



Does foreign aid reduce poverty? A dynamic panel data analysis for sub-Saharan African countries

Edmore Mahembe¹ · Nicholas Mbaya Odhiambo¹

Received: 24 August 2018 / Accepted: 17 May 2021 / Published online: 17 July 2021

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2021

Abstract

This study examines the effect of foreign aid on extreme poverty in sub-Saharan Africa (SSA) over the period 1981–2013. The study uses recent dynamic panel estimation techniques, including those methods which deal with endogeneity by controlling for simultaneity and unobserved heterogeneity. The main findings of the study are summarized as follows: firstly, foreign aid does have a statistically significant poverty reduction effect in SSA. Secondly, the disaggregation of aid by source and type shows that total ODA, grants and multilateral aid have poverty reduction effects. Thirdly, democracy enhances the effectiveness of foreign aid in reducing poverty. Lastly, GDP per capita and globalization reduce extreme poverty, while inequality has a detrimental effect on the fight against poverty. This study confirms that the volume of aid matters as well as how it is allocated. The policy implications of these findings are that development partners should continue to focus on poverty reduction as the main objective for ODA. Further, aid allocation should be focused on channels which have more poverty-reduction effects, such as GDP per capita and democracy. Finally, aid recipient countries should come-up with income distributional policies that allow the benefits of growth to accrue to many people, thereby lifting the majority out of extreme poverty.

Keywords Official Development Assistance (ODA) · Foreign aid · Poverty reduction · Democracy · Sub-Saharan Africa (SSA) · System Generalized Method of Moments Estimators (SGMM)

JEL F35 · I32 · C23

✉ Edmore Mahembe
emahembe@gmail.com

Nicholas Mbaya Odhiambo
odhianm@unisa.ac.za; nmbaya99@yahoo.com

¹ Department of Economics, University of South Africa, P.O. Box 392, UNISA 0003, Pretoria, South Africa

1 Introduction

The world leaders recently committed to the Sustainable Development Goals (SDGs), which is a world development plan with a set of 17 goals to be achieved in 15 years (United Nations 2015). The first of these goals is to eradicate extreme poverty for all people, everywhere by 2030 (United Nations 2014). To achieve this global poverty reduction goal, rich nations made a commitment to increase aid to poor countries by 0.7% of their gross national income (GNI), a target set during the 1960s. Given that the developing community has emphasized the importance of foreign aid as “*one of the most powerful weapons in the war against poverty*” (United Nations 2005, p. 16), it would be important to review the direct effect of aid on extreme poverty.

Many recent studies emphasize the importance of economic growth in poverty reduction, arguing that foreign aid can contribute to poverty reduction through such sustained growth (see Collier and Dollar 2002; Alvi and Senbeta 2014). This model of aid allocation has been challenged both theoretically and empirically. Notably: the underlying assumption is that growth is the main channel through which aid affects poverty. Collier and Dollar (2001) made a pioneering proposition that foreign aid can be allocated, in order to maximize poverty reduction. Clunies-Ross et al. (2009, p. 595) further argue that the world’s attention has been shifting from ‘foreign aid for increased economic growth rates’ to ‘foreign aid for poverty reduction’. They further argue that “*many of the poverty-reducing measures may themselves serve to increase growth rates...*”.

The proponents of foreign aid argue that it can help eradicate poverty in developing countries (Sachs 2005; Bahmani-Oskooee and Oyolola 2009, p. 265); while others such as Easterly (2006) and Collier (2007) maintain that aid has not been effective. Moyo (2009, p. 28) further argues that aid “*perpetuates the cycle of poverty and derails sustainable economic growth*”. Following Burnside and Dollar (2000, 2004) and Kosack (2003), Mahembe and Odhiambo (2017, p. 113) argue that distinguishing channels through which foreign aid affects development reveals encouraging signs of a favourable impact of foreign aid on poverty reduction. However, this depends on the choice of the channel, the recipient country’s features and the domestic economic policies.

Although global poverty has dropped substantially over the past few decades, there are noticeable regional disparities (Alvi and Senbeta 2014, p. 381). East Asia and the Pacific regions have recorded the sharpest declines in poverty, while sub-Saharan Africa (SSA) is the poorest region with more than 35% of its citizens living on less than US\$1.90 a day. Half of the world’s extremely poor people now live in SSA, and it is the only region which has not met its MDGs target (Alvi and Senbeta 2014; Mahembe and Odhiambo 2018). This paper thus focuses on the impact of foreign aid on extreme poverty in the SSA region by attempting to answer three main objectives, namely: (i) to examine the impact of foreign aid on extreme poverty, (ii) investigate the impact of different proxies of foreign aid on extreme poverty, and (iii) assess whether democracy enhances the effectiveness of foreign aid in poverty reduction.

The main contribution of this paper to the existing literature is that the study uses an updated dataset and recent dynamic panel data estimation techniques. It includes those methods which deal with endogeneity by controlling for concerns in simultaneity and unobserved heterogeneity. It also investigates whether the type and source of aid matter through the use of five different proxies for foreign aid. Furthermore, the paper also tests the hypothesis that foreign aid is more effective in reducing poverty in democratic countries. According to Knack (2004, p. 251), foreign aid can contribute to democracy in a recipient country through:

(i) technical assistance, focusing on the strengthening of electoral processes, promotion of civil society organizations and advocating for press freedom; (ii) allocation of foreign aid conditional on democratization of the country; and (iii) supporting education and increasing the general income levels of the citizens. These are assumed to be critical ingredients for the improvement of democracy.

The rest of the paper is organized as follows: Section 2 summarizes the relevant empirical literature; section 3 presents the methodology and discusses the data; section 4 covers the empirical results. Section 5 concludes the article with a brief discussion of policy implications.

2 Empirical literature on foreign aid, poverty, and democracy

This section reviews literature that has evaluated the effectiveness of aid in reducing poverty. The reviewed studies are categorized into two broad categories: (i) those which investigated the direct impact of foreign aid on poverty reduction and (ii) studies which explored the effectiveness of foreign aid in a democratic environment.

2.1 Empirical studies on impact of foreign aid on poverty

Boone (1996) is one of the earliest papers to empirically test the effectiveness of aid in increasing investment (and therefore growth) and reducing poverty. One of the widely-quoted findings from this study is that aid does not have a significant impact on poverty indicators (such as infant mortality and primary schooling ratios).

Bahmani-Oskooee and Oyolola (2009) used pooled-time series and cross-sectional data from 49 developing countries over the period 1981–2002, in order to estimate the impact of foreign aid on poverty. The paper found that aid reduces poverty and that inequality is detrimental to poverty reduction. Chong et al. (2009) used dynamic panel data methods to examine the effect of aid on income inequality and poverty reduction for the period 1971–2002. The study could not, however find any robust statistical relationship between foreign aid and poverty reduction or income inequality.

Mosley et al. (2004) further, examined the direct effect of aid on poverty and found strong evidence that corruption, inequality and the composition of public expenditure are strongly associated with aid ineffectiveness (Mosley et al. 2004, p. F236). The study further concluded that aid allocations which consider good micro and macro policies, income distribution, and GDP per capita, are more effective in reducing poverty. Furthermore, Masud and Yontcheva (2005) assessed the effectiveness of foreign aid in reducing poverty (using infant mortality and illiteracy or education as proxies for poverty). They discovered that aid from non-governmental organizations (NGOs) significantly reduces infant mortality compared to bilateral aid, but the impact of both types of aid on illiteracy is less significant (Masud and Yontcheva 2005, p. 20).

On the positive side, Collier and Dollar (2001) developed a model of what they termed ‘efficient aid’, which would be allocated according to “*policy improvements that create a better environment for poverty reduction and effective aid*” (Collier and Dollar 2001, p. 1787). The paper states that “*poverty reduction...depends primarily on the quality of economic policy*” (Collier and Dollar 2001, p. 1800). The policy implication from this analysis was that a mixture of good policy and foreign aid can lead to economic growth and poverty reduction. Collier and Dollar (2002), using

what they termed a ‘poverty-efficient’¹ allocation of aid criteria, showed that aid operating through increased economic growth, was responsible for lifting about 10 million people out of extreme poverty each year. The study further estimated that approximately 19 million people might be lifted out of poverty each year if aid agencies used a ‘poverty-efficient’ aid-allocation strategy.

Alvi and Senbeta (2012) examined the effect of foreign aid on poverty in a sample of 79 developing countries over the period 1981 to 2004. The estimation method was the GMM, and the paper used: (i) three measures of poverty (headcount index, the poverty gap index and the squared poverty gap index); (ii) two sources of aid (bilateral and multilateral) and (iii) two compositions of aid (grants and concessionary loans). The study found that “*aid reduces poverty after controlling average income and income distribution*” (Alvi and Senbeta 2012, p. 968). The study further found that multilateral aid and grants reduce poverty while bilateral aid and loans do not.

Kaya et al. (2013) furthermore investigated the effectiveness of aid given to the agricultural sector, on poverty reduction. The empirical analysis used four year averaged cross-country data for a panel of 46 developing aid-recipient countries between the 1980–2003 period. The main dependent variable was the poverty headcount ratio at US\$1, while the main explanatory variables were aid given to the agricultural sector and the pro-poor public expenditures (PPE).² The fixed effects panel estimator was used and found that a 1% increase in agricultural aid reduces the headcount poverty ratio by 0.2% in the aid recipient countries. The paper concluded that agricultural aid is effective in poverty reduction directly and indirectly through growth (Kaya et al. 2013, p. 593).

A recent study by Arndt et al. (2015) assessed the impact of aid on economic growth, social welfare indicators (poverty and infant mortality) and intermediate outcomes (such as investment, consumption, health, education and agriculture). The study used limited information maximum likelihood (LIML) and inverse probability weighted squares (IPWLS) estimators in a simultaneous equation model (SEM) framework for the period 1970–2007. Results provided evidence that aid does stimulate growth, improve social welfare indicators and reduce poverty (Arndt et al. 2015, p. 14).

2.2 Empirical studies on the impact of democracy on the effectiveness of foreign aid

A review of the aid effectiveness literature shows that researchers generally agree that certain preconditions must be met to ensure the effectiveness of aid in recipient countries (Arvin and Barillas 2002; Jones and Tarp 2016; Knack 2004). One such key condition is the existence of political freedom (or democracy). There is also widespread debate over the influence of aid in promoting better governance as well as the influence of better governance/democracy on the volume of aid (Ali 2009; Knack 2004). This sub-section examines empirical studies on the relation between foreign aid and democracy. Special attention is paid to answering the following question: does democracy enhance the effectiveness of foreign aid in poverty reduction?

Arvin and Barillas (2002) used data from 118 countries over the period dating 1975 to 1998 to assess whether conditioning aid leads to a reduction of poverty in more democratic receiving

¹ A poverty-efficient aid program is one which reduces poverty as much as possible.

² As per Mosley et al. (2004).

countries. Using Granger causality, the study found that aid did not have a significant impact on poverty reduction given those countries' states of democracy.

Knack (2004) also utilised cross-country data between the years 1975 and 1995 to examine how volumes of aid influence recipient countries' governance. It was found that at higher aid levels, there is a greater tendency for the quality of governance to become eroded. Knack (2004) further examined the extent to which the provision of aid leads to democracy in 105 countries over the period 1975–2000. The study findings suggest that even though countries' levels of democracy were rising over the review period, little if any of this progress was attributable to aid flows. Heckleman and Knack (2008) extended the argument between aid efficiency and poverty reduction in the wake of democratic governments by integrating economic freedom. Cross-country data was used specifically over the period 1990–2000. The study found that foreign aid does not significantly influence economic freedom in recipient countries; however, to some extent, it manages to contribute to policy and institutional environments that are favourable for economic growth and poverty reduction.

In a related study, Ali (2009) corroborated the findings of Knack (2004) after examining the flows of U.S.A. aid into Pakistan from 1947 to 2006. A trend analysis of the aid flows indicated that there was a consistent pattern of high aid flows from the USA to Pakistan military dictatorships versus low amounts advanced towards democratic regimes. Ali (2009) therefore concluded that instead of promoting democratic governance in Pakistan, aid flows from the USA have been undermining the development of democracy over the review period.

On the one hand, Bjørnskov (2010) found that foreign aid targeted at democratic countries seems to be associated with a distribution of income to higher incomes groups (elites). This implies that aid in a democratic environment might lead to the worsening of poverty and an increase in income inequality. On the other hand, Brown (2005) found that aid flows to autocratic regimes tends to strengthen the elites' hold on power, as they use aid receipts to their advantage.

However, using data for 155 countries over the period 1960–2011, Bjella (2012) tested the hypothesis that aid leads to greater economic development in a democratic rather than autocratic receiving nation and found that the more democratic countries become, the more effective foreign aid tends to be in those places. In summary, the empirical studies reviewed herein show mixed results. The papers which investigated the direct impact of foreign on poverty can be categorized into two groups: studies which used social development indicators as proxies for poverty and those which used monetary measures of poverty (such as poverty rate, poverty gap and squared poverty gap), as shown in Appendix A. The main conclusion from this selective survey of the literature is that, though the impact of aid on poverty yields inconclusive and conflicting results, the majority of the papers surveyed found significant evidence of the effectiveness of foreign aid on poverty reduction.

On the issue of whether democracy enhances the effectiveness of foreign aid on poverty reduction, the majority of the studies seem to agree with the assertion. However, there are equally strong opposing views, which suggest that aid in a democratic environment might lead to the worsening of poverty and an increase in income inequality, while autocratic regimes tend to use aid to strengthen the elites' hold on power, at the expense of the poor.

3 Model specification and econometric methodology

3.1 Model specification

Datt and Ravallion (1992) decomposed the poverty measure³ into growth (mean income) and distributional effects (Lorenz curve), Ravallion and Chen (1997), and Alvi and Senbeta (2012, 2014). Following this, we specify the augmented model which takes into account the dynamics of poverty, potential channels through which aid affects poverty and the control variables. This is fully specified in Eq. (1).

$$\begin{aligned} \log P_{it} = & \alpha \log P_{i,t-1} + \beta_1 \log Y_{it} + \beta_2 \log G_{it} + \beta_3 \log AID_{it} + \beta_4 X_{it} \\ & + \beta_5 \log (DEM_{it} \times AID_{it}) + \beta_6 DEM_{it} + \vartheta_i + \varepsilon_{it} \end{aligned} \quad (1)$$

P_{it} is a measure of poverty in country i at time t and β_1 is the growth elasticity of poverty. Y_{it} is the real per capita income (real GDP per capita); G_{it} is the Gini coefficient; AID_{it} is the ratio of aid to GNI (our variable of interest); DEM_{it} and X_{it} represent democracy (our policy variable) and all control variables for country i at time t , respectively. The unobserved individual country-specific effect is ϑ_i , and ε_{it} is the idiosyncratic error term.

Following seminal studies by Bane and Ellwood (1986) and Hoynes et al. (2006) which showed that poverty is persistent and therefore that past levels of poverty can explain the current and future poverty levels, we include the lagged poverty level ($P_{i,t-1}$) as one of the regressors (Eq. 1). As a rule of thumb, the correlation between current levels of poverty and their corresponding lagged values should be higher than the 0.80 threshold (Asongu and Nwachukwu 2017, p. 8).

One of the objectives of this study is to test whether foreign aid can impact poverty through enhancement of democracy. We therefore include the interaction of foreign aid with democracy as shown in Eq. (1).⁴ Differentiating Eq. (1) with respect to foreign aid (AID_{it}) yields the following:

$$\frac{\partial (POV_{it})}{\partial (AID_{it})} = \beta_3 + \beta_5 \log DEM_{it} \quad (2)$$

β_3 and β_5 capture the extent to which democracy in the aid-recipient country enhances the effectiveness of foreign aid on poverty reduction. The introduction of the interaction term means that the effect of foreign aid on poverty, should be treated as a marginal effect in such a specification (see Brambor et al. 2006; Asongu and Nwachukwu 2016; Akobeng 2016).

Both the theoretical and empirical literature suggest that increase in GDP per capita leads to poverty reduction, thus the expected sign for β_1 would be negative. The coefficient for the Gini (β_2) is expected to be positive. This is essentially because greater inequality is assumed to lead to increased poverty, since the extent to which growth benefits the poor is hampered (Hanmer and Naschold 2000; Naschold 2002). The coefficient of foreign aid (β_3) is expected to be negative, if ODA (Official development Assistance) is effective in reducing poverty.

³ $P_t = P(Z | \mu_t, L_t)$, where P_t is the poverty measure, Z is the poverty line, μ_t is the mean income, and L_t is the Lorenz curve at time t .

⁴ According to Brambor et al. (2006), all constitutive terms should be included in the interaction model specification.

The study includes control variables to avoid omitted variable bias. The literature on the aid-growth-poverty nexus cites the importance of macroeconomic and pro-poor policies, institutions and democracy as the main requirements or channels for aid effectiveness (see World Bank 1998; Burnside and Dollar 2000; Mosley et al. 2004; Alvi and Senbeta 2012, among others). We incorporated democracy (institutional quality or freedom), globalization (which is a topical issue in SSA), trade openness and age dependent ratio into our analysis. These complement the decomposition of poverty nexus and have been included in poverty literature. Contingent on the time frame of a study, Asongu and Nwachukwu (2017) caution against having more than five control variables as this would lead to biases in estimated coefficients due to instrument proliferation.

3.2 Justification for other control variables and a priori expectations

We briefly discuss the justification for the control variables and a priori expectations herein, starting with the relationship between democracy and poverty. Theoretically, since the majority of the population in developing countries are poor, one would expect that the poor would use their numbers in an electoral process to put the government to account (Varshney 1999). However, empirical studies have shown that there is no direct link between democracy and poverty reduction. Varshney (1999, p. 4) asserted *“that democracies by themselves do not remove poverty; economic strategies do.”*

According to the World Bank (2002, p. ix), the evaluation of the impact of globalisation, defined as *“the growing integration of economies and societies around the world”*, on poverty has produced mixed results. Generally, globalisation reduces poverty because more integrated economies tend to grow faster, and this growth is usually widely diffused. However, a World Bank (2002) study has shown that, on the one hand, globalisation is credited for the massive poverty reduction in poor countries with around 3 billion people, whose countries managed to break into the global market. On the other hand, poor countries with around 2 billion people are being left behind, playing very marginal roles in the global economy (World Bank 2002, pp. ix-x). Basu (2006) agrees with the World Bank (2002) that globalisation can either be good or bad depending on period or location among others. This suggests that the impact of globalisation on poverty can either be negative or positive.

On the relationship between international trade and poverty, the World Bank Group and World Trade Organization (2015) argue that trade can reduce poverty indirectly through economic growth and directly through the creation of employment for low skilled and poor workers in export industries. The World Bank Group and World Trade Organization (2018, p. 8) further noted that, though there are several channels through which trade affects poverty, empirical evidence reveals that the poor are affected differently. This suggests that the coefficient of trade openness on a poverty regression could be negative and significant or insignificant. According to Harrison (2006), globalisation encompasses international trade. This raises the possibility of multicollinearity in our data.

The age dependency ratio was also included in our analysis. This ratio gives an indicator of members of the household who are economically inactive and therefore dependent. According to Lipton (1983) a large household is generally associated with higher levels of poverty, while a high dependency ratio increases the risk of poverty. Vijayakumar (2013) found that a large age dependency ratio was positively associated with high incidences of poverty.

3.3 Endogeneity issues

One of the main criticisms of the early aid effectiveness literature is that the empirical studies lack robustness of econometric results (Chauvet 2015, p. 360). This is partially due to the weaknesses in the methodologies used in addressing endogeneity issues. The endogeneity of foreign aid emanates from two main sources; (i) reverse causality (or simultaneity) between aid and poverty and (ii) unobservable heterogeneity or omitted variable bias (Baltagi 2013). In our model, if aid donors are motivated by poverty reduction, the higher the levels of poverty, the greater the desire to give foreign aid to reduce it. Secondly, some donors might be motivated by a desire to stimulate real income growth in an aid-recipient country, leading to a correlation between foreign aid and GDP per capita which are both right hand side (RHS) regressors. Furthermore, the introduction of the lagged dependent variable ($P_{i,t-1}$) in Eq. (1) as part of the regressors introduces new complications, including autocorrelation and heterogeneity. Endogeneity, autocorrelation and heterogeneity lead to inconsistency of the ordinary least squares (OLS), random and fixed effects estimates (Baltagi 2005, 2013).

3.4 Econometric method

Empirical literature posits a number of approaches to estimating a dynamic panel data (DPD) model with suspected endogeneity problems. These include: (i) an instrumental variables (IV) approach proposed by Anderson and Hsiao (1981, 1982), (ii) a first differenced GMM (DGMM) estimator by Arellano and Bond (1991), (iii) bias-corrected least squares dummy variable corrected (LSDVC) or fixed effects (FE) estimators developed by Kiviet (1995) and Bruno (2005a, 2005b), and (iv) system GMM from Arellano and Bover (1995) and Blundell and Bond (1998). In a model with highly dynamic data, the first two estimation techniques have been proved to suffer from a severe small-sample bias due to weak instruments (Nickell 1981; Blundell and Bond 1998). Though the LSDVC approach performs well in small, dynamic and unbalanced panel data samples, the model is not suitable where there are endogenous variables on the RHS, as it is for “strictly exogenous regressors” (Bruno 2005b, p. 473).

To overcome the problems of endogeneity, simultaneity, autocorrelation and heterogeneity in our data, we adopted the endogeneity-robust GMM, which is an extension of the Arellano and Bover (1995) and Blundell and Bond (1998) method by Roodman (2009a, 2009b) and available as *xtabond2* in Stata. The SGMM estimator is an improvement over the DGMM procedure. Blundell and Bond (1998) showed that the SGMM estimator produces dramatic efficient gains over the basic DGMM (Baltagi 2013, p. 168).

Some of the advantages of the GMM estimation approach over the other methods and its suitability for our sample are briefly explained herein. First, the method is suitable for dynamic or persistent panels. Second, the GMM addresses biases due to endogeneity (or reverse causality) by controlling for simultaneity (using an instrumentation process) and the unobserved heterogeneity (using time-invariant omitted variables). This is partially achieved through the use lagged explanatory variables as internal instruments. The estimation technique also allows for inclusion of external instruments. Third, the technique is suitable in the “small T, large N” context, by addressing the Nickell (1981) bias and applying the “Windmeijer finite-sample correction” (Windmeijer 2005). Fourth, the approach eliminates the country fixed-effects by differencing the internal instruments to make them exogenous to the fixed effects (Akobeng 2016, p. 215), but does not eliminate the country differences. It controls for

cross-country dependence, limits instruments proliferation and restricts over-identification (Love and Zicchino 2006; Roodman 2009b; Baltagi 2013; Tchamyou and Asongu 2017; Tchamyou 2018a, 2018b). The estimator allows the researcher to control for time invariant country-specific effects and endogeneity of foreign aid (Alvi and Senbeta 2012, p. 955). Fifth, the *two-step* GMM approach has been adopted in our specification because of its ability to control for heteroscedasticity, instead of the *one-step* approach which is consistent with homoscedasticity. We also adopted forward orthogonal deviations, instead of differencing, so as to minimize data loss (Roodman 2009b).

4 Data sources and definitions of variables

4.1 Data sources

Our poverty proxies (dependent variable) are from the World Bank poverty and inequality dataset (PovcalNet). The poverty measures in the PovcalNet dataset are estimated by using a programme developed by Chen and Ravallion (2001). The compilation is based on primary information from nationally representative living-standard household surveys. The poverty data is estimated by combining purchasing power parity (PPP) exchange rates for household consumption with household survey data World Bank (2016). The poverty measures used in this paper are based on the international poverty line US\$1.90 a day in US dollars in 2011 PPP.

The PovcalNet dataset provides triennial estimates of poverty and inequality measures from 1981 to 2008. Thereafter, there is annual data from 2010 and 2013. The dependent variable (poverty) is available every three years between 1981 and 2008. Therefore, we took three-year averages of our explanatory variables over the period 1981–2008 and two-year averages thereafter. As a result, our total panel has 44 countries in Sub-Saharan Africa (see Appendix C for the list of countries), and it covers 12 periods (from 1981 to 2013).

The foreign-aid data was obtained from the Organization for Economic Co-operation and Development Assistance Committee (OECD-DAC). The inequality database is from the Standardised World Income Inequality Database (SWIID) (Solt 2016), while real GDP per capita, age dependency ratio and trade openness are from the World Bank's Development Indicators (World Bank 2016). The globalisation index was obtained from the Konjunkturforschungsstelle (KOF) Swiss Economic Institute (Dreher et al. 2008), and democracy scores data was obtained from the Polity IV Project and Centre for Systematic Peace. The definitions and the construction of the main variables are briefly described below.

4.2 Definition of variables

The dependent variable for this study is poverty. The class of poverty measure used in this study follows the work of Foster et al. (1984). We use the headcount index or the poverty rate as a proxy for extreme poverty. The headcount index measures the proportion of households in a population with income per person below the poverty line (which is US\$1.90 per person per day). Thus, it measures the prevalence of poverty, in terms of the spread of poverty within the population (Schaffner 2014).

The key independent variable in the study is foreign aid. Foreign aid is generally defined as public and private funds given to developing countries – with the main purpose of improving economic development and welfare (Clunies-Ross et al. 2009, p. 590). The study used the

standard OECD-DAC definitions. Official Development Assistance (ODA) and Official Aid (OA) include: (i) grants and (ii) concessional loans of more than a year's term, and with a 25% or more grant-element. Aid can also be categorized, according to its source: (a) bilateral, which is from one country's government to another; and (b) multilateral (many-sided), which goes through international institutions, such as the World Bank and the United Nations (UN) Agencies. We disaggregated foreign aid into the two types and two sources, in order to examine the effects of each category on poverty. Since grants do not carry any interest (and no repayment is required) while loans carry interest and need to be repaid, their effect on poverty is expected to be different. On the other hand, the literature shows that bilateral aid is usually allocated along colonial lines and strategic alliances; whereas multilateral aid has 'economic development and welfare' as the main objectives (Peiffer and Boussalis 2015; Asongu and Nwachukwu 2017).

The main independent variables are based on poverty decomposition by Datt and Ravallion (1992) and Ravallion and Chen (1997) who decomposed poverty into growth and distributional effects. These are proxied by real income per capita at 2005 constant prices (GDP) and the Gini coefficient, respectively. Our control variables,⁵ which complement the decomposition of poverty nexus and have been included in poverty literature, include democracy score (as a proxy for institutional quality, and which has also been included as part of the interaction variable in other specifications), globalization (which is a topical issue in SSA), trade openness and age dependent ratio.

The globalization index used in this study is a weighted index which ranges from no globalization to 100 (highly globalized) and incorporates components such as the international flows of goods, capital, businesses, people, technology, information and the presence of international organization's (Dreher et al. 2008). Democracy scores capture the regime authority spectrum on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy). We normalized the democracy scores such that the values are between zero and one while the other variables, except dummies, are in logarithm form.

5 Empirical analysis and discussion of results

5.1 Descriptive analysis

Table 1 shows the descriptive statistics for the logged and normalized data in terms of the mean, median, minimum, maximum and standard deviation of the variables. Since the data has been linearised, the summary of the statistics for the variables show minimum variations across the countries in the sample.

Appendix B shows the Pearson (1896) correlation matrix for all the variables, including the lag of the dependent variable. All the proxies of aid (ODA, bilateral aid, multilateral aid, loans and grants) are positively and significantly correlated with all the poverty proxies. Alvi and Senbeta (2012) argued that the positive association between aid and poverty could be an indication that more aid goes to poor countries. However, this positive correlation between aid and poverty does not necessarily imply a causal relationship. Appendix B also shows that all the 5 proxies of foreign aid have a strong negative and statistically significant correlation with real GDP per capita ranging from -0.64 to -0.34. There is also possibility of multicollinearity

⁵ We also included education (both secondary and primary), civil conflict, health, agriculture, FDI, remittances and age dependency ratio but this did not significantly change the size and sign of the foreign aid coefficient.

Table 1 Summary statistics

Variable	Obs.	Mean	Std. dev.	Min.	Max.	Source
Poverty headcount	528	3.59	1.00	-0.99	4.57	PovcalNet, World Bank
Poverty gap	528	2.61	1.28	-3.00	4.19	PovcalNet, World Bank
Squared poverty gap	528	1.91	1.51	-4.61	3.92	PovcalNet, World Bank
ODA as % of GNI	504	2.00	1.21	-7.70	4.78	OECD-DAC
Bilateral aid	495	1.48	1.13	-3.62	4.22	OECD-DAC
Multilateral aid	495	0.99	1.29	-3.40	4.33	OECD-DAC
Grant	516	5.56	1.19	-3.51	8.45	OECD-DAC
Loan	424	4.11	1.48	-2.61	6.77	OECD-DAC
GDP per capita	513	6.84	1.00	4.79	9.46	WDI, World Bank
Gini coefficient	341	-0.78	0.16	-1.16	-0.38	SWIID (Solt 2016)
Democracy score	501	0.44	0.28	0.00	0.95	Polity IV Project
Globalization index	525	3.68	0.25	2.90	4.24	Dreher et al. (2008)
Age dependent ratio	528	4.49	0.16	2.90	4.73	WDI, World Bank
Trade openness	480	4.13	0.48	2.50	5.71	WDI, World Bank

The sample comprises 44 SSA countries for the period 1981–2013. These summary statistics are based on logged and normalized data. The abbreviation Obs. stands for number of observations; Std. dev.: standard deviations; Min.: minimum; Max.: maximum; WDI World Development Indicators; SWIID: Standardized World Income Inequality Database; OECD-DAC: The Organization for Economic Co-operation and Development's Development Assistance Committee; ODA: Official Development Assistance; GDP: Gross Domestic Product; GNI: Gross National Income; and the others are as defined in the text

between globalization and international trade (0.54) and between GDP and Gini coefficient (0.46). These strong correlation raises the possibility of the problem of multicollinearity among some of our explanatory variables. The effect of multicollinearity is that the coefficient estimates of the multiple regression may change randomly as a result of small changes in the model or the data. To address this issue, the study used different proxies of aid, GDP, and globalization in the estimation and added one control variable at a time. The addition of one control variable at a time in multivariate regression reduces the chances of including “suppressor variables”, which would be highly correlated with another explanatory variable (Tzelgov and Henik 1991; Pandey and Elliott 2010).

5.2 Empirical results

The main estimation results are presented in Tables 2, 3, 4. Table 2 presents results for five different estimators, from Eq. (1): (i) OLS; (ii) Standard Fixed Effects (FE), (iii) DGMM, (iv) SGMM, and (v) LSDVC dynamic panel data models. As shown in Table 2, the OLS estimation results are in line with economic theory, with many coefficients of the explanatory variables having the correct signs and statistically significance. Table 2 also shows that the coefficient of the lagged poverty rate is positive and highly significant (at the 1% level) in all the different estimation methods. The foreign aid (ODA) coefficient is negative throughout all the different estimation methods. However, the OLS and the FE methods are considered biased and inefficient owing to autocorrelation (owing to inclusion of the lagged poverty), and potential simultaneity and endogeneity problems.

5.2.1 Justification of the use of SGMM estimation technique

Apart from the OLS and FE, the LSDVC and DGMM have some limitations as well. Flannery and Hankins (2013, p 14) found that the “LSDVC is accurate for exogenous regressors but

Table 2 Results of different estimation methods

POVERTY HEADCOUNT	Estimation Method				
	Pooled OLS	FE	LSDVC	DGMM	SGMM
ODA as % of GNI	-0.034** (0.015)	-0.008 (0.021)	-0.031** (0.012)	-0.073** (0.034)	-0.064** (0.026)
GDP per capita	-0.125*** (0.028)	-0.389*** (0.085)	-0.142*** (0.022)	0.122 (0.262)	-0.217*** (0.047)
Gini coefficient	0.366*** (0.087)	0.049 (0.217)	0.466*** (0.074)	0.876 (0.993)	1.072*** (0.260)
Democracy	-0.074 (0.046)	0.015 (0.074)	-0.117*** (0.038)	-0.093 (0.163)	-0.131 (0.085)
Globalization	0.093 (0.078)	0.170 (0.188)	0.123** (0.053)	0.220 (0.576)	-0.475*** (0.144)
Age dependency ratio	0.282*** (0.103)	-0.183 (0.184)	0.375*** (0.059)	-0.044 (0.376)	-0.080 (0.153)
Trade openness	-0.025 (0.029)	-0.133** (0.061)	-0.056** (0.025)	-0.157 (0.110)	0.017 (0.025)
Poverty rate (lagged)	0.909*** (0.019)	0.732*** (0.037)	0.861*** (0.023)	1.122*** (0.082)	0.930*** (0.041)
Constant	0.082 (0.534)	4.438*** (1.071)	-	-	4.677*** (0.984)
Observations	300	300	300	259	300
R-squared	0.965	0.896			
Adj. R-squared	0.963				
No. of groups		41	41	39	41
No. of instruments			72	25	41
AR (1) p value			0.000	0.057	0.065
AR (2) p value			0.277	0.788	0.639
Sargan OIR p value				0.139	0.000
Hansen OIR p value				0.342	0.187

Numbers in parenthesis () are standard errors (SE), and for GMM they the Windmeijer (2005) finite sample corrected SEs. *** Significance at the 1%, ** Significance at the 5% level, * Significance at the 10% level. All regressions include time dummies, but they are not shown here to save space. The abbreviations OLS stands for ordinary least squares, FE: fixed effects; LSDVC: bias-corrected least-squares dummy variable Corrected (LSDVC); DGMM: two-step differenced GMM and SGMM: two-step system GMM; ODA: Official Development Assistance; GDP: Gross Domestic Product; GNI: Gross National Income; and the others are as defined in the text

less accurate for lagged dependent variables in the presence of endogeneity”, while the DGMM estimator performs poorly when the dependent variable is persistent, which is the case with the poverty levels. The specification, robustness checks and comparison with other results on all our estimations confirm that the SGMM is an optimal model, as briefly explained herein.

Firstly, the correlation between all the three proxies of poverty in levels and their corresponding lagged values are higher than the rule of thumb threshold of 0.8 (Appendix B). Furthermore, the coefficient of the lagged poverty variables in all estimated equations is highly significant, at 1 the percent level. This confirms that poverty is persistent and therefore the dynamic panel data method is the correct specification. Secondly, our sample is made up of 44 countries (Appendix C) over 12 time periods. The SGMM is suitable in the “small T, large N” context. Therefore, only the results of the more efficient SGMM method will be discussed henceforth. All the SGMM estimations used the ‘collapse’ option for instruments to limit

Table 3 Analysis of aid by source and type

Dependent variables:	Poverty rate	Poverty rate	Poverty rate	Poverty rate	Poverty rate
ODA as % of GNI	-0.064** (0.026)				
Grant		-0.045* (0.026)			
Loan			-0.011 (0.013)		
Bilateral aid				0.014 (0.019)	
Multilateral aid					-0.081*** (0.018)
GDP per capita	-0.217*** (0.047)	-0.233** (0.039)	-0.028 (0.036)	-0.110* (0.057)	-0.259*** (0.035)
Gini coefficient	1.072*** (0.260)	1.136*** (0.262)	0.196 (0.170)	0.739** (0.273)	0.908*** (0.198)
Democracy	-0.131 (0.085)	-0.133 (0.102)	-0.019 (0.050)	-0.129 (0.085)	-0.130 (0.087)
Globalization	-0.475*** (0.144)	-0.610*** (0.177)	-0.556*** (0.108)	-0.684*** (0.221)	-0.208* (0.119)
Age dependency ratio	-0.080 (0.153)	-0.153 (0.163)	0.043 (0.207)	-0.099 (0.172)	-0.063 (0.132)
Trade openness	0.017 (0.025)	0.069 (0.048)			-0.022 (0.054)
Poverty rate (lagged)	0.930*** (0.041)	0.925*** (0.052)	0.971*** (0.046)	0.935*** (0.043)	0.902*** (0.036)
Constant	4.318*** (0.831)	-	2.251* (1.171)	-	4.000*** (0.855)
AR (1) <i>p</i> value	0.067	0.066	0.010	0.059	0.046
AR (2) <i>p</i> value	0.639	0.670	0.928	0.525	0.438
Sargan OIR <i>p</i> value	0.000	0.000	0.000	0.000	0.000
Hansen OIR <i>p</i> value	0.187	0.151	0.363	0.100	0.178
Observations	300	298	246	313	295
No. of groups	41	41	41	41	41
No. of instruments	41	41	37	37	41

All the regressions are estimated using the dynamic two-step GMM estimator technique developed by Blundell and Bond (1998), with the Windmeijer (2005) finite-sample correction. Numbers in parenthesis () are standard errors. *** Significance at the 1%, ** Significance at the 5% level, * Significance at the 10% level. All regressions include time dummies, but they are not shown here to save space. The model for loan and bilateral aid has one less control variable (trade openness) to avoid a case of having more instruments than the number of groups. The abbreviations ODA stand for official development assistance; GDP: Gross Domestic Product; GNI: Gross National Income; and the others are as defined in the text

instrument proliferation, and the number of lags in the explanatory variables was set at a one for the same reason (Roodman 2009b).

5.2.2 The impact of foreign aid on extreme poverty

The first objective of this paper is to examine the impact of foreign aid on extreme poverty. The SGMM results in Table 2 above show that the coefficient for foreign aid (-0.064) is negative and statistically significant at the 5% level. This means that, on average, a 10% increase in the level of ODA as a share of GNI leads to roughly a 0.06%

Table 4 Analysis of total aid, democracy and poverty

Dependent variables:	Poverty rate	Poverty rate	Poverty rate
ODA as % of GNI	-0.064** (0.026)	-0.056** (0.027)	-0.081*** (0.021)
GDP per capita	-0.217*** (0.047)	-0.210*** (0.061)	-0.197*** (0.040)
Gini coefficient	1.072*** (0.260)	1.115*** (0.287)	1.089*** (0.211)
Democracy	-0.131 (0.085)	-0.123* (0.086)	-0.332*** (0.102)
<i>Democracy x ODA</i>			0.077*** (0.026)
Globalization	-0.475*** (0.144)	-0.442** (0.217)	-0.514*** (0.135)
Age dependency ratio	-0.080 (0.153)	-0.176 (0.170)	-0.215 (0.153)
Trade openness	0.017 (0.051)		
Poverty rate (lagged)	0.930*** (0.041)	0.966*** (0.040)	0.942*** (0.038)
Constant	4.677*** (0.984)	4.862*** (1.099)	5.565*** (1.025)
AR (1) <i>p</i> value	0.067	0.063	0.058
AR (2) <i>p</i> value	0.639	0.650	0.645
Sargan OIR <i>p</i> value	0.000	0.000	0.000
Hansen OIR <i>p</i> value	0.187	0.101	0.165
Observations	300	318	318
No. of groups	41	42	42
No. of instruments	41	37	41

All the regressions are estimated using the dynamic two-step GMM estimator technique developed by Blundell and Bond (1998), with Windmeijer (2005) finite-sample correction. Numbers in parenthesis () are standard errors. *** Significance at the 1%. ** Significance at the 5% level, * Significance at the 10% level. All regressions include time dummies, but they are not shown here to save space. The abbreviation ODA stands for Official Development Assistance; GDP: Gross Domestic Product; GNI: Gross National Income; and the others are as defined in the text. The variable 'trade openness' was not included in the final analysis (column 3 and 4) to avoid the problem of instrument proliferation

reduction in the poverty headcount rate (which is the proportion of people living on less than US\$1.90 per person per day). The results are consistent across all the three extreme poverty proxies.⁶ These results imply that foreign aid does have a positive poverty reduction effect in SSA. This result corroborates earlier findings by Mosley et al. (2004), Mosley and Suleiman (2007), Alvi and Senbeta (2012), and Arndt et al. (2015).

5.2.3 Impact of different proxies of foreign aid on extreme poverty

The second objective of this study is to examine whether the effect of aid on poverty varies by type or source of foreign aid. The results in Table 3 show that total aid (ODA as a percentage of GNI), multilateral aid and grants are more likely to reduce poverty in SSA, while the

⁶ The results on different extreme poverty indicators are however not shown in this paper.

coefficients of loans and bilateral aid are insignificant at the 10% level of significance.⁷ This suggests that the type of aid allocation matters for poverty reduction. Not only does the volume of aid matter, but how it is allocated.

With respect to the issue of grants and loans, our findings are generally in line with literature on the allocation of aid which premises that grants are more likely to have poverty-reducing effects compared to loans (Senbeta, 2009).⁸ A recent study by Das and Serieux (2015) concluded that all foreign inflows generate capital outflows, and loans lead to around 45% outflows, while grants are associated with 12% reverse flows. These reverse flows were found to be most prevalent in Asian and SSA countries.

Our findings on bilateral and multilateral aid are in line with prior expectations. Theoretically, one would expect multilateral aid to be more effective in reducing poverty. According to Riddell (2008) and Clunies-Ross et al. (2009), multilateral aid is most likely to be allocated to sustainable development and poverty-reduction concerns, whereas bilateral aid is allocated based on colonial, strategic, and other political considerations.

5.2.4 Does democracy enhance the effectiveness of foreign aid in poverty reduction?

The third objective of this study is to assess whether democracy enhances the effectiveness of foreign aid in poverty reduction. As shown in Tables 2 and 3, the coefficients for democracy are generally negative but not statistically significant. This confirms the results of Varshney (1999) and Bratton (2006) who found that there is no direct link between democracy and poverty reduction.

Table 4 column (4) shows the results of the test on whether foreign aid can impact poverty through democracy through the introduction of the interaction variable. Apart from the interaction variable which is significant at the 1% level, the coefficient of democracy is now highly significant, and the magnitude of the ODA coefficient has increased. The overall or net effect of foreign aid on poverty, given democracy is $-0.047 (-0.081 + 0.442 \times 0.077)$, where 0.442 is the mean value of democracy, -0.081 is the unconditional effect of foreign aid and 0.077 is the conditional effect from the interaction between foreign aid and democracy. Our study therefore found evidence that democracy does enhance the effectiveness of foreign aid in reducing poverty in the SSA region.

Our finding suggests that foreign aid is more likely to be effective in a democratic environment. This is in line with Bjella (2012) who found that the more democratic a country becomes; the more effective foreign aid tends to be. The implication of this finding is that foreign aid channelled to democratic countries is most likely to lead to a greater impact on poverty reduction. Secondly, aid which strengthens democracy might lead to long term poverty reduction. This finding supports the aid selectivity and conditionality paradigm, which has been advocated by Western Donors, that aid should be channelled to countries which practice political and economic freedom.

5.3 Specification, robustness checks and comparison with other results

We conducted specification, robustness checks and comparison with other results on all our estimations shown in Tables 2, 3, 4. Four different tests were conducted to

⁷ The models for loan and bilateral aid have one less control variable (trade openness) to avoid a case of having more instruments than the number of groups. Adding and removing the number of control variables could not significantly change the sign and significance of their corresponding coefficients.

⁸ Grants are transfers made in cash, goods, or services for which no repayment is required, while loans are transfers for which repayment would be required.

assess the validity of the SGMM estimation (please see Asongu and De Moor 2017; Asongu and Nwachukwu 2018), and the results are briefly explained hereunder. To start with, the test for first order serial correlation rejects the null hypothesis of ‘no first order serial correlation (AR [1])’ while the null hypothesis of ‘no second order autocorrelation (AR [2])’ was not rejected. Second, the Sargan and Hansen tests for overidentification restrictions (OIR) were conducted. These, tested the null that ‘instruments are valid or uncorrelated with the error term’ and did not reject the null. Third, the Difference in Hansen Test (DHT) for the exogeneity of instruments, which examines the results from the Hansen OIR, yielded the expected diagnosis. Fourth, the strongly significant and positive coefficient of the first lag of the dependent variable justified the use of the dynamic panel data approach. Lastly, our results are comparable to those of Mosley et al. (2004), Alvi and Senbeta (2012) and Arndt et al. (2015) among others.

6 Concluding implications, caveats and future research directions

The main objective of this study was to examine the effect of foreign aid on poverty in the SSA region over the period 1981–2013. Foreign aid has been touted as the panacea to poverty reduction in developing countries, particularly in Africa. One of the main targets of the recently promulgated SDGs is to eradicate extreme poverty for all people everywhere by 2030. To achieve this global poverty reduction goal, rich nations made a commitment to increase aid to poor countries by 0.7% of their gross national income (GNI), a target set during the 1960s.

Specifically, this paper assesses whether foreign aid has been effective in reducing extreme poverty. It tests whether the type and source of aid matter, and also examines whether democracy enhances the effectiveness of aid in reducing poverty. The study uses recent dynamic panel estimation techniques, including methods which deal with endogeneity or simultaneity concerns. The main findings of the study are summarized as follows: firstly, foreign aid does have a statistically significant poverty reduction effect in SSA. Secondly, the disaggregation of aid by source and type shows that total ODA, grants and multilateral aid have poverty reduction effects. Thirdly, the study also found that democracy enhances the effectiveness of foreign aid in reducing poverty. Lastly, the study also found that increases in GDP per capita and globalization reduce extreme poverty, while inequality has a detrimental effect on the fight against poverty. This study confirms that not only does the volume of aid matter, but how it is allocated.

The policy implications of these findings are that development partners should continue to focus on poverty reduction as the main objective for ODA to the SSA region. Aid allocation should furthermore be focused on channels which have more poverty-reduction effects, such as GDP per capita and democracy. Aid recipient countries should also be encouraged to come-up with income distribution policies that allow the benefits of growth to accrue to many people, thereby lifting the majority out of extreme poverty.

As with similar studies on cross-country aid-growth-poverty panel data studies, a caveat is important. Challenges with heterogeneity, multicollinearity and endogeneity might not have been fully addressed, especially the heterogeneity of individual countries. Future research could explore possibilities of individual country analysis, disaggregating countries by income and also examining the direction of causality between foreign aid, poverty and democracy.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10888-021-09496-5>.

References

- Akobeng, E.: Out of inequality and poverty: evidence for the effectiveness of remittances in sub-Saharan Africa. *Q Rev. Econ. Finance.* **60**(May 2016), 2017–2223 (2016)
- Ali, M.: US aid to Pakistan and democracy. *Policy Perspect.* **6**(2), 119–132 (2009)
- Alvi, A., Senbeta, A.: Does foreign aid reduce poverty? *J. Int. Dev.* **24**, 955–976 (2012)
- Alvi, E., Senbeta, A.: Foreign aid, growth and poverty relation: a quantile regression approach. *The Journal of Development Areas.* **48**(3), 380–403 (2014)
- Andersen, T.G., Sørensen, B.E.: GMM estimation of a stochastic volatility model: a Monte Carlo study. *J. Bus. Econ. Stat.* **14**(3), 323–352 (1996)
- Anderson, T.W., Hsiao, C.: Estimation of dynamic models with error components. *J. Am. Stat. Assoc.* **76**(375), 598–606 (1981)
- Anderson, T.W., Hsiao, C.: Formulation and estimation of dynamic models using panel data. *J. Econom.* **18**(1), 47–82 (1982)
- Arellano, M., Bond, S.: Some tests for specifications of panel data: Monte Carlo evidence and an application to employment equations. *Rev. Econ. Stud.* **58**(2), 277–297 (1991)
- Arellano, M., Bover, O.: Another look at the instrumental variable estimation of error components models. *J. Econom.* **68**(1), 29–51 (1995)
- Arndt, C., Jones, S., Tarp, F.: Assessing foreign aid's long-run contribution to growth and development. *World Dev.* **69**(May 2015), 6–18 (2015)
- Arvin, B.M., Barillas, F.: Foreign aid, poverty reduction, and democracy. *Appl. Econ.* **34**(17), 2151–2156 (2002)
- Asongu, S.A., De Moor, L.: Financial globalization dynamic thresholds for financial development: evidence from Africa. *Eur. J. Dev. Res.* **29**(1), 192–212 (2017)
- Asongu, S.A., Nwachukwu, J.C.: The mobile phone in the diffusion of knowledge for institutional quality in sub-Saharan Africa. *World Dev.* **86**(October 2016), 133–147 (2016)
- Asongu, S.A., Nwachukwu, J.: Fuel exports, aid and terrorism. *Multinat. Bus. Rev.* **25**(3), 239–267 (2017)
- Asongu, S.A., Nwachukwu, J.C.: Openness, ICT and entrepreneurship in sub-Saharan Africa. *Inf. Technol. People.* **31**(1), 278–303 (2018)
- Bahmani-Oskooee, M., Oyolola, M.: Poverty reduction and aid: cross-country evidence. *Int. J. Sociol. Soc. Policy.* **29**(5/6), 264–273 (2009)
- Baltagi, B.H.: *Econometric Analysis of Panel Data*, 3rd edn. John Wiley & Sons, Ltd., West Sussex (2005)
- Baltagi, B.H.: *Econometric Analysis of Panel Data*, 5th edn. John Wiley & Sons Ltd., West Sussex (2013)
- Bane, M.J., Ellwood, D.T.: Slipping into and out of poverty: the dynamics of spells. *J. Hum. Resour.* **21**(1), 1–23 (1986)
- Basu, K.: Globalization, poverty, and inequality: what is the relationship? What can be done? *World Dev.* **34**(8), 1361–1373 (2006)
- Baum, C.F.: *An Introduction to Modern Econometrics Using Stata*. Stata Press, Texas (2006)
- Bjella, M.: *Democracy and Foreign Aid*. Master Thesis in Political Science, Department of Political Science, University of Oslo, Oslo (2012)
- Bjørnskov, C.: Do elites benefit from democracy and foreign aid in developing countries? *J. Dev. Econ.* Elsevier, **92**(2), 115–124 (2010)
- Blundell, R., Bond, S.: Initial conditions and moment restrictions in dynamic panel data models. *J. Econom.* **87**(1998), 115–143 (1998)
- Boateng, A., Asongu, S.A., Akamavi, R., Tchamyou, V.S.: Information asymmetry and market power in the African banking industry. *Journal of Multinational Financial Management.* **44**(March), 69–83 (2018)
- Bobba, M., Coviello, D.: Weak instruments and weak identification, in estimating the effects of education, on democracy. *Econ. Lett.* **96**(2007), 301–306 (2007)
- Boone, P.: Politics and the effectiveness of foreign aid. *Eur. Econ. Rev.* **40**(1996), 289–329 (1996)
- Brambor, T., Clark, W.R., Golder, M.: Understanding interaction models: improving empirical analyses. *Polit. Anal.* **14**(1), 63–82 (2006)
- Bratton, M.: *Poor People and Democratic Citizenship in Africa*, Cape Town: Afrobarometer, Working Paper No. 56 (2006)
- Brown, S.: Foreign aid and democracy promotion: lessons from Africa. *Eur. J. Dev. Res.* **17**(2), 179–198 (2005)
- Bruno, G.S.F.: Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. *Econ. Lett.* **87**(3), 361–366 (2005a)

- Bruno, G.S.F.: Estimation and inference in dynamic unbalanced panel-data models with a small number of individuals. *Stata J.* **5**(November 4), 473–500 (2005b)
- Burnside, C., Dollar, D.: Aid, policies and growth. *Am. Econ. Rev.* **90**(4), 847–868 (2000)
- Burnside, C., Dollar, D.: Aid, policies, and growth: Revisiting the evidence, Washington DC: World Bank, Working Paper 3251 (2004)
- Chauvet, L.: On the heterogeneous impact of aid on growth: a review of the evidence. In: Arvin, M.B., Lew, B. (eds.) *Handbook on the Economics of Foreign Aid*, pp. 350–374. Edward Elgar Publishing Limited, Cheltenham (2015)
- Chen, S., Ravallion, M.: How did the world 's poorest fare in the 1990s? *Rev. Income Wealth.* **47**(3), 283–300 (2001)
- Chong, A., Grandstein, M., Calderon, C.: Can foreign aid reduce income inequality and poverty? *Public Choice.* **140**(1–2), 59–84 (2009)
- Clunies-Ross, A., Forsyth, D., Huq, M.: *Development Economics*, 1st edn. McGraw-Hill Higher Education, Berkshire (2009)
- Collier, P.: *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It*. Oxford University Press, New York (2007)
- Collier, P., Dollar, D.: Can the world cut poverty in half? How policy reform and effective aid can meet international development goals. *World Dev.* **29**(11), 1787–1802 (2001)
- Collier, P., Dollar, D.: Aid allocation and poverty reduction. *Eur. Econ. Rev.* **46**(8), 1475–1500 (2002)
- Das, A., Serieux, J.: Aid and reverse flows: a global analysis. In: Arvin, B.M., Lew, B. (eds.) *Handbook on the Economics of Foreign Aid*, pp. 28–44. Edward Elgar Publishing, Cheltenham (2015)
- Datt, G., Ravallion, M.: Growth and redistribution components of changes in poverty measures. *J. Dev. Econ.* **38**(2), 275–295 (1992)
- Dreher, A., Gaston, N., Martens, P.: *Measuring Globalization- Gauging its Consequence*. Springer, New York (2008)
- Easterly, W.: *The White Man's Burden: Why the West 's Efforts to Aid the Rest Have Done So Much Ill and So Little Good*. Penguin Books, New York (2006)
- Flannery, M.J., Hankins, K.W.: Estimating dynamic panel models in corporate finance. *J. Corp. Financ.* **19**(February 2013), 1–19 (2013)
- Foster, J., Greer, J., Thorbecke, E.: Notes and comments: a class of decomposable poverty measures. *Econometrica.* **53**(3), 761–766 (1984)
- Hanmer, L., Naschold, F.: Attaining the international development targets: will growth be enough? *Dev. Policy Rev.* **18**(1), 11–36 (2000)
- Hansen, L.P.: Large sample properties of generalized method of moments estimators. *Econometrica.* **50**(4), 1029–1054 (1982)
- Harrison, A.: *Globalization and Poverty*, Cambridge: National Bureau of Economic Research, NBER Working Paper No. 12347 (2006)
- Heckleman, J., Knack, S.: Foreign aid and market-liberalizing reform. *Economica.* **75**(1), 524–548 (2008)
- Hoynes, H.W., Page, M.E., Stevens, A.H.: Poverty in America: trends and explanations. *J. Econ. Perspect.* **20**(1), 47–68 (2006)
- Jones, S., Tarp, F.: Does foreign aid harm political institutions? *J. Dev. Econ.* **118**(C), 266–281 (2016)
- Kaya, O., Kaya, I., Gunter, L.: Foreign aid and the quest for poverty reduction: is aid to agriculture effective? *J. Agric. Econ.* **64**(3), 583–596 (2013)
- Kiviet, J.: On bias, inconsistency, and efficiency of various estimators in dynamic panel data models. *J. Econ.* **68**(1), 53–78 (1995)
- Knack, S.: Does foreign aid promote democracy? *Int. Stud. Q.* **48**(1), 251–266 (2004)
- Kosack, S.: Effective aid: how democracy allows development aid to improve the quality of life. *World Dev.* **31**(1), 1–22 (2003)
- Lipton, M.: *Demography and poverty*, Washington, DC: World Bank, working paper no. 623 (1983)
- Love, I., Zicchino, L.: Financial development and dynamic investment behavior: evidence from panel VAR. *The Quarterly Review of Economics and Finance.* **46**(2), 190–210 (2006)
- Mahembe, E., Odhiambo, N.M.: On the link between foreign aid and poverty reduction in developing countries. *Revista Galega de Economía.* **26**(2), 113–128 (2017)
- Mahembe, E., Odhiambo, N.M.: The dynamics of extreme poverty in developing countries. *Studia Universitatis "Vasile Goldis" Arad. Economics Series.* **28**(2), 18–35 (2018)
- Masud, N., Yontcheva, B.: *Does foreign aid reduce poverty? Empirical evidence from nongovernmental and bilateral aid*, Washington DC: IMF Working Paper WP/05/100 (2005)
- Mosley, P., Suleiman, A.: Aid, agriculture and poverty in developing countries. *Rev. Dev. Econ.* **11**(1), 139–158 (2007)
- Mosley, P., Hudson, J., Verschoor, A.: Aid, poverty reduction and the 'new conditionality'. *Econ. J.* **114**(496), F217–F243 (2004)

- Moyo, D.: *Dead Aid: Why Aid is Not Working and How There is a Better Way for Africa*. Farrar, Straus and Giroux, New York (2009)
- Naschold, F.: Overseas Development Institute, *Why Inequality Matters for Poverty*. [Online] Available at: <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3876.pdf>. Accessed 20 Aug 2018 (2002)
- Nickell, S.: Biases in dynamic models with fixed effects. *Econometrica*. **49**(6), 1417–1426 (1981)
- Pandey, S., Elliott, W.: Suppressor variables in social work research: ways to identify in multiple regression model. *J. Soc. Soc. Work Res.* **1**(1), 28–40 (2010)
- Pearson, K.: *Mathematical contributions to the theory of evolution—III. Regression, heredity, and panmixia*. *Philosophical Transactions of the Royal Society of London, Volume Series A (January 1896)*, 253–318 (1896)
- Peiffer, C., Boussalis, C.: Determining aid allocation decision-making: towards a comparative sectored approach. In: Arvin, B.M., Lew, B. (eds.) *Handbook on the Economics of Foreign Aid*, pp. 45–63. Edward Elgar Publishing Limited, Cheltenham (2015)
- Ravallion, M., Chen, S.: What can new survey data tell us about recent changes in distribution and poverty? *World Bank Econ. Rev.* **11**(2), 357–382 (1997)
- Riddell, R.C.: *Does Foreign Aid Really Work?* Oxford University Press, New York (2008)
- Roodman, D.: A note on the theme of too many instruments. *Oxf. Bull. Econ. Stat.* **71**(1), 135–158 (2009a)
- Roodman, D.: How to do xtabond2: an introduction to difference and system GMM in Stata. *Stata J.* **9**(1), 86–136 (2009b)
- Sachs, J.D.: *The End of Poverty: Economic Possibilities for our Time*. Penguin Books, New York (2005)
- Sargan, J.D.: The estimation of economic relationships using instrumental variables. *Econometrica*. **26**(3), 393–415 (1958)
- Schaffner, J.: *Development Economics: Theory, Empirical Research, and Policy Analysis*. John Wiley & Sons, Inc., Danvers, MA (2014)
- Solt, F.: The standardized world income inequality database. *Soc. Sci. Q.* **97**(5), 1267–1281 (2016)
- Tchamyou, V.S.: The Role of Information Sharing in Modulating the Effect of Financial Access on Inequality. Forthcoming, *Journal of African Business* (2018a)
- Tchamyou, V.S.: Education, Lifelong learning, Inequality and Financial access: Evidence from African countries. *Contemp. Social Sci.* **15**, 7–25 (2018b). <https://doi.org/10.1080/21582041.2018.1433314>
- Tchamyou, V.S., Asongu, S.A.: Information sharing and financial sector development in Africa. *J. Afr. Bus.* **18**(1), 24–49 (2017)
- Tzelgov, J., Henik, A.: Suppression situations in psychological research: definitions, implications, and applications. *Psychol. Bull.* **109**(3), 524–536 (1991)
- United Nations: *Human Development Report: International Cooperation at Cross Roads*. UNDP, New York (2005)
- United Nations: Press Release: UN General Assembly's Open Working Group proposes sustainable development goals. [Online] Available at: <https://sustainabledevelopment.un.org/content/documents/4538pressowg13.pdf>. Accessed 05 Aug 2018 (2014)
- United Nations: Transforming the world: the 2030 agenda for sustainable development. [online] Available at: <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>. Accessed 20 Aug 2018. (2015)
- Varshney, A.: Democracy and poverty, caste Donnington: paper for the conference on world development report 2000, organized by the U.K. Department for International Development, and the Institute of Development Studies (1999)
- Vijayakumar, S.: An empirical study on the nexus of poverty, GDP growth, dependency ratio and employment in developing countries. *Journal of Competitiveness.* **5**(2), 67–82 (2013)
- Windmeijer, F.: A finite sample correction for the variance of linear efficient two-step GMM estimators. *J. Econ.* **126**(1), 25–51 (2005)
- World Bank: *Assessing Aid: What Works, What doesn ' t and why*. World Bank, Washington DC (1998)
- World Bank: *Globalization, Growth, and Poverty: Building an Inclusive World Economy*. World Bank and Oxford University Press, Washington, DC (2002)
- World Bank: *2016 World Development Indicators*. World Bank, Washington DC (2016)
- World Bank Group and World Trade Organization: *The Role of Trade in Ending Poverty*. World Trade Organization, Geneva (2015)
- World Bank Group and World Trade Organization: *Trade and Poverty Reduction: New Evidence of Impacts in Developing Countries*. World Trade Organization, Geneva (2018)