to that, there is evidence of non-Granger causality from the either direction. This type of idea was proposed by Lucas who argued that this finance–growth nexus is unimportant. In other words, these two sectors are not interdependent rather they are independent of each other. Some of our findings support this idea of no strong linkages between financial development and economic growth. There are 6 countries in our sample which show that there is no significant causal relationship between financial development and economic growth. Particularly, in the case of Congo, Mexico, Nicaragua, Niger, Togo, and Uruguay the null hypothesis of no causality is not rejected at even at 10 percent level of significance. This result is quite consistent with the findings of Chandavarkar (1992), Patrick

(1996), Ang and McKibbin (2007), Nain and Kamaiah (2014), Nyasha and Odhiambo (2015, 2017). However, researchers have observed that the finance–growth nexus depends on several factors such as income level of a country, level of inflation, and level of institutional quality. For instance, Deidda and Fattouh (2002) show that income levels matter in finance–growth nexus. The high income countries benefit from finance–growth nexus. So, analyzing the causal relationship between finance and growth considering this factor may lead to a better assessment of the finance–growth nexus. First of all, we have analyzed the importance of income level on the causal directions between financial development and economic growth. For high and low income levels, we have divided the countries on the basis of World Bank income classifications. For the purpose of comparison, we have chosen one group of countries with having the highest level of income and another group of countries with low income.

A common intuition is that the OECD countries are high income countries but there are some non-OECD countries that also have high level of income. So, it is important to look into the World Bank income classifications in deciding the income level of the countries. Following the income classifications, we end up having 11 high income countries and 12 low income countries. But there are 21 medium income countries which fall in between the point. The result shows that in high income group three countries like Chile, Korea, Sweden, and the United Kingdom support the demand following the role of financial development to economic growth. The United States and Australia show that there exists a bidirectional causality between financial development and economic growth. Iceland and Singapore also supported bidirectional causality but only in first proxy of financial development. But when the proxies like BC and PC are considered we find economic growth causes financial development in Singapore. There are two such countries namely Trinidad & Tobago and Uruguay which show that there is no causality between financial development and economic growth. Similarly, in low income countries, Algeria and the Central African Republic show that financial development causes economic growth. Madagascar and Peru also supported supplying leading role of financial development in economic growth but with low robustness. It is because in case of Madagascar financial development causes economic growth in BC and PC proxies for financial development. When we consider LL as the proxy for financial development we see that the economic growth causes financial development. Similarly, in Peru we observed bidirectional causality between financial development and economic growth but only in one proxy of financial development. When all proxies like LL, BC, and PC are considered we find economic growth is causing financial development. Interestingly, both Burundi and Nepal show bidirectional causality for all the three proxies of financial development. There are also three countries like Congo, Niger, and Togo, which show no causality between finance and growth. So, finally all these results indicate that there is no important difference in causality in finance–growth nexus in both income groups indicating income levels do not matter for finance–growth nexus.

Similarly, another factor that influences finance–growth nexus is the level of inflation. A study by Rousseau and Wachtel (2002) observed that the strength of the

finance–growth nexus varies depending on the level of inflation in the countries. The inflation rate between 13% and 25% helps financial development to increase economic growth. So, the level of inflation is taken into account in the causality analysis. It is observed that OECD countries maintain a low level of inflation compared to non-OECD countries. But there are some non-OECD countries which also maintain low inflation rate. Thus, to see the role of inflation in finance–growth nexus, we have divided the countries into high inflation and low inflation countries, respectively. We have calculated average past 20 years inflation and denoted below 3 percent inflation as low inflation country and above 10 percent is considered as high inflation country. The range between 3 and 10 percent assumes the country under medium level of inflation. Most of the low inflation countries show that economic growth causes financial development. This supports the findings of Rousseau and Wachtel (2002). In high inflation countries, the direction of causality is mixed. However, in some of the countries evidence of unidirectional causality is found which is running from economic growth to financial development and in some other countries evidence of bidirectional causality. But countries with medium level of inflation support Robinson's (1952) argument of demand following the role of finance. Although there are some countries in this group that do not show such causality but they are very few in number.

6.2 Nonlinear Granger Causality

The recent increase in nonlinear literature argues that the use of linear causality tests may not able to capture the nonlinear causal relationship between variables. So, we employ Diks and Panchenko (2006) (DP) test to capture nonlinear causality between financial development and economic growth. The test is applied to estimated residual of VAR model. The lag length for nonlinear causality test is $l_x = l_y = 1$ and epsilon value is 1.5.[2] The nonlinear causality test result is reported in Table 3. The result indicates that half of the sample countries do not show nonlinear causality between financial development and economic growth. Although the rest half of the sample countries show nonlinear causality but the direction is mixed depending upon the variables employed. Some of the countries show unidirectional causal flow from financial development to economic growth, some others show unidirectional causality from economic growth to financial development. Further, some countries show bidirectional causality between financial development and economic growth. The United States and United Kingdom show there is bidirectional nonlinear causality between financial development and economic growth. The United States shows bidirectional causality both in linear and in nonlinear causality tests. But nonlinear causality in the United Kingdom was neglected in linear causality test which could perhaps resulted in the acceptance of false null hypothesis. The results

[2]Diks and Panchenko (2006) suggested the epsilon value of 1.5 for 100 observations.

Table 3 Nonlinear Granger causality

Country	Finance⟶ Growth			Growth ⟶ Finance		
	LL	BC	PC	LL	BC	PC
Argentina	−0.006 (0.50)	−0.22 (0.58)	0.03 (0.48)	−1.729 (0.95)	0.81(0.20)	0.96(0.16)
Algeria	−1.77 (0.96)	1.34 (0.08)*	1.36 (0.08)*	1.59(0.05) **	1.08(0.13)	1.61(0.05) **
Australia	2.53(0.00) ***	1.78 (0.03)**	1.40 (0.07)*	0.50(0.30)	1.41(0.00) ***	1.45(0.07) *
Benin	−0.06 (0.52)	−0.30 (0.61)	−0.57 (0.71)	−0.05 (0.52)	0.36(0.35)	0.58(0.27)
Bolivia	−0.08 (0.53)	1.35 (0.08)*	1.10 (0.13)	1.44(0.07) *	0.99(0.15)	1.18(0.11)
Brazil	0.29(0.38)	0.13 (0.44)	−1.19 (0.88)	1.39(0.08) *	0.80(0.21)	0.23(0.40)
Burkina Faso	1.52(0.06) *	0.09 (0.46)	0.09 (0.46)	−0.27 (0.60)	1.75(0.03) **	1.75(0.03) **
Burundi	0.86(0.19)	1.28 (0.09)*	0.78 (0.21)	−0.17 (0.56)	0.36(0.35)	0.08(0.46)
Cameroon	1.32(0.09) *	−0.57 (0.71)	−0.57 (0.71)	0.06(0.47)	1.28(0.10) *	1.28(0.10) *
Central Africa R.	0.37(0.35)	−1.42 (0.92)	−1.38 (0.91)	0.90(0.18)	−2.26 (0.98)	2.15(0.98)
Chile	0.41(0.33)	1.48 (0.06)*	1.48 (0.06)*	1.06(0.14)	0.45 (0.32)	0.45 (0.32)
Colombia	0.42(0.33)	0.71 (0.23)	−0.03 (0.51)	1.50(0.06) *	1.51(0.06) *	1.39(0.08) *
Congo Rep.	−0.79 (0.78)	−1.07 (0.85)	−1.07 (0.85)	−0.48 (0.68)	0.21(0.41)	0.21(0.41)
Costa Rica	0.36(0.35)	−0.83 (0.79)	−0.77 (0.78)	0.55(0.28)	−1.45 (0.92)	−1.41 (0.92)
Dominican Rep.	1.27(0.10) *	1.13 (0.12)	1.27 (0.10)*	0.97(0.16)	2.24(0.01) ***	1.88(0.03) **
Ecuador	0.68(0.24)	−0.28 (0.61)	−0.54 (0.70)	0.95(0.82)	−0.74 (0.77)	−0.39 (0.64)
Egypt	1.17(0.11)	0.97 (0.16)	1.00 (0.15)	1.06(0.15)	0.29(0.38)	0.46(0.31)
EI Salvador	0.40(0.34)	1.45 (0.07)*	1.04 (0.14)	1.43(0.07) *	1.78(0.03) **	1.71(0.04) **
Ghana	−0.69 (0.75)	1.08 (0.13)	1.01 (0.15)	1.12(0.13)	0.91(0.17)	1.36(0.08) *
Guatemala	−2.89 (0.99)	−0.81 (0.79)	−1.03 (0.84)	−1.36 (0.91)	−1.20 (0.88)	−0.81 (0.79)
Honduras	−0.31 (0.62)	−0.68 (0.75)	−0.33 (0.63)	−0.68 (0.75)	−0.05 (0.52)	0.09(0.46)
Iceland	0.95(0.16)	−0.47 (0.68)	−0.22 (0.59)	−0.48 (0.68)	−0.06 (0.52)	0.23(0.40)

(continued)

Table 3 (continued)

Country	Finance—› Growth			Growth —› Finance		
	LL	BC	PC	LL	BC	PC
India	−0.006 (0.50)	−0.73 (0.76)	−0.73 (0.76)	−0.06 (0.52)	0.41(0.33)	0.41(0.33)
Israel	−0.64 (0.73)	−0.85 (0.80)	−0.85 (0.80)	0.50(0.30)	−0.10 (0.54)	−0.10 (0.54)
Korea	−1.20 (0.88)	−0.99 (0.83)	−1.01 (0.84)	−1.12 (0.80)	−1.66 (0.95)	0.01(0.49)
Madagascar	−0.13 (0.55)	0.63 (0.26)	0.63 (0.26)	0.26(0.39)	−1.16 (0.87)	−1.16 (0.87)
Malawi	−0.13 (0.55)	0.11 (0.45)	−0.49 (0.68)	1.13(0.12)	2.57(0.00) ***	2.47(0.00) ***
Malaysia	−1.01 (0.85)	0.73 (0.23)	0.66 (0.25)	0.06(0.47)	0.39(0.34)	0.27(0.39)
Mexico	0.81(0.20)	−0.19 (0.57)	−0.40 (0.65)	0.27(0.39)	0.33(0.37)	0.53(0.29)
Nepal	−1.41 (0.29)	−1.55 (0.93)	−1.53 (0.93)	−0.43 (0.63)	−1.18 (0.88)	−1.19 (0.88)
Nicaragua	−0.02 (0.51)	0.78 (0.21)	0.64 (0.26)	1.33(0.09) *	1.71(0.04) **	1.73(0.04) **
Niger	0.55(0.28)	−0.24 (0.59)	−0.58 (0.72)	−0.29 (0.61)	1.17(0.12)	1.20(0.11)
Peru	−0.83 (0.79)	1.75 (0.03)**	0.25 (0.40)	0.14(0.44)	−0.32 (0.62)	0.98(0.16)
Philippines	1.15(0.12)	−0.42 (0.66)	−0.48 (0.68)	1.15(0.12)	−0.47 (0.68)	−0.32 (0.62)
Singapore	1.95(0.02) **	0.79 (0.21)	0.79 (0.21)	0.76(0.22)	−0.53 (0.70)	−0.53 (0.70)
South Africa	−1.77 (0.96)	−1.19 (0.88)	−0.47 (0.68)	−1.52 (0.93)	0.08(0.48)	0.34(0.36)
Sweden	−0.18 (0.57	−0.88 (0.81)	−1.44 (0.92)	0.05(0.47)	0.36(0.35)	0.42(0.33)
Thailand	0.49(0.31)	−0.42 (0.66)	0.45 (0.32)	0.07(0.47)	0.88(0.18)	0.06(0.47)
Togo	1.68(0.04) **	0.31 (0.37)	0.35 (0.36)	0.06(0.47)	−0.27 (0.60)	−0.18 (0.57)
Trinidad & Tobago	0.37(0.35)	0.58 (0.28)	−0.56 (0.71)	1.62(0.05) **	−0.11 (0.54)	1.24(0.10) *
Turkey	0.88(0.18)	−0.18 (0.57)	−0.31 (0.62)	−0.22 (0.58)	−0.92 (0.88)	−0.78 (0.78)
United Kingdom	0.85(0.19)	1.29 (0.09)*	1.28 (0.10)*	0.86(0.19)	1.32(0.09) *	1.32(0.09) *
United States	−0.72 (0.76)	0.63 (0.26)	1.31 (0.09)*	−0.27 (0.60)	1.38(0.08) *	−0.99 (0.83)
Uruguay	−0.71 (0.76)	−1.23 (0.89)	−0.50 (0.69)	0.79(0.29)	0.57(0.28)	0.67(0.25)

(continued)

Table 3 (continued)

Country	Finance—› Growth			Growth —› Finance		
	LL	BC	PC	LL	BC	PC

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively. Value in parenthesis represents *t*-value. The causality test is conducted using epsilon value of 1.5 and taking one lag

of linear Granger causality test for the United Kingdom show that economic growth causes financial development not otherwise. There are 24 both OECD and non-OECD countries which show no evidence of nonlinear Granger causality between financial development and economic growth. There are five countries such as Chile, Singapore, Peru, Burundi, and Togo, which show that financial development nonlinearly Granger causes economic growth. But the point to note is that except Chile all other countries show the evidence of nonlinear causality only in one proxy of financial development. For instance, Singapore shows evidence of nonlinear causality only when LL proxy is used as a measure of financial development. Similarly, Peru shows evidence of nonlinear causality only when BC is accounted as the measure of financial development. Our result supports some of the empirical findings of Rousseau and Wachtel (2002) which asserted that financial development can have a possible nonlinear influence on economic growth.

Similarly, there are 6 countries which show that economic growth nonlinearly Granger-cause financial development. The result is more robust in Colombia and Nicaragua where all three proxies of financial development are showing significant causality. The nonlinear causality is not so robust in Brazil and Malawi as they show causality only in one proxy. Moreover, we find a bidirectional nonlinear causality in four other countries. They are Australia, the United Kingdom, Dominican Republic, and Algeria. This result indicates that financial development can have strong nonlinear influence on economic growth and economic growth can have a strong nonlinear impact on financial development. The result is stronger in the United Kingdom and Australia as two measures of financial development show significant causality. There are such countries for which this bidirectional nonlinear causality is not robust as the maximum variables measuring financial development turn out insignificant. For instance, Algeria and Dominican Republic where nonlinear Granger causality is evident only in third proxy namely PC. Further, there are some countries which show mixed result in the direction of causality. For instance, in Bolivia nonlinear causality is observed from financial development to economic growth only in second proxy (BC) but shows nonlinear causality from economic growth to financial development when first proxy (LL) is considered for financial development. Similarly, the United States shows nonlinear causality from financial development in third proxy (PC) but the direction of causality turns opposite when second proxy (BC) is used as a measure of financial development

It is observed that finance–growth nexus is nonlinear in the presence of several factors such as level of inflation, income level, level of financial development, etc. Comparing countries on the basis of their income level, we observed a significant

nonlinear finance–growth nexus in low income countries. The high income countries also show nonlinear finance–growth nexus but their number is smaller than low income countries. These findings support the observation made by Masten et al. (2008) pointing that low income countries gain more from financial development. Moreover, in medium income countries the finance–growth nexus and growth-finance nexus show similar numbers in these countries. But again, comparing with high income countries the medium income countries show significant finance–growth nexus supporting the argument of Masten et al. (2008). Further, we looked at the impact of inflation level on finance–growth nexus. Comparing high inflation countries with low inflation countries it is found that indeed there is strong nonlinear Granger-causality running from finance to economic growth in low inflation countries. There are four countries in the low inflation group that show significant nonlinear causality. Similarly, there is evidence of nonlinear causality from financial development to economic growth in the medium inflation countries but same causal effect is not clear-cut in high inflation countries. In high inflation countries, interpretations of causal direction depend upon the proxies used in measuring financial development. These results in line with Huang et al. (2010) and Rousseau and Wachtel (2002) who pointed out that high inflation disappears the benefit from finance–growth nexus.

7 Robustness Analysis

The bank-based indicators are good proxies for financial development. But these indicators may neglect another side of financial development called stock market-based financial development. An efficient stock market channels capital to its most productive use and generates high economic growth. So, stock market-based indicators can be used as a robustness check in determining the direction of causality in finance–growth nexus. To measure stock market-based financial development, two indicators are used by the size and the liquidity level of stock market. The size is measured by the market capitalization ratio, which is the ratio of value of listed shares to real GDP (MK). The second indicator is the value traded ratio, which is defined as the ratio of the total value of shares traded on the stock exchange to real GDP (VT).[3] To minimize the space the unit root test result is not reported and can be available upon request. The empirical test result is reported in Table 4 indicates that there is significant linear causality from stock market development to economic growth. The dominant effect is found when stock market capitalization is considered as the proxy indicator of financial development. There are thirteen countries which

[3]For the stock market-based financial development data is not available for all sample countries. So, few countries are dropped from analysis. Further, the sample length is not same for all countries. For example, Australia (1975–2014), Bolivia (1994–2012), Turkey (1991–2014), Malaysia (1980–2014), and India (1997–2014).

Table 4 VAR linear causality test (Stock market indicator based financial development)

Country	Finance—› Growth		Growth —› Finance	
	MK	VT	MK	VT
Argentina	4.47(0.10)*	0.57(0.75)	0.46(0.79)	1.32(0.51)
Australia	24.13(0.00)***	26.37(0.00)***	4.49(0.34)	3.66(0.45)
Bolivia	4.40(0.11)	2.51(0.28)	12.55(0.00)***	5.62(0.05)**
Brazil	27.72(0.00)***	22.68(0.00)***	1.51(0.46)	4.95(0.08)*
Chile	36.98(0.00)***	1.27(0.72)	0.83(0.65)	7.77(0.05)**
Colombia	1.79(0.18)		0.01(0.88)	
Costa Rica	0.46(0.79)	3.89(0.14)	7.68(0.02)***	1.27(0.52)
EI Salvador	3.85(0.14)	4.91(0.08)*	4.65(0.09)*	0.70(0.70)
Ghanaa	4.63(0.09)*	0.40(0.81)	9.93(0.00)***	5.58(0.06)*
India		4.47(0.10)*		2.21(0.33)
Israel	10.24(0.00)***	2.38(0.49)	0.36(0.84)	7.15(0.06)*
Korea	27.44(0.00)***	5.57(0.13)	4.76(0.09)*	11.45(0.00)***
Malaysia	35.02(0.00)***	0.81(0.66)	1.70(0.42)	0.64(0.72)
Mexico	2.53(0.28)	0.58(0.74)	1.40(0.49)	4.20(0.12)
Peru	26.16(0.00)***	4.49(0.10)*	3.23(0.19)	1.43(0.48)
Philippines	7.33(0.02)**	17.60(0.00)***	4.54(0.10)*	6.65(0.08)*
Singapore	10.96(0.00)***	2.66(0.26)	1.24(0.53)	0.45(0.70)
South Africa	7.98(0.09)*	8.58(0.07)*	4.61(0.31)	4.96(0.29)
Sweden	34.72(0.00)***	7.19(0.06)*	3.54(0.31)	2.47(0.48)
Thailand	17.99(0.00)***	26.08(0.00)***	7.09(0.02)**	2.69(0.25)
Turkey	14.19(0.00)***	0.20(0.65)	1.44(0.48)	3.67(0.05)**
United Kingdom	15.26(0.00)***	2.59(0.27)	1.86(0.39)	0.61(0.73)
United States	17.69(0.00)***	2.27(0.31)	2.19(0.33)	3.48(0.17)

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively. Value in parenthesis is *t*-value

show that stock market capitalization can predict future economic growth. The efficient functioning of stock markets has allowed quick flow of funds to most productive sources. The results are in line with Ngare et al. (2014), Nyasha and Odhiambo (2015), Nyasha and Odhiambo (2017). On the other hand, there are few countries that supported the significant linear causality from economic growth to stock market development. This finding is against the result obtained from bank-based financial development in the previous section where more countries support economic growth causing financial development. This result is in line with Pan and Mishra (2016). Further, there are four countries that show bidirectional causality between stock market development and economic growth. This result supports the finding of Enisan and Olufisayo (2009) and Marques et al. (2013). Moreover, the nonlinear causality test result is reported in Table 5. In most of the countries, we did not find evidence of significant nonlinear causality from stock market development to economic growth. Considering stock market capitalization, countries like Australia, Chile, Korea, and the Philippines show evidence of nonlinear causality from financial development to economic growth. Similarly, South Africa and

Table 5 Nonlinear causality test (Stock market-based financial development)

Country	Finance—› Growth		Growth —› Finance	
	MK	VT	MK	VT
Argentina	−0.92(0.82)	0.59(0.27)	1.70(0.04)	0.09(0.46)
Australia	1.34(0.08)*	1.28(0.09)*	−0.04(0.51)	−0.25(0.60)
Bolivia	0.19(0.42)	−0.22(0.59)	0.63(0.26)	0.42(0.33)
Brazil	2.12(0.01)***	0.76(0.22)	1.69(0.04)**	1.45(0.07)*
Chile	1.23(0.10)*	−0.67(0.74)	0.83(0.20)	1.09(0.13)
Colombia	1.11(0.13)		−0.61(0.72)	
Costa Rica	−1.06(0.55)	−0.94(0.82)	−1.27(0.89)	−1.29(0.90)
EI Salvador	0.10(0.45)	1.12(0.12)	−1.70(0.95)	1.36(0.08)*
Ghana	0.84(0.19)	−1.24(0.89)	−0.66(0.74)	−0.50(0.69)
India		0.78(0.21)		−0.40(0.65)
Israel	−1.03(0.84)	0.81(0.20)	0.82(0.20)	1.38(0.08)*
Korea	1.99(0.02)**	−1.07(0.85)	1.35(0.08)*	1.18(0.11)
Malaysia	1.06(0.14)	−0.0(0.50)	0.74(0.22)	0.64(0.26)
Mexico	−0.05(0.52)	−1.09(0.86)	−1.66(0.95)	1.28(0.09)*
Peru	−1.13(0.87)	0.87(0.21)	−0.30(0.62)	0.04(0.48)
Philippines	1.58(0.05)**	1.44(0.07)*	−1.33(0.90)	1.21(0.11)
Singapore	−0.11(0.54)	−0.07(0.53)	−0.14(0.55)	−1.28(0.90)
South Africa	−0.96(0.53)	−0.45(0.67)	1.26(0.10)*	−0.33(0.63)
Sweden	−0.02(0.51)	0.52(0.30)	−0.08(0.53)	1.72(0.04)**
Thailand	1.13(0.12)	1.07(0.14)	1.41(0.07)*	−0.74(0.77)
Turkey	0.65(0.25)	−0.98(0.83)	−1.92(0.97)	0.03(0.48)
United Kingdom	−0.56(0.71)	−0.70(0.76)	0.09(0.46)	0.15(0.43)
United States	−1.31(0.90)	0.68(0.24)	0.57(0.28)	1.48(0.06)*

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively. Value in parenthesis is *t*-value. The epsilon value is 1.5 and lag length is 1

Thailand are two countries that show causality from economic growth to stock market development.

There are two countries that show evidence of bidirectional causality between stock market capitalization and economic growth. Similarly, considering value traded ratio as proxy for financial development we find significant nonlinear causality from economic growth to stock market development. There are six countries that supports the demand side hypothesis. Further, we have analyzed whether income level and inflation rate have any impact on finance–growth nexus. We divide the countries into high, medium, and low income countries following World Bank income classifications. From this classification, we find that the high income countries largely support supplying leading role of finance. The high income countries like Sweden, the United Kingdom, Israel, the United States, Australia, Singapore, and Chile show that stock market capitalization Granger causes economic growth. But the bidirectional causality is not strong in high income countries as Korea is the only country which shows that stock market development causes economic growth and in turn economic growth causes stock market development. But the supply

leading theory is not significant in high income countries when value traded ratio is taken proxy for financial development. Only two countries show significant causality from stock market development to economic growth. But the result of bidirectional causality between stock market development and economic growth is seen increasing in number in high income countries where value traded ratio is taken for financial development. This bidirectional causality indicates that economic growth demands greater stock market development and greater stock market activity induces economic growth. The nonlinear causality result indicates that neither demand following theory nor supply leading theory is significant in high income countries. Further, the results from nonlinear causality test show that most of the high income countries do not show significant causality from stock market development to economic growth. There are two countries such as Australia and Chile which reveal that stock market development nonlinearly causes economic growth. Similarly, using the stock market liquidity indicator we find only Australia showing the nonlinear causality. However, there are some evidences of nonlinear causality from economic growth to stock market development.

Countries like the United Kingdom, Sweden, and Chile show significant evidence of nonlinear causality running from economic growth to value traded ratio. But in medium income countries evidence of the causal relationship is mixed. Some countries show unidirectional causality from financial development to economic growth and the other countries show causality from economic growth to financial development. There is, however, also evidence of bidirectional causality in some countries. But most of the nonlinear causality results do not support either demand following theory or supply leading theory in medium income countries. The Philippines is the only country that reveals stock market development nonlinearly Granger-causes economic growth. The insignificant causality in those countries indicates that there is an independent link between stock market liquidity and economic growth. Similarly, stock market capitalization and economic growth are insignificantly correlated in medium income countries. Similarly, low income countries show strong cases of linear causality from stock market development to economic growth. But there is no significant nonlinear causality in finance–growth nexus.

Similarly, we studied the impact of inflation level on finance–growth nexus. The result indicates that both high and medium level of inflation in a country strengthen the finance–growth relationship and high inflation level weaken the finance–growth relationship. And in low inflation countries, the causal direction is significantly running from stock market development to economic growth. The stock market capitalization predicts future economic growth in low inflation environment. This causal relationship is significant even if the country is in high inflation environment. But their number is only two indicating that the generalization of results for a group can be problematic. However, medium inflation countries show significant causality running from stock market development to economic growth. Moreover, these countries show economic growth significantly causes stock market development. The results from the nonlinear causality test reveals that only medium inflation countries show significant causality from economic growth to stock market

development. The high and low inflation countries do not show significant nonlinear causality in either direction.

8 Conclusion

This chapter examines the finance–growth nexus for a large sample of countries to find out the nature bases on bank-based indicator of causal relationship between financial development and economic growth. Our empirical result based on bank-based indicators shows that most of the countries have linear causality from growth to finance supporting demand-side hypothesis. The result supports the theoretical argument of Robinson (1952) and empirical findings of Demetriades and Hussein (1996) and Akinci et al. (2014). But there are some countries which show that the direction of causality depends upon the proxy used to measure the financial development. On the contrary, stock market-based indicators show that there is a linear causality from stock market development to economic growth. Further, we find that income levels do not matter for the finance–growth nexus as there is no significant difference in causality between two income groups. However, the result changes significantly when stock market-based financial development is considered into analysis. There is significant causality from stock market development to economic growth in high income countries. Further, comparing the high inflation countries with low inflation countries, we find strong evidence of linear causality running from financial development to economic growth in low inflation countries. A similar result is observed when stock market development is accounted as financial development. This finding is in line with Rousseau and Wachtel (2002).

Moreover, using nonlinear causality test we observe that more than half of the countries do not show nonlinear causal relationship in finance–growth nexus. A similar result is obtained from stock market-based finance–growth nexus. But the rest of the half of the sample countries show evidence of different directions of nonlinear causality, depending upon the indicators employed. But, comparing countries by their inflation level we find significant nonlinear causality running from financial development to economic growth in low inflation countries. This result is in line with Huang et al. (2010) and Rousseau and Wachtel (2002). However, this causal direction is insignificant in stock market-based financial development. Similarly, comparing countries by their income level we do not find significant nonlinear causality in finance–growth nexus in both high and low inflation countries. A similar result is observed using stock market development as a proxy for financial development. This finding is contrasting Masten et al.'s (2008) argument that low income countries gain from finance–growth nexus. But using bank-based indicators we do find significant evidence of nonlinear causality in finance–growth nexus in the medium income countries.

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Effectiveness of Macroprudential Policies: Panel Data Evidence on the Role of Institutions, Financial Structure, and Banking Regulations

Mehmet Fatih Ekinci and Gülserim Özcan

1 Introduction

The global financial crisis has motivated policymakers to review the policy framework to prevent the buildup of financial imbalances. To decrease the procyclicality of the financial system and mitigate capital flow volatility, macro-prudential policies are used more frequently after the global crisis. Global liquidity conditions driven by loose monetary policy in advanced economies made the topic of macro-prudential tools in emerging markets more important. Although these policies have been effectively utilized by both advanced and emerging economies, they are implemented more intensively by emerging market economies, especially as capital flow management tools. These countries have experienced massive capital inflows during the post-crisis period of abundant global liquidity. After the gradual reversal of quantitative easing policies of advanced economies, we observed capital outflows from the emerging market economies.

Recent literature presents ample evidence on the effectiveness of macro-prudential policies. For example, Akinci and Olmstead-Rumsey (2018) shows that tightening in macro-prudential policy stance induces lower rates of credit growth and real estate price appreciation. Using a sample of emerging market economies, Fendoglu (2017) documents that macro-prudential policy effectively dampens the impact of capital flows. Bruno et al. (2017) and Galati and Moessner (2018) also support the validity of macroprudential instruments in mitigating the credit cycles.[1]

An overlook of these studies shows that macro-prudential policies are effective instruments to enhance the financial stability objectives. However, the effectiveness

[1]See Alam et al. (2019) for a review of theoretical and empirical studies on macro-prudential policies.

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of these policies can rely on country characteristics through different channels. Policymakers need a broad range of tools to implement these policies. Institutions may impede the ability to use some of these tools. For some policies, the participation of the fiscal authority[2] may be necessary. Policy toolkit may also require cooperation with supervisory agencies, which may be legally or institutionally tricky. The sophistication of the financial system, tightness of banking regulations, and credit market imperfections can also influence the effectiveness of macro-prudential policies. The aim of this chapter is to examine the role of country characteristics that might affect the performance of macro-prudential policies. To materialize the impact of macro-prudential policies, we utilize the macro-prudential policy index (MPI) compiled by Cerutti et al. (2017). We focus on a sample of 108 countries spanning the period from 2001 to 2017.[3] Following the model proposed by Cerutti et al. (2017), our baseline empirical model establishes that the growth rate of the credit depends on lagged credit growth, the growth rate of real output, lagged monetary policy rate, and a dummy variable controlling for the crisis. To account for the factors which may influence the effectiveness of macro-prudential tools, we extend the baseline model by including an interaction term of the MPI with the institutional variables, indicators that describe the financial structure and banking regulations.

The baseline empirical model suggests that macro-prudential policies cause lower credit growth. Differentiating between two main subgroups of indices: borrower-based measures and financial institution-targeted macro-prudential policies, we find that borrower-based instruments are more effective than the policies related to financial institutions in mitigating growth in bank credit.[4] Considering the role of country characteristics, our findings suggest that institutional factors and financial structure are not associated with the effectiveness of macro-prudential policies. We observe a weak relationship between the business environment and the performance of macro-prudential policies. Results show that a better business environment reduces the effectiveness of policy tools by enhancing access to credit for firms. Our chapter also relates to a substantial literature on the role of financial deregulation besides the research on the assessment of macro-prudential policies. There are two extreme views of regulation. The first view suggests that deregulation increases economic growth stemming from a more efficient allocation of resources (Demirgüç-Kunt 2004; Levine, 2005; Beck, 2009). Opposing view on the regulations emphasizes that they are necessary to avoid banking crises and maintain financial stability (Demirgüç-Kunt & Detragiache, 2002; Beck et al., 2006a, 2006b). By focusing on the indicators describing the tightness of regulations, our results suggest that tighter banking sector regulations are associated with more effective macro-prudential policies.

[2]Some policy instruments require the usage of tax policies.

[3]Although the IMF database covers 119 countries, our sample selection is determined by the availability of data on country characteristics.

[4]These results are consistent with Cerutti et al. (2017).

This chapter proceeds as follows: Section 2 describes the data and methodology. Section 3 analyzes the effects of macro-prudential policy indices on credit growth and discusses how various factors related to institutional quality, business environment, banking structure, and regulations influence the effectiveness of macroprudential policies. Section 4 concludes.

2 Data and Methodology

We use a sample of 108 countries, including 28 advanced economies, 54 emerging market economies, and 26 low-income developing economies over the period from 2001 to 2017. Table 1 lists the countries. We use the macro-prudential policy index (MPI) by Cerutti et al. (2017) as a measure to evaluate the effectiveness of macro-prudential tools. MPI is a dummy index that summarizes the macro-prudential policy stance of a country. The index describes the usage of 12 different instruments to mitigate credit growth. These instruments are aggregated into two subcategories: borrower-based measures such as debt-to-income and loan-to-value ratios are aggregated as MPI-B, and the sum of the rest of policy measures which are aimed at financial institutions are summarized as MPI-F. Following the model proposed by Cerutti et al. (2017), our baseline empirical model-1 establishes that the growth rate of the credit depends on lagged credit growth, the growth rate of real output, monetary policy rate, and a dummy variable controlling for the banking crisis:

$$\begin{aligned}\Delta Credit_{i,t} = \mu_i + \beta_1 \Delta Credit_{i,t-1} + \beta_2 Growth_{i,t-1} + \beta_3 MonetaryPolicy_{i,t-1} \\ + \beta_4 Crisis_{i,t-1} + \beta_5 MPI_{i,t-1} + \varepsilon_{i,t}\end{aligned} \quad (1)$$

Table 2 describes the main regression variables. Due to the inertia in the evolution of credit growth, a dynamic panel data model is estimated. By construction, unobserved country effects and the lag of the dependent variable are correlated. This leads to inconsistent estimates. Since the adoption of the macroprudential policies may be a response to movements in credit fluctuations, we also need to consider a potential endogeneity problem. Employing a system GMM estimation, lagged level, and lagged differences of internal variables are used as instruments for the lagged dependent variable to exploit the sample information available (Ullah et al., 2018, 2020). We also report fixed effect estimates as a benchmark. To investigate the underlying conditions which might influence the effectiveness of macro-prudential policies, we extend the baseline model and include interaction with macroprudential policy indices as follows:

Table 1 Country classification

Albania (EM)	Dem. Rep. Congo (DE)	Kenya (DE)	Philippines (EM)
Algeria (EM)	Denmark (AD)	Kuwait (EM)	Poland (EM)
Angola (EM)	Dominican Republic (EM)	Kyrgyz Republic (DE)	Romania (EM)
Argentina (EM)	Egypt (EM)	Luxembourg (AD)	Russian Federation (EM)
Armenia (EM)	Fiji (EM)	Macedonia (EM)	Rwanda (DE)
Australia (AD)	Finland (AD)	Madagascar (DE)	São Tomé and Príncipe (DE)
Austria (AD)	France (AD)	Malaysia (EM)	Senegal (DE)
Azerbaijan (EM)	Germany (AD)	Maldives (EM)	Serbia (EM)
Bangladesh (DE)	Georgia (EM)	Mali (DE)	Sierra Leone (DE)
Belarus (EM)	Ghana (DE)	Mauritania (DE)	Singapore (AD)
Belgium (AD)	Greece (AD)	Mauritius (EM)	South Korea (AD)
Belize (EM)	Guatemala (EM)	Mexico (EM)	Spain (AD)
Benin (DE)	Guinea-Bissau (DE)	Moldova (DE)	Sweden (AD)
Bolivia (EM)	Guyana (EM)	Mongolia (EM)	Switzerland (AD)
Botswana (EM)	Honduras (DE)	Morocco (EM)	Sri Lanka (EM)
Brazil (EM)	Hong Kong (AD)	Mozambique (DE)	South Africa (EM)
Bulgaria (EM)	Hungary (EM)	Myanmar (EM)	Thailand (EM)
Burkina Faso (DE)	Iceland (AD)	Nepal (DE)	Tajikistan (DE)
Canada (AD)	India (EM)	Netherlands (AD)	The Gambia (DE)
Cape Verde (EM)	Indonesia (EM)	New Zealand (AD)	Togo (DE)
Chile (EM)	Ireland (AD)	Niger (DE)	Trinidad and Tobago (EM)
China (EM)	Israel (AD)	Norway (AD)	Tunisia (EM)
Colombia (EM)	Italy (AD)	Pakistan (EM)	Turkey (EM)
Côte d'Ivoire (DE)	Jamaica (EM)	Papua New Guinea (DE)	Uganda (DE)
Costa Rica (EM)	Japan (AD)	Portugal (AD)	Ukraine (EM)
Croatia (EM)	Jordan (EM)	Paraguay (EM)	United Kingdom (AD)
Czech Republic (AD)	Kazakhstan (EM)	Peru (EM)	United States (AD)

Notes: Country classification is based on IMF WEO (October 2017)
AD Advanced, *EM* Emerging, *DE* Low-Income Developing

$$\begin{aligned}\Delta Credit_{i,t} &= \mu_i + \beta_1 \Delta Credit_{i,t-1} + \beta_2 Growth_{i,t-1} + \beta_3 Crisis_{i,t-1} \\ &+ \beta_4 MonetaryPolicy_{i,t-1} + \beta_5 MPI_{i,t-1} + \beta_6\, MPI_{i,t-1} * X_i + \varepsilon_{i,t}\end{aligned} \tag{2}$$

We categorize the interaction variables in terms of four distinct groups: (i) institutional quality, (ii) business environment, (iii) banking sector structure, and (iv) banking regulations. Variables are described in Table 3.

Table 2 Variable definitions and data sources

Variable	Definition	Source
(A) Dependent variable		
Credit Growth	Real credit growth (%) (Deflated by World Bank WDI CPI series)	Various (BIS when available, otherwise IMF IFS)
(B) Control variables		
Monetary Policy	Monetary Policy Rate (%)	Thomson Reuters
Growth	Real GDP growth (%)	World Bank WDI.
Crisis	Financial Crisis Indicator	Laeven and Valencia (2018) dataset
Macroprudential policy		
MPI	Aggregate Macroprudential Index [0–12]	Updated Cerutti et al. (2017) dataset
MPI-B	Borrower-Based Measures [0–2] Sum of the usage of loan to value and debt to income policies	
MPI-F	Financial Institution-Targeted Macroprudential Instruments [0–10]. Sum of the usage of remaining instruments	

Notes: BIS stands for data delivery system of Bank for International Settlements, IMF IFS is International Monetary Fund International Financial Statistics and WDI is World Bank Development Indicators

3 Empirical Results

3.1 Main Regression Results

Baseline empirical model results are summarized in Table 4. To begin with, we find a positive correlation between current and past credit growth, 0.37, justifying the use of a dynamic model. We document that lagged MPI is negatively associated with credit growth, implying a significant dampening effect of macroprudential measures on credit growth. A unit change in index decreases credit growth by 1.74 percent points. The estimated coefficients are qualitatively similar in fixed effects results. Furthermore, credit growth is negatively related to the crisis indicator and positively affected by the real GDP growth consistent with theoretical predictions. A banking crisis contracts the credit growth by 7.3 percent, and the income elasticity of credit is found to be 0.46. Although a one percent tightening of monetary policy slows down the credit by 0.53 percent, it is not as powerful as the macro-prudential policy stance. However, one has to note that the primary objective of monetary policy is not controlling the fluctuations in credit. When we closely examine the borrower-based and financial institution-targeted measures, our results indicate that borrower-based macro-prudential tools are more than twice as effective as the policies related to financial institutions. Regarding other control variables, the coefficients are stable among the subgroups of indices.

Table 3 Interaction variables

Variable	Definition	Source
Panel (A) Institutional quality		
Government stability	Index ranges between [0–12]	ICRG Political Risk Component. Higher points indicate better institutions
Investment profile	Index ranges between [0–12]	
Law and order	Index ranges between [0–6]	
Democratic accountability	Index ranges between [0–6]	
Bureaucratic quality	Index ranges between [0–4]	
Panel (B) Business Environment		
Ease of doing business	Index ranges between [0–100]	World Bank Doing Business dataset
Credit information depth	Index ranges between [0–8]	
Contract enforcement cost	Percentage of claim	
Panel (C) Banking sector structure		
Bank concentration	Market share of the largest five banks in terms of asset holdings	Bank Regulation and Supervision dataset Barth et al. (2013)
Government banks	Market share of the government-owned banks	
Foreign banks	Market share of the foreign-owned banks	
Panel (D) Banking regulations		
Activity restrictions	Index ranges between [3–12]	Bank Regulation and Supervision dataset Barth et al. (2013)
Bank entry requirements	Index ranges between [0–8]	
Capital regulations	Index ranges between [0–10]	
Supervisory power	Index ranges between [0–14]	
Deposit insurer power	Index ranges between [0–4]	
Deposit insurance funds	Funds/Total assets	

3.2 Institutional Quality

Better institutions might lead to more effective macro-prudential policies, especially by improving inter-organizational cooperation when necessary. However, better institutions may also be correlated with financial development and a more sophisticated financial system. A sophisticated financial system might repress the

Table 4 The impact of macroprudential indices on credit growth

Variables	System GMM			Fixed Effects		
Credit growth	(1)	(2)	(3)	(4)	(5)	(6)
MPI	−1.738***			−1.814***		
	(0.396)			(0.357)		
MPI_B		−4.063***			−2.987***	
		(1.23)			(0.798)	
MPI_F			−1.710***			−2.140***
			(0.449)			(0.482)
Lagged credit growth	0.368***	0.375***	0.378***	0.347***	0.356***	0.351***
	(0.071)	(0.071)	(0.071)	(0.053)	(0.054)	(0.053)
Monetary policy rate	−0.534***	−0.534***	−0.502***	−0.259*	−0.15	−0.226
	(0.188)	(0.194)	(0.19)	(0.144)	(0.136)	(0.144)
RGDP growth	0.458***	0.474***	0.459***	0.783***	0.816***	0.787***
	(0.157)	(0.151)	(0.159)	(0.122)	(0.123)	(0.123)
Banking crisis indicator	−7.310***	−7.630***	−7.315***	−8.572***	−8.379***	−8.468***
	(1.829)	(1.821)	(1.969)	(1.694)	(1.696)	(1.683)
Constant	9.989***	7.829***	9.038***	7.711***	4.137***	7.346***
	(1.573)	(1.425)	(1.514)	(1.442)	(1.044)	(1.46)
Observations	1448	1448	1448	1448	1448	1448
Number of countries	108	108	108	108	108	108
Number of instruments	99	99	99	–	–	–
Sargan test (p-value)	0.3241	0.3086	0.2508	–	–	–
AB AR(2) (p-value)	0.4379	0.4099	0.4318	–	–	–

Notes: Dynamic panel data estimations correspond to system GMM and implemented using Stata xtdpdsys command. GDP growth is treated as endogenous. Fixed effects estimation controls for country fixed effects. Robust standard errors clustered by country are in parentheses

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 5 Overall institutional quality and effectiveness of macro-prudential indices

	(1)	(2)	(3)
Interaction variables	MPI	MPI-B	MPI-F
Government stability x index	1.076	4.559	−0.297
	(2.567)	(8.122)	(3.486)
Investment profile x index	1.288*	3.798	0.722
	(0.758)	(2.773)	(1.053)
Law and order x index	1.413	5.276	0.495
	(0.960)	(3.603)	(1.157)
Democratic accountability x index	0.999	2.793	0.919
	(0.700)	(2.188)	(0.798)
Bureaucratic quality x index	1.352*	4.487*	1.029
	(0.798)	(2.674)	(1.036)

Notes: Dynamic panel data estimations correspond to system GMM and implemented using Stata xtdpdsys command. Robust standard errors clustered by country are in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

effectiveness of macro-prudential tools. To measure the institutional quality, we consider the International Country Risk Guide (ICRG) political risk measures. From the wide selection of ICRG, we only consider the institutional measures that may be economically relevant. These indicators are (i) government stability index, which is a score given to the government's power to implement declared programs; (ii) investment profile index, which is based on an assessment of political, economic, and financial factors affecting the risk to investment; (iii) law and order index, which reflects the soundness and impartiality of the legislative system; (iv) democratic accountability index which measures the responsiveness of government to its citizens; (v) bureaucratic quality index, that quantifies the independence of bureaucracy from political pressures. Table 5 reports the coefficients of interaction variables. We find that interactions with the institutional indicators do not show up significantly for any subgroups of macro-prudential policies, with the exception of bureaucratic quality. Overall, we interpret this result as follows: the improvement of effectiveness with better institutions is offset by the development of better institutions.

3.3 Business Environment

The effectiveness of macro-prudential instruments can also be related to the general business environment. Doing Business Dataset from the World Bank provides measures to quantify ease of doing business, depth of credit information, and contract enforcement. Our results related to the business environment are reported in Table 6. Coefficients of interactions are documented to analyze the influence of business environment conditions on the effectiveness of macro-prudential tools. Our findings suggest that overall macro-prudential policy effectiveness seems to be partially weakened by these conditions, especially for borrower-based measures.

Table 6 Business environment and effectiveness of macro-prudential indices

	(1)	(2)	(3)
Interaction variables	MPI	MPI-B	MPI-F
Ease of doing business x index	0.205***	0.694***	0.121
	(0.074)	(0.248)	(0.075)
Credit information depth x index	0.879*	1.951	0.752
	(0.477)	(1.825)	(0.461)
Contract enforcement cost x index	−0.063	−0.457	−0.057
	(0.066)	(0.288)	(0.060)

Notes: Dynamic panel data estimation corresponds to system GMM and implemented using Stata xtdpdsys command. Robust standard errors clustered by country are in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

The degree to what extent the regulations are supportive of new business operates in favor of the credit growth and obstructs the channels through macro-prudential instruments works. This effect is more pronounced for borrower-based instruments. Availability and quality of credit information are significant only for the overall index, providing limited evidence that credit information depth is less crucial. On the other hand, the coefficient of contract enforcement cost is negative, implying that the quality and efficiency of judicial processes on resolving a commercial dispute potentially strengthen macro-prudential measures on controlling the credit growth; however, it is not found to be statistically significant.

3.4 Financial Structure

If the government-owned banks work in tandem with supervisory agencies to curb excessive credit growth, one can expect to observe more effective macro-prudential policies. Similarly, a higher concentration in the banking sector might make enforcement in policy implementation easier. Thus, the structure of the financial sector is also a factor to consider when evaluating the effectiveness of policy tools. Considering the structure of the financial sector (Table 7), we consider the banking sector concentration, the shares of government-owned banks, and foreign banks in the banking sector. However, we provide no supporting evidence in this direction. Coefficients of the interaction terms are not statistically significant and are relatively small in magnitude.

3.5 Banking Sector Regulations

Considering the influence of banking sector regulations on macro-prudential policy effectiveness, we use six measures to describe the regulatory framework from Barth et al. (2006). The measure for activity restrictions indicates whether banks can

Table 7 Banking sector structure and effectiveness of macro-prudential indices

	(1)	(2)	(3)
Interaction variables	MPI	MPI-B	MPI-F
Government banks x index	−0.069	−0.096	−0.062
	(0.045)	(0.087)	(0.049)
Foreign banks x index	0.023	0.127	−0.011
	(0.028)	(0.079)	(0.031)
Bank concentration x index	0.003	0.154	−0.016
	(0.036)	(0.118)	(0.038)

Notes: Dynamic panel data estimations correspond to system GMM and implemented using Stata xtdpdsys command. Robust standard errors clustered by country are in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 8 Regulations and the effectiveness of macro-prudential indices

	(1)	(2)	(3)
Interaction variables	MPI	MPI-B	MPI-F
Activity restrictions x index	−0.915*	−1.495	−1.126*
	(0.520)	(1.146)	(0.596)
Bank entry requirements x index	−2.110**	−0.492	−2.775**
	(0.980)	(2.638)	(1.153)
Capital regulations x index	−0.796	−1.141	−1.293
	(1.828)	(5.027)	(2.283)
Supervisory power x index	−0.624	−0.064	−1.071
	(1.546)	(3.671)	(2.029)
Deposit insurer power x index	−2.536*	−2.538***	−2.992*
	(1.539)	(0.946)	(1.634)
Deposit insurance funds x index	5.763	9.191	7.602
	(5.558)	(54.945)	(6.011)

Notes: Dynamic panel data estimations correspond to system GMM and implemented using Stata xtdpdsys command. Robust standard errors clustered by country are in parentheses
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

involve in insurance and capital market-related transactions. This measure also includes information on real sector activities. Entry into banking measure summarizes the strength of limitations on obtaining new bank licenses. Capital regulatory index relates to whether certain risk elements are considered for calculating the necessary capital requirements. Supervisory power stands for whether the authority is allowed to take specific actions to counteract financial stability problems. Deposit insurer power indicates the ability to intervene when necessary. We also consider the size of the deposit insurance fund.

We present the results on the banking regulations in Table 8. For most of the variables considered, the estimated coefficients have the expected negative sign with the only exception of deposit insurance funds. Our results show that macroprudential policies are more effective when activity restrictions are higher, entry into the banking sector is more tightly regulated, and the deposit insurance authority is

equipped with more power to intervene. This result extends to financial institution-based measures as well. Relative to the variables analyzed in previous subsections, the magnitudes of the coefficients indicate a more pronounced effect. We conclude that more regulated banking sectors increase the effectiveness of prudential tools.

4 Concluding Remarks

There is a well-established literature on analyzing the effectiveness of macro-prudential policy actions on controlling credit growth to prevent the build-up of systemic risk. Yet, how macroprudential policy effectiveness relies on country characteristics remains an open question. This chapter assesses whether the power of macroprudential policies is amplified through better institutions, deeper financial structure, and tighter banking regulations.

We document that some underlying factors indicating sophistication and depth of financial system repress the effectiveness of macroprudential policies. For example, some evidence shows that business environment conditions that are supportive of new business in favor of credit growth and impedes the channels through macro-prudential instruments works. Our results provide strong evidence on the importance of banking regulations. We show that tighter banking sector regulations are associated with more effective macro-prudential policies. Restrictions in the regulatory framework complement the macroprudential policy implementation.

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Financial Liberalization, Economic Growth, and Capital Flight: The Case of Pakistan Economy

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1 Introduction

The McKinnon-Shaw hypothesizes that suppressive financial market regulations distort savers and investors incentives. Thus, financial deregulation and liberalization is a policy prescription for economic growth and development in a country. Historically, the early era after independence in 1947 was quite deterministic of its economic policy. Different financial and economic institutions were developed during that period, for instance, central bank, i.e., State Bank of Pakistan and Central Planning Board. In 1958, President General Ayub Khan initiated financial liberalization and also inculcated it in the 1962 constitution. He introduced economic freedom as a state policy. Besides, the economic fruit of financial liberalization, a public debate emerged and politicized the whole process regarding the inequitable distribution of wealth, income, and concentration of economic power in few hands. In policy circles, the talk was on forty big industrial groups in the country, who owned nearly half of the national industrial assets. Interestingly, the concentration was not only in industrial assets, rather eight out of nine major commercial banks control were also in the hands of such industrial state. The country's economic wizard at the time Dr. Mahbub ul Haq, the chief economist of the Planning Commission of Pakistan confirmed the little benefit of national industrial largesse

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on a common man life. He coined the term of twenty-two industrial families which then made a huge politico-economic impact on Pakistani society. Dr. Mehboob Ul Haq suggested state intervention essential in such economic conditions to correct the situation created by the liberalization policy of Ayyub government.

The post-1971 cessation war of Pakistan's eastern wing put the country on a difficult economic trajectory, which led to Bhutto's populist economic policy of nationalization program. The program nationalized major private national economic assets. Resultantly, in the aftermath of the nationalization program, government investments grew under the five years plan and resulted in the public sector expansion. The policy curbed a liberalized private sector investment. In 1977, the military government of General Zia again took over, ousting pro-socialist Bhutto's government. He initiated two-pronged economic policies including liberalization, and Islamization of economy. General Zia's government policy led to industrial liberalization but financial sector remained in the government ambit. This policy resulted in the private sector expansion to the extent of 44% in 1989. Zia promoted liberalization under the flag of Islamization. Economic liberalization policy was the major pillar of Nawaz Sharif's government economic policy in 1990s. He promoted privatization, deregulation, and liberalization policies keeping in view the experiences of Asian Tigers Malaysia, Korea, Japan, etc. The policy promoted foreign investment, liberalization of foreign exchange, and credit subsidies were cut down to a larger extent, although, the weaker macroeconomic conditions limit the benefits of economic liberalization to the national economy. Pakistan's strategic geographic location created many problems for the national economy. For instance, the US Pressler amendment badly affected economic conditions in Pakistan and the liberalization of economy. The amendment slowed down economic freedom during 1993–1997. Government policy to adjust macroeconomic indicators failed to deliver and led to the era of high unemployment and deterioration of foreign exchange position during 1995, which resulted in the ouster of Benazir Bhutto government. The succeeding Nawaz Sharif government again relaunched aggressive privatization of the economic assets. In the aftermath of 1997, private sector grew while the public sector shrank to a level. Furthermore, due to the geostrategic situation in the region, Pakistan responded to Indian nuclear tests by conducting five such detonations. It invited international embargos; and consequently ouster of Nawaz government. The Shaukat Aziz government in 2000 continued with the liberalization program and privatized major SOEs, etc. The Aziz economic policies produced highest economic growth in terms of GDP up to 9 percent. Regardless of the liberal policies in successive governments, capital mobility remained restricted during these eras.

In Pakistan, capital flight became a political flashpoint after the famous Panama papers in 2016 revealing 11.5 million documents and information about 150 politicians in fifty countries. Although, ownership and mobility are every citizen's right to their legally obtained capital. In many cases, the Panama leak was taken in a wrong direction whereas the legitimate offshore account should not be a matter of question. The presence of 200 names of Pakistanis created political ripples. Although, such generalization of massive funds outflow is not corruption or crime. Pakistan has a tight controlled regime for its citizen's foreign currency bank accounts ownership

Table 1 Pakistan's score

Categories	Score
Size of the Government	7.02 (10)
Legal Systems and Property Rights	3.63 (10)
Sound Money	6.67 (10)
Freedom to Trade Internationally	5.85(10)
Regulation	6.36 (10)

and capital control; besides, operating foreign currency account outside the country is also limited. This might be the result of the government's intention to discourage the flight of capital from Pakistan. Although, there are news on a daily basis of illegal capital flow from Pakistan mainly to Dubai. Pakistanis have invested hugely in Dubai's real estate business amounting to over 4 US billion $ tantamount to the Panama case. The existing regulations negatively affect Pakistani firms; for instance, containing acquisition of abroad assets unless allowed by the Economic Coordination Committee of the cabinet, which has dampened globalization of Pakistani businesses through international acquisition of assets.

This chapter will assess the foreign capital flight in the context of financial liberalization between 1972 and 2015 and its association with economic growth. The chapter will overview the evolution of Pakistan's exchange and trade control regimes during different phases. The chapter will offer specific policy recommendations based on these findings.

2 Overview of Economic Freedom in Pakistan

Canada's Fraser Institute publishes the "Economic Freedom of the World (EFW)" Index every year, ranking the countries according to the developments occurring in selected areas. There are five major areas, namely "Size of the Government," "Legal Systems and Property Rights," "Sound Money," "Freedom to Trade Internationally," and "Regulation." Within these five major categories are 24 subcategories, which contain further subcategories. The final ranking bifurcates countries in four quartiles, from "Most Free" to "Least Free." Suffice to say, EFW evaluation gauges how free are the citizens of a country in terms of carrying out mutually beneficial economic transactions, and overall, how free is a country's economy. In short, Pakistan does not fare well in terms of economic freedom. According to the latest available rankings (2019) based on the 2017 data, Pakistan ranks a lowly 136 out of the 162 countries evaluated in the report.[1] It is categorized as "least free." Pakistan's score on the five major categories is reflected in Table 1.

As can be gauged from Table 1, Pakistan fares particularly poorly in terms of "Legal Systems and Property Rights," which is not a surprise for anybody even

[1] "Economic Freedom Index 2019."

Table 2 Pending cases in Pakistani courts

Institution	Pending cases
Supreme Court of Pakistan	41,239
Federal Shariat Court	191
Lahore High Court	169,887
High Court of Sindh	87,292
Peshawar High Court	32,060
High Court of Balochistan	5877
Islamabad High Court	16,075
District Judiciary, Punjab	1,078,188
District Judiciary, Sindh	105,558
District Judiciary, KPK	201,174
District Judiciary, Balochistan	13,395
District Judiciary, Islamabad	38,265
Total	1,789,201

slightly acquainted with Pakistan's legal system and the abysmal state of its property rights. Whether related to physical property or intellectual property, property rights need a robust legal system for protection. It is well established that secure property rights are a must for quality life and economic growth. Hernando De Soto's groundbreaking work[2] (2001) in this regard demonstrated this aspect even more succinctly. Yet, the situation on this front remains abysmal, if not outright terrible. Laws for protecting intellectual property rights are mostly limited to papers only. Cases pertaining to physical property's possession and its use remain stuck in court for generations without any resolution. This means that the physical property cannot be used for a mutually beneficial economic transaction, thus reflecting what De Soto (2000) termed as "dead capital." Its non-use, in turn, connotes a financial loss to its owner and the economy as a whole. Just to understand the gravity of this issue in Pakistan, it is perhaps pertinent to mention that in one particular case related to property ownership, a final decision was made in 2018 after remaining for 100 years in the different courts of Pakistan.[3]

The overall picture of the efficiency of the legal system remains even more abysmal, reflected in Table 2, which gives the number of pending cases in various Pakistani courts as of end-August 2019.[4] With 1.7 million cases pending in the courts, with a substantial portion in terms of cases that have been pending for a considerable time, it is quite apparent that Pakistan has a legal system that fails to provide the required legal cover that can protect economic freedom as well as propel economic activity. A similar picture of inefficiency is reflected in other indicators. When we consider the size of the government as an indicator, there are no two views that Pakistan's state apparatus at every level (federal, provincial, and district) is

[2]"The Mystery of Capital."

[3]"Justice delivered? Supreme Court passes ruling on 100 year old case."

[4]Data obtained from Law & Justice Commission of Pakistan.

predatory and extractive in its nature and functioning.[5] The taxation system of Pakistan is perhaps an apt indicator of this reality, with an estimated 37 government agencies administering and collecting 70 different types of taxes.[6] It is almost incomprehensible that a conducive business environment can be created with such a large number of taxes, administered by a government apparatus beset with inefficiencies and corruption (Bukhari, 2019).

One outcome of this can be seen in large government footprint in the economic affairs, which tend to retard the process of open and beneficial exchange. The major portion of Pakistan's economy (as measured by growth in GDP) comes from government expenditures, which is a sign of unproductive form of growth.[7] This dominant footprint of the government, though, comes at a substantial cost in various forms. One cost is reflected in the mismanagement of resources due to corrupt practices. For example, the Federal Audit report for the Fiscal Year 2015–2016 estimated mismanagement/corruption in Public Sector Entities (PSEs) to the tune of Rs. 852 billion.[8] Similarly, $18 billion or more are reported under corrupt government procurement practices that have an estimated size of $60 billion per year.[9] Thus, the large size of the government results in allocative inefficiencies of capital besides harming the chances of mutually beneficial economic transactions that can spur sustained economic growth. Empirical studies have born out over time.[10] Yet, Pakistan's government keeps expanding at the expense of domestic economic liberties. Other indicators, besides the above two, show a similarly dismal picture. When it comes to "sound money,"[11] it is hard to justify Pakistan's currency as constituting sound money. Inflation by now has galloped to more than 10 percent in 2019, spurred by multiple raises in utilities prices that have given vent to inflationary momentum in almost all items of use. The domestic currency has seen a precipitous decline in its value against other currencies, something that is expected to persist in the coming years. When it comes to opening foreign currency accounts, the atmosphere is such that foreign currency accounts are now one of the most suspicious items in lexicon of federal investigation and tax agencies. This is especially excruciating for traders who have to open foreign currency accounts for carrying cross-border, external trade.

Closely linked to this issue is the criterion of "freedom to trade internationally." Again, if one were to go through the various criteria of this indicator, Pakistan does

[5]"The long remonstrance: Pakistan's receding writ of the state in light of federal law and order commission report of 1993."

[6]"Tax reforms with borrowed funds."

[7]See, for example, various Annual reports of the State Bank of Pakistan (SBP).

[8]"Rs. 852 billion corruption in public sector entities exposed."

[9]"$60 billion"

[10]For example, see "An analysis of the impact of the government size on economic growth of Pakistan: An endogenous growth."

[11]Sub-components of sound money include money growth, freedom to hold foreign currency accounts, inflation and deviation from inflation.

not find itself in a good position. They have been elevated markedly in order to lower the quantum of imports, directly and indirectly affecting the quality of life of domestic residents. And if we come to "regulation," it would suffice to say that Pakistan's economy is a highly regulated, an indirect outcome of the large footprint of government in economic affairs.

3 Linkages of Economic Growth to Economic Freedom

When Adam Smith wrote his magnum opus, The Wealth of Nations (1776), it was a time when nation-states in Europe were gradually rising to the realization that two centuries of mercantilist[12] policies had perverse outcomes for the economy. Smith was the first, and foremost, among a small array of writers who advocated a more liberal approach toward economic management. In one of the celebrated passages of his book, he opined that in order to enhance economic growth and make a nation wealthy, little else is required than easy taxation and tolerable administration of justice. Both of these are directly and indirectly linked with the freedom to engage in economic and financial transactions, and provision of a legal cover to protect people's liberties in their quest to enhance their wellbeing through free, mutually beneficial exchange. Smith's maxim, it appears, has stood the test of time very well. By now, there is ample evidence (anecdotal and institutional research) to suggest that economic freedom and economic growth are positively correlated with each other. The literature supporting this notion is vast. For this chapter, it would suffice to give few examples.

Julio Cole (2003) studied the robustness of this conjecture through estimates based on long-term data.[13] Despite tweaking the methodology as per his criticism of traditional economic freedom index and running the new one on different models of economic growth, he still concluded that there indeed existed a strong link between economic freedom and economic growth. Campbell and Rogers (2007) looked at the instance of business formation in the context of economic freedom and found that net business formation has a positive relation with economic freedom.[14] Carlsson and Lundstrom (2002) decomposed the economic freedom index into smaller measures in order to find out whether the decomposition and addition of few more measurement variables can challenge the notion of economic freedom being important to economic growth. Despite introducing of new variables in measurement and decomposing the measurement variables into smaller segments, they still found a robust relationship between economic freedom and economic growth.[15] De Haan and

[12]Mercantilism, as an economic policy, had large government economic footprint and advocated heavy regulation of economic activity, especially commercial and financial aspects of the economy.

[13]"The contribution of economic freedom to world economic growth, 1980–1999."

[14]"Economic freedom and net business formation."

[15]"Economic freedom and growth: decomposing the effects."

Sturm (2000) compared various economic freedom indicators in order to gauge whether the results are the same or differ sizeable according to the methodology used. Their research concluded that no matter which indicator is used, economic freedom does foster economic growth.[16]

Similarly, Hernando De Soto's excellent work on property rights was mentioned in the lines stated above. In one of his written pieces (2001),[17] he and his colleagues estimated $9.3 trillion of "dead capital" around the globe. It probably would not have been the case if Smith's advice of tolerable justice dispensation had been followed, accompanied by facilitation of such institutional mechanisms that would have ensured disposal of this dead capital in economic transactions. In essence, it appears that despite different freedom indices serving as measures of economic freedom, there is sufficient evidence to prove that economic freedom does matter for economic growth.

4 The Political Economy of Financial Liberalization

The antecedents of modern financial system and financial liberalization can be traced back to the late nineteenth and early twentieth centuries. The decisions are taken then had a notable impact upon various economic variables (like flow of finances and income generation within economies). It would, thus, be of interest to briefly go through the political economy behind these decisions since it can not only give us a glimpse into what propelled financial policies at that time, but also guide us toward the important components of this debate that may shape future policies, both around the globe and in Pakistan. The time between 1870 and 1914, is known as the first era of globalization, saw relatively free movement of capital and financial resources across the borders. In 1919, when the end of WWI and its aftermath had brought about the end of the era of free capital movements, John Maynard Keynes (1919) reminisced about the time when an "unsuspecting" Londoner would decide where in the globe to venture his finances without the need for being physically present, while sharing the fruits of his investments. Perhaps more importantly, Keynes stated that he would have been much aggrieved at the slightest interference, reflecting that pre-war era was one of unfettered financial movements across borders.[18] It was perhaps a sign of times and changing mood toward unfettered global financial movements that the same Keynes supported restrictions upon such flows in his seminal work (1936),[19] in the aftermath of the Great Depression in 1929. A 1938

[16] "On the relationship between economic growth and economic freedom."

[17] "The Mystery of Capital," Finance and Development, IMF.

[18] "Globalization of Finance: A historical view," p. 134.

[19] "The General theory of employment, interest and money." Keynes advocated finances to remain "national" rather than global.

study carried out under the aegis of the League of Nations tried to gauge financial integration and openness among nations by grouping countries into three specific groups (Obstfeld and Taylor, 2004).[20] It concluded that financial openness and integration were indeed the highest before WWI but saw a significant decline after that. Even the advent of Bretton Woods and its end, heralding in a time of independent central banks pursuing policies without pegs, could not reverse this trend with studies suggesting that capital mobility has never attained on a *de jure* basis, levels seen before WWI.[21]

What were the factors that became the basis of the above-described developments? The growth and ebb in capital flows and financial integration are closely interlinked with the debate surrounding *capital controls*. The main arguments in the debate upon capital controls are the *political economy* and the *second-best* arguments. It is the political economy argument that is of interest to us for this research effort. In terms of political economy of financial liberalization, one can use Quinn and Inclan's (1997)[22] distinction between "Partisan Effects" and "Macro Policy Effects." Partisan effects analyze the reaction of various groups within a country to financial openness, particularly if they feel that such an integration would end up hurting their financial prospects or their hold upon a certain trade (a monopoly or an oligopoly). These effects extend the Stopler-Samuelson theorem of international trade, which discusses the possible implications of flow of unfettered cross-border homogenous resources on relative prices in home country. Put another way, this effect gauges the distributional consequences of financial integration using the Stopler-Samuelson theorem. Such effects directly interact with the structure of the economy. In contrast, macro policy effects relate to distributional implications of a government's policy on different groups rather than direct interaction with structure of the economy and any change in it. For example, Alesina and Tabellini (1989) presented a model[23] where two major groups of the economy (workers and capitalists) compete in terms of resource extraction and lessening the tax burden upon their group. The basis of this competition is consumption smoothing and resource optimization. Other models also discuss the implications and methodology along the same lines. In Pakistan's context, its economic history is rife with controversies over who is benefitting from the economic policies of successive governments. Put another way, the implications of Alesina and Tabellini's model, and macro effects aspect, fits Pakistan pretty well. The financial repression of the 1950s and the 1970s (through state-administered rates and nationalization of financial institutions, respectively) were carried out mainly under the pretext of wealth concentration in a small group of businessmen/industrialists, and to direct capital toward politically favored industries. In contrast, a major portion of 1960s and 1990s were devoted to deregulation policies. The context was the urge to foster private wealth accumulation and

[20] "Global capital markets: integration, crisis, and growth."

[21] "The political economy of global financial liberalization in historic perspective," p. 5.

[22] "The origins of financial openness: A study of current and capital account liberalization."

[23] "External debt, capital flight, and political risk."

enhanced domestic investment by the private sector. From the 1990s onward, though, there seems to have been a consensus among policymakers that a comparatively liberal financial regime is the preferred route, with interventions taking place through managed fiscal and monetary policies ("managed" exchange rate). There is, no shortage of critics of such policies who believe that they are exploitative in nature. For example, former State Bank of Pakistan (SBP) governor Dr. Yaqub Khan strongly criticized non-public, liberalized banking system since he believed it adversely affects small level savers and depositors (Khan, 1999).[24] A particular area of concern for such critics has been the wide disparity between what savers/depositors get in return and what banks earn by investing the same money in high-yielding, less risky investments like government treasuries (this difference is termed as the "spread"), a situation that has been prevalent since the deregulation/de-nationalization drive of the early 1990s. Such an adverse distribution of gains, critics argue, has negative implications for the society, with major chunk of gains accruing to the financial elite who constitute a minute group of Pakistan's overall population.[25]

The question of who gained or who lost through pursuing a comparatively liberalized financial policy is still a matter of debate and research, with opinions divided on the efficacy of pursuing such a policy in Pakistan. But there is unanimous agreement among researchers and analysts that whichever policy a particular government follows in this regard, it is ultimately based primarily on political motives rather than purely cost-benefit considerations.

5 Evolution of Pakistan's Exchange and Trade Controls

The history of Pakistan's exchange and trade controls is lit with innumerable policy changes and frequent "adjustments" made specifically to address the deficits in its Current Account (CA). Some of the distinct characteristics of the policies pursued since independence are:

(a) Managed exchange rate policies which are driven mainly by CA and export promotion considerations rather than open market valuation. Till the 1970s, a "Foreign Exchange Committee" of Finance division called the shots in this regard, until the advent of a more independent Central bank that has been closely coordinating with the government to determine exchange rates.
(b) Resorting frequently to tariff and nontariff barriers to compress imports as trade deficits widened. Till the 1960s, at least, the favored go-to policy was import licensing. Since then, the policy to limit imports mainly revolves around "import compression" through higher tariffs and other taxes on imports.

[24] "Dr. Yaqub says banking system exploitative, inefficient and corrupt."

[25] For example, see "The curious case of a bank CEOs salary."

(c) Incentivizing exports through publicly financed subsidies. The quantum of subsidies has varied over time but has largely been directed toward textiles sector, which has maintained its position as the largest component of Pakistan's exports.
(d) The use of both tariff and nontariff barriers to shield the domestic industry from competition. It started with the "infant industry" argument but has carried on ever since.
(e) Government relied on government controlled domestic commerce rather than commerce based on market-based, free transactions with limited government interference.

In short, cumulatively, these policies are thought to have caused more damage than impart advantages upon Pakistan's economy. For example, provinces still cannot price their natural resources on market rates despite the passage of the 18th Amendment which gives provinces more autonomy. The prices of natural resources are still centrally controlled, which has led to some provinces like Balochistan being denied trillions of rupees (Bengali, 2018).[26] Similarly, the infant industry argument has been exploited mercilessly by local industrialists to preserve their monopolistic hold on sectors and stave off competition. From 1947 to 1951–52, trade and exchange policies were comparatively liberalized as Pakistan enjoyed surplus CA, mainly driven by high demand for cotton due to Korean War. But as the war ended and demand fell drastically leading to CA deficits, policy for the remaining decade changed completely. The fifties were marked by stringent "direct" controls on trade and exchange rates. The main purpose was to limit imports as much as possible while encouraging exports through a devalued rupee, a policy that seems to find wide favor among Pakistani policymakers over time (continuing to the present). Imports were strictly regulated through licenses, and so were new investments in industrial sectors. Capital was incentivized to be diverted to selected industries. As per government's assessment such a policy may contribute to a rise in exports. Even within the country, government would resort to strict price controls on domestically produced goods, akin to an indirect intervention in domestic commerce. Later studies and analyses looked upon these as inefficient methods of running economic management.[27]

The stringent trade and exchange rate controls were deregulated to a large extent in the Ayub Khan era, which many terms the "golden growth era" of Pakistan. Price controls and restrictions on profit margins were largely done away, and a liberal trade regime was followed with fewer restrictions upon imports. However, an overvalued exchange rate was maintained through government intervention, ostensibly to help

[26]Dr. Kaiser Bengali, former advisor NFC to government of Baluchistan, has estimated that from 1955 to 2014, Baluchistan had to bear cost equaling Rs 7.69 trillion under centrally administered subsidy schemes despite the fact that it provided major portion of natural gas to the whole country until at least mid-1990s. Its pertinent to mention that Baluchistan got its first natural gas connection in 1982. See "A cry for justice: Empirical insights from Baluchistan."

[27]"The management of Pakistan's economy: 1947–1982."

importers import latest capital equipment (like machinery and raw material). Import licensing was abolished, and by 1964, quite a few items could be imported without government permission. There was a marked pro-industrial bias as there were low interest loans, tax concessions such as tax holidays and accelerated depreciation allowances. Studies (for example, Janjua, 2007) that look at post-1971 instances of exchange and trade controls[28] normally assume four distinct phases in this regard, which are as follows.

5.1 Phase I (1972–1981): Fixed Exchange Rate Regime and Partial Lifting of Trade Controls

Pakistan adopted a fixed exchange rate policy during this period. Pakistani currency was devalued by 56 percent in 1972, followed by an 11 percent appreciation in 1973. This fixed exchange rate policy was maintained till 1982. Capital and current accounts remained substantially restricted during this phase. While the currency was devalued, trade control system was revived mainly on the recommendations of the International Monetary Fund (IMF). The export bonus scheme was abolished along with all kinds of export subsidies except for tax rebates and export financing. Tariffs were reduced on intermediate and capital goods. In addition to these, the import licensing system was also simplified.

5.2 Phase II (1982–1998): Managed Floating Exchange Rate and Liberalization Initiatives

The government adopted a managed floating exchange rate in 1982 and linked the currency to a basket of 16 currencies (major trading partners). The currency value started declining since then. In 1991, some new measures to reform the exchange and payments system were introduced that include: (i) resident Pakistanis were allowed to maintain foreign currency accounts like nonresidents; (ii) restrictions on holding of foreign currency and on foreign exchange allowances for travel were removed; and (iii) rules governing private sector's foreign borrowing were liberalized. During this phase, import tariffs were significantly reduced from 350 percent in 1982 to 45 percent in 1998. Import licensing was eliminated with a few exceptions, and nontariff barriers were reduced considerably. New export promotion measures were also introduced regarding bonded warehousing and export credit, textile export quotas, quality control, marketing, and training of skilled manpower.

[28]"Pakistan's external trade: Does exchange rate misalignment matter for Pakistan?" and "Perspectives on Pakistan's trade and development."

5.3 Phase III (July 1998–July 2000): Multiple Exchange Rate and Dirty Float Regimes

This phase was marked with political instability leading to erosion of the private sector's confidence. Whatever liberalization achieved on current and capital accounts in the earlier periods was virtually reversed. The system of multiple exchange rates was adopted, consisting of an official rate (pegged to US dollar), a floating inter-bank rate (FIBR), and a composite rate (combining official and FIBR rates). From 1999 to 2000, dirty floating exchange rate was adopted, and MER system was removed. Despite economic and political problems, Pakistan managed to continue with market-based reforms, including liberal policies for imports and foreign investment.

5.4 Phase IV (July 2000–2009): Flexible Exchange Rate Regime and Trade Liberalization

Since 2000, Pakistan is following a flexible exchange rate regime with minimal FX control and restrictions. Central bank's role in this exchange rate regime was limited to the extent of preventing excessive fluctuations in exchange rate. Tariff rates were reduced across the board, direct state interventions and quantitative restrictions were largely reduced. Between 2003 and 2007, the maximum tariff rate was 25 percent. However, due to rising trade deficit, the maximum tariff was raised to 35 percent since 2008. Quantitative restrictions and other direct state interventions into trade along with Statutory Regulatory Orders (SROs), previously used to discriminate firms and industries were drastically reduced, thus making the trade regime fairly simple. Rapid Export Growth Strategy (REGS), introduced in 2005, was aimed to reduce the cost of doing business in Pakistan, upgrade skills and technology, comply with social and environmental concerns, encourage and strengthen trade promotion bodies, higher value-added exports, and export market diversification.

6 The Aftermath of Nationalization Policy of Bhutto Era

When the Pakistan Peoples Party (PPP) assumed power in December 1971 after the country's dismemberment into eastern and western parts, it embarked on a massive nationalization in all spheres of the economy that was to have a lasting repercussion upon Pakistan's economic trajectory. The large-scale drive to nationalize economic assets owed to the firmly held impression of 22 families having the major portion of

Pakistan's wealth within their grasp.[29] The PPs answer to address this monopolistic hold, redistribute wealth and carry out management according to their belief in "Islamic-Socialism" was to carry out wholesale nationalization under the "Nationalization and Economic Reforms Order" (NERO). It began with nationalization of 31 industrial units, predominantly the capital and intermediate goods industry. In this second phase of nationalization, 13 major banks, more than a dozen insurance companies, two petroleum companies, and ten shipping companies were nationalized. The third, and the last phase, culminated in the nationalization of over 2000 cotton, ginning, and rice husking units. Moreover, to expand such a massive nationalization effort, the public sector saw substantial expansion in scope and employment. There are no two views in terms of the nationalization program proving to be a disaster for a long time to come. The only difference of opinion remains upon the severity of the negative effects! As early as 1973, the US government had recognized the negative repercussions of such a program by pointing out lack of private investment and initiatives for the private sector, rising food grain prices (partly due to higher support prices), increasing budgetary deficits (resulting in negative savings), substantial rise in nondevelopment spending, and rising foreign debt obligations.[30] Most of Pakistan's major investors, especially in the industrial sector, did not invest again in Pakistan for a very long time.[31] Amjad and Ahmed (1984), while critically assessing the economic performance under Bhutto, observed that socioeconomic programs were overambitious plus costly for the country to afford, notable failures in the industrial and agricultural sectors, failure to generate additional employment, failure of agricultural sector to perform despite massive government help, stagflation (high inflation and higher unemployment), and long-gestation programs, etc.[32]

Even if looked in terms of a longer time horizon to judge the fallout from nationalization policies, there is no doubt that the said policy left a legacy of unending economic problems. Arguably the most well documented of these is the burden to Public Sector Entities (PSEs) on Pakistan's economy. Heavily overstaffed, under substantial debt burden and unionized, the governments after 1977 have failed in convincing the private sector to buy these entities. A clear reflection of their burden upon Pakistan comes in the form of their total debt (domestic plus external). By September 30th, 2019, the end of first quarter of 2019, the domestic debt of PSEs stood at approximately Rs. 1.4 trillion, and external debt stood at approximately $

[29]This concept of 22 families controlling Pakistan's wealth was made famous by Dr. Mahbub ul Haq in his capacity as Chief Economist of the Planning Commission, in 1968. As per his calculation, these 22 families controlled 66 percent of the industry and 87 percent of country's banking and insurance industry. See, for example, "People who own greatest amount of wealth."

[30]"Pakistan: The economy under Bhutto." The list of 31 key industries nationalized during this time is given, plus the experiences of some major investor are recounted.

[31]"Impact of nationalization on Pakistan's economic development."

[32]"The management of Pakistan's economy: 1947–1982," p. 98.

3.9 billion.[33] Zahoor and Asif[34] (2018) lamented nationalization policy under Bhutto, terming it "Fabian socialist reforms" which made the economic structure a bureaucratic quagmire. Rammal (2008) studied[35] of Pakistan's nationalized banks under the Bhutto regime, and found that the decision was based purely on political grounds. The banking sector's inefficiencies kept increasing until the 1990s, when majority of them were finally privatized under Nawaz Sharif's government. Ahmad and Hussain (2012), in their study carried out on the industrial policies of various governments,[36] opined that nationalization along with policies of other governments (like higher tariffs to discourage imports and protect local industries) have led to a gradual decline of Pakistan's industry but also its non-competitiveness over time. Similarly, Ali and Malik (2009) opined that the confidence lost by businessmen due to nationalization has never managed to return to Pakistan's economy.[37] It can be safely concluded that majority of the research, if not all, shows that nationalization under Bhutto has negative repercussions that still reverberate in one form or another through the economic sphere.

7 Globalization of Pakistani Business Firms and Its Impediments

Globalization is a multifaceted phenomenon where some people focus on its economic and political impacts while others are concerned with the globalization's social and cultural footprints. This chapter will focus on the economic aspect of the globalization on businesses in Pakistan. Economic globalization can be defined as "unity of market, labor, production market, money and capital." Economic globalization has helped countries expand their market size in the form of export and foreign capital accumulation, which aids development. It provides competition within the industry which results in a variety of products at lower prices and an improved standard of living. Like many developing countries, Pakistan liberalized its economy in realization of the fact that globalization is imperative to growth as Late Dr. Mahbub-ul-Haq has rightly said that "Globalization is no longer an option, it is a fact. Developing countries have either to learn to manage it far more skillfully, or simply drown in the global cross currents."[38] Globalization in Pakistan did not bear the same fruits as some fast globalizers like India and China. The anti-capitalist sentiments and propaganda over the past few years had highlighted the possible negative aspects of globalization (that these gains will only benefit the rich

[33]Figures taken from State Bank of Pakistan (SBP).

[34]"Political and economic dimensions of nationalization of industries under Zulfikar Ali Bhutto."

[35]"Political motivations: The nationalization of the Pakistani banking sector."

[36]"Experiments with industrial policy: The case of Pakistan."

[37]"The political economy of Industrial development in Pakistan: A long-term perspective."

[38]"Corporate Globalization and Challenges for Pakistani Companies."

and MNCs) (Husain, 2001).[39] Moreover, Pakistan's manufacturing and export units, have not kept pace with that of the rest of the world. However, there is a lot of untapped potential and opportunities toward globalization for Pakistani businesses. A brief account of the available opportunities is as follows:

Agriculture With the new WTO development rounds, subsidies and support for agricultural products are hopefully removed enabling Pakistan to capture a chunk of global commodity markets, especially in close proximity. Moreover, with the agricultural trade liberalization regime in Pakistan, tariffs and quantitative restrictions have also been removed to facilitate the trade of agricultural products.

Trade The recent reforms and market-determined exchange rate have facilitated competitive and efficient industries in which Pakistan has a comparative advantage. Except for a few items, the export of all goods is allowed. The gains from trade in services can be as huge as that of merchandise goods. The general agreement on trade in services has liberalized this sector and many developing countries have benefitted from this sector. Pakistan has not been able to take advantage of this dynamic sector as yet.

The challenges toward business globalization can be broadly classified into four categories:

Companies' Competitive Strength Competitive strengths or capacity building in all the functional areas of business enable companies to build competitive edges pertaining to technology, quality, cost, and control over operations. The firms operating and expanding globally need to transfer their human and financial capital abroad and build relationship with buyers and suppliers. The Pakistani companies that are expanding overseas go global on their own, i.e., on their learning and experience curve, technical and financial competencies, and international linkages and the capacity to meet the standards prevailing abroad. A very serious difficulty in global expansion of Pakistani firms has been a problem of low, uneven, and inconsistent quality of products. Although many firms have obtained ISO 9000 certification, yet many are still striving to achieve this quality standard.

Institutional Support Framework The public/private institutional support for technical and financial capacity building is vital for corporate globalization. This support originates from trade policy incentives of government pertaining to foreign trade. It provides enabling environment to companies with the potential of global expansion. Unfortunately, such support is non-existent from public bodies. Globally expanding companies and individual exporters are complainant of their long-awaited pending claims owing to volatile and unfriendly policies executed by the public sector. Pakistani market lacks highly competitive, strong, and efficient financial institutions which can take a lead in exports of their services resulting in negligence of a much dynamic sector of trade in services.

[39] "How is Pakistan Positioning Itself for Challenges of Globalization" and "Internationalization of SMEs in Pakistan: A brief theoretical overview of controlling factors."

Foreign Regulations Governing Businesses Foreign regulations governing businesses also influence such as Labor laws, environmental safety, consumer rights, fair trade practices, international codes like International Labor Organization (ILO), United Nations Conference on Trade and Development (UNCTAD), and Organization for Economic Cooperation and Development (OECD) for businesses.

Cultural/Social Perceptions The anti-capitalist sentiment, protests, and rhetoric in the past few years have helped focus on the negative aspects of globalization within Pakistan. On the international front intense competition, unknown culture and customer behavior, cost of marketing and business research, quality, hygiene, the perceived risks of failures, and changing environment.

8 Financial Liberalization and Economic Growth: Pakistan's Case

The case for financial liberalization to spur economic growth has gained momentum over the decades after various studies emphasized upon the openness of financial sector. In the nineteenth century, Walter Bagehot revolutionized the writings on financial sector and its role in the economy. His 1873 book[40] was arguably the first modern, complete description of the workings of the global financial sector, detailing the role of money markets in the global economy and the importance of this sector for the overall economic activity. Schumpeter (1934) and Joan Robinson (1952) are some of the well-known, early writers who wrote on the financial sector's effect on economic growth. Schumpeter, for example, thought that the role of financial intermediaries is of critical importance in economic growth since they help bridge the disconnect between savers and investors, thus enabling more loanable savings and hence increasing the likelihood of increased finances spurring economic growth. After WWII financial liberalization became an important aspect of studies on the effects of financial sector openness on economic growth. The basic argument underlying the push for financial transparency was the perceived increase in the productivity of capital that in turn affects aggregate economic outcomes. Like the famous Evsey-Domar model of economic growth, several models emphasized the critical role that savings play in the process of economic growth, something that Schumpeter had alluded to in his writings. It was argued that in an atmosphere where financial markets are repressed by too many regulations, the use and allocation of capital are less than productive. Moreover, such repression has negative repercussions for savings, financial intermediation, depth and growth of primary and secondary financial markets (financial deepening), etc.

There have been numerous studies on the various aspects of financial sector and financial liberalization on economic growth in Pakistan's case. These studies can be

[40]"Lombard Street: A description of the money market."

divided into studies that cover shorter and longer time spans. Suffice to say that the studies reach differing conclusions, based on the variables, aspects, criteria, and methodology used. Some of these are stated in the following lines. Khan and Qayyum (2007) undertook a study involving long-term data (1961–2005) on trade and financial sectors.[41] Although their results indicated a positive impact of trade and financial liberalization on economic growth, the effect of financial liberalization on economic growth in the short run was negative. Awan et al. (2010), instead of looking at the impact of financial liberalization upon different variables, tried to gauge the effects of changes in real interest rate on financial liberalization and other variables.[42] Their findings suggest that real interest rates positively correlate with financial liberalization in Pakistan, which in turn tends to have positive effects upon accumulation of savings. Munir et al. (2013) undertook empirical testing of the link between Pakistan's financial liberalization and economic growth. Using long-term data from 1972 to 2010, their research concluded a positive correlation between financial liberalization and economic growth.[43] They further contend that the low level of savings and economic growth rates till the early 1990s and later on were the result of restrictive financial liberalization policies pursued earlier. Samina Shabbir (2013) undertook a study of financial liberalization in Pakistan and its effects upon economic growth in Pakistan[44] using component analysis (Naveed and Mahmood, 2019). She bifurcated the impact by its domestic and external components, and found that both the domestic and the external components of financial liberalization (if measured *de jure*) have a positive impact upon economic growth in Pakistan.

9 Discussion and Recommendations

In light of the above-stated discussion, it would perhaps be safe to state that the link between financial liberalization and economic growth in Pakistan is still debated. However, a major portion of research points to positive links between the two. Especially controversial/debatable are the distributional issues surrounding financial liberalization, an aspect upon which there is scant quality research. It is argued that most of the studies in the context of financial liberalization and its related issues tend to miss a few important variables of consideration, which calls for tweaking future studies in a manner that covers these aspects so that a more nuanced, authentic picture on this issue could emerge. The first important variable/aspect that majority of these studies ignore is the issue of *Trust*. Put another way, Pakistan lacks

[41] "Trade, financial and growth nexus in Pakistan."

[42] "Rate of Interest, financial liberalization and domestic saving behavior in Pakistan."

[43] "Financial liberalization and economic growth in Pakistan: Empirical evidence from co-integration analyses."

[44] "Financial Liberalization and its impact on Economic Growth of Pakistan" and "Competitive environment in banking industry: Evidence from an emerging economy."

credibility in terms of its policies, which imparts a negative image upon the country, thus limiting chances of foreign investment coming in. And it is not just the foreign investment that is a victim of negative perceptions about the country, but domestic financial flows towards economic activities also become retarded. This aspect and its implications (both long-term and short-term) are yet to be appropriately analyzed through studies.

The examples are many, demonstrating credibility in terms of Pakistan's chances of attracting financial flows. There were, for example, long-term repercussions for Pakistan when it froze foreign currency accounts in the aftermath of nuclear explosions in 1998. It dealt a severe blow to the foreign investors' confidence and perception about their investment in Pakistan. But there is yet to appear a study that can estimate the damage in terms of financial inflows. More recently, the financial penalties imposed upon Pakistan in the Reko Dek and Karkay rental power case has again sent a negative vibe through financial markets about Pakistan that will hurt its chances of attracting significant financial inflows. Critics of the hypothesis stated in the above paragraph, especially in the existing scheme of things, would immediately point out the recent uptick in financial inflows to Pakistan and the fact that the CPEC is a $60 billion venture under which Pakistan received significant financial inflows as negating the issue of Pakistan's less than stable perception. But such arguments are misdirected in the sense that they do not take quality and nature of these flows into consideration (as do most studies). The uptick in financial inflows is largely characterized by portfolio investment ("hot money"), chasing the considerable arbitrage opportunities arising out of an enormous difference of 11 percent between discount rates in Pakistan and globally (also called as "carry trade"). The other way of saying this is that these kinds of inflows are not brick and mortar, long-term investment that leads to job creation, thus feeding into GDP growth. Instead, these are short-term, volatile inflows that can be pulled out at a moment's notice. Also, the inflows under the CPEC to a large extent government-to-government arrangements rather than led by private sector participants. Suffice to say that this kind of arrangement does not in consonance with the aim of economic freedom, which envisions a minor role of the government in economic affairs.

A third and equally important aspect of the debate regarding financial liberalization and economic growth in Pakistan is the monopolistic structure dominating the financial sector in Pakistan, especially the big banks. This fact has been established beyond doubt by now.[45] Yet, the impact of such an arrangement on the probability of financial inflows (especially foreign) has yet to be adequately gauged through studies. A sector characterized by monopolistic tendencies is highly unlikely to attract much investment. Given that the major source of profit of banks in Pakistan is an investment in government treasuries and that there is a wide spread of rate between the profit obtained and the one given to account holders, Pakistan's financial sector is by and large indulging in an adverse distribution of wealth (from populace to a group of individuals, i.e., financial industry) rather than helping

[45]See "Assessing nature of competition in banking sector of Pakistan."

propel economic growth. For any proper assessment of Pakistan's financial sector and its role in economic development, the factors discussed above will have to be considered in future studies, along with other variables that affect the outcomes in this sector.[46]

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Financial Liberalization, Capital Movements, and Economic Growth in Asia: A Panel Structural VAR Approach

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1 Introduction

After the great depression of the World economy in 1929, the relevant policies and practical outputs confirmed the Keynesian economic view until the 1960s, especially to oil shock. The intervention and orientation of the public to the economic structure, especially the development and industrialization of developing countries, have been realized through import substitution policies. In the first half of the 1970s, the world economy experienced one of the most important collapses after the 1929 major crisis. Therefore, these economic activities necessitated economic change and restructuring. This restructuring is thought to have started after the second world war, especially in the 1960s, but the origins of the theory of financial liberalization are included in the work of McKinnon (1973) and Shaw (1973). In fact, it is originally the Patrick (1966) study that analyzes the relation between financial development and economic growth for underdeveloped countries. The study highlights that demand for financial services depends on the growth of production and the commercialization and monetization of Agriculture and other traditional subsistence sectors. In other words, for external funds businesses, it means more revenue and a higher growth rate, hence more demand.

In the literature, foreign capital flows are recognized as one of the most important channels of financial globalization and also as the engine of economic growth. Due to their large externalities in both developing and developed countries, financial

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globalization has been strongly increasing and causing worldwide growth. Such a development has led to several developments in the economic structure. Gourinchas and Jeanne (2002) state that the externalities of financial globalization fall into two main categories: first, this phenomenon establishes the framework for optimal and effective allocation of foreign capital. The other is that this effect focuses on national incentives that support the implementation of appropriate policies and reforms that can drive economic development. Therefore, development strategies suggest that by addressing foreign capital inflows into economic sectors, a positive impact will occur on the productivity of the economy, and by accelerating capital accumulation, they increase relations between domestic markets. Over the past few decades, many countries around the world have implemented some reforms in their domestic financial markets. In this case, these reforms, along with internal and external developments, triggered some structural changes. During this period, criticism of many government policies focused on controlling financial markets, which are referred to as financial repression in the economics literature, began to increase. Because it was understood that these policies impeded the efficient functioning and structure of financial institutions. Economic liberalization occurs through the liberalization of trade, the liberalization of financial–capital accounts, or the liberalization of both. The liberalization of the financial capital account means that financial resources flow without any hindrance from countries where expected returns are low, capital is plentiful, to countries with capital scarcities where expected returns are high. Especially after the mid-1980s, many developing countries pursued policies toward the liberalization of the capital account to finance both their investments and their debt stocks. However, fluctuations in capital flows may pose significant macroeconomic challenges; for example, excessive volatility of capital flows can increase financial system deficits by increasing economic cycles.

The theoretical underpinning of the relationship between financial liberalization, financial development, and economic growth is called the McKinnon-Shaw hypothesis. Seminal studies on this subject include Krugman (1993), Levine (2000), Bumann et al. (2013), and Tswamuno et al. (2007). Does the relationship between international integration, capital flows, and economic growth encourage each other, especially in developing countries? This question has resulted in different responses between economists and institutions. The World Bank, the International Monetary Fund, and the World Trade Organization give a positive answer to this question. Among economists, for instance, Bumann et al. (2013) confirms the response of these institutions while Krugman (1993) thinks that the answer would be "no." Tswamuno et al. (2007) show that capital account liberalization is necessary but not sufficient for economic growth. Therefore, this chapter focuses on the relationship between financial liberalization, financial flow, and economic growth, which has increased in popularity since the mid-1980s. Besides, what is the existence of the relationship between these variables and how they affect each other is of separate importance.

The main reason for the steps taken in the direction of financial liberalization in the last few decades is that this situation will bring benefits to the economies of the country. Another reason for such a trend is that since the 1990s, developing countries have pursued policies to liberalize capital accounts to finance both investments and

growing debt stocks. Especially after the debt crisis in the 1980s, the process of accumulating informal foreign assets by the private sector is called "capital flight" (Yalta & Talha Yalta, 2012). The macroeconomic effects of capital flows are an important issue for the theoretical and empirical literature given the financial constraints faced by many countries. There is no consensus in economic literature in terms of the results of studies examining the relationship between financial development, economic growth, and capital flight. Some studies such as Kitchen (1986), Arestis et al. (2003), Obadan (2004), Iyoha (2004), Bonfiglioli (2005), Ozdemir and Erbil (2008), and Bittencourt (2012) suggest that the flight of financial development and capital flows will contribute to economic growth. The chapter confirms the Schumpeterian prediction for Latin American countries in the period 1980–2007. Bonfiglioli (2005) focuses on the economic impact of financial liberalization through having a strong positive impact on productivity. The literature is full of studies that address a wide variety of aspects of the subject. While some of the studies in the literature examined the event from a methodical point of view, others focused on the subject from a periodical point of view. In this chapter, we analyzed the impact of capital flows on the economies of certain Asian countries. We contribute to the literature by examining whether capital flows promote the economic performance of panel Asian countries.

2 Literature Review

The pressure and interventionist policies implemented in the financial system were tried to be justified until the 1970s. However, the outlook for interventionist policies changed in the 1980s, and the idea that financial pressures would adversely affect economic growth became widespread in both academic and political circles. With these thoughts, financial liberalization has become an important policy proposal in developing and stabilization programs for developing countries (Dekle & Pradhan, 1999; Mckinnon, 1989). Since the 1990s, developing countries have pursued policies to liberalize capital accounts to finance both investments and rising debt stocks, especially after the debt crisis in the 1980s, the process of accumulating informal foreign assets by the private sector is called capital flight (Yalta & Talha Yalta, 2012). Currently, the macroeconomic effects of capital flow and financial liberalization are an essential issue for the theoretical and empirical literature given financial constraints faced by many countries. There is no consensus in economic literature in terms of the results of studies examining the relationship between financial development, economic growth, and capital flight. Therefore, this chapter first reviews theoretical papers and then empirical papers on the relationship between financial liberalization, capital movements, and economic growth.

The financial liberalization hypothesis, whose theoretical background is based on McKinnon (1973) and Shaw (1973), defends the view that positive real interest rates may support economic growth by promoting savings in the economy. According to McKinnon (1973), negative or low real interest rates determined by the monetary

authority under financial pressure may cause (1) reduction in savings and (2) ineffective distribution of resources. (3) The decrease in savings also leads to the division of financial markets and financial intermediation role of banking system to be negatively affected. As a result of all this, the loanable supply of funds in the economic system decreases, investors' access to financial resources becomes difficult, and finally the growth rate decreases. McKinnon (1973) and Shaw (1973) argue that there is a complementary relationship between money and physical capital investments, as money and capital market are split in developing countries. According to them, financial liberalization policies increase money balances by raising interest rates. The banking system provides more deposits, and financing tools are diversified (thanks to such a financial environment, investments savings increase, and the real economy strengthens). Consequently, interest rates and capital movements controlled by governments in developing countries put firms face financial pressure. Especially, in a high level of government debts, this control might increase (Doğan & Bilgili, 2014). In a financial system under pressure, real deposit interest rates on monetary assets are negative, and these disabilities create a high degree of uncertainty. Uncertainty leads to high inflation expectations, fluctuations in the exchange rate, and low savings (Shrestha & Chowdhury, 2007).

Another important application area of financial liberalization policy is to increase the freedom of foreign financial institutions and foreign companies to operate in domestic financial system. Therefore, financial liberalization practice is basically in two directions, internal and external liberalization. In internal financial liberalization, policies such as the liberalization of nominal interest rates, reduction of credit controls, and removal of barriers to entry into the financial system are implemented. In foreign financial liberalization, there are policies such as the acquisition of assets by foreigners in national financial system, the permission of residents to operate in international financial markets, and removal of all obstacles to trade in foreign currency (Ghosh, 2005). With the internal and external financial liberalization, (1) the deposit volume of the banking system grows, (2) the credit opportunities of investors improve, (3) capital movements toward the host country increase, (4) technology is transferred to the host country with foreign capital inflows, (5) competitive behavior and experience of firms increase. All these gains contribute significantly to a stable economic growth process (Singh, 1997; Thirlwall, 1994).

Apart from the views that the financial liberalization process has a positive effect on economic growth, liberalization is also claimed to have serious social and economic losses by causing financial crises (Weller, 2001; Kaminsky & Reinhart, 1999). According to Bird and Rajan (2001), international financial liberalization raises an explosion in domestic credits, leading to acute balance problems for banks. In this environment, if capital inflows are suddenly reversed, a crisis may arise due to banking weaknesses. Kaminsky and Reinhart (1999) review the banking and payments balance crises in twenty developing countries for the period 1975–1995. According to the results of the research, more than 60% of banking and payments balance crises in developing countries are explained by financial liberalization. For this reason, some economists suggest that countries should be isolated from the international financial system or suspend the liberalization process, while another

indicates that government interventions may be useful to tackle these problems. Stiglitz (2000) draws attention to the importance of government control to eliminate the negativities that foreign capital entering the country will leave in short run. Otherwise, the liberalization process of financial markets loses its effectiveness due to speculative attacks, asymmetric information, moral breakdown, herd behavior, and the problem of spreading crises and exacerbates economic fluctuations. Sutherland (1996) states that financial liberalization diverts capital movements from developed countries with low-interest rates to developing countries with high-interest rates. Sutherland (1996) emphasizes that a sudden interest rate increases in developing countries increase the costs of banks and firms and, therefore, may have negative effects on macroeconomic indicators such as investment and growth. What approach does empirical research results support? The results of empirical research on the impact of financial liberalization and capital movements on economic growth are classified into three groups (see Table 1).

The first group of research supports the McKinnon-Shaw hypothesis, which argues that financial liberalization has a positive impact on economic growth (Bekaert et al., 2005; Khan & Qayyum, 2007; Romero-Ávila, 2009; Obamuyi & Olorunfemi, 2011; Adeel-Farooq et al., 2017; Rachdi et al., 2018). Some research, on the other hand, focuses on capital movements instead of financial liberalization and concludes that capital movements toward developing countries have a positive effect on economic growth (Bailliu, 2000; Vo, 2010; Shen et al., 2010; Combes et al., 2019; Bilgili et al., 2012, 2016; Bonfiglioli & Mendicino, 2004). There are also findings that financial liberalization has a partial, weak, or short-run positive effect on economic growth (Ben Gamra, 2009; İnce, 2011; Nasreen et al., 2020). On the other hand, Saidi et al. (2017) show that the positive effect of financial liberalization on economic growth is achieved through quality institutions and effective governance.

The second group of researches points out that financial liberalization and capital movements harm economic growth (Ardic & Damar, 2006; Narayan & Narayan, 2013; Alley, 2015; Klobodu & Adams, 2016). Besides, Batuo Enowbi and Kupukile (2012) conclude that financial liberalization and financial development have a negative impact on economic growth through financial instability. The third group of researches provides empirical findings that there is no statistically significant relationship regarding the relationship between financial liberalization, capital movements, and economic growth (Grilli & Milesi-Ferretti, 1995; Rodrik, 1998; Andersen & Tarp, 2003; Prasad et al., 2007; Gries et al., 2011).

The empirical literature is also classified methodologically. The chapters follow linear models to largely test the relationship between financial liberalization, capital movements, and growth. Barradas (2020) only prefers a nonlinear model. An essential part of the research focuses on the estimation of regression parameters. Some of the researches are panel data, while others apply time series analysis methods. In panel data analysis, estimators such as ordinary least squares (OLS) method, generalized method of moments (for more information on GMM, refer to Ullah et al., 2018, 2020), two-step ordinary least squares (TSLS) method are frequently used. Rodrik (1998), on the other hand, examines the relationship

Table 1 Summary on nexus between financial liberalization, capital movements, and economic growth

Author(s)	Country/ region	Period	Method	Result
Grilli and Milesi-Ferretti (1995)	Industrialized and developing countries	1966–1989	Panel OLS	There is no significant relationship between capital controls and economic growth.
Rodrik (1998)	Developed and developing countries	1975–1989	Partial scatter analysis	There is no significant relationship between capital-account liberalization and economic growth.
Bailliu (2000)	Forty developing countries	1975–1995	Dynamic panel data analysis	International capital flows in developing countries play an important role in supporting economic growth.
Andersen and Tarp (2003)	Ninety-five countries	1960–1989	Panel GMM	There is not enough evidence of financial liberalization and economic growth nexus.
Bonfiglioli and Mendicino (2004)	Ninety countries	1975–1999	Panel GMM	Removal of capital account restrictions and financial deepening has a positive effect on economic growth.
Bekaert et al. (2005)	Ninety-five countries	1980–1997	Pooled OLS	The stock market and capital account liberalization encourage economic growth.
Hondroyiannis et al. (2005)	Greece	1986–1999	VAR, error-correction model	In the long run, there is a bidirectional causality relationship between finance and economic growth.
Ardic and Damar (2006)	Turkey (province-level)	1996–2001	Panel OLS, Panel GMM	There is a strong negative relationship between financial deepening (both public and private) and economic growth.
Prasad et al. (2007)	Fifty-six nonindustrial countries	1970–2004	Panel OLS, Panel GMM	There is no evidence that the increase in capital movements directly boosted economic growth.
Ang and McKibbin (2007)	Malaysia	1960–2001	VAR, error-correction model	Financial liberalization has a positive effect on promoting financial sector development. There is a positive relationship between financial depth and economic development.

(continued)

Table 1 (continued)

Author(s)	Country/ region	Period	Method	Result
Khan and Qayyum (2007)	Pakistan	1961–2005	Autoregressive Distributed Lag (ARDL)	Trade and financial liberalization have a positive effect on economic growth in the long run.
Romero-Ávila (2009)	EU-15	1960–2011	Analysis of Variance (ANOVA), panel GMM	Liberalization of capital controls and interest rates positively affects economic growth through increased financial efficiency.
Ben Gamra (2009)	East Asian countries	1980–2002	Panel OLS, panel TSLS, panel GMM	While full liberalization of the financial sector is associated with slower economic growth results, a more moderate partial liberalization causes more growth.
Vo (2010)	Emerging Asian economies	1980–2001	Panel GMM	Capital movements have a positive effect on economic growth.
Odhiambo (2010)	Tanzania	1969–2006	Johansen-Juselius cointegration, Granger causality	Interest reforms have a positive effect on economic growth. Financial deepening has no significant impact on economic growth.
Shen et al. (2010)	Eighty countries	1976–2007	Panel OLS	Capital movements in the form of foreign direct investment have a positive effect on economic growth. However, international portfolio investment movements have an unfavorable impact on growth.
Obamuyi and Olorunfemi (2011)	Nigeria	1970–2006	Error-correction model	Financial reforms and interest rate liberalization have a triggering effect on economic growth.
Gries et al. (2011)	Thirteen Latin American and Caribbean countries	1960–2004	Principal component analysis, VAR, error-correction model	There is no econometric evidence of the impact of financial deepening on economic growth.
İnce (2011)	Turkey	1980–2010	Johansen-Juselius cointegration, Granger causality	While there is a positive relationship between financial liberalization, financial development, and economic growth in the short run, there is no significant relationship in the long run.

(continued)

Table 1 (continued)

Author(s)	Country/ region	Period	Method	Result
Batuo Enowbi and Kupukile (2012)	African Countries	1985–2010	Panel GMM	Financial liberalization and financial development cause financial instability effects. Financial liberalization also negatively affects economic growth.
Narayan and Narayan (2013)	Sixty-five developing countries	1995–2011	Panel GMM	The effects of the developments in the financial system on economic growth are weak. The expansion in bank loans negatively affects economic growth.
Alley (2015)	Fourteen Sub-Saharan African countries	1990–2013	Kao cointegration, panel GMM	Capital flows shocks negatively affect economic growth and are responsible for poor economic performance in the region.
Klobodu and Adams (2016)	Ghana	1970–2014	ARDL	Capital movements harm economic growth in the short and long run.
Adeel-Farooq et al. (2017)	Pakistan and India	1985–2014	Principal component analysis, ARDL	In the long run, financial liberalization has a positive and significant impact on economic growth in Pakistan and India.
Saidi et al. (2017)	Fifty-four countries	1985–2010	Panel Smooth Transition Regression (PSTR) model	Financial liberalization has a positive impact on economic growth through better institutions and governance.
Rachdi et al. (2018)	The Middle East and North African countries	2000–2013	Panel GMM	Bank crises are harmful to economic growth. On the other hand, financial liberalization contributes to economic growth.
Combes et al. (2019)	Low- and middle-income countries	1980–2012	Panel GMM	Financial movements have both indirect and direct positive effects on economic growth.
Nasreen et al. (2020)	European countries	1989–2016	Panel GMM	Financial globalization prevents financial development. Economic growth and institutional development are associated with financial liberalization.
Barradas (2020)	Portugal	1977–2016	ARDL	The existence of a nonlinear relationship

(continued)

Table 1 (continued)

Author(s)	Country/ region	Period	Method	Result
				between the banking system, stock market, and economic growth is supported.

Table 2 Panel Asian countries

1	Armenia, Republic of	13	Lebanon
2	Azerbaijan, Republic of	14	Malaysia
3	Bahrain, Kingdom of	15	Mongolia
4	Bangladesh	16	Oman
5	China	17	Pakistan
6	India	18	Philippines
7	Iran, Islamic Republic of	19	Russian Federation
8	Israel	20	Singapore
9	Jordan	21	Sri Lanka
10	Kazakhstan	22	Thailand
11	Korea, Republic of	23	Turkey
12	Kyrgyz Republic	24	United Arab Emirates

Table 3 Data, definition, and source

Data	Data definition	Source
FINDI	Financial Development Index	data.imf.org
FINMAI	Financial Markets Access Index	data.imf.org
FINMEI	Financial Markets Efficiency Index	data.imf.org
GDP	GDP (constant 2010 US$)	databank.worldbank.org
FDI	Foreign direct investment, net inflows (BoP, current US$)	databank.worldbank.org
GFCF	Gross Fixed Capital Formation, Nominal, Domestic Currency	data.imf.org

between financial liberalization and growth in developed and developing countries with the method of partial scatter analysis. In the time series analysis, vector autoregressive (VAR) model, error correction mechanism, cointegration estimators, and causality tests are mostly used (Hondroyiannis et al., 2005; Khan & Qayyum, 2007; Odhiambo, 2010; Obamuyi & Olorunfemi, 2011; İnce, 2011; Adeel-Farooq et al., 2017).

3 Data and Methodology: Panel Structural Vector Autoregressive (Panel SVAR) Model

This section explores panel Asian countries (Table 2), and data, definition, and relevant source (Table 3). The panel data include 24 Asian countries, which were chosen based on data availability for time series of FINDI, FINMAI, FINMEI, GDP, GDP1, FDI, and GFCF, with 576 observations. The first column of Table 2 lists the abbreviations of raw data. Later, in the analyses, data were transformed into logarithmic forms. All data sources were extracted on May 3, 2020.

This chapter follows panel Structural Vector Autoregressive (henceforth panel SVAR) models. The SVAR developed through Vector Autoregressive (VAR) models is based on the interpretation of the model as a reduced form of simultaneous equation models (Bernanke, 1986; Sims, 1986). In the VAR model, each variable is expressed endogenously as a linear function of the past values of both itself and other variables. Let $y_t = (y_{1t}, y_{2t}, \ldots, y_{nt})$ to represent the multivariate $(n \times 1)$ dimensional variable vector (Bilgili, 2001, 2002). Then, p lagged vector autoregressive model (VAR (p)) is expressed in the form of Eq. (1) as depicted in Zivot and Wang (2006).

$$y_t = v_t + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + \varepsilon_t, \qquad t = 1, \ldots, T \tag{1}$$

$v_t = (v_1, \ldots v_n)$ is a constant term vector. A_i $(n \times n)$ represents the coefficient matrix. The term εt $(n \times 1)$ is the noise term. The SVAR models are a useful tool for analyzing the dynamics of a model by subjecting it to an unexpected shock (Gottschalk, 2001). According to Breitung et al. (2004) and Lütkepohl (2005), SVAR is mainly based on the VAR model structure. The SVAR model allows the impulse-response functions to be obtained by introducing short- and long-term constraints into the model calculation process. The SVAR model can be depicted by Eq. (2).

$$\beta_1 Y_{it} = \beta_0 + \Gamma \mathrm{Y}_{\mathrm{it}-1} + D e_{it} \tag{2}$$

In Eq. (2), e_{it} is the structural shock vector. The matrix D shows the interaction between structural shocks in the current period. If the structural shocks are independent of each other, D is the unit matrix. β_1 is the matrix that shows simultaneous interactions between intrinsic variables. If there is no simultaneous interaction between the internal variables, β_1 is the unit matrix. In this case, the shock in each equation only affects its own equation. Otherwise, if β_1 is not a unit matrix, shock in each equation has a direct effect on the internal variables in other equations. Also, the SVAR model is estimated as follows from the reduced VAR model to the lagging level □ (Lee et al., 2012).

$$Y_{it} = u_{it} + \beta_1 y_{it-1} + \beta_2 y_{it-2} + \cdots + \beta_{\mathrm{e}} y_{it-\mathrm{e}} + \varepsilon_{it} = \beta(\mathrm{L})\mathrm{Y}_{\mathrm{it}} + \mathrm{u}_{\mathrm{it}} + \varepsilon_{\mathrm{it}}. \tag{3}$$

where, i and t represent variables and years, respectively. y_{it} is a $n \times 1$ vector including $Y_1, Y_2, Y_3 \ldots Y_n$; L is a lag operator, B is a $n \times n$ coefficient matrix, u_{it} is an

unobservable individual effect and ε_{it} is an error term. The panel SVAR considers responses to shocks (idiosyncratic and common structural shocks), by allowing full cross member heterogeneity in the panel, to reveal the dynamics in impulse-response functions. In panel SVAR analyses, the relevant matrices are optimized through the decomposition of innovations (shocks) into idiosyncratic versus common shocks (Pedroni, 2013). In the Panel SVAR, the long-run constraints take the form of Eq. (4).

$$\begin{pmatrix} \Delta Y_{it}^{1} \\ \Delta Y_{it}^{2} \\ \Delta X_{it}^{3} \\ \vdots \\ \Delta Y_{it}^{n} \end{pmatrix} = \begin{pmatrix} \beta_{11}(L) & 0 & 0 & 0 & 0 \\ \beta_{21}(L) & \beta_{22}(L) & 0 & 0 & 0 \\ \beta_{31}(L) & \beta_{32}(L) & \beta_{33}(L) & 0 & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \beta_{n1}(L) & \beta_{n2}(L) & \beta_{n3}(L) & \dots & \beta_{nn}(L) \end{pmatrix} \begin{pmatrix} \varepsilon_{it}^{1} \\ \varepsilon_{it}^{2} \\ \varepsilon_{it}^{3} \\ \vdots \\ \varepsilon_{it}^{n} \end{pmatrix} \tag{4}$$

Equation (4) gives recursive impulse-responses by a triangular Matrix. In Eq. (4), ΔY_{it}^{1} is the change in Y_1 of ith country at time *t*. Similarly, ΔY_{it}^{2} is the change in Y_2, ΔY_{it}^{3} is the change in Y_3, and ΔY_{it}^{n} is the change in Y_n of ith country at time *t*. The first row of Eq. (4) demonstrates that Y_1 does not respond to other variables contemporaneously, it responds to other variables with lag. The second row indicates that Y_2 responds to the only Y_1, it does not respond to other variables contemporaneously but responds to other variables with lag. The process continues similarly in other rows. The outputs of Panel SVAR analysis obtained in the paper are given in the following section.

4 Empirical Results

Tables 4, 5, and 6 yield the estimation outputs from panel SVAR models. The panel SVAR model-1 employs the variables of LFDI, LFINDI, LGFCF, and LGDP. Panel SVAR model-2 comprises the LFDI, LFINMAI, LFINDI, LGFCF, and LGDP, and Panel SVAR model-3 observes the structural impulse-response analyses of the system in which LFDI, LFINMEI, LFINDI, LGFCF, and. LGDP are employed.

In panel SVAR model-1, the second row indicates that financial development responds positively to the shock in LFDI. The response is given by parameter C2. third-row yields that capital formation responds positively to the shocks in LFDI and LFINDI. The responses are yielded by parameters of C3 and C6. The fourth row yields that panel Asian GDP is affected positively by the impulses in panel Asian LFDI and LGFCF, and that panel Asian GDP does not respond to panel Asian LFINDI (C7). In panel SVAR model-2 given in Table 5, second row underlines that the financial markets access index is not influenced by a shock in LFDI (C2) at the 10% level. third-row states that financial development index is influenced positively by a shock in LFINMAI (C7). The fourth row reveals that LGFCF responds

Table 4 Panel SVAR model-1

Model: e = Su where E[uu′] = I				
C(1)	0	0	0	
C(2)	C(5)	0	0	
C(3)	C(6)	C(8)	0	
C(4)	C(7)	C(9)	C(10)	
	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.704739	0.021980	32.06243	0.0000
C(2)	0.009956	0.004431	2.247093	0.0246
C(3)	0.018901	0.006219	3.039040	0.0024
C(4)	0.008216	0.001490	5.513992	0.0000
C(5)	0.100203	0.003125	32.06243	0.0000
C(6)	0.013153	0.006178	2.129100	0.0332
C(7)	0.000890	0.001468	0.606410	0.5442
C(8)	0.139752	0.004359	32.06243	0.0000
C(9)	0.011445	0.001423	8.041829	0.0000
C(10)	0.031235	0.000974	32.06244	0.0000
Log-likelihood	1238.143			
Estimated S matrix:				
0.704739	0.000000	0.000000	0.000000	
0.009956	0.100203	0.000000	0.000000	
0.018901	0.013153	0.139752	0.000000	
0.008216	0.000890	0.011445	0.031235	
Estimated F matrix:				
15.65391	−4.470787	−7.106877	16.30050	
3.111368	1.831243	−2.742203	3.860182	
9.897122	−64.28485	53.08513	31.14180	
16.27517	−9.788986	−6.493405	22.52642	

Note: Panel SVAR Lag = 2 based on SC. The estimation method: Maximum likelihood via Newton-Raphson (analytic derivatives). Convergence is achieved after 17 iterations. Panel Structural VAR is just identified.

positively to the shock in LFDI and negatively to the innovation in LFINDI as depicted in estimated parameters of C(4) and C(11). The negative response of LGFCF to the financial development index might stem from the fact that the loanable fund supply and demand interact with each other mostly at financial markets and its derivative markets rather than the capital markets. Finally, fifth raw yields that LGDP responds positively to the impulses in LFDI at a 1% significance level, LFINMAI at 15% level, LFINDI at 5% level, and in LGFCF at 10% level. These responses are denoted by the estimated parameters of C(5), C(9), C(12), and C(14), respectively, in Table 5. In panel SVAR model-3 shown in Table 6, the second row explores that the financial markets' efficiency index responds positively to the impulse in LFDI (C2). Third row shows that LFINDI is affected positively by a positive innovation in LFDI (C3) at a 15% level and LFINMEI (C7) at a 1% level. Fourth row gives the result that LGFCF responds positively to LFDI at a 1% level,

Table 5 Panel SVAR model-2

Model: e = Su where E[uu′] = I				
C(1)	0	0	0	0
C(2)	C(6)	0	0	0
C(3)	C(7)	C(10)	0	0
C(4)	C(8)	C(11)	C(13)	0
C(5)	C(9)	C(12)	C(14)	C(15)
	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.730814	0.022217	32.89376	0.0000
C(2)	0.013946	0.009579	1.456013	0.1454
C(3)	0.005120	0.004657	1.099390	0.2716
C(4)	0.033657	0.008589	3.918792	0.0001
C(5)	0.006982	0.001632	4.278305	0.0000
C(6)	0.222572	0.006766	32.89376	0.0000
C(7)	0.026917	0.004582	5.874629	0.0000
C(8)	−0.006609	0.008525	−0.775179	0.4382
C(9)	0.002649	0.001616	1.639302	0.1012
C(10)	0.104859	0.003188	32.89376	0.0000
C(11)	−0.018172	0.008505	−2.136598	0.0326
C(12)	0.003486	0.001611	2.164543	0.0304
C(13)	0.197401	0.006001	32.89376	0.0000
C(14)	0.002694	0.001605	1.678582	0.0932
C(15)	0.037282	0.001133	32.89376	0.0000
Log-likelihood	1021.573			
Estimated S matrix:				
0.730814	0.000000	0.000000	0.000000	0.000000
0.013946	0.222572	0.000000	0.000000	0.000000
0.005120	0.026917	0.104859	0.000000	0.000000
0.033657	−0.006609	−0.018172	0.197401	0.000000
0.006982	0.002649	0.003486	0.002694	0.037282
Estimated F matrix:				
23.29091	−20.11396	−20.95685	−2.334685	33.79442
27.72575	16.70913	−19.09514	−9.313989	45.87627
5.650255	−1.250180	−3.364570	−0.871294	9.048330
−0.610994	−45.22245	−38.72981	19.84903	11.80012
22.24240	−31.04202	−26.98852	−0.770990	38.68268

Note: Panel SVAR Lag = 1 based on SC. The estimation method: Maximum likelihood via Newton-Raphson (analytic derivatives). Convergence is achieved after 18 iterations. Panel Structural VAR is just-identified.

and LFINMEI at a 15% level. These impulse-response estimations are given by C (4) and C(8). The last row of Table 6 reveals that Asian panel GDP has positive associations with panel LFDI (at 1% level), panel LFINMEI (at 5% level), and LGFCF (at 1% level).

Table 6 Panel SVAR model-3

Model: e = Su where E[uu′] = I				
C(1)	0	0	0	0
C(2)	C(6)	0	0	0
C(3)	C(7)	C(10)	0	0
C(4)	C(8)	C(11)	C(13)	0
C(5)	C(9)	C(12)	C(14)	C(15)
	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.727936	0.022616	32.18695	0.0000
C(2)	0.054492	0.025071	2.173502	0.0297
C(3)	0.006886	0.004694	1.466914	0.1424
C(4)	0.018995	0.006682	2.842573	0.0045
C(5)	0.008135	0.001495	5.441329	0.0000
C(6)	0.569304	0.017687	32.18695	0.0000
C(7)	0.070534	0.004146	17.01266	0.0000
C(8)	0.010631	0.006648	1.599086	0.1098
C(9)	0.003638	0.001469	2.476042	0.0133
C(10)	0.080102	0.002489	32.18695	0.0000
C(11)	−0.002847	0.006639	−0.428773	0.6681
C(12)	0.001516	0.001464	1.035452	0.3005
C(13)	0.151090	0.004694	32.18695	0.0000
C(14)	0.010838	0.001424	7.610854	0.0000
C(15)	0.031491	0.000978	32.18696	0.0000
Log-likelihood	859.1406			
Estimated S matrix:				
0.727936	0.000000	0.000000	0.000000	0.000000
0.054492	0.569304	0.000000	0.000000	0.000000
0.006886	0.070534	0.080102	0.000000	0.000000
0.018995	0.010631	−0.002847	0.151090	0.000000
0.008135	0.003638	0.001516	0.010838	0.031491
Estimated F matrix:				
−33.79228	−8.379748	36.09288	−8.776508	−61.87442
−15.56516	−0.186177	18.53723	−5.063473	−27.10565
−4.914880	−0.891238	7.191439	−1.078644	−8.845376
−84.95428	−10.86968	40.59945	−8.046604	−131.2666
−47.06319	−10.14054	44.28299	−11.87913	−78.41297

Note: Panel SVAR Lag = 1 based on SC. The estimation method: Maximum likelihood via Newton-Raphson (analytic derivatives). Convergence is achieved after 18 iterations. Panel Structural VAR is just-identified.

All three-panel SVAR models reached convergence through some iterations and explored some significant responses of one variable to the impulses (shocks) in other variables in the structural VAR system. Therefore, all three-panel models allow us to interpolate both panel and member-specific dynamics. However, this chapter has focused mainly on specifically the panel dynamics rather than 24 cross

section-specific dynamics to save space in the research and, hence, to reveal more clear tangible outputs from Asian panel estimations.

5 Conclusion and Suggestion

This chapter considers analyzing the interactions between financial liberalization, capital movements, and economic growth in Asia through a panel structural VAR approach by employing the panel variables of 24 Asian countries. The panel SVAR monitors the reactions of a variable to the impulses of other variables in the VAR system by considering full cross member heterogeneity in the panel to explore the dynamics in impulse responses. The variables are financial development index, financial markets access index, financial markets efficiency index, GDP, foreign direct investment, and gross fixed capital formation, respectively. The panel data range from 1994 to 2017 and consists of 576 observations.

This chapter launches three-panel SVAR models. The panel SVAR model 1 yields that panel Asian foreign direct investments and gross fixed capital formation have positive impacts on panel Asian GDP. The panel SVAR model 2 states that panel GDP responds positively to the shocks in panel foreign direct investments, panel financial development, and gross fixed capital formation. It is also observed that panel GDP has been tended to react positively to the panel financial market access index. The panel structural VAR 3 model yields that Asian panel GDP responded positively to the panel foreign direct investments, panel financial market efficiency, and capital formation.

All three-panel SVAR models achieved the convergence (optimization) significantly. Although panel structural VAR 1 has the highest log-likelihood statistic among all three models, all outputs from Panel SVAR 1, SVAR 2, and SVAR 3 can be considered noteworthy in terms of (a) statistical optimization with consistent and efficient parameter estimations, and (b) potential macroeconomic policy that might be suggested upon the parameters of optimized panel structural VAR models. This chapter may suggest upon the output of the analyses that policy-makers of Asian countries follow the policy to invite more foreign capital sources and to develop financial instruments for the target of higher welfare of Asia.

The future potential works might consider specifically (a) cross-section responses to the impulses of other cross-sections in the panel, and (b) panel responses to shocks in variables of some leading cross-sections (e.g., China, India, Korea, Pakistan, Russia, Singapore, Turkey, and Thailand). The future possible works might also consider (a) time-series analyses of Markov regime-switching (MS) models, (b) panel analyses of panel MS and/or panel MS-VAR models to observe the impacts of one variable to other variables (s) by taking into account of different sates/regimes and/or structural changes in the Asian data. Finally, this chapter has the potential to invite other future works to launch dynamic stochastic general equilibrium models (DSGE's) to include microeconomic foundations into international

finance-macroeconomic models to understand the behavior of financial–capital–commodity markets of Asian countries.

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Financial Development-Economic Growth Nexus: Theoretical Underpinnings, Empirical Evidence, and Critical Reflections

Ahmed Imran Hunjra, Murugesh Arunachalam, and Mahnoor Hanif

1 Introduction

The discussion in this chapter rekindles the century-old debate on the association between Financial Development (FD) and Economic Growth (EG). This chapter draws from extant literature to discuss the nexus between FD and EG and provides insights on underlying theories, empirical evidence, methodologies adopted in prior studies that investigate and explain the relationship. The chapter also contextualizes the nexus in terms of the Islamic Banking Sector and provides a comparison of the contextualization in the Conventional Banking System. Critical reflections on the extant understandings of FD and EG relationship adds to the vigor of the debate presented in this chapter. Debates on FD–EG nexus have prevailed over several decades. Numerous theoretical and empirical writings postulate and provide evidence that FD promotes EG (Arestis et al., 2001). On contrary, other studies indicate insignificant (Ram, 1999) or no association between FD and EG. Yet some other studies reveal that EG promotes FD (Stolbov, 2013). This chapter presents a concise

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overview of the theories and empirical evidence that have emerged in extant literature around the FD-EG nexus. The chapter also argues that conventional theories on FD–EG nexus need to be expanded to include elements of social and environmental responsibilities in development and growth models. Concepts such as sustainable development and corporate social responsibility (CSR) have emerged prominent in growth and development models and popularized by United Nations conferences and international agreements on sustainable development. Extant CSR literature has revived the FD–EG debate, both in theoretical and empirical terms, and highlighted the significance of CSR and sustainable development for countries across the globe.

The importance of incorporating social and environmental conditions in growth and development models is becoming more apparent under the current era of the COVID-19 pandemic and in particular to encounter the disastrous impacts of the pandemic. The impacts of the lockdown are already appearing around the globe including job losses, a decline in value of investments and businesses, huge financial losses of corporations that are expected to filter into the financial sector in terms of non-performing loans, and decline in GDP or countries across the globe. If these repercussions are not checked, the FD and EG of several economies will decline sharply and cause chaos throughout the world. The chapter suggests a greater role for the financial sector to balance social, environmental, and economic development in encountering the adverse impacts of the current COVID-19 pandemic. The significance of the essay presented in this chapter is that it would appeal to an international audience of regulators and policymakers who may draw some important lessons on how FD impacts EG and vice versa. A host of other interested parties and individuals attached to central and regional government bodies and other statutory organizations such as the reserve or central bank as well private corporations may find relevance in the current discussion particularly in encountering the forthcoming financial crisis and economic recession that are expected to result from the impacts of COVID-19 pandemic. Although it is not the intention of the current discussion to provide prescriptions for overcoming the forthcoming crisis, the discussion intends to provide some insights into how the nexus between FD and EG can benefit jurisdictions around the world to promote growth that would be advantageous to the general populace. The authors are passionate about this relationship and maintain that such a discussion would be relevant for the most current era engulfed by an unprecedented pandemic.

2 Financial Development

The financial sector comprises a number of instruments, institutions, and markets which facilitate transactions by making loans as well as providing information on investments and capital markets. Levine (1997) classifies the roles of a financial system into five essential areas including enabling and encouraging trading, products and services exchange, allocation of funds, hedging, and risk alleviation. To

undertake these roles efficiently and effectively, development in the financial sector needs to consider the most recent factors that are expected to affect EG. Guru and Inder (2019) define financial sector development as the process of establishing and advancing institutions, markets, and instruments through the growth of financial markets in terms of size, efficiency, and stability as well as expanded accessibility to the financial markets. The primary purpose of FD is to sustain investments and EG through efficient dissemination of investment information and optimum capital allocation. The development of the financial sector entails both financial expansion and deepening. Financial expansion means the growth and development of financial services and institutions. Whereas, financial deepening means increasing financial services provision. The development of the financial sector, by expanding and diversifying the financial markets and channeling savings into more productive economical uses leads to better resource allocation. Furthermore, the development of the financial sector likely to increase funding choices for investors, allowing them to select an appropriate debt structure for their particular project.

FD can take place through the development of financial markets and other areas of the financial system. Financial markets which are well developed can efficiently allocate an economy's savings to productive investments (Stiglitz & Weiss, 1983), lower the cost of information for efficient resources distribution (Greenwood & Jovanovic, 1990), and boost technological innovation resulting in greater returns for investors (King & Levine, 1993). Das and Guha-Khasnobis (2008) consider financial systems as playing a crucial role in the allocation of credit to fund working capital requirements to raise productivity in the real economy. According to Wiederkehr et al. (2004), an efficient financial system can promote investments by identifying new firms that have begun their operations, giving attention to the good ideas of entrepreneurs who require financing, approving trade, and making the exchange of commodities possible. Evidence from extant literature reveals that the financial sector performs a significant role in the growth of an economy. It boosts the economy through the accumulation of capital and technological advancements by mobilizing, and accumulating savings, generating investment knowledge, facilitating, and promoting foreign capital inflows, and improving capital allocation. It is evident that domestically well-developed financial markets are crucial in effectively assigning international funds flows to competitive investment ventures (Wurgler, 2000). A substantial literature has examined the financial sector's role in facilitating EG (Gurley & Shaw, 1967; Revell & Goldsmith, 1970).

Most economists reveal that FD is a prerequisite for high EG (Cole & Shaw, 1974; Revell & Goldsmith, 1970). There are several ways by which FD leads to EG. First, financial markets allow small investors to raise capital. Second, depositors get hold of a variety of financial instruments that boost savings. Third, capital allocation is achieved efficiently as the share of financial savings in total wealth increases. Accumulation of capital and technological advancement improve the association between FD and EG (Levine, 1997). Fourth, additional wealth is generated as financial intermediaries move savings from individuals and the least-growing segments to the high growth sectors. Finally, financial markets encourage productivity, skill development, and implementation of new technologies.

3 Economic Growth

EG theories have proliferated economic literature over the last century. Numerous models of EG have been proposed by several economic scholars (such as Rostow & Rostow, 1990; Woźniak, 2008; Harrod, 1939; Domar, 1946; Kaldor, 1961; Pasinetti, 1962; Solow, 1956; Swan, 1956; Uzawa, 1963; Diamond, 1965; Schumpeter, 1934; Lewis, 1956). Most of these scholars propose growth theories that emphasize the role of one or more of the factors of production that contribute to Gross Domestic Product (GDP). EG in terms of GDP means a rise in goods and services production over a time period. Positive EG creates greater income for companies resulting in higher stock prices. In general, economic literature considers EG as a macroeconomic variable that is proxied by GDP per capita (Malizia, 1990) or in income per capita (Levine, 1997). At the national level, GDP as an outcome of the production system is considered an appropriate measure of EG (Malizia, 1990). GDP covers the overall output of the economy including goods and services and exports but excluding imports. The World Bank instead of GDP uses GNI to gauge EG. Seers (1969) expanded the measures by suggesting that economic development occurs when poverty, unemployment, and inequality decreases, while income per capita increases. Neoclassical economic theorists (such as Solow, 1956; Swan, 1956) consider EG as the outcome of three driving forces - capital, labor, and technology. Though labor and capital are limited, the role of technology in growth is limitless. Different amounts of capital and labor determine short-term equilibrium in the production process, while there is a significant influence of technological advancements on EG.

Neoclassical economic theory posits that the accumulation and use of capital are vital in the growth of an economy. The association between an economy's labor and capital determines its productivity. Technology is expected to drive labor capabilities and productivity. Changes in any one of these production factors affect an economy's equilibrium output as well as GDP. If these components are not identical, the output from both labor and capital decrease. Technology has a limitless impact on growth and associated output it can generate. Schumpeter (1934) emphasizes an innovative entrepreneur instead of capital accumulation as the main driver of EG. Their proposed theory of EG is formulated on democratic and economically developed countries but not applicable for countries without a democratic system. Lewis (1954) proposed a growth model for poorer economies that have a huge labor force. The model supposes that keeping a low standard of living in the short run increases savings and the capital stock, which ultimately results in income growth. The theory was supported by Kuznets (1976) who found a direct link between EG and the growing ratio of urban population to the total population. More recent scholars explore the association between FD and EG (as discussed in the next section).

4 Financial Development and Economic Growth

4.1 Theory

Theories underpinning the association between FD and EG deliberate on whether FD promotes EG or EG drives FD. The seminal theoretical underpinnings of the nexus between FD and EG can be linked to the neoclassical demand and supply theory supported by the arbitrage theory. Neoclassical growth theory postulates the significance of FD for EG (Solow, 1956; Swan, 1956). The theory highlights that EG is derived from labor, capital, and technology. The classical view considers EG to be driven by changes in the number of production factors (labor and capital). The theory emphasizes the significance of financial systems in accumulating capital and allocating them to the most productive ventures that are supposed to boost EG in turn. Hence, based on the neoclassical theory, financial systems perform an important part in fostering EG. Durusu-Ciftci et al. (2017) extended the neoclassical growth model to ascertain the role of the development of the stock market in long-term EG. Aziakpono (2011) regards the neoclassical framework as a direct channel for FD to boost EG by growing domestic investment which raises domestic saving and reduces capital expenditure. Alternatively, through indirect channels, FD provides the catalyst for certain *collateral benefits* (such as domestic institutional development, better governance, macroeconomic discipline) that positively influences EG. Through indirect means, the effects of FD are felt when a critical level of institutional development and macroeconomic policies are in place (Kose et al., 2006). The assumptions behind the neoclassical theory of perfect market include sufficient knowledge, systematic economy, and flexible resources. However, some scholars have shown that some of the premises do not always remain true in the real world (Stiglitz, 2001; Akerlof, 1970).

The seminal works of Schumpeter (1934) also emphasize the significance of FD for EG. Schumpeter argued that innovation, which can be realized by banking loans, is the prime factor behind EG. The mechanisms of innovation include new means of production, new market development, and innovation in raw materials (Stolbov, 2013). Schumpeter considers financial institutions such as banks as an interface between innovators and private equity shareholders. Banks by providing loans, endorse the implementation of the innovation which in turn is expected to drive the economy. Financial markets seem to be a crucial factor in achieving rapid EG, since they lead to economic productivity by redirecting financial assets from inefficient to efficient activities. The emergence of this financial-market function is linked directly to the fundamental work of Schumpeter (1911). He figures out the banks as the key driver of EG because of their position in savings allocation, technology development, and financing of efficient investments.

However, Schumpeter's view on the significance of financial institutions in fostering EG became less popular during World War I and the great depression which led to the stock market crumble and in the declining importance of financial institutions for EG. This led followers of Keynesian ideology to question the

importance of financial systems for EG and argue that EG leads to FD. However, Gurley and Shaw (1955) figured out the weakness of Keynesian thinking in the context of financial economies. Gerschenkron (1962) continued this discussion and suggested that the involvement of finance in terms of EG relies on the country's level of economic backwardness. Countries that are more economically backward need a stable financial system to boost EG relative to non-economically backward countries (Eschenbach, 2004). Previous studies including Goldsmith (1969) and Shaw (1973) favored the view that FD positively influences EG. Goldsmith (1969) develops three main theories on the association between FD and EG. The initial theory states that EG contributes to the fluctuations in the financial system which is comprised of financial instruments, markets, and institutions. He revealed that economic development results in strengthening the financial system. In particular, Goldsmith finds evidence of the growth of banks when output increases along with economic development. Second, is the assumption that the financial system structure of a country affects EG. He revealed a significant positive impact of FD on the economic activity level. Third, he failed to justify the correlation between the integration of financial markets and the country's EG, while dealing with cross-country data limitations. Regressionist theory (McKinnon, 1973; Shaw, 1973) assumes that financial liberalization would improve competition, stimulate savings by increasing interest rates, boost investment and consequently enhance EG. The theory proposed by structuralists postulates that volume, structure, and composition of financial indicators stimulate EG by mobilizing savings, which consequently enhances the accumulation of capital resulting in EG (Guha-Khasnobis & Mavrotas, 2008).

Patrick (1966) labels the potential causal paths between FD and EG as the supply-leading and demand-following theory. The *supply-leading assumption* posits a causal association from FD to EG, which means the development of financial markets and institutions enhances the financial services supply which consequently contributes to EG. This supply-leading hypothesis is backed by King and Levine (1993) and Levine et al. (2000). On contrary, the *demand-following assumption* posits a possible link from EG to FD. Growing financial services demand here could lead to a growth of the financial sector as the overall economy flourishes. Gurley and Shaw (1967) and Goldsmith (1969) support this hypothesis. The relationship between FD and EG has also been explained on the basis of the theory of welfare economics and the efficient market hypothesis. The theory of welfare economics posits that competitive markets are Pareto efficient which is only achievable in a perfectly competitive market (Jehle & Reny, 2001). The efficient market hypothesis suggests that financial markets use information efficiently, competitive markets are "efficient," and government interventions to restrict the capital market would be "inefficient" (Eatwell, 1996). The theories suggest that economic efficiency depends on free markets for goods, labor and finance, and minimal state interference. Therefore, market liberalization would eliminate market distortions that are considered inefficient (Eatwell, 1996). Atje and Jovanovic (1993) extend the application of the Mankiw–Romer–Weil (MRW) growth model to reveal that the development of the stock market may be a prime factor of EG. In addition, Cooray (2010) by extending the MRW growth model also concludes the stock market as a key factor

in determining the degree of EG. Fung (2009) highlights two viewpoints considering the association between FD and growth. First, increasing use for services of financial intermediaries encourages growth and these services are regarded as a powerful tool for a country's EG. Second, the positive impact of financial facilities leads to the country's EG. If a transformation is made in the quality and quantity of financial services, then there is also improvement in EG.

Some scholars have a different understanding of how FD and EG are associated. Robinson (1952) and Lucas (1988) argue that financial sector development has a minimal contribution to EG, but growth drives it. According to Shan (2005), the economic crisis in Asia during 1997–1998 raises serious concerns about FD as a determinant of EG as financial markets remained unsuccessful in effectively allocating funds into productive ventures. In addition, the 2008 global financial crisis shows that financial markets collapse was triggered primarily by subprime mortgage lending. Therefore, the economies' failure to monitor and control the emerging financial markets and their reluctance to maintain financial innovation demand the cautious and continuous growth of financial markets, which could have a significant influence on the overall economy. Following the seminal theories on the association between FD and EG. Several empirical investigations have reported varied conclusions in terms of the association between FD and EG (as reported in the next section).

4.2 Empirical Evidence

Although economic theories postulate that FD is engaged in an optimistic relationship with the growth of the country's economy, empirical studies report mixed results. Goldsmith (1969) employed a sample of 35 countries and reported a positive association between FD and growth, reveals that financial markets which are well-developed, improve the effectiveness of capital allocation and quicker long-term growth through various channels. Berthelemy and Varoudakis (1996) indicate that financial sector development is a significant determinant of EG. Several studies found that the development of stock market is directly related to EG (Bencivenga et al., 1996; Levine & Zervos, 1999). Beck and Levine (2004) demonstrate that EG is strongly altered by both banks and stock markets. Arestis et al. (2001) argue that both credit and equity markets foster EG, but banking sector influence is more significant. King and Levine (1993) employed 77 countries' data and covered the large time span from 1960–1989 and concluded the positive association between FD and GDP growth. Beck and Levine (2004) declared that banks and stock market development have a positive impact on EG for 40 countries. Further, Saci et al. (2009) observed measures of the development of the stock market to have a positive impact on growth. However, EG was negatively affected by the bank's development in the presence of stock market development indicators. From 1980 to 2006, Leitao (2010) by employing a sample of 27 European and 5 BRICS economies revealed a positive link between FD and EG. Adusei (2013) incorporated African countries'

samples during 1981–2010 and discovered a positive association between FD and EG.

Regarding the causal link between FD and growth, the study of Jung (1986) declared a causal link between financial and economic measures based on data collected in the post-war era for 56 countries containing 19 developed countries. Furthermore, King and Levine (1993) conclude that FD does not result in EG; instead, finance contributes to EG. Luintel and Khan (1999) by employing 10 countries' data observed a two-sided causal link between FD and EG. Likewise, Wolde-Rufael (2009) verified a two-way association between EG and FD indicators. Levine and Zervos (1998) declared bank credit to private firms as a percentage of GDP, turnover ratio of the stock market, and price of shares traded are vigorous indicators of EG, income growth, and wealth generation. Lastly, Menyah et al. (2014) did not observe any association between FD and EG. Guru Biplab and Yadav Inder (2019) concluded that there is a strong and positive link between FD and EG in selected countries. The expansion of stock market and banking activities simultaneously is essential for a country's growth. Therefore, there may be no trade-off between the development of bank and stock market. In short, their study reinforces the theory of Schumpeter (1934), McKinnon (1973), and Shaw (1973) that FD supports EG. Calderón and Liu (2003) show that the development of the financial system leads to EG. Liang and Teng (2006) considered the association between FD and EG from the period of 1952 to 2001 for China and concluded that a one-way causal link exists between them. Demetriades and Hussein (1996) used time-series estimation for GDP growth and FD and found that FD is crucial for the development of an economy. Kargbo and Adamu (2009) revealed that FD influences growth in a significant way and shows that investment is a tool through which the financial system leads to EG. Odhiambo (2009) investigated the association between FD, interest rate reforms, and EG in South Africa and reveal that financial depth and EG are significantly associated. Choong (2012) examined hypothetical models by using regression analysis for FD and EG association that indicates a positive influence of FD on EG. Fung (2009) examined the convergence by the interaction between finance and growth and found a strong indication for conditional convergence. Fung (2009) notices that in high and middle-income economies there are parallel growths in FD and a country's EG. Naceur and Ghazouani (2007) explored the influence of stock market and banking system advancement on EG. The finding shows that the stock market, banking system, and GDP growth are strongly associated.

Demetriades and Hussein (1996) declared that FD has a significant effect on the country's EG. They revealed a two-directional causality, though in many situations' FD monitors the growth of the economy. Luintel and Khan (1999) found an interconnection between FD and growth of economy in the selected sample of 10 least developed economies. Prior studies also explored the link between FD and EG in several developing and industrial countries. Calderón and Liu (2003) conduct a study in several countries including Chile, Netherlands, Denmark, and Bangladesh, and find that FD contributes to EG, and financial deepening leads to EG more in the emerging countries, and financial deepening also forces the growth of the

countries' economy through the accumulation of capital and output growth. Researchers (such as Yang, 2019) are also concerned about the middle-income economy trap. Low-income economies attempt to move toward middle-income economies and middle-income economies endeavor to move toward high-income economies. The issue of concern is some economies are caught in the middle-income economy trap, while others enjoy a quick and smooth transition to high-income economies. For instance, Mexico and Colombia are economies that have been trapped in the middle income for many decades. This dilemma is caused by factors in a banking system that hinders the formation of physical capital accumulation and technology innovation and therefore prevent credit and funds to work efficiently for economic development. Adu et al. (2013) suggest FD is necessary for the growth of a country's economy, but this growth of the economy is too complex to be dealt with only by FD. Abubakar et al. (2015) indicate that poor economic performance is the major problem in the ECOWAS region. Suitable financial policies and human capital accumulation are the main tools for EG for the ECOWAS region.

Xu (2000) provides evidence that in developing countries (e.g., India, Pakistan, Egypt, Chile, Congo, etc.) FD plays a central role in EG. The evidence shows that investments at the domestic level are a significant channel that encourages FD and the growth of the country's economy. Gokmenoglu et al. (2015) reported that international trade and FD contribute largely to the growth of Pakistan's economy. A change in FD and international trade can cause a change in Pakistan's EG change which in turn can cause a change in FD and international trade of the country (Gokmenoglu et al., 2015). Chaitip et al. (2015) report that as a consequence of the 2008 financial crisis, ASEAN countries have encountered a larger and prolonged decline in GDP growth. Especially, the GDP growth rate of Singapore, Thailand, and Malaysia have declined substantially. Chaitip et al. (2015) contend that the monetary policy of the central bank is one of the most influential tools for stabilizing and leading to EG. Khan (2003) states that the main constituents of the financial sector change with the deregulation of the scheduled bank's loaning rates, and with the introduction of new provident rules and regulations. However, several other studies did not find evidence of the influence of FD on EG. Alesina et al. (1994) analyzed the effect of capital controls among 20 OECD countries from 1950 to 1989 and revealed no proof of the clear impact of capital controls on GDP growth (OECD, 2004). Likewise, Grilli and Milesi-Ferretti (1995) could not find any evidence of a robust effect of capital control on growth in per capita real GDP, for 61 countries covering the period 1966 to 1989. Rodrik (1998) declared an insignificant impact of capital liberalization on EG for the East Asian and Latin American economies.

Quinn (1997) reveal conflicting results and found a significant positive impact of FD on EG. Several other studies also show mixed or conflicting results even with the use of more advanced panel data econometric methods such as the GMM (Schularick & Steger, 2006, 2010; Laureti & Postiglione, 2005; Lee & Jayadev, 2005; Bonfiglioli & Mendicino, 2004; Eichengreen & Leblang, 2003; Edison & Warnock, 2003; McLean & Shrestha, 2002; McKenzie, 2001; Reisen & Soto, 2001; Bailliu, 2000). Aziakpono (2011) reports that the contradictory conclusions are due to differences across the studies including differences in indicators of FD, the sample

of countries, the time period, the econometric methodology, and the set of variables used. Other studies in terms of emerging economies, found an insignificant and negative influence of financial markets on EG (Nili & Rastad, 2007; Kar et al., 2011; Narayan & Narayan, 2013). Nili and Rastad (2007) reveal that in oil-exporting countries, FD has a dampening impact on investment. Likewise, Narayan and Narayan (2013), for middle east economies found no evidence that the financial sector contributes to EG. Rioja and Valev (2014) in this regard, on low-income economies, found that stock markets do not contribute to growth, while banks have a significantly positive impact on the accumulation of capital. Many researchers also highlighted that this link may vary in terms of the degree of FD. Rioja and Valev (2004) indicated that the impact is positive in countries with moderate and high levels of FD but highest in the middle region.

4.3 Methodological Issues

Extant literature proposes an intense association between FD and EG. The literature also suggests that enhanced financial services would greatly lead to EG. Researchers declared that improvement in financial sector services would probably cause the growth of a country's economy. Many studies were organized in a way to find empirical verification for the association between FD and EG. Some scholars were focused on investigating the impact and casual link between FD and a country's EG and some scholars aim to add the long-run analysis to their work by also analyzing a probable co-integrating relation between FD and the country's EG. Several empirical studies are conducted at different stages. Empirical studies of first stage are structured on cross-sectional data. Here, researchers adopted WLS or OLS to examine the association of FD and the growth of a country's economy. Goldsmith (1969) concluded that the growth of economy is certainly connected with financial sector development by examining 35 countries' data during 1860–1963. Empirical studies of second stage are structured on the basis of time-series data. Researchers have used the error correction model and cointegration model to examine the non-stationery and time-series data and applied Granger test to examine the connection for FD and EG. Arestis and Demetriades (1997) examined the link between FD and EG in Germany, the USA, and South Korea and concluded that FD causes EG in all three countries by employing Johnsen cointegration and weak exogenous test. Empirical studies of third stage are structured on the basis of panel data. This model has not only expanded the framework research about the time series model and cross-sectional model but also exposes heterogeneity of diverse cross-sectional units. Panel data model has been extensively incorporated in studies on FD and EG. Calderón and Liu (2003) use the VAR model to check the relation between FD and growth of a country's economy, taking data of 109 underdeveloped and well-developed countries covering the time span of 1960–1994 and conclude that FD facilitates the growth of the economy by encouraging investment, and this result is robust in developing countries as compared to the developed countries.

In providing solutions, recent researches adopted dynamic panel data estimation, which includes the first differenced GMM approach, to control the biased coefficient estimates in cross-country analysis (Levine et al., 2000). Their findings show a positive association between FD and the country's long-run EG. This approach is in line with the classical view. One of the solutions to reduce the problems linked with the cross-country analysis is to assess the association between FD and the growth of country's economy in a regional analysis framework. Valverde and Fernández (2004) contend that the benefits of the regional analysis framework come from major two ways. First, it is assumed that the heterogeneity in the regions of a sole country is low and simply handled. Secondly, the proxy for FD including liberalization, nature of institutional and formal framework that affect the country's EG more efficiently can be controlled at a regional level. The connection between FD and EG have been analyzed in a regional framework for Spain (Valverde & Fernández, 2004), China (Chen, 2006), and Italy (Guiso et al., 2004), lack of empirical work at regional level framework can be credited to the hypothesis that financial capital is smoothly mobile among different regions of a country and the problem related to the link between FD and growth of country's economy cannot have a spatial dimension. Under this assumption, financial intermediaries confirm that there is a perfect distribution of funds between organizations and the country's economy that would lead to an integrated financial market across regions within one country.

Several researchers formulated different equations to investigate the relationship between the two variables. In some studies, the independent variable is FD for the purpose to inspect its influence on EG, which is a dependent variable. In these equations, the consequences of the coefficient of the independent variable (FD) provide clear evidence on if and what FD influences the dependent variable (EG). For instance, Odedokun (1996) projected equations of growth with OLS and generalized least squares approach using data for the period of 1964–1989 of 71 countries and declared that FD significantly determines EG. Furthermore, the equation also provides support that FD has an identical status to EG as related to other elements of EG such as a country's openness to trade and investment. Khan (2003) examined 159 underdeveloped and industrial countries covering the period 1960–1999 and indicated that FD influences the growth of a country's economy. Some researchers, i.e., Goldsmith (1969), Khadraoui and Smida (2012) also estimated the growth equation by OLS and least-squares approach for panel data. Furthermore, they recommend caution when selecting proxies for FD.

Rather than using a single growth equation, Dawson (2008) used three different growth equations in his analysis. In his study, the hypothesis of Solow (1956)) is used to derive growth equations, and investment, level of labor, and physical capital were used as control variables. Each equation has its varying measures for FD. The initial equation uses the growth rate of credit to measure FD. The second equation captures an economy's credit share as a measure of FD. Both equations tested superior to the single growth equation. The study using 44 underdeveloped countries covering a period of 1974–2001 and using the growth equations demonstrate that FD has a significant influence on the growth of a country's economy. Khadraoui and

Smida (2012) considered panel data of 70 underdeveloped and developed economies from 1970 to 2009 time period and used the OLS equation for their analysis. They also used the difference and system GMM approach for analyzing the dynamic panel data. Their evidence shows that FD significantly influences the growth of country's economy with five different proxies of FD including the credit level, current liabilities, size of market capitalization, and assets of financial system that contribute to the GDP. Even by including various measures of FD, the findings still show a positive influence of FD on the growth of the economy. Although, Demetriades and Hussein (1996) examined 10 developing countries and applying the Granger causality test failed to back the argument that FD leads to the country's EG. They used two indicators of FD and failed to show evidence for bidirectionality. Khalifa Al-Yousif (2002) examined a bidirectional association between FD and growth of country's EG by using panel data for 30 underdeveloped economies covering the period from 1970 to 1999.

4.3.1 Measuring FD and EG

An efficient measure of FD is essential for assessing financial sector development as well as understanding the role of FD in the growth of a country's economy. However, measuring FD is difficult in general because it is a broader concept with many aspects. Empirical studies conducted generally relied on traditional quantitative measures that are valid for long time periods for a large number of countries. These indicators include the proportion of financial institutions' assets to GDP, the proportion of liquid liabilities to GDP, and the share of deposits to GDP. FD may be assessed by a variety of factors such as financial system' size, depth, accessibility, and soundness. It may be determined by assessing the financial markets and institutions' activities and performance. It is found that the higher the level of a country's FD, the greater the financial services would be available. A well-established financial sector provides greater returns with relatively low risk (Adnan, 2011). The measures of FD also include variables associated with the stock market and banking sector of an economy. The development of the banking sector is assessed through the proportion of liquid liabilities of banks to GDP (Levine, 1997), the percentage of bank credit to bank deposits; and domestic credit to the private sector (CPS) as a proportion of GDP (Levine & Zervos, 1998; Adusei, 2013). The measures of stock market development include the size of stock market or total value of overall shares listed in stock exchange as a proportion of GDP; the total amount of the shares traded as a proportion of GDP (Saci et al., 2009); and the ratio of total traded shares value to average market capitalization (Beck et al., 2000). The literature typically describes FD as improving the quality, quantity, and effectiveness of financial institutions. This method implies the integration of several institutions and activities. As it could not be measured with a single indicator, FD indicators widely used are as follows: The first indicator is the proportion of broad money (M2) to GDP. A greater proportion of M2 to GDP suggests higher FD. CREDIT to GDP is the second indicator defines as the proportion of credits to the private sector to GDP. As

compared to the credit given to the public sector, this indicator segregates credits provided to the private sector and further eliminates credits granted by the central bank. We presume that this indicator is better than other FD indicators employed in the literature. King and Levine (1993) have used a proxy of private-sector gross claims to GDP, which involves credits approved by the central bank and government entities. Levine (1997) employs an indicator of money bank credits to the private sector as a percentage of GDP that does not include nonmonetary bank credits to the private sector. He further claimed that the credit has a strong advantage over monetary aggregate indicators such as M1, M2, or M3, because it reflects more reliably the real amount of funds channeled into the private sector. Hence, the private-sector bank Credit-to-GDP is quite linked directly to investment and growth. We perceive high credit to GDP as an indicator of greater financial services and thus greater development of financial intermediaries. Financial sector development measures must address the characteristics of the financial system such as credit intermediation, liquidity, and risk management. Two broad categories of measures of FD are quantity measures and structural measures.

Quantity Measures

The common indicators of FD and financial deepening are quantity measures centered on money and credit aggregates. The most basic measure is a percentage of money to GDP that captures the level of economic monetization. Money delivers useful services related to payments and savings. The "narrow money" better reflects the first and "broad money" the latter.

Structural Measures

The structural measures are intended to better evaluate the financial system's structure and to assess the effectiveness of its various components. In this regard, three measures are recommended. Initially, the percentage of broad money to narrow money is used. This measure is positively associated with the FD of a country. Secondly, the percentage of stock market outstanding to broad money or (SEC/M2) is used as a measure of the balance between intermediaries and securities markets in the financial sector. At last, the percentage of derivative turnover divided by underlying instrument market turnover is used. This measure captures the significance of "off-balance-sheet" risk management practices, in relation to monetary exchange in the instruments on which the derivatives are based. The positive trend indicates FD.

5 FD and EG in Islamic Context

Islamic finance is quickly increasing throughout the world. The size of global Islamic financial services is increasing quickly, and this industry's assets have now amount up to $ 2 trillion, of which 80% of assets are held by Islamic banks (IBs) (Reuters, 2018). Hence, this sector is growing at a higher rate than conventional banking especially following the financial crisis of 2008. There is the hope of this continuous growth in future (The Economist, 2013). Maintaining the significant size of that sector and basic differences between these two banking systems (Islamic banks (IBs) and Conventional banks (CBs)), our study also presents a comparative analysis of the association between FD and EG across each bank type. Banks are one of the institutions that contribute to FD. Many economies entirely rely on their banking sector more than financial markets. Recently Islamic banking has gained greater attention from academic as well as professional fronts. The sharia-compliant industry has about $ 2000 million asset size worldwide at present. Gheeraert (2014) observed an increase of a sharia-compliant banking industry that does not overtake the traditional banking sector in the Islamic economies, contributes to the greater development of the banking sector, when measured in terms of private credit or deposits to GDP.

5.1 Islamic Banks (IBs) and EG

Over recent years, several researchers have been concentrated on the impact of Islamic banking on the country's EG. Such views have not gained much extensive empirical attention given favorable opinions on Islamic finance within the financial world. In contrast to traditional banking, where interest dealing is the main component and money is exchanged as a commodity. Islamic finance is an interest-free banking mechanism based on real assets. Under the Islamic banking system, the risk is communicated between the borrowers and the lenders as per principles of partnership, mutual ownership, sale, and lease. Islamic finance has the prospect of supporting minority groups like farmers and SMEs, which can help to promote economic development (Fasih, 2012). Many studies have explored the link between the Islamic banking system and EG (Farahani & Mohammad Hossein, 2012; Warde, 2010). The common consciences of these studies are that the principles of Islamic finance foster harmony, synchronization, and coordination between the economic and productive domains. Thus, the application of Islamic banking concepts in terms of asymmetrical information and conflicts of interest can resolve certain deficiencies in the traditional banking system. Goaied and Sassi (2010) studied the association between FD and EG. They tried to assess the particularly the influence of the Islamic banking sector on country's EG by using a sample of 16 MENA countries. They have used the volume of Islamic banking credit given to private sector to GDP as a measure of Islamic banking development and their findings are based on the

dynamic panel model estimated by GMM methodology. They found no significant association between Islamic banking development and EG and suggest that EG is not stimulated by Islamic financial system. Lastly, the findings also figured out that the association between FD and EG is varied among MENA region, which is adverse for oil-exporting MENA and insignificantly positive for non-oil rich MENA countries.

5.2 Conventional Banks (CBs) and EG

Many studies have analyzed the significance of CBs for EG. Brunner et al. (1963) as well as Kashyap and Stein (2000) explored the function of banks in communicating monetary policy and economic fluctuations domestically. They revealed that FD is important domestically and also suggests that if capital markets are segregated, the output would change due to a shift in bank lending. Hondroyiannis et al. (2005) employed the VAR model to examine long-term empirical association between banking sector and stock market development and EG. They studied this relationship for Greece and covers the time span of 1986 to 1999. Their findings highlight that the development of stock markets and banks both enhances long-term EG even if its impact is not substantial. In addition, they also stated that the role of the development of the banking sector in stimulating EG tends to be greater than that of stock markets. Naceur and Ghazouani (2007) employed the panel data from MENA region covering the time span of 10 years from 1980 to 1990 for examining FD and EG nexus. They declared no significant association between the development of banks, stock markets, and EG which may be due to an underdeveloped financial sector that adversely affects EG of MENA countries. Thus, they suggest the need to ensure institutional development and improved the effectiveness of banking sector in MENA countries. Similarly, Cole et al. (2008) analyzed the link between stock returns of banking sector and potential EG. They incorporate data of 18 developing and 18 developed countries and the sample period is 1973–2001. The dynamic panel model is used to analyze data and findings suggest a significant positive association between stock returns of banking sector and EG.

Conversely, Bolbol et al. (2005) explored the relationship between the financial system and total factor productivity in Egypt. The time span of their study was from 1974 to 2002. This is the first study conducted in MENA region, which analyzes the combined impact of stock market and banking sector development in terms of EG. They concluded that bank-based measures have a detrimental effect on TFP if they are correlated with per capita income limit, meanwhile, the impact of market-based measures is positively revealed through the transfer of private net resources. Chang et al. (2010) analyzed the impact of the reallocation of bank funds on growth in four Chinese state-owned banks that conduct the nationwide reallocation of funds. They observed no connection between the bank funds reallocation and EG; however, they reported a significant positive association between bank deposits and growth. Furthermore, as market-oriented reforms in China intensify, reallocation of funds

and loans begin to have a positive effect on growth given the fact that banks are owned by the government.

6 Critical Reflections

The debate on the association between FD and EG remains controversial as reflected in the evidences produced by prior studies. While numerous studies based on the underpinnings of seminal economic theories found support for a positive association, a number of other studies show insignificant or negative relationships. All these prior studies and theories are premised on the instrumental view that the firm's primary objective is to maximize shareholder wealth and hence FD and economic development are mechanisms that facilitate such instrumental motives. Though these theories have been popularized for more than a century, the relevance of the viewpoints expressed by the theorists and scholars, who have found evidences via statistical analysis to support the theories, is questionable in the wake of environmental and social; responsibility developments that have taken place during the last five decades or so. The traditional definitions of EG and FD are premised primarily on the instrumental perspective of economic rationality of profit and value maximization with minimum or no serious consideration for the adverse societal and environmental impacts of growth in GDP and FD. GDP growth in the traditional sense, such as in neoclassical economic theory, is viewed mainly in terms of growth in production measurable in monetary terms. This includes the measurement of inputs and outputs of the key factors of production stated as labor, capital, and technology. GDP does not include the cost of unpaid services such as volunteer work to help the disabled, childcare, and the cost of environmental destruction resulting from the production of goods and services. GDP does not measure how environmental degradation impacts the wellbeing of society. Hence EG facilitated by FD measured purely in terms of traditional economics and finance does not measure the standard of living when environmental impacts are factored in. Although the level of EG does not always reveal the real standards of living, it remains the key indicator of inclination. In addition, EG indicators do not involve activities having negative impacts, like environmental pollution and its continuous deterioration.

The issue of EG augments serious concerns about the key drivers that influence EG. Since EG is a continuous process, will the same factors in the same dimensions decide its intensity in the future? Classical economists consider investments and improving productive capacity as contributing factors of EG. Neoclassical economics in the twentieth century founded three main determinants of EG: that are land, labor, and capital. In capitalist economies, this was enough to describe the causes of EG. The more these determinants were employed, the higher was the EG. However, the question remains whether the capitalist stance on EG and FD is sustainable. Societies only value what they measure and if their focus on the drivers and measurement of EG consistent with conventional economic theory, the instrumental approach will be preferred over environmental and social considerations. The

instrumental approach to EG would be valued by societies that value capitalism. Governments aiming for more tax revenue may want to increase EG to allow businesses to hire workers, resulting in increased income and higher taxes. In addition, governments seeking reelection may pursue the instrumental objective of EG. The government boosts growth through the expansion of fiscal policy. According to which it may spend more, cut taxes, or both.

Fiscal policy expansion results in a deficit when the government keeps spending more and imposed less taxes, and eventually contributes to high debt levels. As the percentage of debt-to-GDP approaches 100%, it lowers EG. Foreign investors cease investing resources in a high debt ratio economy. Governments must be careful with the expansion of fiscal policy. They should only use it when there is a contraction or recession in the economy. The leaders should spend less and impose more taxes when economy is in a growing phase. This conservative fiscal policy makes sure that the EG will remain sustainable. A central bank of a country can also enhance growth through monetary policy. It can lower interest rates to increase the money supply and boost consumer spending and EG. FD is associated with capital markets including financial institutions such as the stock market and the banks and is also engulfed by the instrumental perspective of economic rationality with the primary aim of maximizing value for shareholders. FD in the modern era operates under the charade of being a savior of EG for the benefit of society as a whole.

The above reflections are not new in CSR literature and for critical theorists of economic rationality. However, the relevance of rekindling the critical debate in the current era is imperative, especially with the advent of the COVID-19 pandemic and its continuing disastrous impacts in a world that is vainly struggling to overcome the pandemic. With almost 16 million reported cases and more than 1 million deaths worldwide, with some countries more adversely affected than others, and the grave economic impacts of the pandemic, EG and FD need to be redefined. The emerging notion of normative rationality embraces a more holistic approach of stakeholders as comprising all parties affected by EG and FD in general and in particular by the activities of private corporations who are at the forefront of the production process and driving labor, capital; and technology in GDP growth. Consistent with the normative view, the idea of sustainable development emerged in the 1980s stressing that development had to meet current needs without compromising the needs of the next generations. A new turn to EG was promulgated by the United Nations starting with 1992, United Nations Conference on "*Environment and Development*" in Rio de Janeiro where representatives of 176 countries have signed Agenda 21, which sets out the concept of sustainable development and outlines a strategy for achieving it. Ever since the Rio de Janeiro conference numerous other sustainable development United Nations conferences followed including UN Conference on Human Rights & Sustainable Development (1993); UN Climate Change Conference (1995); World Food Summit & Sustainable Development Conference (1996); The Kyoto Protocol & Sustainable Development Conference (1997); Millenium Summit & Sustainable Development Conference (2000); Johannesburg's Conference on Sustainable Development (2002); New York World Summit on Sustainable Development (2005); Copenhagen Summit & Sustainable Development (2009); Rio20+ UN Conference

on Sustainable Development (2012); UN Climate Change Conference & Sustainable Development (2014); COP21 & the Paris Agreement for Sustainable Development (2015); New York & the new Sustainable Development Goals (2005); Sustainable Development conference COP24 in Katowice, Poland (2018). The primary aim of these conferences was to redefine development in terms of social and environmental considerations while acknowledging the importance of EG. During the same era, numerous scholars have expressed viewpoints on corporate social responsibility. While some of the scholars were leaning more toward the instrumental perspective in their articulation of CSR, others were approaching CSR like normative thinking giving more emphasis to social and environmental considerations. However, in spite of these endeavors, the instrumental perspective remains the preferred and prevailing approach to EG and the development of the financial sector. Such a strong preference for the instrumental approach reflects the influence of capitalism and neoclassical economics.

The present era of the COVID-19 pandemic has created uncertainty as to the direction of EG and FD across the globe. It is not clear whether the classical notions of EG and FD would be able to provide sustainable solutions in the event of a total collapse of economies around the world and the event of another great recession more severe than the Great Depression of the early twentieth century. If there are no forthcoming solutions like classical economic theory, then a redefinition of development and values becomes an option. Sustainable development with all its elements of economic, social, and environmental considerations is deemed to replace the classical notions of EG and FD. This would amount to the emergence of values defined, not merely from an instrumental perspective, but also from a normative approach to include such values as environmental value, social value, cultural value, religiosity, philanthropic values, business ethics, and sustainability value and maximizing these values along with economic value becomes the primary objective of development. It is no longer the interest of the shareholders and entrepreneurs that is maximized but the interests of all stakeholders. The concept of common good prevails over that of the interests of certain groups in society, the order of the day is socialist in nature and no longer capitalist.

7 Conclusion

The FD (FD) plays a significant role in the EG of the country. The main purpose of the book chapter is to analyze the impact of FD on the growth of the country's economy. By boosting investments through savings availability, enhancing foreign capital inflows, and optimizing resource allocation among productive ventures, the development of financial system can improve the long-term EG through its effect on the accumulation of capital and level of technological development. The causal link between financial deepening and EG is important due to its varying implications for development policies. One could argue that policies should aim to the liberalization of financial sector in case of supply leading; while in the terms of demand-following,

stress should be given to growth-enhancing policies. The current chapter is helpful for the policymakers and financers. For policymakers, it is helpful as it provides practical direction on banking policies in underdeveloped countries. For financers, this chapter is helpful in providing information to those who are interested in financing in underdeveloped countries. By knowing the association in the FD and growth of the economy, it also helps financers to overcome risk.

The planned result of this chapter is to provide practical direction to policymakers in developing countries. This research will facilitate policymakers by advising on issues such as: efficiently strengthening the domestic banking sector and helps in smoothly and effectively regulate it by encouraging savings on the domestic level, contribute significantly to private and public investments, improving country's international trade in order to increase the real GDP growth and overall economic condition (Revell and Goldsmith, 1970). This chapter has a direct impact on macroeconomic policies. For example, if FD is critical and important for the growth of the country's economy and as such finance also encourages growth then fiscal policies and monetary policies will all be planned in a way to strengthen the financial system in the economy. This chapter helps us to encourage thought on this topic and gives a chance to contribute to the literature review on FD and EG for further researchers.

Despite the increasing empirical studies on the link between financial integration and EG, the lack of consensus among the studies arises the need for additional studies to improve our understanding of the nexus. The weakness inherent in neoclassical models of EG has not been adequately addressed in extant studies. In particular, the failure of empirical studies to factor in social and environmental considerations in growth models and the role of the financial sector need to be addressed in future studies.

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New Insights on the Trading Volume–Return Relationship: Evidence from the Three Largest Stock Exchanges

Victor Troster, André M. Marques, and Muhammad Shahbaz

1 Introduction

The predictability of stock returns is a topic of intense debate in theoretical and empirical finance. As long as trading volume helps explain subsequent stock returns, the directional predictability from volume to returns emerges as a relevant field of research in finance. Although asset pricing models incorporated trading volume only recently (Acharya & Pedersen, 2005), many studies have analyzed the return–volume relationship. Clark (1973), Epps and Epps (1976), and Tauchen and Pitts (1983) proposed a mixture-of-distributions hypothesis to analyze the volume–return relationship. Copeland (1976), Jennings et al. (1981), and Jennings and Barry (1983) developed a "sequential arrival information" hypothesis to explain the volume–return relationship. Other theoretical models attempted to assess the trading volume–stock return relationship via asymmetric information models (Kyle, 1985; He & Wang, 1995; Llorente et al., 2002), information accuracy models (Schneider, 2009), and equilibrium models emphasizing the interpretation of news (Harris & Raviv, 1993; Blume et al., 1994; Wang, 1994; Kandel & Pearson, 1995; Suominen, 2001). In addition, certain papers suggest that the sign of the volume–return causality is affected by the information content of the trades (Campbell et al., 1993; Gebka & Wohar, 2013).

This chapter provides new insights on the dynamic volume–return relationship. We verify whether non-informational or informational trading can explain the

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volume–return relation in the three largest stock markets: the theoretical framework of Campbell et al. (1993), Wang (1994), and Llorente et al. (2002) states that the relative predominance of informational (non-informational) trades leads to a contemporaneous high volume and to subsequent return continuations (reversals). We apply the cross-quantilogram procedure of Han et al. (2016) that tests for directional predictability and calculates quantile dependence across all market states of the volume–return relation. It is important to consider different market states since the volume–return relationship may change across different market phases (see e.g., Chen, 2012). In addition, the overall overconfidence level increases (decreases) during bull (bear) market states, the so-called learning to be overconfident hypothesis proposed by Gervais and Odean (2001). Overconfident traders may induce a higher volume by overreacting to outstanding but irrelevant information (see e.g., Odean, 1998). Hence, we apply a cross-quantilogram analysis that accounts for nonlinearities and asymmetries in the dynamic volume–return relation. Our approach allows us to discern whether prevalent informational or non-informational trading is followed or positive volume–return causality across different market states.

This chapter not only analyzes whether there is significant quantile dependence between trading volume and stock returns, but also examines linear and nonlinear volume–return causality across different market phases. It is important to consider nonlinear and asymmetric causal relationships in different market phases since certain papers suggest that linear models are inaccurate for modelling stock market returns (Ciner, 2002) Gabaix et al., 2003; Bouezmarni et al., 2012; Chen, 2012; Pradkhan, 2016). We implement a quantile-causality test developed by Troster (2018) that considers asymmetries and nonlinearities in the volume–return relation. This test has the advantage of allowing for nonlinear specifications, in contrast to the standard quantile-causality sup-Wald test of Koenker and Machado (1999) that specifies only linear quantile regression models. Therefore, we deliver a more complete examination of the volume–return relationship by considering linear/nonlinear quantile dependence across different market phases.

The empirical evidence on the contemporaneous relationship between stock returns and trading volume is mixed (see Karpoff, 1987; Gallant et al., 1992). Morgan (1976), Westerfield (1977), and Rogalski (1978) showed that significant stock price changes are followed by substantial trading volume. Balduzzi et al. (1996) found no significant correlation between volume and returns when analyzing extreme price changes. Nonetheless, the dynamic causal volume–return relationship is more relevant than the contemporaneous correlation between them. Thus, since the 1990s, studies have examined whether past trading volume forecast future returns. Saatcioglu and Starks (1998) provided weak evidence of stock returns leading to volume changes for six Latin America stock markets. Gervais et al. (2001) found that extremely high values of volume lead positive stock returns, while very low values of volume lead to negative stock returns. Chen et al. (2001) reported bidirectional Granger-causality between volume and returns for certain countries, but they found no causal relation between them in the USA, the UK, Japan, France, and Italy. Ciner (2002) performed linear and nonlinear causality tests

between volume and returns for Tokyo future contracts. He found linear and nonlinear return–volume causality without nonlinear feedback from volume to return. Lee and Rui (2002) investigated the empirical dynamic volume–return relationship for stock exchanges of the USA, Japan, and the UK. They found no volume–return causality, but a positive feedback from volume to the volatility of the returns for all markets analyzed. Gabaix et al. (2003) showed that the volume–return relation is nonlinear, suggesting that financial returns display heavy-tailed distributions.

Xu et al. (2006) examined the dynamics between volume and return volatility; they document a significant correlation between past volume and future return volatility. Griffin et al. (2007) found a significant relationship between turnover and past returns among 46 developed and emerging economies. Su and White (2007) provided evidence of return–volume causality, using a nonparametric conditional independence test, for the Nasdaq and Standard and Poor's 500 (S&P 500) data but not for the Dow Jones; they found absence of volume–return causality. Hutson et al. (2008) showed that past volume helps predict subsequent return skewness in 8 out 11 international stock markets, including the USA. Chen (2012) reported significant return–volume causality across different market phases for the S&P 500 index; nevertheless, trading volume affects future returns only in bear markets. Bouezmarni et al. (2012) documented strong linear and nonlinear return–volume causality, but weak evidence of nonlinear volume–return causality for the S&P 500 index. Hiemstra and Jones (1994) and Moosa and Silvapulle (2000) reported evidence of a nonlinear relationship between trading volume and future returns. Nonetheless, Diks and Panchenko (2006) uncovered some problems with the approach of Hiemstra and Jones (1994), and they found weak support of volume–return causality once these problems were corrected. Chuang et al. (2009) applied tests for Granger-causality-in-quantiles between volume and returns for the S&P 500, New York Stock Exchange (NYSE), and Financial Times Stock Exchange 100 (FTSE-100) indices. They found varied results across quantiles of the volume–return causality, whereas the observed return–volume causality was more balanced. Lin (2013) confirmed these findings by using the same approach for six emerging Asian markets. Gebka and Wohar (2013) reported an asymmetric quantile-causality from volume to returns for the USA and certain Asian countries. More recently, Longin and Pagliardi (2016) documented tail dependence between volume and returns of the S&P 500 index. Pradkhan (2016) also found asymmetries in the dynamics between volume and returns of commodities futures contracts across distinct market states.

Our analysis covers daily trading volume and stock return series of the three largest stock exchanges: S&P 500 (New York), FTSE-100 (London), and Nikkei 225 (Tokyo). Our daily data span from Jan 04, 1993 to Dec 30, 2016. Furthermore, we extend the data used by Chuang et al. (2009), Chen (2012), and Gebka and Wohar (2013), covering the period before and after the 2008 great recession. We find bidirectional Granger-causality between volume and returns in the quantiles above and below the median for all three stock market indices using linear specifications of the quantile regression model. In contrast to the results of a conditional mean analysis, we find a volume–return causal relationship for all stock indices. In

addition, the observed causality of past trading volume is negative (positive) for low (high) returns of the S&P 500 and FTSE-100 indices. The observed heterogeneity of results across quantiles on the volume–return causality is conforming to the theoretical framework of Campbell et al. (1993), Wang (1994), Llorente et al. (2002), in which prevalent informational (non-informational) trading leads to negative (positive) volume–return causality. We find positive (negative) volume–return causality as well as negative (positive) autocorrelation of the returns for quantiles above (below) the median, indicating the predominance of non-informational (informational) trading in bull (bear) markets of the S&P 500 and FTSE-100 stock exchanges. The relative predominance of non-informational trades during bull market phases may also be generated by increases in the aggregate level of overconfidence, as implied by the model of overconfident traders of Gervais and Odean (2001). We found linear and nonlinear volume–return causality for the Nikkei (Nikkei 225) index, without strong nonlinear feedback from returns to volume. Our results suggest that non-informational selling pressure is the main reason for trades during both bear and bull markets for the Nikkei index, since there is positive volume–return causality together with negative autocorrelation of the returns. Furthermore, non-informational selling induces positive volume–return causality at high quantiles, whereas non-informational buying leads to negative volume–return causality at low quantiles for the Nikkei index, for different subsample periods and for a detrended volume measure. Our findings have important policy implications for risk managers, who may use the predictability from past volume to future returns across different market phases for develop optimal hedging strategies.

The remainder of the chapter advances as follows. Section 2 outlines the literature on the theoretical models for explaining the dynamic volume–return relationship. Section 3 describes the econometric framework used in the chapter. Section 4 reports our empirical findings, and Sect. 5 presents some robustness checks. Finally, Sect. 6 concludes the chapter.

2 Theoretical Framework on the Dynamic Volume–Return Relationship

This chapter stands in the literature that analyzes the dynamic volume–return causality. Certain asset pricing models suggest that trading volume helps predict subsequent stock returns (Copeland, 1976; Jennings & Barry, 1983; Blume et al., 1994; Wang, 1994; Llorente et al., 2002; Schneider, 2009). Copeland (1976), Jennings et al. (1981), and Jennings and Barry (1983) document that the gradual dissemination of new information in the market helps create a positive volume–return causality. Conversely, Clark (1973), Epps and Epps (1976), and Tauchen and Pitts (1983) developed a mixture-of-distributions model where the dissemination of information is contemporaneous so that they found no significant volume–return causality. Campbell et al. (1993) derived a model of non-informational trades to

account for the dynamic volume–return relation. They argue that a large trading activity leads to negative return autocorrelations when trades are due to liquidity motives. On the other hand, Wang (1994) proposed a model of asymmetrically informed investors where a large trading activity leads to returns continuations if trades are related to speculative (or informational) reasons. In his model, investors have different information about stock's subsequent dividends. The informed investors may trade when they collect private information about the stock's subsequent cash flow (informational trading) or when their private investment opportunity changes (non-informational trading). Nevertheless, the uninformed investors are unable to completely differentiate non-informational from informational trades of the informed investors. The uninformed investors update their trades to adapt non-informational trades of informed investors. Then, a large trading activity is followed by positive (negative) return autocorrelations when trading is informational (non-informational).

Blume et al. (1994) developed a model where trading volume provides relevant information on the accuracy of traders' information signals. Using a rational expectations model, He and Wang (1995) showed that volume generated by new information is followed by large price changes; nevertheless, they found absence of volume–return causality when the volume is generated by existing information. Kandel and Pearson (1995) derived a model where agents have differential interpretations of the public signals, which provides evidence for a contemporaneous positive volume–return relation as reported in Karpoff (1987). Llorente et al. (2002) confirmed the findings of Wang (1994) by applying a model where investors trade for reasons related to speculative or hedging trades. Their empirical findings suggest that returns associated with a high (low) degree of speculative (or informational) trading relative to hedging (or non-informational) trading are less (more) likely to display reversals on high-volume periods. Gervais and Odean (2001) developed a model where an investors' level of overconfidence changes with his successes and failures. Since investors are more likely to obtain successful portfolio strategies during bull market phases, this model implies that the aggregate level of overconfidence during bull market states is higher than in bear market phases. Moreover, Deaves et al. (2010) and Shi and Wang (2013) reported evidence that overconfidence is higher during bull markets. Odean (1998) shows that overconfident traders may induce a higher volume by overreacting to outstanding but irrelevant information. Thus, in line with the models of non-informational and informational trading (Campbell et al., 1993; Wang, 1994; Llorente et al., 2002), overconfidence may lead to an asymmetric volume–return relation. Schneider (2009) proposed a rational expectations model where trading volume provides extra information that helps investors choose how to consider public signals relative to their private information when they adjust their expectations. Besides, high trading activity is correlated with higher expected returns. Pradkhan (2016) argues that overconfidence has an intrinsic non-informational part that is the overestimation of the accuracy of the information. Therefore, we characterize non-informational trading as the trades related to overconfidence reasons or liquidity needs.

The amount of informational trading does not necessarily entail a unique sign on the volume–return causality. Gebka and Wohar (2013) propose four distinct cases of the volume–return relationship and the prevalent trading reason. First, trading based on negative (positive) private signals may generate a contemporaneous high trading volume and negative (positive) returns, together with subsequent negative (positive) returns at the following day as private information disseminates among market investors. Therefore, trading based on negative (positive) private information may entail negative (positive) volume–return causality as well as positive return autocorrelation. This pattern is more probable during bear market phases, where the overconfidence level is low and investors are less willing to trade except if they have some private information. In addition, non-informational selling (buying) may lead to a contemporaneous high trading volume and negative (positive) returns, succeeded by subsequent positive (negative) returns at the following day as uninformed traders update the non-informational proportion of their trades and prices regress to their equilibrium values. Thus, non-informational selling (buying) may induce positive (negative) volume–return causality as well as negative return autocorrelation. Assuming that non-informational trades are predominant during bull market states, this pattern is more probable during bull market phases than in the course of bear market states.

3 Econometric Methodology

According to Granger (1969, 1980), the null hypothesis of Granger non-causality from trading volume, V_t, to stock returns, R_t, can be stated as follows:

$$F_{R_t}\left(r|\mathcal{F}_{t-1}^{R}, \mathcal{F}_{t-1}^{V}\right) = F_{R_t}\left(r|\mathcal{F}_{t-1}^{R}\right), \text{for all } r \in \mathbb{R}, \tag{1}$$

where $\mathcal{F}_{t-1}^{R} = \left\{R_{t-1}, R_{t-2}, \ldots, R_{t-q}\right\}$, $\mathcal{F}_{t-1}^{V} = \left\{V_{t-1}, V_{t-2}, \ldots, V_{t-q}\right\}$, $\mathcal{F}_{t-1} = \left(\mathcal{F}_{t-1}^{R}, \mathcal{F}_{t-1}^{V}\right)'$, and $F_{R_t}(\cdot|\mathcal{F}_{t-1})$ is the conditional distribution of R_t conditioned on $\mathcal{F}_{t-1}$. If Eq. (1) holds, it follows that $E\left(R_t|\mathcal{F}_{t-1}^{R}, \mathcal{F}_{t-1}^{V}\right) = E\left(R_t|\mathcal{F}_{t-1}^{R}\right)$, a.s., where $E(R_t|\mathcal{F}_{t-1})$ is the mean of $F_{R_t}(\cdot|\mathcal{F}_{t-1})$. Then, to test for Granger-causality in mean, we estimate a bivariate VAR model as following:

$$R_t = \alpha + \sum\nolimits_{j=1}^{q} \beta_j R_{t-j} + \sum\nolimits_{j=1}^{q} \gamma_j V_{t-j} + u_t,$$

$$V_t = \xi + \sum\nolimits_{j=1}^{q} \delta_j R_{t-j} + \sum\nolimits_{j=1}^{q} \zeta_j V_{t-j} + \upsilon_t,$$

where u_t and υ_t are uncorrelated White-noise processes. We choose the lag length of the VAR that minimizes the Akaike information criterion (AIC), considering a lag length up to 36. A test for Granger-causality in mean from V_t to R_t consists of a F-test on the null $H_0 : \gamma_j = 0, j = 1, \ldots, q$. To account for heteroscedastic errors, we apply the robust heteroscedasticity-consistent covariance matrix estimator (HCCME)

proposed by MacKinnon and White (1985) and the wild bootstrap method of Hafner and Herwartz (2009). We also verify whether the residuals of the VAR are uncorrelated by applying the serial correlation test of Edgerton and Shukur (1999). To consider possibly tail dependence or asymmetric causality, we conduct Granger-causality tests at each quantile of the distribution. Let $Q_{\tau}^{R_t}(\cdot|\mathcal{F}_{t-1})$ be the τ-quantile of $F_{R_t}(\cdot|\mathcal{F}_{t-1})$. Given an indicator function $1(R_t \leq r)$, it follows that $\Pr\{R_t \leq Q_{\tau}^{R_t}(R_t|\mathcal{F}_{t-1})|\mathcal{F}_{t-1}\} = E\{1[R_t \leq Q_{\tau}^{R_t}(R_t|\mathcal{F}_{t-1})]|\mathcal{F}_{t-1}\}$. Let $\psi_\tau(\epsilon) \equiv 1(\epsilon \leq 0) - \tau$. The null hypothesis in Eq. (1) can be rewritten as:

$$H_0 : E\{\psi_\tau(R_t - M_\tau(\mathcal{F}_{t-1}^R, \theta_0(\tau)))|\mathcal{F}_{t-1}\} = 0, \text{for all } \tau \in (0,1), \tag{2}$$

where $M_\tau(\mathcal{F}_{t-1}^R, \theta_0(\tau))$ is a parametric specification of the conditional τ-quantile of R_t, $Q_{\tau}^{R_t}(\cdot|\mathcal{F}_{t-1})$, with $M_\tau \in \mathcal{M} = \{M_\tau(\cdot, \theta(\tau))|\theta(\cdot) : \tau \mapsto \theta(\tau) \in \Theta \subset \mathbb{R}^q, \text{for } \tau \in (0,1)\}$. Assuming a correct specification of the quantile regression model under Eq. (2), Troster (2018) introduced a transformation of the conditional null hypothesis of Eq. (2) into an unconditional one as follows:

$$E[\psi_\tau(R_t - M_\tau(\mathcal{F}_{t-1}^R, \theta_0(\tau)))\exp(i\boldsymbol{\omega}'\mathcal{F}_{t-1})] = 0, \text{for all } \tau \in (0,1), \tag{3}$$

where $\exp(i\boldsymbol{\omega}'\mathcal{F}_{t-1}) \coloneqq \exp\left[i\left(\omega_1(R_{t-1}, V_{t-1})' + \ldots + \omega_p(R_{t-p}, V_{t-p})'\right)\right]$ is a weighting function, for all $\boldsymbol{\omega} \in \mathbb{R}^p$ with $p \leq q$, and $i = \sqrt{-1}$ is the imaginary root. Let $\theta_T(\cdot)$ be a consistent estimator of $\theta_0(\tau)$, for all $\tau \in (0,1)$**.** Troster (2018) derived the following test statistic to test the null hypothesis of Eq. (3):

$$z_T(\boldsymbol{\omega}, \tau) \equiv \frac{1}{\sqrt{T}} \sum_{t=1}^{T} \psi_\tau(R_t - M_\tau(\mathcal{F}_{t-1}^R, \theta_T(\tau)))\exp(i\boldsymbol{\omega}'\mathcal{F}_{t-1}).$$

Under standard regularity conditions, Troster (2018) showed that $z_T(\boldsymbol{\omega}, \tau)$ converges to a zero-mean Gaussian process as $T \to \infty$. Then, for testing the null hypothesis in (3), we apply a Cramér von-Mises functional norm of $z_T(\boldsymbol{\omega}, \tau)$ as follows:

$$GCQ_T \equiv \int_{\mathcal{T}} \int_{\mathcal{W}} z_T(\boldsymbol{\omega}, \tau)^2 dF_{\boldsymbol{\omega}}(\boldsymbol{\omega}) dF_\tau(\tau), \tag{4}$$

where $F_{\boldsymbol{\omega}}(\cdot)$ and $F_{\boldsymbol{\tau}}(\cdot)$ are the distributions of the weights and of the quantiles, respectively. We reject the null hypothesis of Eq. (3) when GCQ_T in Eq. (4) is sufficiently large. We apply the subsampling procedure of Troster (2018) to estimate the p-values of GCQ_T in Eq. (4). Since subsampling methods depend on the subsample size, we adopt the recommended size suggested by Sakov and Bickel (2000). Then, we use subsamples of size $b = [kT^{2/5}]$, where $[\cdot]$ is the floor function,

and we choose $k = 5$, but the performance of the test statistic GCQ_T of Eq. (4) remains unalterable for other choices of the constant k.

We specify linear and nonlinear quantile models under the null hypothesis in Eq. (2). We first implement linear tests of causality in quantiles based on dynamic quantile autoregressive (QAR) models. The linear QAR specifications under the null hypothesis in Eq. (2) are specified as QAR(j): $Q_\tau^{R_t}\left(R_t|\mathcal{F}_{t-1}^R\right) = \alpha(\tau) + \sum_j \beta_j(\tau)R_{t-j}$, for $j = 1, 2, 3$. To test for nonlinear causality, we also specify nonlinear conditional quantile autoregressive (CAViaR) models proposed by Engle and Manganelli (2004). The CAViaR has the advantage of modelling directly the quantiles by specifying an autoregressive process of the quantiles. Since financial returns display volatility clustering, the quantiles of the distribution are likely to present autocorrelation. In addition, CAViaR models obtained reliable performance compared with other alternatives (see e.g., Bao et al., 2006; Chen et al., 2012; Jeon & Taylor, 2013). To simplify notation, let $Q_\tau^{R_t} \equiv Q_\tau^{R_t}\left(R_t|\mathcal{F}_{t-1}^R\right)$. We estimate the symmetric absolute value (SAV) and the asymmetric slope (AS) CAViaR models proposed by Engle and Manganelli (2004) under the null hypothesis in Eq. (2) as follows:

$$\begin{aligned} &\text{SAV}: Q_\tau^{R_t} = \beta_0(\tau) + \beta_1(\tau)Q_\tau^{R_{t-1}} + \beta_2(\tau) \mid R_{t-1} \mid, \\ &\text{AS}: Q_\tau^{R_t} = \beta_0(\tau) + \beta_1(\tau)Q_\tau^{R_{t-1}} + \beta_2(\tau)(R_{t-1})^+ + \beta_3(\tau)(R_{t-1})^-, \end{aligned} \tag{5}$$

where $(R_{t-1})^+ = max\{R_{t-1}, 0\}$, and $(R_{t-1})^- = -min\{R_{t-1}, 0\}$. The SAV specification is a nonlinear quantile regression model that has an asymmetric response to lagged returns. Under the AS model, the quantile regression responds differently to positive and negative returns. Both SAV and AS are mean-reverting and would be correctly specified by a generalized autoregressive conditional heteroskedasticity (GARCH) process, where the standard deviation is modelled with i.i.d. errors. Nevertheless, both CAViaR models generalize this GARCH specification, since they can be applied to other forms of error distributions, such as when both the errors and the distribution change over time.

We evaluate the dependence between the quantiles of stock returns and trading volume by applying the cross-quantilogram approach of Han et al. (2016). Linton and Whang (2007) proposed a quantilogram analysis to test for directional predictability across different quantiles of a series. Davis and Mikosch (2009) and Davis et al. (2012, 2013) extended the quantilogram to extreme quantiles of the distribution. Han et al. (2016) proposed a multivariate version of the quantilogram, the cross-quantilogram, which allows for testing the directional predictability between the quantiles of two different series. Jiang et al. (2016) applied the cross-quantilogram approach for analyzing return spillovers of agricultural commodities. Baumöhl and Lyócsa (2017) used the cross-quantilogram method to measure the dependence between the quantiles of stock market indices and the quantiles of gold prices.

Let $Q_{\tau_1}^{R_t} \equiv Q_{\tau_1}^{R_t}\left(R_t|\mathcal{F}_{t-1}^R\right)$ and $Q_{\tau_2}^{V_t} \equiv Q_{\tau_2}^{V_t}\left(V_t|\mathcal{F}_{t-1}^V\right)$ for a given pair of quantiles $\boldsymbol{\tau} = (\tau_1, \tau_2)' \in (0, 1)$. The cross-quantilogram, proposed by Han et al. (2016),

calculates the serial dependence between the events $\left\{R_t \leq Q_{\tau_1}^{R_t}\right\}$ and $\left\{V_{t-j} \leq Q_{\tau_2}^{V_{t-j}}\right\}$ for $j = 0, \pm 1, \pm 2, \ldots$, as follows:

$$\rho_\tau(j) = \frac{E\left[\psi_{\tau_1}\left(R_t - Q_{\tau_1}^{R_t}\right)\psi_{\tau_2}\left(V_{t-j} - Q_{\tau_2}^{V_{t-j}}\right)\right]}{\sqrt{E\left[\psi_{\tau_1}^2\left(R_t - Q_{\tau_1}^{R_t}\right)\right]}\sqrt{E\left[\psi_{\tau_2}^2\left(V_{t-j} - Q_{\tau_2}^{V_{t-j}}\right)\right]}}. \tag{6}$$

The cross-quantilogram of Eq. (6) measures the serial dependence between R_t and V_t at different quantiles. We estimate the cross-quantilogram by calculating its sample analogue, based on the parametric conditional quantile functions $\widehat{Q}_{\tau_1}^{R_t} = X_{1t}'\widehat{\beta}_1(\tau_1)$ and $\widehat{Q}_{\tau_2}^{V_t} = X_{2t}'\widehat{\beta}_2(\tau_2)$ proposed by Koenker and Bassett (1978) as follows:

$$\widehat{\beta}_1(\tau_1) = \underset{\beta_1 \epsilon\ \mathbb{R}^3}{\text{argmin}} \sum_{t=1}^{T} ???_{\tau_1}\left(R_t - X_{1t}'\beta_1\right),$$

$$\widehat{\beta}_2(\tau_2) = \underset{\beta_2 \epsilon\ \mathbb{R}^3}{\text{argmin}} \sum_{t=1}^{T} ???_{\tau_2}\left(V_t - X_{2t}'\beta_2\right),$$

where $???_\tau(\epsilon) \equiv \epsilon[\tau - 1(\epsilon < 0)]$, $X_{1t} = (1, R_{t-j}, V_t)'$, and $X_{2t} = (1, R_t, V_{t-j})'$. Then, the sample cross-quantilogram is defined by

$$\widehat{\rho}_\tau(j) = \frac{\sum_{t=j+1}^{T}\psi_{\tau_1}\left(R_t - \widehat{Q}_{\tau_1}^{R_t}\right)\psi_{\tau_2}\left(V_{t-j} - \widehat{Q}_{\tau_2}^{V_{t-j}}\right)}{\sqrt{\sum_{t=j+1}^{T}\psi_{\tau_1}^2\left(R_t - \widehat{Q}_{\tau_1}^{R_t}\right)}\sqrt{\sum_{t=j+1}^{T}\psi_{\tau_2}^2\left(V_{t-j} - \widehat{Q}_{\tau_2}^{V_{t-j}}\right)}}, \tag{7}$$

where $\widehat{Q}_{\tau_1}^{R_t}$ and $\widehat{Q}_{\tau_2}^{V_{t-j}}$ are the estimated conditional quantiles of R_t and V_{t-j}, respectively. The sample cross-quantilogram $\widehat{\rho}_\tau(j)$ of Eq. (7) calculates the directional predictability between R_t and V_{t-j} by considering the direction of the discrepancy between conditional quantiles of R_t and V_{t-j}. By definition, $\widehat{\rho}_\tau(j) \in [-1, 1]$ and $\widehat{\rho}_\tau(j) = 0$ if there is no directional predictability between R_t and V_{t-j} for a given pair of quantiles $\boldsymbol{\tau} = (\tau_1, \tau_2)'$. We want to test for directional predictability from events up to q lags $\left\{V_{t-j} \leq Q_{\tau_2}^{V_{t-j}} : j = 1, 2, \ldots, q\right\}$ to $\left\{R_t \leq Q_{\tau_1}^{R_t}\right\}$. Han et al. (2016) derived a significance test statistic of the cross-quantilogram $\rho_\tau(j)$ for $H_0 : \rho_\tau(j) = 0$, for all $j = 1, \ldots, q$, against $H_A : \rho_\tau(j) \neq 0$, for some $j \in \{1, \ldots, q\}$ as follows:

$$\underset{\tau}{\check{Q}}(q) = \frac{T(T+2)\sum_{j=1}^{q}\widehat{\rho}_{\tau}^{2}(j)}{T-j}. \tag{8}$$

The critical values of $\underset{\tau}{\check{Q}}(q)$ in Eq. (8) are calculated by the stationary block-bootstrap procedure developed by Politis and Romano (1994), in which the block length is selected by the rule proposed by Politis and White (2004) and Patton et al. (2009). We consider the directional predictability from volume to returns over a grid of 11 quantiles $\tau_j \in \{0.05, 0.10, 0.20, \ldots, 0.90, 0.95\}$, $j = 1, 2$, given a lag length q. We need to adjust the significance level of the test to deal with the multiple hypothesis test problem. Hence, we apply a Bonferroni correction, resulting in an adjusted significance level of $0.05/121 = 0.0004132$. We consider four alternative lag specifications $q \in \{1, 3, 5, 21\}$, and we apply $B = 999$ bootstrap replicates to calculate the critical values of $\underset{\tau}{\check{Q}}(q)$ in Eq. (8).

After testing whether there is directional predictability from V_t to R_t, we need to infer the autocorrelation of R_t to obtain the correct economic interpretation of this relationship. Thus, we estimate a linear quantile regression model for R_t that depends on the past returns R_{t-1} and on the lagged trading volume V_{t-1} to calculate a proxy of the autocorrelation of the returns for each quantile of the distribution as follows:

$$Q_{\tau}^{R_t}(R_t|\mathcal{F}_{t-1}) = \alpha(\tau) + \beta(\tau)R_{t-1} + \gamma(\tau)V_{t-1}, \tag{9}$$

where $\beta(\tau)$ is a proxy of the estimated autocorrelation of R_t for each quantile $\tau \in (0, 1)$.

4 Empirical Results

Our data comprise daily stock returns and trading volume series for the price indices of the three largest stock markets: S&P 500 (New York), FTSE-100 (London), and Nikkei (Tokyo). Our daily data span from January 4, 1993 to December 30, 2016, and they consist of 6045, 6055, and 5896 observations of the S&P 500, FTSE-100, and Nikkei indices, respectively. We chose this period due to data availability restrictions on the trading volume series. We obtained all data sets from the Bloomberg database. We define the daily returns as the log-return times 100, $R_t = \log(P_t/P_{t-1}) \times 100$, where P_t is the stock index price at time t. The daily volume is the traded share volume divided by 10^6. Figure 1 depicts the log-trading volumes and log-returns for all indices. Table 1 displays summary statistics and unit root tests of the trading volumes and stock returns for the three indices. All returns present standard deviations higher than one, excess kurtosis, and negative skewness, indicating the existence of heavy-tailed distributions. On the other hand, all the volume series present positive skewness. We reject the null hypothesis of normality for all return and volume series of all indices at the 1%

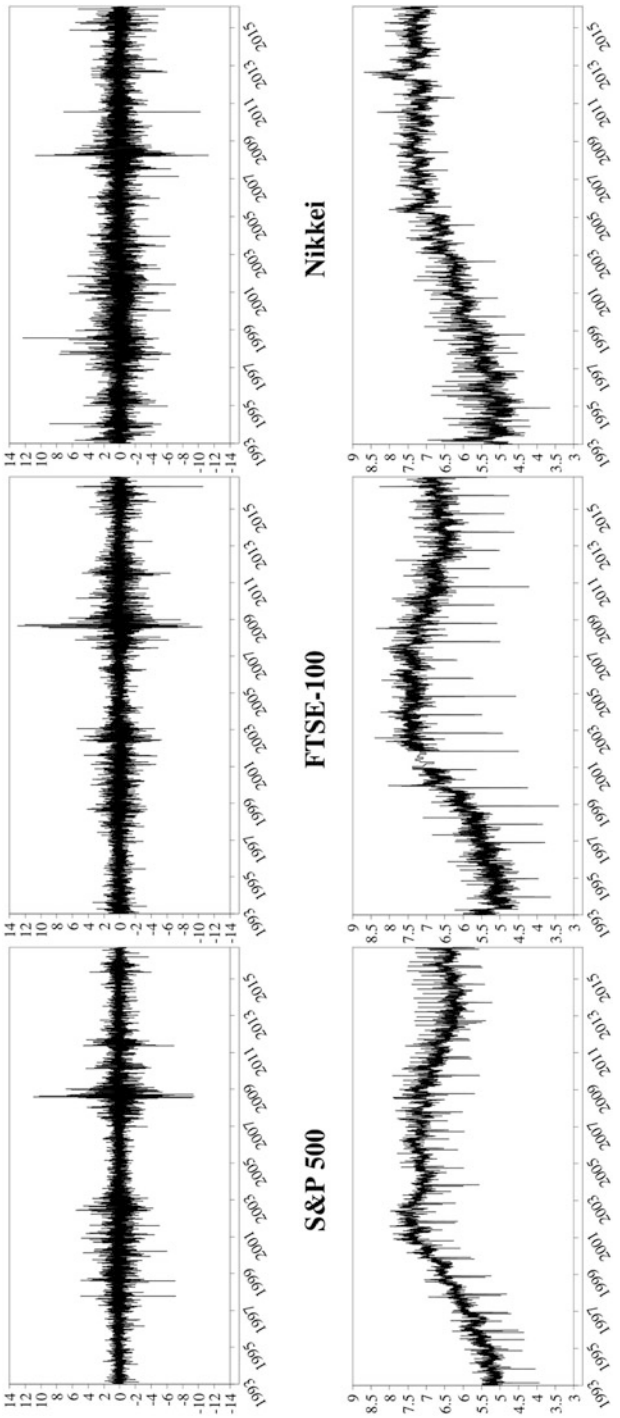

Fig. 1 Daily log stock returns (upper panel) and log-trading volume (lower panel)

Table 1 Summary statistics and unit root tests

	S&P 500		FTSE-100		Nikkei	
	R_t	V_t	R_t	V_t	R_t	V_t
Mean	0.03	863.19	0.01	936.81	0.00	907.27
Median	0.05	762.84	0.06	842.56	0.01	854.91
Std. Dev.	1.16	503.18	1.29	616.60	1.58	648.82
Min	−9.47	51.06	−10.56	30.22	−11.27	38.39
Max	10.96	2960.00	12.99	4447.00	12.31	5952.00
Skewness	−0.25	0.59	−0.17	0.69	−0.05	0.97
Kurtosis	8.66	−0.26	9.07	0.24	3.77	2.02
JB Test	18966.56	367.90	20780.19	500.36	3502.17	1939.09
Prob.	0.00	0.00	0.00	0.00	0.00	0.00
ADF Test	**−59.37**	**−9.72**	**−57.46**	**−11.84**	**−58.86**	**−18.65**
PP Test	**−83.68**	**−14.51**	**−79.11**	**−19.81**	**−85.38**	**−37.44**
ZA Test	**−21.69**	**−10.46**	**−23.05**	**−11.68**	**−21.43**	**−11.33**

Notes: R_t is the daily log-return times 100 of each one of the stock indices. V_t is the volume of traded shares divided by 10^6. The data cover the period that spans January 4, 1993 to December 30, 2016. JB Test is the Jarque-Bera test statistic (Jarque & Bera, 1980), and Prob. is its p-value. ADF Test is the Augmented Dickey-Fuller unit root test (Dickey & Fuller, 1979), PP Test is the Phillips-Perron unit root test (Phillips & Perron, 1988), and ZA Test is the Zivot-Andrews unit root test (Zivot & Andrews, 1992). In each one of the tests, the series has a unit root under the null hypothesis, where boldface values indicate rejection at the 1% level

level. The unit root test results reject the null hypothesis of unit root for all return and volume series at the 1% level. Therefore, we use log-returns and log-volume series in our analysis.

We first apply a test of Granger-causality in mean between trading volume and stock returns. Table 2 reports the mean-causality test results for the three indices. The p-values of the serial correlation test of Edgerton and Shukur (1999) show that the VAR residuals are uncorrelated at the 5% level. We find return–volume causality in mean at the 5% level for all indices. These results are robust for the HCCME and wild bootstrap approaches. Conversely, we find no volume–return causality in mean at the 5% significance level for all indices. Therefore, we document only unidirectional return–volume causality in mean. These results are conforming to Chen (2012), who reported strong evidence of return–volume causality but no volume–return causality in conditional mean for the S&P 500 index. Next, we implement the GCQ_T quantile-causality test of Eq. (4). We apply three linear QAR specifications and two nonlinear CAViaR specifications under the null hypothesis in Eq. (2). Table 3 displays the p-values of the Granger-causality test in quantiles for the S&P 500 index. We find linear and nonlinear bidirectional Granger-causality between trading volume and stock returns for all quantiles of the distribution above and below the median ($\tau = 0.50$) at the 5% level. Our findings are invariable across alternative linear and nonlinear specifications. Contrary to the results of Table 2, we find significant linear/nonlinear quantile-causality from volume to returns. Thus, a conditional mean analysis may lead to a wrong conclusion by

Table 2 Granger-causality-in-mean tests

Index	p-value (HCCME)	p-value (WB)	q	ES test
$H_0 : V_t \not\Rightarrow R_t$				
S&P 500	0.545	0.480	35	0.528
FTSE-100	0.068	0.131	34	0.307
NIKKEI	0.640	0.534	21	0.328
$H_0 : R_t \not\Rightarrow V_t$				
S&P 500	0.000**	0.000**	35	0.528
FTSE-100	0.000**	0.000**	34	0.307
NIKKEI	0.000**	0.004**	21	0.328

Notes: We report the p-values of Granger-causality-in-mean tests, where ** denotes rejection of H_0 at the 1% level. P-value (HCCME) denotes the p-value calculated using the heteroscedasticity-consistent covariance matrix estimator (HCCME) proposed by MacKinnon and White (1985), and p-value (WB) is the p-value calculated by the wild bootstrap procedure proposed by Hafner and Herwartz (2009). ES test is the p-value of the test for serial correlation of the residuals of the VAR model proposed by Edgerton and Shukur (1999). We selected the lag length q that minimized the AIC

focusing only at the middle of the distribution. Nevertheless, we find absence of nonlinear volume-causality at the median quantile at the 5% level. In contrast to the results presented in Bouezmarni et al. (2012), we report a significant nonlinear feedback effect from volume to returns of the S&P 500 index, for quantiles above and below the median.

Table 4 reports evidence of bidirectional linear Granger-causality-in-quantiles between volume and returns for the FTSE-100 index at the 5% level. Contrary to the conditional mean test results presented in Table 2, we find volume–return causality in quantiles at the 5% level for the FTSE-100 index. We also find strong nonlinear volume–return causality for the quantiles below the median. Conversely, we report weak return–volume causality-in-quantiles under nonlinear specifications, as there is nonlinear feedback from returns to volume only at the 10% significance level. Table 5 displays the p-values of the GCQ_T test in Eq. (4) for the Nikkei index. We provide evidence of linear bidirectional Granger-causality-in-quantiles between volume and returns for the Nikkei index at the 5% level. Moreover, nonlinear tests uncover unidirectional nonlinear volume–return causality at the 5% level, without strong return–volume causality under nonlinear specifications. In sum, Tables 3, 4, and 5 show that all stock markets exhibit bidirectional linear quantile-causality between volume and returns at the 5% level. Nonetheless, nonlinear tests provide evidence of only a nonlinear unidirectional volume–return dynamic relationship for the FTSE-100 and Nikkei indices, as we found a nonlinear feedback effect from returns to volume only at the 10% significance level. Furthermore, there is strong nonlinear volume–return causality at both tails of the conditional distribution for the S&P 500 index, whereas the FTSE-100 index displays significant nonlinear tail dependence between volume and returns at the lower tail of the distribution. We also report nonlinear volume–return causality at the upper tail for the Nikkei index.

Table 3 Granger-causality-in-quantile tests: S&P 500

	Linear specifications			Nonlinear specifications	
	QAR(1)	QAR(2)	QAR(3)	SAV	AS
$H_0 : V_t \not\Rightarrow R_t$					
[0.05; 0.95]	0.000**	0.000**	0.000**	0.000**	0.000**
0.05	0.000**	0.000**	0.000**	0.001**	0.002**
0.10	0.000**	0.000**	0.000**	0.000**	0.001**
0.20	0.000**	0.000**	0.000**	0.000**	0.002**
0.30	0.000**	0.000**	0.000**	0.001**	0.005**
0.40	0.000**	0.000**	0.000**	0.017*	0.007**
0.50	0.001**	0.000**	0.000**	0.031*	0.053
0.60	0.000**	0.000**	0.000**	0.000**	0.015*
0.70	0.000**	0.000**	0.000**	0.000**	0.004**
0.80	0.000**	0.000**	0.000**	0.001**	0.004**
0.90	0.000**	0.000**	0.000**	0.001**	0.002**
0.95	0.000**	0.000**	0.000**	0.001**	0.013*
$H_0 : R_t \not\Rightarrow V_t$					
[0.05; 0.95]	0.000**	0.000**	0.000**	0.009**	0.011*
0.05	0.000**	0.000**	0.000**	0.021*	0.026*
0.10	0.000**	0.000**	0.000**	0.009**	0.008**
0.20	0.000**	0.000**	0.000**	0.001**	0.002**
0.30	0.000**	0.000**	0.000**	0.008**	0.010*
0.40	0.000**	0.000**	0.000**	0.008**	0.009**
0.50	0.000**	0.014*	0.047*	0.001**	0.002**
0.60	0.000**	0.000**	0.000**	0.016*	0.017*
0.70	0.000**	0.000**	0.000**	0.018*	0.019*
0.80	0.000**	0.000**	0.000**	0.016*	0.023*
0.90	0.000**	0.000**	0.000**	0.020*	0.019*
0.95	0.000**	0.000**	0.000**	0.020*	0.020*

Notes: We report the p-values of GCQ_T in Eq. (4) for the volume and returns of the S&P 500 index. QAR(j) is the linear quantile autoregressive model under H_0 specified with j lags, for $j = 1$, 2, 3. SAV is the symmetric absolute value model, and AS is the asymmetric slope specification of Eq. (5). We implement a subsampling approach to calculate the p-values with a subsample of size $b = 163$. The symbols * and ** indicate rejection of H_0 at the 5% and 1% levels, respectively

Overall, our findings display asymmetric and nonlinear causal relations that may be ignored by conditional mean regression models.

Figure 2 presents heat maps of the estimated cross-quantilograms of Eq. (7) between volume and returns for the three stock markets. We apply the block-bootstrap test statistic $\underset{\tau}{\check{Q}}(q)$ in Eq. (8) to test for the significance of the cross-quantilogram between volume and returns. The magnitude of the cross-quantilogram coefficient varies from bold red (highly negative) to bold green (highly positive). The heat map is blank if there is no significant directional predictability from volume to returns. Consistent with the findings presented in Tables 3 and 4, we find

Table 4 Granger-causality-in-quantile tests: FTSE-100

	Linear specifications			Nonlinear specifications	
	QAR(1)	QAR(2)	QAR(3)	SAV	AS
$H_0 : V_t \not\Rightarrow R_t$					
[0.05; 0.95]	0.000**	0.000**	0.000**	0.010*	0.002**
0.05	0.000**	0.000**	0.000**	0.001**	0.007**
0.10	0.000**	0.000**	0.000**	0.021*	0.001**
0.20	0.000**	0.000**	0.000**	0.009**	0.027*
0.30	0.000**	0.000**	0.000**	0.026*	0.032*
0.40	0.000**	0.000**	0.000**	0.014*	0.002**
0.50	0.004**	0.000**	0.000**	0.097	0.024*
0.60	0.000**	0.000**	0.000**	0.124	0.076
0.70	0.000**	0.000**	0.000**	0.339	0.118
0.80	0.000**	0.000**	0.000**	0.083	0.171
0.90	0.000**	0.000**	0.000**	0.068	0.023*
0.95	0.000**	0.000**	0.000**	0.108	0.028*
$H_0 : R_t \not\Rightarrow V_t$					
[0.05; 0.95]	0.000**	0.000**	0.000**	0.051	0.049*
0.05	0.000**	0.000**	0.000**	0.015*	0.014*
0.10	0.000**	0.000**	0.000**	0.011*	0.010*
0.20	0.000**	0.000**	0.000**	0.062	0.064
0.30	0.000**	0.000**	0.000**	0.175	0.168
0.40	0.000**	0.001**	0.001**	0.156	0.160
0.50	0.000**	0.001**	0.001**	0.166	0.173
0.60	0.023*	0.031*	0.024*	0.021*	0.135
0.70	0.017*	0.017*	0.011*	0.108	0.108
0.80	0.000**	0.000**	0.000**	0.018*	0.021*
0.90	0.000**	0.000**	0.000**	0.175	0.168
0.95	0.000**	0.000**	0.000**	0.083	0.084

Notes: We report the p-values of GCQ_T in Eq. (4) for the volume and returns of the FTSE-100 index with the same specifications of Table 3, where * and ** indicate rejection of H_0 at the 5% and 1% levels, respectively

directional predictability from volume to returns at the quantiles below and above the median for the S&P 500 and FTSE-100 indices. These results are robust to four alternative lag lengths. The signs of the cross-quantilograms are negative (positive) for low (high) quantiles of trading volume, respectively. Figure 3 reports the estimated coefficients of the lagged returns of the quantile regression model of Eq. (9), for each quantile of the distribution. The returns display positive (negative) autocorrelation for very low (very high) quantiles of the S&P 500 and FTSE-100 indices. The returns are negatively autocorrelated at median quantiles for the S&P 500 index, whereas the autocorrelation of the returns at median quantiles is not significant for the FTSE-100 index. The negative volume–return causality together with the positive autocorrelation of the returns for lower quantiles ($\tau \in [0.05; 0.30]$)

Table 5 Granger-causality-in-quantile tests: Nikkei

	Linear specifications			Nonlinear specifications	
	QAR(1)	QAR(2)	QAR(3)	SAV	AS
$H_0 : V_t \not\Rightarrow R_t$					
[0.05; 0.95]	0.000**	0.000**	0.000**	0.000**	0.000**
0.05	0.014*	0.010*	0.009**	0.449	0.446
0.10	0.000**	0.000**	0.000**	0.079	0.272
0.20	0.000**	0.000**	0.000**	0.003**	0.028*
0.30	0.000**	0.000**	0.000**	0.002**	0.001**
0.40	0.000**	0.000**	0.000**	0.000**	0.000**
0.50	0.015*	0.017*	0.019*	0.000**	0.000**
0.60	0.000**	0.000**	0.000**	0.000**	0.000**
0.70	0.000**	0.000**	0.000**	0.000**	0.008**
0.80	0.000**	0.000**	0.000**	0.000**	0.012*
0.90	0.000**	0.000**	0.000**	0.000**	0.001**
0.95	0.000**	0.000**	0.000**	0.008**	0.003**
$H_0 : R_t \not\Rightarrow V_t$					
[0.05; 0.95]	0.000**	0.000**	0.000**	0.071	0.050
0.05	0.000**	0.000**	0.000**	0.877	0.871
0.10	0.000**	0.000**	0.000**	0.283	0.303
0.20	0.000**	0.000**	0.000**	0.142	0.138
0.30	0.000**	0.000**	0.000**	0.106	0.109
0.40	0.000**	0.000**	0.000**	0.088	0.088
0.50	0.000**	0.025*	0.073	0.124	0.123
0.60	0.012*	0.000**	0.000**	0.090	0.088
0.70	0.000**	0.000**	0.000**	0.101	0.005**
0.80	0.000**	0.000**	0.000**	0.055	0.052
0.90	0.000**	0.000**	0.000**	0.011*	0.012*
0.95	0.000**	0.000**	0.000**	0.175	0.173

Notes: We report the p-values of GCQ_T in Eq. (4) for the volume and returns of the Nikkei index with the same specifications of Table 3, where * and ** indicate rejection of H_0 at the 5% and 1% levels, respectively

indicate that informational trading is prevalent among market investors in bear markets, for the S&P 500 and FTSE-100 indices. Conversely, we find positive volume–return causality together with negative autocorrelation of the returns for higher quantiles ($\tau \in [0.70; 0.95]$) that indicate that non-informational selling pressure is the main motive for trades during bull market phases, for these two indices.

The observed asymmetry in the relationship between volume and returns across different market states may reveal why linear VAR models overlook strong volume–return causality. The negative and positive directional predictability from volume to return may compensate each other in models that ignore asymmetric relationships. Figure 2 also provides evidence of the high-volume return premium proposed by

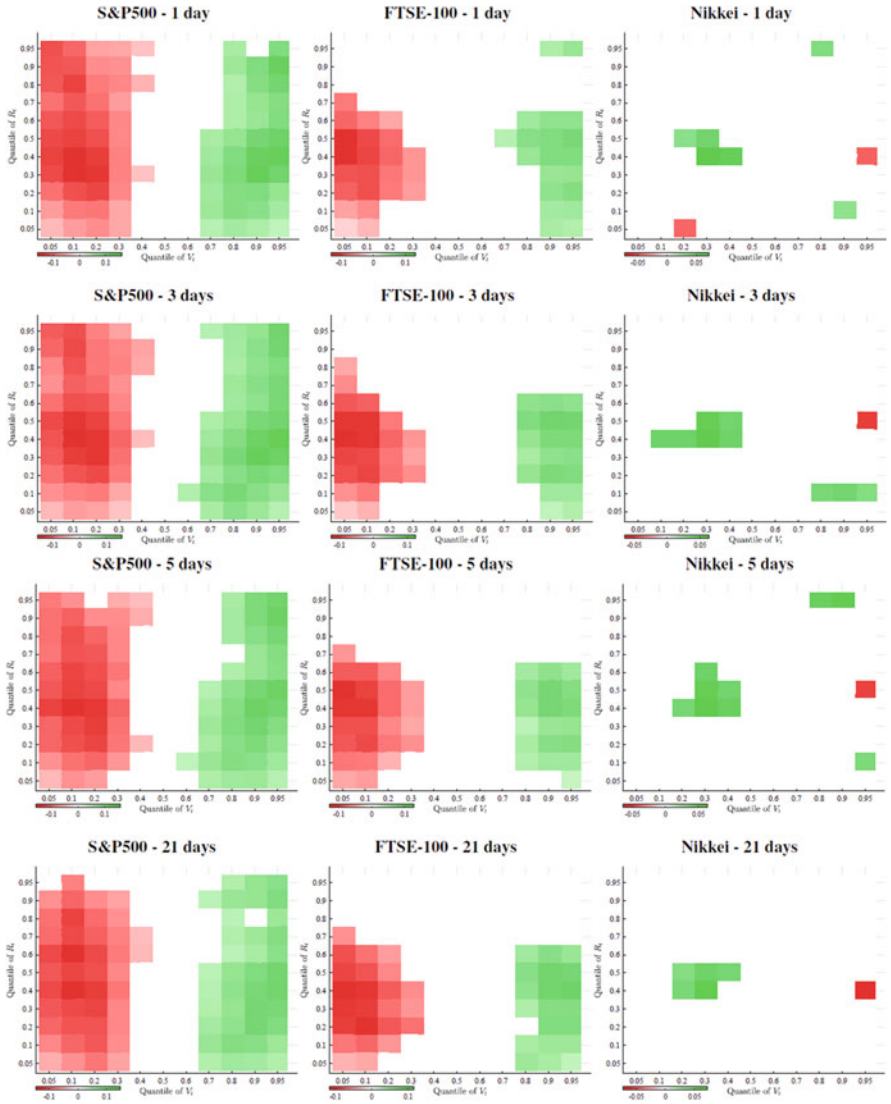

Fig. 2 Directional predictability in quantiles from V_t to R_t with q lags, $q \in \{1, 3, 5, 21\}$

Gervais et al. (2001) for the S&P 500 and FTSE-100 indices. Periods of high volume are followed by positive stock returns, while periods of extremely low volume are followed by negative stock returns. The "learning-to-be-overconfident" hypothesis, proposed by Gervais et al. (2001), may also explain the observed predominance of informational (non-informational) trading in bear (bull) markets, as the overall overconfidence level decreases (increases) during bear (bull) market states. We found different results for the Nikkei index. Figure 2 provides evidence of

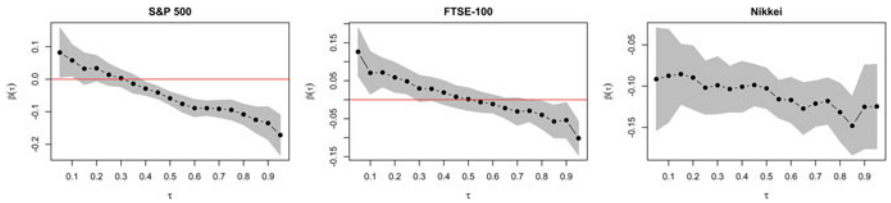

Fig. 3 Estimated quantile regression coefficients, $\beta(\tau)$, of the lagged returns

directional predictability from volume to returns only for certain median and extremely high quantiles for the Nikkei index. There is no significant volume–return causality, however, at the lower tail of the distribution for the Nikkei index. The lack of significant causality at the left tail of the distribution may reveal contemporaneous dissemination of information (Clark, 1973; Epps & Epps, 1976; Tauchen & Pitts, 1983), or that the volume is generated by existing information (He & Wang, 1995), or that agents have differential interpretations of public signals (Kandel & Pearson, 1995). Nevertheless, the absence of volume–return causality for lower tail quantiles may not preclude nonlinear forecasting power of volume to future returns for the Nikkei index. Except for a very high quantile, the observed volume–return directional predictability is positive. Furthermore, Fig. 3 shows that the returns are negatively autocorrelated for all quantiles of the distribution, for the Nikkei index. Thus, the positive volume–return causality together with negative autocorrelation of the returns suggest that non-informational selling pressure is the main motive for trades during both bear and bull markets for the Nikkei index.

In line with Gervais et al. (2001), we find that extremely high values of volume lead to positive stock returns, while very low values of volume lead to negative stock returns for the S&P 500 and FTSE-100 indices. Our results differ from that of Lee and Rui (2002), who reported no volume–return causality for the daily data of the New York, Tokyo, and London stock markets. Our results are conforming to Chuang et al. (2009), who found two-way Granger-causality between volume and returns across quantiles above and below the median for S&P 500 and FTSE-100 indices, using linear specifications of the quantile regression model. However, our results differ from Chuang et al. (2009) under nonlinear specifications of the quantile regression, as we found weak nonlinear feedback from returns to volume for the FTSE-100 index. In contrast to Su and White (2007) and Chen (2012), we observed significant volume–return causality-in-quantiles for the S&P 500 index during both bull and bear market phases. Besides, we also found strong nonlinear volume–return causality for the S&P 500 index in opposition to the results presented in Bouezmarni et al. (2012). In consonance with Gebka and Wohar (2013), the uncovered volume–return causality of the S&P 500 index can be explained within the framework of Campbell et al. (1993), Wang (1994), and Llorente et al. (2002) where non-informational (informational) trades in bull (bear) markets lead to a contemporaneous high volume and to subsequent return reversals (continuations). We

observed the same pattern of volume–return causality and return autocorrelations for the FTSE-100 index. In contrast to the findings of Gebka and Wohar (2013), we found significant positive volume–return causality for the Nikkei index that is also in line with the asymmetric information models, where non-informational trades are followed by contemporaneous high volume and by future return reversals in both bear and bull markets. Finally, our results are consistent with Longin and Pagliardi (2016) and Pradkhan (2016), as we provide evidence of asymmetric volume–return causality across distinct market phases.

5 Robustness Checks

This section performs robustness checks that analyze the volume–return relationship across different subsamples. We also apply a different measure of trading volume. We first conduct the same analysis on two subsample periods before and after the 2008 great recession. It is important to verify whether the dynamic volume–return relation changes across different economic growth periods. Thus, we apply our analysis over a subsample period before the 2008 financial crisis, from March 1, 2000 to February 29, 2008, and over a subsample period after the crisis, from March 3, 2008 to December 31, 2016. In addition, we use the detrended trading volume measure suggested by Gallant et al. (1992), Campbell et al. (1993), Lee and Rui (2002), and Chen (2012). To compute the detrended volume, we run a linear regression of the log-volume on a deterministic time trend and on a quadratic trend as follows:

$$V_t = a + bt + ct^2 + e_t. \tag{10}$$

Unreported regression results of the model (10) demonstrate that all volume series have significant linear and quadratic trends at the 1% significance level. Thus, we define the detrended volume as the residuals e_t of the regression model (10). Table 6 in the Appendix summarizes the results of the robustness checks for all indices. We report the p-values of the quantile-causality tests only for all quantiles of the distribution. Figures 4 and 5 in the Appendix display the heat maps of the estimated cross-quantilograms and the quantile regression coefficients of the lagged returns for these robustness checks, respectively. To spare space, we report only the results of the heat maps with one lag for calculating $\check{Q}_{\tau}(q)$ in Eq. (8). Our findings for the S&P 500 are robust to two subsample periods and to an alternative measure of trading volume. We find linear and nonlinear bidirectional causality in quantiles between volume and returns, but no volume–return causality in mean. In addition, Figs. 4 and 5 provide evidence of negative (positive) volume–return causality together with positive (negative) autocorrelation of the returns for very low (very high) quantiles. These results confirm that informational (non-informational) trades are the main reason for trading in bear (bull) markets for the S&P 500 index.

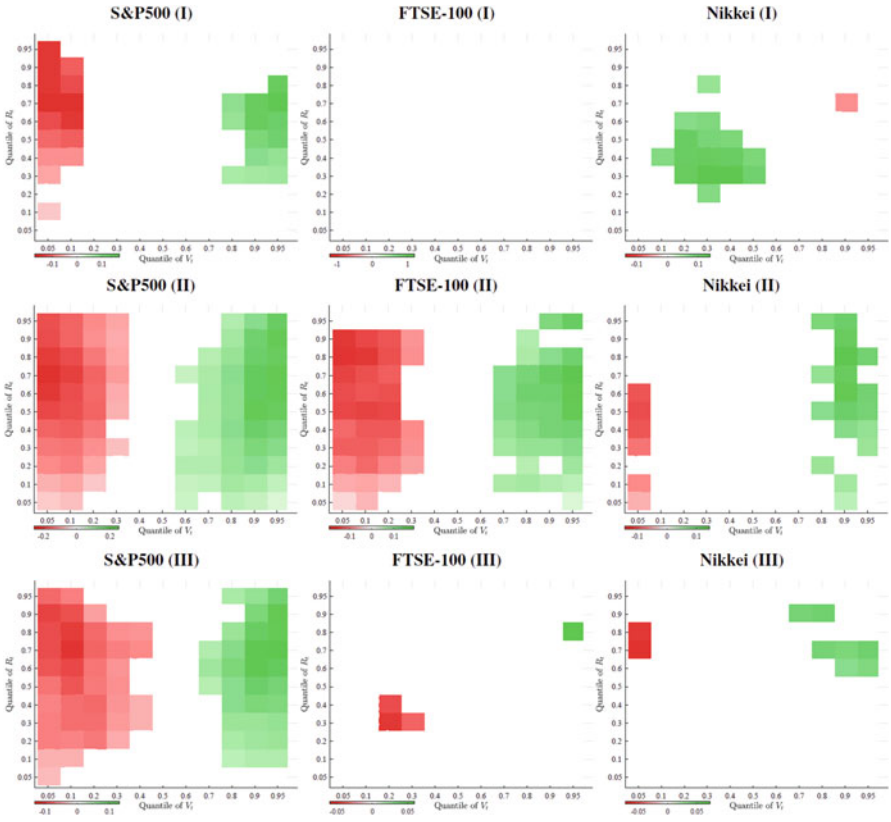

Fig. 4 Directional predictability in quantiles from V_t to R_t with one lag ($q = 1$): (I) Mar. 2000–Feb. 2008, (II) Mar. 2008–Dec. 2016, and (III) Detrended volume for Mar. 1993–Dec. 2016

On the other hand, we find different results for the FTSE-100 index for the first subsample period. We find no directional predictability from volume to returns in the first subsample period. Nevertheless, there is still evidence of bidirectional linear causality-in-quantiles between volume and returns for the first subsample period. Our findings hold for the second subsample period and for the detrended volume measure, although the volume–return directional predictability is weaker when we use a detrended volume series. Similar to the results for the S&P 500 index, our results provide evidence of negative (positive) volume–return causality together with positive (negative) autocorrelation of the returns for very low (very high) quantiles for both the second subsample and the detrended volume measure.

The causality test results are robust to alternative subsample periods and volume measures for the Nikkei index. Nevertheless, we find a pattern of directional predictability from V_t to R_t similar to that of the S&P 500 and FTSE-100 indices, for the second subsample period and for the detrended volume series. That is, we find negative and positive volume–return causality for low and high quantiles,

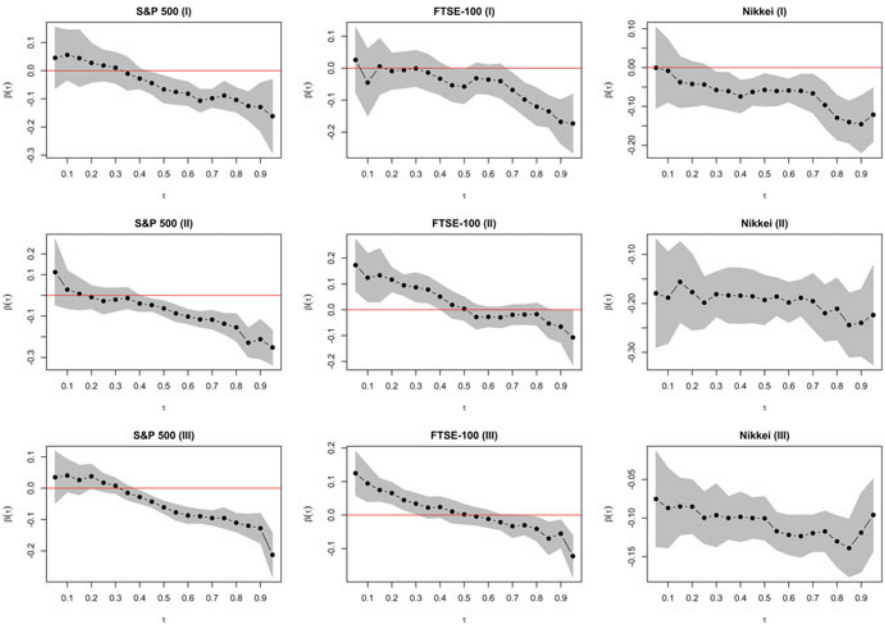

Fig. 5 Estimated quantile regression coefficients, $\beta(\tau)$, of the lagged returns: (I) Mar. 2000–Feb. 2008, (II) Mar. 2008–Dec. 2016, and (III) Detrended volume for Mar. 1993–Dec. 2016

respectively. Figure 5 shows that the returns of the Nikkei index are negatively autocorrelated for all quantiles of the distribution, for the second subsample period, and for the detrended volume series. These findings provide additional evidence that non-informational selling pressure is the main reason for trades during both bear and both markets for the Nikkei index. Non-informational selling induces positive volume–return causality at high quantiles, whereas non-informational buying leads to negative volume–return causality at low quantiles for the Nikkei index, for the second subsample period and for the detrended volume measure.

6 Conclusions

This chapter provides new insights on the dynamic volume–return relationship. We verify whether non-informational or informational trading can explain the volume–return relation in the three largest stock exchanges across different market states. We use the cross-quantilogram method proposed by Han et al. (2016) that tests for directional predictability and calculates quantile dependence across all market phases of the volume–return relation. In addition, we apply a quantile-causality test that considers asymmetries and nonlinearities in the volume–return relation, which implies a lower level of uncertainty generated by the specification error in

modelling. We corroborate the results of Chuang et al. (2009) of two-way Granger-causality between volume and returns considering all quantiles of the distribution, for the S&P 500 and FTSE-100 indices. Besides, the causal effect of volume is negative (positive) for low (high) subsequent returns for these two stock markets. In contrast to the results of a conditional mean analysis, we found evidence of volume–return causality for all stock indices. In line with Gebka and Wohar (2013), the observed heterogeneity across quantiles on the volume–return causality and on the return autocorrelations are conforming to the theoretical models of Campbell et al. (1993), Wang (1994), and Llorente et al. (2002), in which prevalent informational (non-informational) trading leads to negative (positive) volume–return causality. We find positive (negative) volume–return causality as well as negative (positive) autocorrelation of the returns for quantiles above (below) the median, suggesting the predominance of non-informational (informational) trading in bull (bear) markets for the S&P 500 and FTSE-100 indices. Conforming to the high-volume return premium depicted in Gervais et al. (2001), extremely high or low trading volume helps forecast future stock returns. Furthermore, the relative predominance of non-informational trades during bull market phases may also be generated by increases in the aggregate level of overconfidence, as implied by the model of overconfident traders of Gervais et al. (2001).

We find strong linear and nonlinear volume–return causality for the Nikkei index, without strong nonlinear feedback from returns to volume. Our results suggest that non-informational selling pressure is the main reason for trades during both bear and both markets for the Nikkei index, since there is positive volume–return causality together with negative autocorrelation of the returns. Furthermore, some robustness checks indicate that non-informational selling induces positive volume–return causality at high quantiles, whereas non-informational buying leads to negative volume–return causality at low quantiles for the Nikkei index, for a subsample period and for the detrended volume measure. Overall, we highlight the ability of the cross-quantilogram and general quantile-causality methods to measure asymmetric and nonlinear volume–return relationships. Our findings report asymmetric causal relations that are overlooked by linear causality tests, offering additional evidence that trading volume helps predict future returns. The observed findings in the volume–return dynamics have important implications for risk managers and investors. Our analysis indicates that the relationship between volume and return is asymmetric and nonlinear. In addition, we show that non-informational or informational trading can explain the volume–return relation in the analyzed stock exchanges across different market phases, which may be useful for building optimal trading strategies.

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Appendix

Table 6 Robustness checks: subsample periods and detrended volume

	GCM		Linear specifications			Nonlinear specifications	
	HCCME	WB	QAR(1)	QAR(2)	QAR(3)	SAV	AS
I. March, 2000–February, 2008							
$H_0 : V_t \nRightarrow R_t$							
S&P 500	0.586	0.602	0.000**	0.000**	0.000**	0.000**	0.027*
FTSE-100	0.376	0.357	0.000**	0.000**	0.000**	0.204	0.045*
Nikkei	1.000	0.990	0.000**	0.000**	0.000**	0.043*	0.002**
$H_0 : R_t \nRightarrow V_t$							
S&P 500	0.000**	0.000**	0.000**	0.000**	0.000**	0.035*	0.037*
FTSE-100	0.000**	0.031*	0.000**	0.000**	0.000**	0.155	0.156
Nikkei	0.144	0.226	0.000**	0.000**	0.000**	0.652	0.659
II. March, 2008–December, 2016							
$H_0 : V_t \nRightarrow R_t$							
S&P 500	0.989	0.940	0.000**	0.000**	0.000**	0.000**	0.002**
FTSE-100	0.593	0.369	0.000**	0.000**	0.000**	0.002**	0.000**
Nikkei	0.910	0.794	0.000**	0.000**	0.000**	0.000**	0.098
$H_0 : R_t \nRightarrow V_t$							
S&P 500	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
FTSE-100	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
Nikkei	0.027*	0.044*	0.020*	0.008**	0.008**	0.058	0.051
III. Detrended volume: March, 1993–December, 2016							
$H_0 : V_t \nRightarrow R_t$							
S&P 500	0.537	0.487	0.000**	0.000**	0.000**	0.000**	0.006**
FTSE-100	0.067	0.130	0.000**	0.000**	0.000**	0.155	0.167
Nikkei	0.602	0.492	0.000**	0.000**	0.000**	0.000**	0.025*
$H_0 : R_t \nRightarrow V_t$							
S&P 500	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.007**
FTSE-100	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.073
Nikkei	0.000**	0.003**	0.000**	0.000**	0.000**	0.000**	0.206

Notes: We apply the causality tests for the subsample periods March, 2000–February, 2008 and March, 2008–December, 2016 in panels I and II, respectively. We use the detrended volume series for the whole sample period in panel III. We report the p-values of the Granger-causality-in-mean test (columns 1–2) and of the GCQ_T test in Eq. (4) (columns 3–7) for all $\tau \in [0.05; 0.95]$ for the S&P 500, FTSE-100, and Nikkei indices, with the same specifications of Tables 2 and 3, where * and ** indicate rejection of H_0 at the 5% and 1% levels, respectively

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Corporate Social Responsibility Practices of Multinational Companies and Sustainable Development: An Economic Perspective

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1 Introduction

Multinational companies (MNCs) are functioning in various communal and ecological situations and establishing Corporate Social Responsibility (CSR) systems for endorsing collective rights, sustainability which emboldens civil responsibility, deprived of overlooking major objectives of monetary sustenance (Santos, 2014). The conception of CSR in communities is as long standing as the notion of businesses itself (Youd-Thomas, 2005). For that reason, the efficient CSR system should be connected with the industry value of multinational companies functional in various countries. Accordingly, MNCs are on fronting urges from different concerned participants (Arvidsson, 2010) to carry out CSR actions that are effective for sustainable development and at the same time create greater value formation for MNCs (Santos, 2014). MNCs are becoming influential with time, and the prospective to establish efficient systems toward worldwide subjects is also growing, among which CSR is on priority (Jamali, 2010). As a result, MNCs are considered influential players in disentangling worldwide concerns (Scherer & Palazzo, 2007). MNCs are also being condemned for damaging impacts concerning the manipulation of resources and damage to environment (Prout, 2006). Therefore, Carroll (1999) described the outset of CSR as "where companies establish the monetary, legitimately, moral and humanitarian prospects concerning communities." The basic

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agenda of CSR actions is to create an optimistic industry attitude (Smart, 2003), where MNCs use CSR as an instrument of encouraging a constructive image of the company and to develop the economic sustainability for restoration toward communal concerns, like poverty, health, and environment (Pimpa, 2011). Hence, MNCs' CSR strategies have to be planned and connected with the strategic objectives of business while prioritizing sustainable development (Abugre & Anlesinya, 2019). Sustainable development concerns are associated with the agenda of growth, meeting the current necessities, but not conceding the necessities for upcoming generations (Rockström et al., 2009).

The notion of sustainable development consists of three basic elements: (1) ecological veracity, (2) communal justice, and (3) economic affluence (Bansal, 2002). According to WWF, the scenario of sustainability will be more unstable by 2030, as communities will be needing resources of almost two planets to meet the necessities of the arrangement of manufacturing and utilization. Ecological systems are despoiled, edible resources and energy reserves are becoming scarce, facing clashes for resources and societies are more defenseless to natural hazards (Rockström et al., 2009). Therefore, CSR is the dynamism that provides remedying prospects for harms of global scenarios which hinder the comprehension of sustainable development, like resource inequities, ecological harm, and discriminating employment practices. These elements primarily shape the notion of CSR, global domain, sustainable development, and establish the position of MNCs on these issues (Herrmann, 2004). These sustainable development rudiments are associated with economic progress, which is influential and similarly concerns with societal and ecological sustainability (Kolk & Tulder, 2010). Globally, the catastrophes of economies, trading inequalities, and transferal in economic supremacy establish a challenging situation for the progress required for handling poverty, habitation devastation, and ecological changes in the future (Abugre & Anlesinya, 2019). This imposes a cost on societal and ecological façade and also connects innovation capabilities of MNCs in this regard. This wider perspective identifies the crucial influence that MNCs can offer to evolving and executing resolution innovatively toward societal and ecological challenges by congregating communal and business objectives (Hamann, 2012). Over the decade, it includes the element called "Triple P" representing (1) people, (2) planet, and (3) profit. This shaped the attention of MNCs simultaneously on societal, ecological, and economic aspects of business actions, to aid in modeling the future of communities globally (Kolk, 2009), and comprising the context for MNCs' immersion toward poverty reduction, where MNCs including "Poverty" as an important element of CSR (Jamali & Mirshak, 2007). Similarly, sustainable development provides business value for MNCs by meeting the requirements of stakeholders like society, government, in terms of anticipated cash flows and monetary progress (Asgary & Li, 2015). In context with the discussion above, the following sections will discuss the triple bottom line (TBL), economic impact, and sustainable development from MNCs' CSR perspective.

2 Corporate Social Responsibility and Triple Bottom Line

In the twenty-first century, rapid changing situations are moving toward the agendas of global revolution imposing pressure on businesses performing not solely for monetary benefits but equally giving importance to be a moral corporate citizen. This global revolution consists of elements like CSR because environmental variation, societal well-being, literacy, and sustainable development are needed and priority concerns of today (Sherman, 2012). The companies are under pressure to show their performing capacities in terms of impact on economies, people, and environment overall. CSR never gets as high a priority as it currently possesses worldwide. The monetary predicament and its influence on the economies worldwide designates the prospect that the strength of economies contingent on accountability and reasonable attitudes and frameworks of sustainable corporate actions toward societal and legitimate protocols (Willard, 2012). Now, the concerns toward ecological safety are increasing rapidly, mainly, on environmental conversion, greenhouse gasses, and manipulation of natural reserves (Reddy & Gordon, 2010). Adopting approaches towards sustainable development supports MNCs to deal effectively with the concerns of society and come up as communal accountable, environmentally responsive, and economically valued entities (Hubbard, 2009). Integrating CSR with corporate practices encourages effectiveness, which includes decreasing wasting resources (can by reprocessing or innovativeness), companies instantaneously helping the environment and lessening the manufacturing price, which as a result betters the revenue (Medarevic, 2012). However, the debate of CSR is sturdiest, when it causes an increase in instant assistants like savings and bigger revenues. In a longstanding perspective, ambition for being effective endorses a system of competitiveness. Companies motivated for achieving effectiveness and associated profits will develop activities for innovativeness, which focus on developing the latest technological support. This improved the effectiveness approach toward better sustainable approaches for companies. At the same time focus of companies for the betterment of societal and environmental hazards reduces the intervention of concerned authorities (Żak, 2015). This facet directed to the increase of environment-friendly policies (Stanislavská, et al. 2010). To deal with the worldwide defies, MNCs over the world implementing sustainable developments approach (Zadek, 2004) by employing the philosophy of triple bottom line where the focus is not just on the monetary aspects of the businesses but at the same time businesses performing capacity in terms of societal and ecological agendas as well (Norman & MacDonald, 2004).

In the late 1990s, the conception of the triple bottom line came into light, which established the framework for measuring morally, ecologically, and socially responsible conduct of businesses (Elkington, 1997). The notion of "triple bottom line" is amongst the fundamentals of CSR, that outcomes from the prototype of sustainable development which establish three pillars: (1) economy, (2) ecosystem, and (3) communal morals (Dixon & Clifford, 2007). The philosophy of triple bottom line was first explained by Elkington in 1994, which established that businesses have to

formulate three diverse bottom lines. *Line one*, customary standard for business revenue, represents as "bottom line of revenue and cost account"; *Line two*, the extent business activities are communally accountable, represents as "bottom line of people's account"; *Line Three*, the extent, business activities are ecologically accountable, represents as, "bottom line of planet account" (Hindle, 2008). The comparable description is given in the European Commission (2001) where TBL is considered as the notion where performing capability of businesses in this regard is seen as collective involvement toward ecological safety, dominion of economy, and societal principal.

Medarevic (2012) asserted TBL as the manufacturing of products and providing services under a system which are not polluted, preserving energy and natural reserves, soundness of economies, the well-being of labor, society, buyers, and other stakeholders. The notion behind this idea is that the performance and accomplishments of businesses can not only be determined through the old system like a monetary bottom line only, where the aspects of businesses are equally important like societal and ecological domain (Norman & MacDonald, 2004). This obliged MNCs to declare the systematic effect of actions taken by businesses on the economy, society, and environment. Therefore, MNCs focused to update the concerned stakeholders on the types of processes businesses they are engaged in; secondly facilitates stakeholders who can easily observe and evaluate the actions and their effect on the communities and environment; and lastly enable businesses and concerned stakeholders to apply stratagems and plans to reduce the upshots of those actions and processes (Reddy & Gordon, 2010). This approach toward stratagem and applying those plans can result in strengthening MNCs' performance (Fauzi et al., 2010). Identifying the determining factors of a company's performance is crucial in terms of economic crunch as it assists the recognition of dynamics requiring handling on priority to better the performing capacity of business (Gavrea et al., 2011). Experts also called this conception "Three Ps," explaining the dimensions under priority while operating people, profit, and planet. It defines the philosophy of activities of MNCs concerning equally ecological agendas, communal safety, and revenue for economies survival (Żak, 2015). To have a closer look into these three aspects, we are explaining them in the following section.

Profit is a compulsory need, on which businesses grow and economies survive smoothly. Yet, the dimension of the economy not just relies on making revenue; the crucial part is how to utilize it creatively which has a larger impact on the economy. The economic element of CSR is concerned with its impact on society and concerned stakeholders. CSR can assist the companies to be cost-effective in the long term that will impact significantly the economy, GDP, buying power, and overall humanizing the standard of life (Uddin et al., 2008). The important facets which are attached with "economic impact" are, firstly, companies create employment opportunities, and open opportunities for the suppliers, which in return benefit the communities. Moreover, the revenue generation of the businesses will increase the remunerations, and hence increase the income of suppliers and other parties. Secondly, the economic domain will significantly impact taxation systems. The better the profit, the better will be taxation systems, which impacts on overall economy (Ksieszak & Fisch Bach, 2017).

People are the backbone of businesses. The community domain is concerned with humanizing the standard of life. CSR is the instrument that aids in improving and stabilizing the better connection among the community and businesses. CSR of companies covers all the stakeholders who are directly or indirectly affected by the activities of the business. CSR ensures the welfare of people, as businesses stand nowhere without their workforce, consumers, or suppliers (Porter & Kramer, 2006). Hence, the economic well-being works side by side with community progression and welfare. Therefore, the CSR of business which compliments TBL will not misuse the community like a counter to child labor, provides better pay, and respects the rights of the workforce (Muthu, 2017).

Planet is the habitation for businesses and communities. If MNCs contaminate the ecological system with the activities and business processes that will lead to its damage to the planet, it consequently affects anything living (Mullerat, 2010). Therefore, the ecological domain is the duty of everybody, especially MNCs, as their activities and processes are the primary reason for its destruction. A reckless attitude of companies toward nature, resources, and largely creating pollution are the core reasons for damage to the earth and ecological system (Gupta, 2011). According to Elkington (1997), seven purposes can stimulate companies to TBL objectives: (1) Markets, (2) business-value transferences, (3) focus on transparency mechanism, (4) technological upgradation and related cost, (5) partnering with consumers and society, (6) long-term return, and (7) business governance. Willard (2012) explained that the impacts of TBL toward these three crucial accounts are profit generation, reserving energy reserves, reserving other crucial reserves like water, improving labor motivation, decreasing cost of rehiring, decreasing leftover expenditures, and decreasing jeopardies of processes. This recognizes an improved and extended accountability domain for companies to add toward the communal welfare and environment. Highlighting and designing CSR in a shape that does not overlook or contempt the objectives and vision of the company, but to plan them in inclusive way that includes both the objectives of CSR and company (Miller et al., 2007). Hence, influential CSR practices and economic bottom line can occur side by side. CSR can develop the triple bottom line, which primarily depends on the best strategic alignment of business approaches and CSR to equally oblige the benefits of shareholders, community, and environment (Dixon & Clifford, 2007). CSR cannot be a "futile investing approach" but a TBL investing approach for companies, which fetches significant effects for businesses, society, and ecological systems when properly and steadily designed. Therefore, CSR is a TBL strategic investing approach that is aligned with the objectives of business. TBL does not entail that businesses are needed to increase revenues in all three domains of business performance (Dutta et al., 2011). Instead, it identifies improved inclusive stakeholder determined recording appliances which include the broad revelation of business activities including environmental, communal, and economic concerns (Fleming, 2012). This reflects that for businesses ignoring the safety of concerned stakeholders will not be beneficial in the long term (Stanislavská et al., 2010).

Through acting intelligently in these domains, the businesses can defend themselves from destructive social representation and reinforce a progressive and

constructive perception of stakeholders on their business actions (Stanislavská et al., 2010) by determining, computing, reviewing, and recording activities concerning society and environmental domain in relation to sustainable development, as similar to the reporting of monetary performance of businesses (Mitchell et al., 2008). The efficient system of the triple bottom line only exists when businesses focus on all three domains, only then it will establish sustainability as all these dimensions are narrowly linked. Approaches of business CSR concerned with revenues and society but ignoring the ecological concerns is equally negligent. At the same time prioritizing community and ecological concerns but ignoring the dimension of profit will badly harm the business and overall domain of the economy; similarly, ignoring community badly affects the goodwill of companies and community welfare, as it will negatively impact the society and employees well-being (Cane, 2013).

3 Corporate Social Responsibility Practices of Multinational Companies

MNCs bring investment opportunities in countries that hold a prominent position in the overall economic domain worldwide, communal contribution, and administrative modifications (Abugre & Anlesinya, 2019). MNCs are coming as influential entities of economies and their perspective on dealing and aiding on crucial concerns worldwide as major CSR approaches also enhances vividly (Husted & Allen, 2006). This has a significant impact on handling issues and problems all over the world (Raschi & Kell, 2010). As MNCs are always been condemned on the impact of their activities and processes on the environment, resources, and manipulation of the workforce (Prout, 2006), this also stresses for accountability of MNCs toward the community and environment due to the antagonistic effects of their activities and processes (Collings et al., 2008). Therefore, the conception of CSR is considered as a significant subject in the present business environment because the linkages among the industries and their concerned partners from community are coming as more prominent and cohesive dynamism (Sethi, 2005). The businesses comprehend the fact that to survive and function efficiently, the companies cannot function in vacuums and are detached from the stakeholders (Kotler & Lee, 2004). This stresses the emphasis toward both commercial and noncommercial stakeholders. These approaches will lead the companies to be successfully operationalized in the long run (Adams et al., 2001). Consequently, the alignment of CSR with the corporate stratagem is established as the primary facet of MNCs globally (Jamali, 2010).

The dynamic aspects of CSR practices of MNCs may include the force from the community where companies are operating and the major global authorities (Ite, 2004). Most of the CSR concerned approaches are being prioritized in developing states, for example, Asian and African nations. The impact on these nations is putting stress on MNCs on challenges like safety and well-being, social rights, greenhouse gasses, and labor (Matten & Moon, 2008). The other determining

influence can be the company's obligation toward the concerned parties who can be affected by the activities and processes companies are involved with (Ite, 2004). Therefore, MNCs globally are making efforts to prove their goodwill and also recognizing the prominence and significance of better association with consumers, community, and supplying parties (Bethoux et al., 2007). CSR is connected with the promise to meet the interests of shareholders and at the same time equally considering the concerned parties, who are affected by business processes and actions. These parties can be customers, workforce, society, supplying groups, and ecological systems overall. CSR is more than a juridical duty. It is more like a promise by the businesses to understand the impact of their activities and policies on communities and the environment (Medarevic, 2012). According to McInerney (2007), companies while designing CSR initiatives should focus on five important dimensions, which should be aligned with the objects of CSR; the dimensions may include cause preferment. The dimensions are discussed in the following section. *Cause concerned publicizing* is a communal determined stratagem, with the objective of changing the view and consciousness of concerned parties to some extent of altering the attitude toward a cause and communal concern which can affect the welfare of society (Żak, 2015). Usually, a cause or any communal problem is recognized and upheld between specific stakeholders. For example, improving awareness towards the issue of ecological change and its adverse effects on the society (Buhmann, 2006). *CSR concerned publicizing* is the community relevant approach, where large businesses usually offer the share of their profit of sales in order to assist communal problematic situation or to provide aid in case of any emergency like natural catastrophes or financing educational institutions or campaigns for the safety and health of children (McInerney, 2007).

Business benevolence represents the business community publicizing with the objective of improving the attitude of society, for example, discouraging smoke, no drinking when driving, using helmets, and saving energy (Buhmann, 2006). *Societal volunteering* is the approach of businesses to contribute to important causes, for example, charitable aids like blood contributions, financial contributions, scholarships for students, or rural job offerings (Muthu, 2017). In *Communally responsible activities*, business efforts are dedicated to recovering the effect of communal, ecological, and monetary accomplishment by altering the activities and processes of businesses. For example, greenhouse effect, improving the processes to reduce its adverse effect on the environment, reducing waste, recycling (Zerk, 2006). The first three dimensions of CSR discussed above are communal-determined stratagems, with the objective of resolving societal harms by improving people's view, responsiveness, and attitude toward various issues. The other dimensions are connected with the business determined stratagems, with the objective of establishing the company's integrity and ethics to the community and ecological domain. These objectives can be met by altering the activities, policies, and approaches of companies within companies and externally as well. These stratagems are practically adopted by large businesses (Khan & Ghouri, 2011).

In context with the discussion above, there can be many CSR prospects that MNCs can focus on in terms of obligation toward the welfare of society and all

concerned parties. But alliance among the activities of companies and CSR approaches is crucial which represents "CSR in progression," whereas the other domain is CSR approaches in the outer domain of company's activities which represents "CSR after progressions" (Bethoux et al., 2007). CSR can face both the defies and prospects with the aim of efforts to decrease poverty, spending on society, improving work settings, ecological concerns, business translucency, welfare of employees, handling jeopardy, and brand differentiation. "CSR in progression" stimulates long-run sustainable development than "CSR after progression." These CSR in progression approaches are connected with systemized activities, which must include the description and amalgamation of basic fundamentals of CSR in activities like mission, objectives, preparation, application, monitoring, and valuation—in alliance with the company's activities (Murtaza et al., 2014). The plans depict visibly the social and communal concerns and their significant effects on communal issues, for example, benevolent involvement, concerns on child employment, social moralities, worldwide moral practices, unbiased employing practices, and infirmities benefits. Similarly, the authorities like ILO also pressured MNCs to include the important aspect of poverty reduction in CSR like organized work system and understanding and improving the impact of poor labor policies, poor wages, and influence on economies (Kolk & Tulder, 2006). At the same time, MNCs plan various forms of community releases that are intended toward concerned parties as fragments of CSR activities and approaches (Aerts et al., 2006). MNCs are taking special initiatives on endorsing ethical acts and their impact on economies and social benefits with the help of company's websites, social media, print media, and electronic media. Where at the same time ethical work and socially responsible behavior of the company in this regard should be included in community releases (Gonzalez & Martinez, 2004).

MNCs are becoming responsive regarding the significance of CSR and integrating specific strategies and activities concerning CSR. For example, instead of instituting new industrial units, MNCs are constricted with the locally established companies in order to manufacture the merchandise, where at the same time the importance of labor laws, ecological concerns, and workforce health and safety will never be compromised (Doh and Guay, 2006). MNCs also inaugurate corporate associations with the concerned constituents like workforce policies, social rights, and community concerned practices (Kiran & Sharma, 2011), which includes elements like, internal code of conduct. Moreover, besides other CSR activities by MNCs, one significant part of CSR is establishing system as inside "code of conduct," these systems for conducting activities ethically and morally are to provide benefit to workforce attached with business, affiliate businesses, franchises, contracting parties and any other party working with businesses (Matten & Moon, 2008). These systems also establish the other crucial areas like defined rights for workforce, legislations on labor and their rights and the activities they are involved in, safeguards on labor practices, market compatible compensation, benefits for workforce, ethical policies on labor working hours, and personnel policies on discouraging manipulation and harassment by management or by employees (Pederson, 2009). One of the crucial elements of CSR internal code of conduct is

the health and safety of employees to ensure providing better health and safety measures especially for the workforce who are attached to manufacturing processes, machines, and handling chemicals (Matten & Moon, 2008).

The vision of CSR activities has served as the influential mechanism for MNCs to act as ethical corporate citizens toward the associated groups and all the activities and policies are designed for reflecting CSR norms effectively (Perrini et al., 2007). For example, in the late 1990s, when disclosure came to light that the diamond market was establishing a basis for funding different bloody public hostilities in Africa called "blood diamond," these exposures put a huge pressure on the diamond market by different bodies. Therefore, diamond industrial entities worked collectively with the state, coming with the agenda of international documentation/certification practices. Similarly, mining businesses have always been facing accusations of their negligence on labor rights and exploitation of the labor practices. In understanding this, gold businesses work thoroughly on the CSR practices concerning health and safety, personnel rights, and encouraging non-forced workings (Harrington, 2012). Likewise, other businesses also include CSR in their vision to play their role effectively toward society overall (Reddy & Camelia, 2007). Globalization pressurizes the MNCs to act as a moral citizen toward society and environment; this enforces MNCs to establish CSR activities and implement them effectively not in a home country but also ensure that those CSR policies and activities are implemented effectively in host countries as well. These policies and activities of CSR have to be consistent with the local and international legislations on workforce and processes (Rodriguez et al., 2006).

4 Corporate Social Responsibility and Economic Impact

The pressure on businesses to evaluate their CSR and philanthropic activities brings businesses, shareholders, and stakeholders together. The impact of CSR activities on financial positioning and economy is vital (Burke & Logsdon, 1995). Though CSR and its concerned activities may entail a cost but it will provide benefits in long term to companies, communities, and economies. The approaches are moving beyond traditional objectives of "profit and market capture" only. The modern aspects of stratagems included the objectives of economic and noneconomic impact for company, workforce, and community where they are operationalized. The policies on socially responsible attitude of companies including strategically the social and economic agendas of companies and society (Carroll et al., 1987). Implementing effectively the activities of CSR eventually results in strategic profit and value for businesses. This "value" formation is connected with the business activities anticipated to obtain the impact. This impact is related to the association between CSR activities and economic prospects for companies and communities. Companies create "value" and invest it in the workforce, business investments, employment, innovation, production, and initiating wider programs of CSR, which influence the financial performance of companies and economic domain overall (Orsato, 2006).

CSR approaches represent companies' social responsibility attitude toward society, environment, and economic facets (Takala & Pallab, 2000). The focus is to design the CSR and sustainable development system which do not increase risk; in fact, it improves the economic performing capability of business and community (Orsato, 2006). According to UNDP (2007), the efforts toward poverty reduction and economic development should be collective accountability between and among all responsible groups globally. Whereas the part of government is crucial and compulsory to establish the policies aimed to improve the lives of people, it also includes the role of international policymakers and businesses in order to improve the living fundamentals of the community. The argument on the role of MNCs to adopt more than a revenue making agenda, MNCs mostly establish CSR contrivance for stimulating progressive impression on the community and concerned authorities with the agenda to develop the living standards of people (Pimpa, 2011). MNCs are using CSR and its policies to design a corporate model for extensive involvement of businesses toward poverty and economic growth (Holliday et al., 2002). According to Ite (2004) and Jamali and Mirshak (2007), the MNCs must include poverty reduction and economic development as their vision and objectives of business. Reddy and Camelia (2007) asserted community-centric aspects for poverty and its impact on the economic conditions of developing countries. Investing in CSR activities is executed in different arrangements which include activities concerning ecological protecting measures, aids for community concerned activities, labor, and consumer protection. These investing dominions permit businesses to establish their goodwill and also achieve sustenance from stakeholders, which ultimately returns in benefits and revenue (Surroca et al., 2010). Literature supports the association between the CSR activities and significant economic impact (Al-Tuwaijri et al., 2004). Better ecological performance capacity improves overall monetary benefits to both businesses and the national economy. Similarly, Brammer et al. (2006) asserted that CSR efforts of MNCs related to environment, society, and employment significantly effect on business's revenue and economic domain overall. Nelling and Webb (2009) identified a positive association between CSR efforts which includes charitable contributions, ecological safety, efforts on sustainable development, and society's welfare and business economic capabilities. The MNCs' obligation on CSR has three types of impact overall: economic impact, ecological betterment, and social impact. CSR is the crucial element of sustainable development (WBCSD, 2010). At the same time, these economic impacts also have a constructive impact on future obligations regarding CSR (Balabanis et al., 1998). According to Orlitzky et al. (2003), MNCs' communal aptitude, monetary performance, and economic impact stimulate one another, where these economic concerns are associated with the financial capability of businesses and also national economic impact overall. Companies can develop extensive performing capability by aligning monetary objectives and societal/communal objects. The strategic slant to CSR can support both economic and societal objects (Porter & Kramer, 2002).

According to the World Economic Forum (2007), CSR objectives are crucial constituents of business intricacy and stratagems. In fact, CSR is a concord of shared profit among communities that requisite businesses for economic and communal

growth, where companies required a supportive corporate system (Davies, 2003). That determines the competitiveness of economies at the national level. As the extent of growing production determines the progress in the economy and quality of life (Schwab, 2009), which can be dignified by different indicators like income level, quality of life, community welfare, and liveliness of people (Aiginger, 2006). Therefore, it is crucial that the business CSR objective, business financial objectives, and national economic objectives are strategically aligned (Swift & Zadek, 2002), henceforth entrenching it in broader economy aspects. According to MacGillivary et al. (2003), an economy's efficiency can be improved by businesses' initiatives and accountability toward societal, ecological, and economic concerns. Thus, a company's utmost social responsibility is generating revenue for shareholders, providing employment opportunities, investing in societies, improving economies and income level of people (Florini, 2003).

5 MNCs' Corporate Social Responsibility and Sustainable Development

Society's prospects concerning companies are increasing largely, as a form of boundaries among the governmental and private parties on issues like sustainable development, TBL, and business ethics. The fundamental of sustainable development is associated with the objective of meeting the current requirements efficiently to save the resources for future generations as well (Kotler & Lee, 2004). The present industrial activities are increasingly damaging the ecosystem and natural reserves. Therefore, the need for businesses, concerned authorities, and policymakers to work on sustainable development and CSR is growing (Ekins & Simon, 2003). The perspectives are on the domains concerning traditional attitude and activities of businesses on sustainable development, and innovative perspectives and models on CSR, sustainable development, ecological management, and green innovation (Devinney et al., 2013). Where focusing on the wellbeing of all stakeholders and objectives of CSR along revenue making (Kang & Moon, 2012). The policies and activities of MNCs should be built on the vision to best meet the agendas of CSR and sustainable development (Kolk, 2010). This vision includes elements like environmental change, greenhouse gasses, reserve diminution, and communal and ethical aspects (Collinson et al., 2013), implementing these activities both within the internal system of businesses and outside the companies while involving other stakeholders (Kolk, 2005). It reverberates within wider communal ramifications and anticipations from concerned regulating bodies and also concerning the requisite to aid or stimulate economic impact on neglected parties/stakeholders. MNCs will prioritize the range of concerns to include in the vision and planning of CSR and sustainable development to effectively address including them in stratagems, governing edifices, and business progressions, which consequently affect the CSR and its impact (Collinson et al., 2013).

These priority schemes on sustainable development are usually also influenced by the concerned regulatory bodies like the United Nations, OECD, WBSD (World Business Council for Sustainable Development), and GRI (Global Reporting Initiative) (Campbell et al., 2012). The UN is evolving its focus from the millennium growth objectives to sustainable development agendas, and OECD also initiated welfare guides (Campbell et al., 2012) that are basically influencing MNCs and determining their course of action. The policy deliberations have been changed in the late 1960s and move more toward community and environmental concerns due to high mass production, increasing pollution, environmental change, greenhouse gases, and exploitation of resources (Kolk, 2014). The agendas and elements of sustainable development are prioritized in terms of: (1) economy concerns, (2) societal/communal concerns, and (3) ecological concerns (Labuschagne & Brent, 2005). In *Green Ecological concerns*, goals are concerned with reducing pollution, exploitation of reserves, renewable reserves and including the wide range of policies concerning ecological domain (Kolk & Pinkse, 2008). The ecological concerns of sustainable development are pertinent with the objects of taking the ethical obligation to save the natural reserves for the upcoming generations, which include significant purposes like (1) efficient use of natural reserves and economically responsible attitude, (2) policy-making on reducing the likelihood of waste material and recycling, and (3) comprising of activities to ensure health and safety of the community (Ekins & Simon, 2003).

Ethics and morality aspects of business activities concerning society are also receiving the attention of MNCs and regulatory bodies which embolden the business and societal imperative like benevolence, moral obligation of industrialism, workforce welfare, moral obligation toward society (Singh et al., 2005). *Economic concerns and sustainable development* includes agendas like poverty reduction, economic development, reducing the income gap, and green revolution technological improvement in developing nations to deal with environmental damage and exploitation of natural reserves like water and energy reserves (Meyer, 2004). The United Nations (UN) included sustainable development goals, which widely focused on TBL (people, planet, and prosperity), where pride and reasonableness are also included. Overall, five broad agendas have been highlighted like ecological agendas, communal prosperity, economic development (both on community and economy level), reducing poverty and eliminating disparities, and harmless and healthy communities (UN, 2014). The role of businesses has always been crucial toward sustainable development and CSR as businesses are among the key actors which are transmuting natural reserves into manufactured resources (Ekins, 2003). There can be two fundamentals slants to understand the role of businesses toward this objective; first, the business value produced by businesses by utilizing the reserves contrary to the damage initiated to the ecological domain and society well-being, and secondly, the absolute measuring is concerned with the total extent of products manufactured and contributing to economy, while least demerging the ecological system (Figge & Hahn, 2004). The essential approaches of MNCs including CSR and sustainable development includes: utilizing renewable reserves, like solar, wind, and water energy, understanding the stability among the use of nonrenewable and

renewable reserves, and stratagems on reducing the greenhouse effect (Heeres et al., 2004). Technological support and "ecological footprint" (EF) are also dominant and strangleholds of CSR. Better and greater CSR activities and environment management organism and efforts are also contributing effectively toward sustainable development (Bagliani et al., 2008). The role of MNCs for improving and fastening CSR activities are covering both internal and external objectives of CSR. The internal goals of CSR are to improve controlling acquiescence to eliminate or decrease a business's harmful effect on ecological systems and to control precarious emanations in the society where these businesses are operating. Implementing greenhouse gasses avoidance and clean producing systems can effectively control the polluting concerns, decreasing wastage of resources, recycling, paperless work procedures, and overall work practices (Rondinelli & Berry, 2000). Whereas external objectives of CSR is connected with the broader agendas of sustainable development like projects on ecological and renewable resources, benevolent contribution toward society's basic issues, actively participating in efforts concerning "saving earth," coalition with policymakers on sustainable development, and overall environment protection agendas (Robins, 2005). Both inner and external CSR objectives add in sustainable development effectively toward preservation of natural reserves, energy, and ecological systems (Rondinelli & Berry, 2000; Spitzek, 2005).

6 Conclusion

The aim of this chapter was to highlight the MNCs' role in modeling CSR effectively to impact sustainable development while understanding the association between the MNCs, global concerns, community, and other stakeholders. Sustainable development is receiving immense attention globally which is emerging as a general slant of growth that requires the amalgamation of community issues, global ecological system, and economic concerns in all domains strategically (Nasrullah, 2011). In the scenario of globalization, businesses are contemplated as part of the primary actors, for example, governmental institutions, policymakers, and other private bodies working on the schema of sustainable development and other social challenges (Cynthia, 2002). The reason is that with time, businesses, especially, MNCs are attaining substantial dogmatic and economic stimulus. Therefore, the capital, control, and resources of MNCs highlight them as crucial actors among communities they are operating, home countries, and global communal domains (Nasrullah, 2011). The vision of industrial development and denationalization as a result of globalization is evolving the giant businesses as a prominent element equivalent to other stakeholders, like governmental authorities, policymakers, economists, and society and therefore, their influence is becoming progressively prime for ecological challenges, societal issues, and economic impact overall (Lantons, 2001). Accordingly, MNCs are considered as having gigantic potential toward sustainable development (Malovics et al., 2008). Hence, MNCs are incorporating the necessity for their volunteer approach toward CSR by encompassing people, economy, and

ecological concerns (Asgary & Li, 2015). These CSR initiatives and policies are implied for ecological safety, philanthropic contribution to communal projects, labor protection, and sustainability agendas (Jamali & Mirshak, 2007) by effectively implying CSR which has a wider impact on sustainable development and economic sustainability, while considering all three accounts of TBL. This ecological sustainability embodies competent utilization of nonrenewable reserves and avoiding exploitation of natural reserves, reduction of waste, recycling and innovatively managing the pollution (Nasrullah, 2011).

The objectives on achieving economic sustainability are associated with elements like improving living standards, income level, better health and education facilities, hygiene and water availability, and poverty reductions (Asgary & Li, 2015). The CSR objectives on achieving social sustainability are associated with the objectives to form societal or communal aptitude which ensures the excellence of living standards, employing opportunities, effective labor laws, philanthropic activities for educational institutions and hospitals to improve the business–societal association (Steurer et al., 2005). These efforts of MNCs permit businesses to be acknowledged as socially responsible entities and significantly attain sustenance from stakeholders (Kolk, 2016) as giant businesses have accessibility to natural reserves which also can become the reason for few situations that may lead to unsustainability as well. The contrivance of CSR empowers the businesses for fetching a corresponding change toward economic impact, communal welfare, and ecological safety (Andersson et al., 2005). Hence, the context of CSR represents the multidimensionality tactics of sustainable development in terms of outlook and subjects. So, from the overhead discussion, it is established that the implication of CSR activities can significantly improve the economic concerns, communal challenges, and ecological sustainability. Therefore, MNCs have to integrate CSR into primary business stratagems to ensure its support toward the agenda of sustainable development as expected by the stakeholders and policymakers.

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Investigating the Impact Natural Resource Abundance on Capital Flight: Evidence from African Countries

Ilyas Okumus, Muge Manga, and Mehmet Akif Destek

1 Introduction

Capital flight, especially in the 1990s with the financial crisis caused by the increase in foreign debt in Southeastern Asian countries such as Indonesia, Malaysia, the Philippines, and Thailand, has started to be considered a crucial economic problem worldwide (Beja, 2006a, b). Throughout history, large-scale capital outflows often fuel the external debt problem in developing countries (Cuddington, 1986). Mainly, the capital stock of economies is based on the portfolios of individuals or firms depending on the tax practices and legacies in the country, the expectations of returns, and the risk of non-repayment of assets. In the long run, capital flight leads to an increase in external debt burden by reducing the state revenues, national savings and private capital formation and deteriorating the tax base (Khan & Haque, 1987; Ndungu, 2007). Especially the developing countries are deprived of some marginal social benefits such as infrastructure, human capital, and equipment improvements because of the capital flight (Epstein, 2005). Namely, for the countries that do not have the infrastructure necessary for development, the financial resources and capital needed for infrastructure development should be met by foreign investments. Therefore, the development process of these countries is disrupted due to the capital flight. Increasing economic uncertainty and fragility

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sourced from sudden capital flight also damages domestic investments. In addition, with the increase in capital fluctuations, the other problems also arise in terms of economic justice because only a minority group benefited from the capital outflow while increasing external debt adversely affects the majority of the country's population (Beja, 2006b).

Despite the increasing number of studies on the impact of capital flight, the other problematic issue is that there is no consensus on the definition of capital flight. One of the oldest definitions of capital flight is to have been put forward by Kindleberger (1937). According to Kindleberger (1937), capital flight refers to abnormal flows of capital from one country to another due to fear and insecurity in the market. Accordingly, to qualify a capital outflow as capital flight, it must be realized in an amount and size that would create an unexpected and adverse flow in the economy (Kant, 2002). According to World Bank (1985), which deals with capital flight in a wider scope and emphasizes capital outflows that emerge especially in the first half of 1980s; an overvalued exchange rate that makes foreign assets look cheaper and at the same time creates a fear of devaluation; higher and variable inflation that creates uncertainty and reduces real interest rates; repressive financial policies that keep the real interest rates at negative levels during rapid inflation periods and the transition to markets where capital from high internal protection will feel safer (World Bank, 1985).

In general, capital channels are taking place through various channels in the countries. The first includes money laundering activities due to smuggling or corruption. The second one is the increase in foreign exchange assets of the firms due to the excessive invoicing of imports and/or the low invoicing of exports, while the third most commonly used channel is the evasion of taxes from foreign suppliers by adjusting their commissions and fees. Finally, people carry out capital outflows by transferring money to family members across the border (Alam & Quazi, 2003). It supports the financing and sustainability of the non-resource sector by providing the development of the domestic market, especially an equity market, with its benefits in preventing capital flight, risk-sharing, and liquidity arising from multinational companies operating in the resource sector (Arezki et al., 2014). It is clear that the studies conducted in this field focus on the factors that affect capital flight due to the contribution of the prevention of capital flight to macroeconomic indicators. Fedderke and Liu (2002), Hermes and Lensink (1992), Harrigan et al. (2002), Mulino (2002), Kolapo and Oke (2012), Bakare (2011), Al-Fayoumi et al. (2012), Geda and Yimer (2016), Liew et al. (2016), Puah et al. (2012) are studies on the economic and political factors that affect capital flight. One of the most important sources affecting capital flight is the abundance of natural resources, and in general, it might well be argued that the capital flight occurring in the countries rich in natural resources is higher than the countries with limited natural resources (Ndikumana et al., 2015). This situation can be expressed by the hypothesis of Dutch Disease. Corden and Neary (1982) in their study, natural resource dependence, natural resource sector, the non-resource tradable sector, and the nontradable sector is divided into three different categories are discussed. In this chapter, the economic effects of the overvaluation of national money due to spending effects and resource

movement effects are mentioned with an emphasis on emerging sectors and sectors with limited production (Brahmbhatt et al., 2010). This leads to an overvaluation of the national currency and a decrease in competitiveness in other export-related sectors. As a result, the growth and development processes of the country come to a halt, and investments have decreased significantly. This creates an insecure market environment and accelerates capital outflows and causes different financial crises within the country.

Although the natural resources sector plays an important role in determining the rent struggles in developing countries, its connection with other sectors in the economy is very limited (Arezki et al., 2014). There are different reasons for the fact that capital flight, which is also observed mainly through smuggling and corruption, is frequently seen in natural resource-rich countries. One of them is the high attractiveness of investments in this area due to the high profits made in the natural resource sectors. Another is that the natural resource rent payments are given to the elite who support the ruling group so that these resources can be used as desired by the government (Kolstad & Søreide, 2009). Moreover, the limited level of competition in the natural resource sector increases tax evasion and capital flight in these areas. However, the differences between the governments of the developing countries and the multinational corporations of the expertise and technical capacity of the countries, which are important in carrying out the complexity of the technological and financial processes required for the utilization of natural resources, increase the capital flight in the developing countries. Finally, the complexities involved in the ownership structure and residence of multinational corporations also increase capital outflows, particularly in the form of trade misinvoicing (Ndikumana & Sarr, 2016).

One of the common features of African countries is that they have witnessed a high amount of capital escape due to their rich natural resources reserve structure such as oil and various minerals. According to the Political Economy Research Institute (2018) report, between the years 1970 and 2015, capital outflows in 30 African countries amounted to $ 1.4 trillion (cumulative $ 1.8 trillion with interest gains). This rate corresponds to 65.6% of the GDP of African countries compared to 2015 (Ndikumana & Boyce, 2018). However, it is considered that capital flight in these countries is mainly in the form of trade misinvoicing. Based on the above reasons, in this chapter, it is aimed to investigate the effect of the abundance of natural resources on capital flight in selected African countries (Algeria, Botswana, Kenya, Madagascar, Malawi, Sierra Leone, South Africa, Uganda, Zambia, and Zimbabwe) for the period between 1990 and 2015. In doing so, to avoid the omitted variable bias, the impacts of corruption, external debt stocks, and exchange rate on capital flight are also examined with panel data methodologies. The contributions of the chapter are threefold. First, to the best of our knowledge, this is the first study that investigates the role of natural resource abundance on capital flight for African countries. Second, the impacts of many factors that are accepted as the main reasons for capital flight are also considered instead of using a bivariate empirical model. Third, unlike previous studies on the resource abundance and capital flight nexus, this study takes into account the possible cross-sectional dependence among African countries.

The organization of the chapter is as following: Section II reviews the literature on natural resource abundance and capital flight. Section III describes the constructed empirical model, utilized data set, and employed methodology. Section IV presents the empirical findings. Finally, Section V concludes the chapter with discussions and policy implications.

2 Literature Review

In literature, the empirical studies regarding the relationship between natural resource wealth on capital flight are quite limited. Demachi (2014) examined that the impact of natural resource abundance on capital flight for 21 natural resource-rich countries (Azerbaijan, Bolivia, Chile, Congo, Algeria, Ecuador, Egypt, Gabon, Guinea, Guyana, Indonesia, Kazakhstan, Malaysia, Nigeria). In the empirical model of this chapter, public and private sector debt, inflation rate, share of crude oil rent, and share of foreign direct investments in GDP are used as control variables. The results show that as the share of rental income of natural resources in GDP increases, so does the share of capital escape in GDP. It is also obtained from the empirical analysis that especially as there are plenty of natural resources in selected countries expressed as an important reason for the economic and social stagnation; therefore, the natural resource curse hypothesis is valid. Kwaramba et al. (2016) examined the relationship between capital flight which is computed by the wrong invoicing method, the abundance of natural resources, and institutionalization in Zimbabwe. It is concluded that high macroeconomic instability increases capital flight and there is a positive relationship between capital flight and natural resource returns. Ljungberg and Friedl (2014) discussed the impact of the abundance of natural resources on capital flight. In this chapter, the share of natural resource rents in GDP is used as the indicator of the abundance of natural resources, and institutional indicators such as compliance with laws and democracy index are also included as explanatory variables. It is concluded that there is a positive relationship between natural resource return and capital flight.

Ondo and Taylor (2012) estimated the determinants of capital flight in 40 sub-Saharan countries for the period between 1970 and 2000 and the results indicate that a 1% increase in oil revenues in these countries increases capital escape by 0.193%. Another finding is that there is no significant relationship between the increase in the ratio of other natural resources' revenues to GDP and the capital flight. Arezki et al. (2014) examined the relationship between the abundance of natural resources and tax evasion in the form of tax evasion by multinational companies that are oil producers in 117 countries for the period from 1970 to 2012. According to the findings, it is concluded that especially the countries whose economic structures are mainly based on natural resources are more affected by the sudden capital outflows. Ayamena Mpenya et al. (2016) probed the relationship between capital flight in Cameroon and natural resource sectors (oil and timber) for the years between 1995 and 2012 and they stated that misdirection of especially

oil and timber sectors increases capital escape. Gankou et al. (2016) aim to estimate the impact of revenue growth in the similar natural resource sector on capital outflows in 1970–2010, depending on the return of oil resources in Cameroon, natural resource assets increase capital to use in the long run, 1% rise in oil revenues increases capital escape by 1.04%, and the effect of lumber sector revenues on capital escape is not statistically significant. Ndikumana and Sarr (2016) investigated the relationship between capital flight, FDI, and abundance of natural resources for the period between 1970 and 2013 in 32 African countries. The findings proved that the abundance of natural resources correlates between FDI and capital flight and that the amount of natural resources both directly and indirectly affects capital flight. On other hand, natural resource revenues have a positive effect on the capital flight in selected countries. Ndiaye (2011) aimed to make predictions on the determinants of capital flight in the Franc Zone region between 1970 and 2005, depending on indicators such as institutional, macroeconomic stability, and natural resource returns using with Generalized Method of Moments (GMM). The empirical results from the analysis show that there is a positive relationship between the share of fuel exports in GDP and capital flight. Boyce and Ndikumana (2008) searched the effects of inflation, real interest rate, the share of total loans in GDP, exports of fuels representing natural resource abundance, and various administrative related indicators on the capital flight in 40 sub-Saharan African countries spanning the period from 1970 to 2004. The findings show that there is no significant relationship between fuel exports and capital flight. Ndikumana and Boyce (2011) examined the relationship between capital escape in 33 sub-Saharan African countries and the share of natural resources in total exports for 1970–2004. The findings from the research show that there is a positive relationship between the two indicators. Ali (2013) evaluated the determinants of capital flight in 37 sub-Saharan African countries for the period 1980–2000. According to the findings, no significant relationship was found between capital flight and the abundance of natural resources. Ndikumana et al. (2013) discuss the relationship between the abundance of natural resources and capital flight, which is expressed as an important characteristic feature for a country for a total of 39 African countries from 4 North Africa and 35 sub-Saharan African countries between 1970 and 2010. The relationship between oil exports and capital flight as an indicator of the abundance of natural resources was analyzed by the GMM method. The findings show that capital abundance tends to increase with the increase in natural resource abundance, but this effect will decrease with good policy practices. In addition, it is stated that the relationship between the abundance of natural resources and capital flight varies depending on the political and administrative regime of the country. Yapatake and Ngaba (2019) searched the relationship between the lowest level of corruption, capital flight, and rental income from natural resources for the period between 1996 and 2016 in seven African countries (Botswana, Ghana, Swaziland, Rwanda, Cape Verde, Burkina Faso, Lesotho). According to the findings, it is stated that capital flight will increase in parallel with the increase in wrong invoices with the increase in natural resource rental income in selected countries. Ndikumana and Sarr (2019) analyzed the relationship between capital flight, FDI, and natural resource revenues in 30 African

countries for the period from 1970 to 2015. According to the findings, it is concluded that there is no relation between FDI and capital flight, high natural resource revenues are associated with high capital flight and the quality of institutions does not reduce this bond. In general, it is concluded that the abundance of natural resources increases capital flight.

3 Data, Model, and Methodology

This chapter tries to explain the relationship between natural resource abundance, corruption, external debt stock, exchange rate, and capital flight in ten African countries (Algeria, Botswana, Kenya, Madagascar, Malawi, Sierra Leone, South Africa, Uganda, Zambia, and Zimbabwe). Due to data constraints, the annual data used in this chapter covers the time period of 1990–2015. Following the existing literature, the empirical model is as follows:

$$\ln CF_{it} = \beta_{0it} + \beta_{1it}\ln RES + \beta_{2it}\ln COR + \beta_{3it}\ln DEBT + \beta_{4it}\ln EXC + \varepsilon_{it}, \quad (1)$$

where lnCF is the natural logarithm of capital flight (constant USD), lnRES is the natural logarithm of natural resources abundance (total natural resources rents (% of GDP)), lnCOR is the Bayesian corruption index developed by Standaert (2015), lnDEBT is the natural logarithm of total external debt stocks (constant USD), and lnEXC is the natural logarithm of the exchange rate (local currency per USD). The data of lnRES, lnDEBT, and lnEXC are obtained from the World Development Indicators database, lnCF is obtained from the Political Economy Research Institute (PERI) database, and lnCOR is obtained from https://users.ugent.be/~sastanda/BCI/BCI.html website. The Bayesian corruption index values lie between 0 and 100, with an increase in the index corresponding to a rise in the level of corruption.

Due to the increasing economic and financial integration and high level of globalization in recent years, panel data methods ignore possible cross-section dependency, which could cause biased estimations and hypothesis tests (Chudik & Pesaran, 2013; Ullah et al., 2018, 2020). Therefore, this study firstly investigates the presence of cross-sectional dependence between countries using the LM test of Breusch and Pagan (1980), CD_{LM} tests of Pesaran (2004), and LM_{adj} test of Pesaran et al. This method is based on the equation:

$$y_{it} = \alpha_i + \beta_i X_{it} + \varepsilon_{it}, \quad (2)$$

where i and t denote cross-section and time dimensions, respectively. The calculation of the LM statistic as follows:

$$\mathrm{LM} = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\widehat{\rho}_{ij}^{2}X_{N(N-1)/2}^{2}. \tag{3}$$

In Eq. (3), $\widehat{\rho}_{ij}$ denotes the correlation of residuals from OLS estimation of Eq. (2). While the LM test is appropriate for panels with lower cross-section dimension, time dimension ($N < T$), $\mathrm{CD}_{\mathrm{LM}}$ and bias-adjusted LM ($\mathrm{LM}_{\mathrm{adj}}$) tests can be used in the panels with both $N > T$ and $T > N$ dimensions. The computation of $\mathrm{CD}_{\mathrm{LM}}$ and $\mathrm{LM}_{\mathrm{adj}}$ tests:

$$\mathrm{CD}_{\mathrm{LM}} = \left(\frac{1}{N(N-1)}\right)^{\frac{1}{2}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\left(T\widehat{\rho}_{ij}{}^{2}-1\right). \tag{4}$$

$$\mathrm{LM}_{\mathrm{adj}} = \sqrt{\frac{2}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\frac{(T-k)\widehat{\rho}_{ij}^{2}-\mu_{Tij}}{V_{Tij}}. \tag{5}$$

V_{Tij}, μ_{Tij}, and $\widehat{\rho}_{ij}$, respectively, represent variance, exact mean, and the correlation between cross-section units. The null and alternative hypothesis for three of test statistics:

H_0: No cross-sectional dependence
H_1: Cross-sectional dependence

Moreover, the delta tests developed by Pesaran and Yamagata (2008) were used to examine the homogeneity of slope coefficients. The delta tests developed by Pesaran and Yamagata (2008) test slope homogeneity of slope coefficients in linear panel data analyses. The delta tests were based on changes in the distribution statistics of Swamy. Two different test statistics are calculated to test the homogeneity of series:

$$\widetilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\widetilde{S}-k}{\sqrt{2k}}\right). \tag{6}$$

$$\widetilde{\Delta}_{\mathrm{adj}} = \sqrt{N}\left(\frac{N^{-1}\widetilde{S}-E(\widetilde{z}_{it})}{\sqrt{var(\widetilde{z}_{it})}}\right). \tag{7}$$

N, S, and k indicate the cross-section number, Swamy test statistics, and explanatory variable number, respectively.

The common correlated effect mean group (CCE-MG) method developed by Pesaran (2006) takes the cross-sectional dependence and coefficient heterogeneity between countries into account. Moreover, the CCE-MG estimator provides robust

results with the series as stationary or non-stationary, cointegrated or not cointegrated, small cross-sections dimensions, or the series have structural breaks (Eberhardt & Teal, 2013; Parker & Liddle, 2017). Based on these reasons, no preliminary test procedure (unit root or cointegration) is necessary to use this approach. Pesaran (2006) CCE-MG estimator is based on the following equation:

$$\widehat{b}_i = \left(X_i' M_w^{\cdot} X_i\right)^{-1} X_i' M_w^{\cdot} Y_i, \tag{8}$$

$$\widehat{b}_{\text{CCEMG}} = \frac{1}{N} \sum_{i=1}^{N} \widehat{b}_i, \tag{9}$$

where $\widehat{b}_i$ denotes individual CCE estimation for each cross-section unit.

4 Empirical Findings

In this study, we analyzed the impact of natural resources abundance, corruption, external debt stock, and exchange rate on capital flight for ten African countries. In the first stage, it is examined the possible cross-sectional dependence among these African countries by utilizing Breusch and Pagan (1980) LM, Pesaran (2004) CD_{LM}, and Pesaran et al. (2008) LM_{adj} tests. The results of these cross-sectional dependence tests are given in Table 1. The results of cross-section dependency tests revealed that the null hypothesis of no cross-section dependency is strongly rejected; therefore, it could be said that there is a cross-section dependency in the model, and possible shock in any of those countries would affect others. In addition to cross-section dependency results, Table 1 gives the results of delta tests investigating whether there is slope homogeneity or not. Delta tests results showed that the null hypothesis of slope homogeneity is rejected for both $\widehat{\Delta}$ and $\widehat{\Delta}_{adj}$ tests.

In the second stage of empirical analysis, after unveiling cross-section dependency and slope heterogeneity, this chapter has employed a common correlated

Table 1 Cross-section dependency and delta tests results

Test	Statistic	*p*-values
Cross-section dependency		
LM	100.400***	0.000
CD_{LM}	4.300***	0.000
LM_{adj}	12.540***	0.000
Delta tests		
$\widehat{\Delta}$	1.845*	0.065
$\widehat{\Delta}_{adj}$	1.935*	0.053

Note: *** and * indicate 1% and 10% significance, respectively

Table 2 CCE test results

	lnRES	lnCOR	lnDEBT	lnEXC
Algeria	−0.318* [0.188]	1.865 [2.465]	0.286 [0.293]	−0.158 [0.144]
Botswana	0.002 [0.032]	−0.972 [0.935]	0.110** [0.043]	0.228 [0.142]
Kenya	0.192 [0.217]	1.050 [3.283]	0.060 [0.293]	−0.211 [0.184]
Madagascar	0.158*** [0.046]	0.519 [2.223]	0.010 [0.057]	0.008 [0.022]
Malawi	0.040* [0.023]	1.034 [0.649]	0.148*** [0.054]	−0.039* [0.020]
Sierra Leone	0.100** [0.047]	−6.232 [5.173]	0.083 [0.058]	0.020 [0.033]
South Africa	−0.328 [0.262]	17.041*** [5.828]	0.591 [0.399]	−1.072* [0.563]
Uganda	0.062 [0.085]	0.250 [1.418]	0.141* [0.082]	−0.062 [0.072]
Zambia	−0.028 [0.048]	−0.289 [1.029]	0.330*** [0.094]	−0.010 [0.017]
Zimbabwe	0.083 [0.062]	1.449 [1.093]	0.343* [0.184]	0.017** [0.007]
Panel	0.068* [0.037]	0.628* [0.355]	0.193*** [0.056]	−0.038 [0.040]

Note: ***, **, and * indicate 1%, 5%, and 10% significance, respectively
The values in brackets are standard errors

effect mean group (CCE-MG) estimator developed by Pesaran (2006) to analyze the coefficients of the variables. Table 2 represents both panel and country-specific CCE estimator results. As it is shown in Table 2, natural resource abundance has a positive and statistically significant effect on capital flight in the panel. This finding is similar to the studies of Ljungberg and Friedl (2014) and Ndikumana and Sarr (2016). In addition, CCE-MG results revealed that an increase in corruption may lead to an increase in capital escape from these countries. As a seen in Table 2, external debt stock has also a positive and statistically significant impact on capital flight in African countries. On other hand, the coefficient of the exchange rate is negative and statistically insignificant.

When country-specific results are taken into consideration, natural resource abundance has a negative impact on capital flight in Algeria, while it has a positive impact in Madagascar and Sierra Leone. As it is considered the coefficients of corruption series, corruption has a positive and statistically significant impact on capital flight in only South Africa. An increase in external debt stock increases capital flight in Botswana, Malawi, Uganda, Zambia, and Zimbabwe. Similarly, increasing the exchange rate increases capital flight in Zimbabwe. On contrary, an increase in exchange rate decreases capital flight in Malawi and South Africa.

5 Conclusions and Policy Implications

This chapter examines the role of natural resource abundance on capital flight in ten African countries. In doing so, the relationship between natural resources rents, corruption index, total external debt stocks and exchange rate and capital flight is examined for the period from 1990 to 2015 using second-generation panel data methodologies to take into account the possible cross-sectional dependence. In the

case of panel mean-group findings, we found that increasing corruption and external debt stock lead to an increase in capital flight from African countries. The finding that corruption increases capital flight is an expected result because in the countries where corruption is increasing, bribery activities, which are mandatory for access to public services, are perceived as extra taxes for foreign investors. Similarly, since inflationary public and monetary policies are accepted as the main reasons for capital flight, the finding that increasing external borrowing increases capital flight. However, the impact of exchange rate on capital is found negative but statistically insignificant. According to this finding, exchange rate overvaluation is not one of the main reasons for capital flight in African countries. In addition, it is concluded that the impact of natural resource abundance on capital flight is significantly positive. This is possibly due to the fact that sectors based on natural resource rent in African countries are made available to certain segments of the society, thus reducing the possibility of competition. In addition, the inadequate qualified labor force needed by the sector to increase natural resource rent can be considered as one of the reasons for capital outflow. In the case of country-specific findings, corruption has a positive and statistically significant impact on capital flight in only South Africa. An increase in external debt stock increases capital flight in Botswana, Malawi, Uganda, Zambia, and Zimbabwe. Similarly, increasing exchange rate increases capital flight in Zimbabwe. However, an increase in exchange rate decreases capital flight in Malawi and South Africa. Moreover, natural resource abundance has a negative impact on capital flight in Algeria, while it has a positive impact in Madagascar and Sierra Leone.

Regarding the policy implications, to reduce the capital flight increasing impact of natural resource abundance, the measures to increase competition in the sector based on natural resources should be taken. In addition, the quality of labor force needs to be increased in line with the needs of the sector and the education structure should be directed accordingly.

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The book was inadvertently published with a typo in affiliation of Prof. Ahmed Imran Hunjra title from chapter 9 'Financial Development-Economic Growth Nexus: Theoretical Underpinnings, Empirical Evidence, and Critical Reflections'. The city name was corrected to 'Dera' from 'Dear'.

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