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The impact of foreign direct investment, foreign aid and trade on poverty reduction: Evidence from Sub-Saharan African countries

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Abstract: Despite postulations on the effects of foreign direct investment (FDI), foreign aid, and trade on growth, empirical evidence from extant research has been mixed. The focus of recent research has shifted from the growth effects of these international flows to their poverty reduction effects. However, results have also been mixed. Most studies have examined the empirical evidence of these flows separately and have mostly conducted single country studies. In this study, we use data from twenty-nine countries in Sub-Saharan Africa between the period 1990–2017 to analyze the effects of FDI, trade, and foreign aid on poverty reduction in a single model using the Feasible Generalized Least Square (FGLS) technique. Our results show that FDI and foreign aid have a negative effect on poverty reduction in the countries studied. These results suggest that the level of FDI required to alleviate poverty has not been reached, and foreign aid have not been properly channeled. However, the results show that trade has a positive and significant impact on poverty reduction, especially in low-income countries. We conclude with policy recommendations.

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PUBLIC INTEREST STATEMENT

Foreign Direct Investment (FDI), foreign aid, and foreign trade are different types of international flows received by countries. Past research has argued that these international flows can help improve economic growth. More recently, it has also been argued that these international flows can help in poverty reduction. In this study, we use sample data on 29 Sub-Sahara African countries (SSA) for 1990 to 2017 to explore the impact of these international flows on poverty reduction in SSA. From our results, only foreign trade had an overall positive impact on poverty reduction. Further analysis revealed that foreign trade only reduced poverty in low-income countries but not in middle-income and high-income countries; FDI and foreign aid still had no impact on poverty reduction. These findings suggest that FDI and foreign aid have not been appropriately channeled into sectors that would have a positive impact on poverty reduction in SSA countries.

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1. Introduction

On 21 March 2018, the heads of governments of forty-nine African countries signed the African Continental Free Trade Agreement (AfCFTA) in Kigali, Rwanda's capital city. Although the ratification process is still ongoing, the hope is that AfCFTA is a step towards the economic integration of Africa that will promote trade both within the continent, and with the rest of the world. The value of merchandize exports, a rough measure of international trade, for Sub-Saharan Africa increased from 6 USD.5 T in 2000 to 19 USD.6 T in 2018, an increase of over 200% (World Bank, 2019a). In 2018, inflow of Foreign Direct Investment (FDI) into the whole of Africa increased by 11% from 41 USD.39B in 2017 to 45 USD.9B while that of Sub-Saharan Africa increased by over 12% from 28 USD.04B in 2017 to 31 USD.6B (UNCTAD, 2019). Between 2000 and 2017, official foreign aid into Sub-Saharan Africa increased from 13 USD.06B to 47 USD.27B, a cumulative increase of over 261% (World Bank, 2019b).

Extant research suggest that international flows such as Foreign Direct Investment (FDI), foreign aid, and foreign trade, are viable vehicles for economic growth (Adams, 2009; Akinlo, 2004; Alfaro et al., 2000; Arndt et al., 2015; Bunte et al., 2018; Gnangnon, 2018; Greenaway et al., 2002; Gunby et al., 2017). However, although between 2000 and 2015, African countries grew at an average of 5% (World Bank, 2019c), the poverty levels in most African countries have not abated. About one billion people were lifted out of poverty between 1990 and 2015 (Asadullah & Savoia, 2018; UNDESA, 2015). However, according to the World Bank (2019d), "more than half of the extreme poor live in Sub-Saharan Africa". Thus, although the average growth rate of African countries between 2000 and 2015 exceeded that of much of the developed countries in the west, and in many parts of Asia, welfare and standard of living conditions in many African countries remain poor. This is contrary to the expectations of extant research's postulations of economic growth leading to poverty reduction. It is also contrary to recent empirical evidence of China and the fast rising Asian countries. As the economy of many Asian countries grew, poverty also reduced (Angelsen & Wunder, 2006; Perera & Lee, 2013; Zhuang et al., 2010).

In this paper, we investigate the impact of FDI, foreign aid (aid), and foreign trade (trade) on poverty reduction in Sub-Saharan African countries. Extant studies on the effects of FDI, aid, and trade, on poverty reduction presents mixed evidence. Although there is also some mixed evidence from extant studies on the effects of FDI, aid, and trade, on growth, much of the evidence almost conclusively points to a positive effects of these international flows on growth (Arndt et al., 2015; Bunte et al., 2018; Gnangnon, 2018; Gunby et al., 2017). However, the focus of recent research and international development community has shifted from economic growth to poverty reduction as growth does not always equate poverty reduction (Reis, 2001).

The impact of FDI, aid, and trade, have also been modelled and studied separately in most studies. Gohou and Soumare (2012), Magombeyi and Odhiambo (2017), and Fauzel et al. (2015), for examples, modelled the effects of FDI on poverty reduction without including aid or trade in their models. Similarly, Alvi and Senbeta (2012) and Le Goff and Singh (2014) also model aid and trade respectively without including any other international flows in their models. In addition, most studies have also been conducted using data from a single country (e.g., Magombeyi & Odhiambo, 2017; Tambunan, 2005). Furthermore, there are also sparse studies that have utilized causal models (Gohou & Soumare, 2012; Magombeyi & Odhiambo, 2017 are notable exceptions). To infer causation, statistical models have to be causal models rather than just correlation effect models (Rohrer, 2018).

Consequently, the motivation for this research, and contributions to extant research, is three-fold. First, this study contributes to the literature by analyzing the impact of FDI, aid, and trade on

poverty reduction in the low income countries, lower-middle income and upper-middle income of sub-Saharan Africa. This make this study unique as existing studies examined the subject matter in sub-Saharan countries as a whole without taking into conginizance the distinct attributes (e.g., income level) of each country in the region. Second, the novelty of this study also lies in the way the subject matter is being modeled. For instance, existing studies mostly measure poverty reduction using either poverty gap or poverty head-count. These indices, however, do not take into cognizance human development. As a result, this study used the human development index (HDI), proposed by the United Nations Development Programme (UNDP), as an in-depth measure of poverty reduction because it takes into account life expectancy, education and standard of living. Finally, most existing studies favor the use of the Ordinary Least Square (OLS) coefficient estimate. This technique, however, suffers from the problem of serial correlation and heteroskedasticity errors, which render the OLS estimator inefficient and induce bias in the corresponding standard errors. As a result, this study applied the Feasible Generalized least Square (FGLS) statistical modelling technique because it is considered as a viable method, which helps to overcome the problems of serial correlation and heteroskedasticity.

In the rest of the paper, first the theoretical background and literature review to this study is presented. This is followed by a description of the model specification, data, and methodlogy utilized for the study. The results of the statistical analysis is then presented. The paper concludes with a discussion of the results and ample recommendations for policy and future research.

2. Theoretical background and literature review

Much of earlier research on the effects of international flows such as FDI, aid, and trade on national economies focused on growth. However, results of the growth effects of FDI, aid, and trade remain mixed. While some studies found positive effects (e.g., Adams, 2009; Alfaro et al., 2000; Burnside & Dollar, 2000; Hansen & Tarp, 2000; Kobrin, 2005; Kumar & Pradhan, 2002; Lean & Tan, 2011; Tang et al., 2008; Wacziarg & Welch, 2008), others indeed found negative effects (e.g., Akinlo, 2004; Boone, 1996; Ulaşan, 2015). Some extant studies have argued that the existence of a "micro-macro-paradox" might lead to positive micro effects that are neither readily evident nor measurable at macro levels (Alvi & Senbeta, 2012; Mosley, 1986). Although this paradox has been argued to apply mainly to the effects of foreign aid, the focus of recent research has shifted from growth to poverty reduction, a more micro measure than growth. Economic growth is a necessary but insufficient requirement for poverty reduction (Reis, 2001). Moreover, poverty reduction is a top priority in the sustainable development goals, and is particularly important in developing regions such as SSA.

3. Foreign Direct Investment (FDI)

Many developing countries, and even developed countries, now have policies to attract FDI. FDI inflows not only contribute to capital accumulation, it can generate employment, increase technology transfer, and enhance competitiveness (Adams, 2009; Alfaro et al., 2000; Kobrin, 2005; Kumar & Pradhan, 2002). However, all FDIs are not equal (Adams, 2009; Akinlo, 2004). While some types of FDI will lead to growth, and perhaps, poverty reduction, others will not. Financial markets in host countries have to be developed to a certain level for FDI to have any positive effects in the host country (Alfaro et al., 2000). The right economic and technological conditions also have to be place for FDI to make a positive impact on the economy of recipients (Akinlo, 2004; Buckley et al., 2002).

FDI can help in poverty reduction through direct and indirect channels (Gohou & Soumare, 2012; Mirza & Giroud, 2004; Mold, 2004; Sumner, 2005). FDI reduces poverty through the direct channel by creating jobs in the private sector and when foreign investors invest directly in the provision of some social welfare for the poor (Gohou & Soumare, 2012; Klein et al., 2001). Jobs created by FDI in host countries can be particularly good jobs and help in knowledge and technology transfer (Javorcik, 2015). These good jobs directly reduce poverty and the knowledge transferred can also enable indigenes to further create more jobs. Through the indirect channel, investments and

capital accumulation from FDI can facilitate economic growth (Gohou & Soumare, 2012). The hope is that such economic growth will eventually lead to poverty reduction. However, for FDI to directly reduce poverty through job creation, a labour-intensive economy is required (Gohou & Soumare, 2012; Tambunan, 2005). The effects of FDI thus depends on the type of inflow (Adams, 2009; Akinlo, 2004).

FDI can aid in poverty reduction both in the short and long run (Fauzel et al., 2015; Fowowe & Shuaibu, 2014; Gohou & Soumare, 2012; Magombeyi & Odhiambo, 2017). However, Fowowe and Shuaibu (2014) suggest that quality institutions and a functioning financial system increases the rate at which FDI reduces poverty. In other words, countries with developed institutions and financial systems will see the impact of FDI on poverty faster than countries without good institutions and financial systems. The impact of FDI on poverty reduction has also been found to be much more in poorer countries than in wealthier countries (Gohou & Soumare, 2012; Sharma & Gani, 2004). Consequently, since most countries in SSA are developing countries, and thus poor countries, FDI is expected to have significantly reduced poverty in SSA. However, Africa, and SSA in particular, is still home to extreme poverty (World Bank, 2019d).

To our knowledge, there are very few extant studies that have investigated the impact of FDI on poverty reduction in SSA. Using the Granger causality test, Gohou and Soumare (2012)'s study of African countries investigated the period 1990 to 2007. Their results showed that FDI has a strong impact on poverty reduction in Africa. Similarly, Fowowe and Shuaibu (2014) extended the period investigated and studied the period 1981 to 2011. However, rather than using Human Development Index (HDI) as a measure of welfare condition, Fowowe and Shuaibu (2014) made use of poverty head count index (POV), the proportion of people living on less than 1 USD.25 a day. Results from Fowowe and Shuaibu (2014) also found that FDI has a positive impact on poverty reduction in Africa. Fauzel et al. (2015) also studied the impact of FDI on poverty in SSA for the period 1990–2010 using POV rather than HDI and found that FDI reduces poverty. Magombeyi and Odhiambo (2017) study of South Africa using different measures of poverty suggest that the effect of FDI on poverty is sensitive to the proxy used to measure poverty. Consequently, given that most SSA countries continued to grow rapidly, in comparison with the western world, we study the impact of FDI on poverty reduction using data from 1990 to a more recent time, 2017. From the foregoing, we expect that FDI will have a positive effect on poverty reduction in SSA for two main reasons. One, SSA countries grew consistently over the period studied. Two, FDI into SSA countries also grew over the period studied. Consequently, we suspect that FDI would have had both direct and indirect effects on poverty reduction and specifically state the hypothesis as follows:

Hypothesis 1: Foreign direct investment has a significant impact on poverty reduction in SSA

4. Foreign aid

The disbursement of Official development assistance (ODA) or what is now more commonly known as foreign aid, started after World War 2 (Mahembe & Odhiambo, 2019; World Bank, 1998). Aid consists of all resources, which may comprise of physical goods, skills, knowledge, technology, or financial grants and loans, that are transferred from donor countries to recipient countries (Mahembe & Odhiambo, 2019; Riddell, 2008). Although wealthy countries are sometimes recipients of aid, especially in natural disasters, economic crisis, or emergencies, most recipients of aid are poor and developing countries. While much of aid is provided by governments, some percentage of aid is now provided by Non-Governmental Organizations (NGOs) (Riddell, 2008). However, the scholarly debate on the effects of foreign aid on economic growth and poverty appears unending with economists on opposing sides of the divide.

The effects of foreign aid, has been argued to be particularly susceptible to the micro-macro paradox (Alvi & Senbeta, 2012; Mosley, 1986). This is because average aggregation of household and firm income levels do not need to increase for foreign aid to reduce poverty (Lensink & White, 2000; Mosley et al., 2004; Mosley & Suleiman, 2007). Following Burnside and Dollar (2000) seminal

empirical analysis, some studies have argued and shown that foreign aid reduces poverty (Alvi & Senbeta, 2012; Arndt et al., 2015; Lensink & White, 2000; Mosley et al., 2004; Mosley & Suleiman, 2007; Rajan & Subramanian, 2008). However, some studies are on the other side of the divide and argue against the impact of aid on economic development and poverty reduction (Boone, 1996; Chong et al., 2009; Easterly et al., 2004; Moyo, 2009). Interestingly, opponents of foreign aid do not have a total opposition to aid. Neither do they ask for the elimination of foreign aid (Easterly, 2007). Rather, they advocate against a total reliance on foreign aid as a means of economic development. This is partly because while aid has been very successful in some countries, it has failed to either improve growth or living conditions in some others (World Bank, 1998).

Summarily, good policies, quality institutions, and a well-developed financial system, are necessary requirements for aid to have any impact on poverty (Alvi & Senbeta, 2012; Burnside & Dollar, 2000; Chong et al., 2009; Kosack, 2003). The type of aid, channels, and mechanism for transmitting aid will determine the impact of foreign aid on poverty reduction (Alvi & Senbeta, 2012; Easterly, 2003, 2007). Multilateral aid, for example, has been shown to be better able to reduce poverty than bilateral aid (Alvi & Senbeta, 2012). More recent studies suggest that for aid to reduce poverty, it should be targeted at the right programmes and objectives such as job creation, and directly at social expenditure on health, and education (Guillaumont & Wagner, 2014; Michaelson, 2015; Page & Shimeles, 2015). While democracy enhances the effectiveness of aid (Arvin & Barillas, 2002; Kosack, 2003; Mahembe & Odhiambo, 2019), unfortunately, the ideology of ruling political parties play a role in how aid received is put to use in African countries (Tawiah et al., 2019).

Consequently, aid may not be utilized for job creation and social expenditure if the ruling party does not deem it fit. Although SSA countries have historically been huge recipients of aid, few studies have investigated the effects of aid on poverty reduction using data solely on SSA countries. The two studies, to our knowledge, that have made use of data solely on SSA countries have found contrasting results. While Ijaiya and Ijaiya (2004) found that aid had no effect on poverty reduction in SSA, a recent study, Evans and Kelikume (2018) found that aid has a positive impact on poverty both in the short and long runs. Arvin and Barillas (2002) study of some countries in Asia, Latin America, Caribbean, and Africa, found that aid had no impact on poverty reduction in the Africa sub-samples of North Africa and SSA for the period 1975 to 1998 studied. This study aims to add to the empirical evidence on the impact of aid on poverty reduction in SSA using data on a more recent period, 1990–2017. The institutions, policies, and political governments in most countries in SSA have improved, albeit only slightly, during this period. Consequently, we suspect that aid will have a positive effect on poverty reduction and state the hypothesis specifically as follows:

Hypothesis 2: Foreign aid has a significant impact on poverty reduction in SSA.

5. Foreign trade

Advancement in technology has enabled a remarkable increase in international trade. Evidence on the growth effects of international trade from extant studies has been more positive than that of FDI and foreign aid. International trade promotes domestic employment, enhances the transfer of technology between countries, and can help domestic firms to gain competitive advantage (Evans & Kelikume, 2018). However, similar to the effects of FDI and aid, results of empirical studies of the effects of trade on growth presents mixed evidence. Recent studies, for example, Gnangnon (2018), Zahonogo (2016), and Were (2015), present mixed results. While Gnangnon's (2018) study of 150 countries for the period 1995 to 2015 showed that trade had positive effect on growth, Were's (2015) study of 85 countries for the period 1991 to 2011 showed insignificant results for least developing countries, most of which were from Africa. Results from Zahonogo's (2016) study of SSA countries for 1980 to 2012 showed that the effects of trade on growth was neither linear nor clear. However, on the average countries that are open to trade outgrow those that are not by over 1.5% (Wacziarg & Welch, 2008).

On the other hand, the empirical evidence of the effects of trade on poverty have mostly yielded insignificant results with some even finding a negative impact (Beck et al., 2007; Guillaumont-Jeanneney & Kpodar, 2011; Le Goff & Singh, 2014; Singh & Huang, 2011). Indeed Singh and Huang (2011) even showed that trade increases poverty and poverty gap. Just like FDI and aid, good policies, deep financial sectors, high education levels, and the right institutional settings are required for international trade to reduce poverty (Le Goff & Singh, 2014). Otherwise, the benefits of trade may allude the poor (Le Goff & Singh, 2014). It is also not enough to simply liberalize trade. Trade facilitation aimed specifically at reducing costs are necessary for trade to reduce poverty in the long run (Balistreri et al., 2018; Sakyi et al., 2017). Furthermore, all trades are not equal. Agricultural exports, for example, contribute more to poverty reduction in low income countries than manufacturing exports (Santos-Paulino, 2017).

Studies on the effects of trade on poverty using data from SSA are sparse in the literature. Fosu and Mold (2008) simulation study showed that due to sharp contractions in the import-competing sectors in most SSA countries, the effect of trade on poverty was either limited or negligible. Le Goff and Singh (2014) study using data for the period 1981 to 2010 showed that the effects of trade on poverty in Africa was not automatic; deep financial markets, high education levels, and strong institutions are required. A more recent study, Onakoya et al. (2019), using data for 2005 to 2014, found a negative relationship between trade and poverty, measured as HDI. In other words, trade actually increased the level of poverty in the period studied. Consequently, we also investigate the impact of trade on poverty using data for 1990 to 2017, in an attempt to clarify the effects of trade on poverty in SSA. Due to the increased volume of international trade in SSA in the period under study, we suspect that trade will have a positive effect on poverty reduction and specifically state the hypothesis as follows:

Hypothesis 3: Trade has a significant impact on poverty reduction in SSA.

6. Empirical model

The study investigates the link between foreign direct investment, foreign aid, trade, and poverty reduction. It is pertinnet to mention that various parameters have been used to measure poverty reduction and these include poverty gap and poverty head-count. However, these indices do not take into cognizance human development. As a result, the United Nations Development Programme (UNDP) considererd the human development index (HDI) as an in-depth measure of poverty reduction because it takes into account life expectancy, education, and standard of living (Uttama, 2015). Hence, this study employed the human development index as a proxy for poverty reduction. The empirical functional model of this study is thus specified as:

$$Hdi_{it} = f(Fdi_{it}, Fad_{it}, Trade_{it}, Gdppcg_{it}, Gcf_{it}, Pop_{it}, Inf_{it}) \quad (1)$$

Where,

Hdi_{it} denotes human development index and it proxy poverty reduction

Fdi_{it} denotes foreign direct investment.

Fad_{it} denotes foreign aid.

$Trade_{it}$ denotes trade openness.

$Gdppcg_{it}$ denotes per capita growth in GDP.

Gcf_{it} denotes gross domestic formation.

Pop_{it} denotes annual population growth.

Inf_{it} denotes inflation.

i denotes country.

t denotes time.

The functional model of Equation (1) is transformed into an econometric model in Equation (2)

$$Hdi_{it} = \beta_0 + \beta_1 Fdi_{it} + \beta_2 Fad_{it} + \beta_3 Trade_{it} + \beta_4 Gdppcg_{it} + \beta_5 Gcf_{it} + \beta_6 Pop_{it} + \beta_7 Inf_{it} + \mu_{it} \quad (2)$$

The *a priori* expectations are specified as follows:

$$\beta_0 > 0, \beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 < 0, \beta_7 < 0$$

7. Data and methodology

The study used data of 29 countries in Sub-Saharan Africa covering the period of 1990–2017[1] (i.e. 812 observations). Table 1 depicts the detail of the sources of data employed and how each of the data is measured. The study employed the feasible generalized least square (FGLS) to analyze the data. The rationale for employing the FGLS technique of estimation is because it deals with the problem of serial correlation and heteroskedasticity.

8. Empirical results

8.1. Descriptive statistics

Table 2 reports the descriptive statistics of the variables employed. The statistics indicate the average human development index in the region is 0.45, which is low compared to the developed countries. The average contribution of foreign direct investment to the GDP is 2.99, suggesting that

Table 1. Data sources and measurement of variables

Variables	Description	Measurement	Expectation	Source
Hdi	Human Development Index	It is the geometric mean of life expectancy index, education index and income index	-	UNDP Human Development Report, 2018
Fdi	Foreign direct investment	It is measured as the percentage ratio of FDI net inflows (i.e. new investment inflows less disinvestment) in the reporting economy to GDP.	Positive	World Bank Development Indicator (WDI, 2018)
Fad	Foreign Aid	Official development assistance (% of GNI)	Positive	WDI, 2018
Trade	Foreign trade	It is computed as the percentage ratio of sum of exports plus imports of goods to total output.	Positive/Negative	WDI, 2018
Gdppcg	Economic Growth	It is measured as GDP per capita growth.	Positive	WDI, 2018
Gcf	Gross capital formation	It will be measured as the ratio of gross capital formation divided by GDP.	Positive	WDI, 2018
Pop	Population growth	Annual growth in population	Negative	WDI, 2018
Inf	Inflation	Consumer price index	Negative	WDI, 2018

Source: Authors' Compilation.

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Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max.
Hdi	0.45	0.13	0.19	0.79
Fdi	2.99	4.79	−8.59	50.02
Fad	9.64	9.41	−0.26	94.95
Trade	65.10	28.32	0	165.65
Gdppcg	1.30	4.72	−47.81	36.98
Gcf	20.87	9.44	0	73.78
Pop	2.52	0.98	−6.77	8.12
Inf	51.63	852.92	−11.69	23773.13

Note: Hdi, human development index; FDI, foreign direct investment (% GDP); Fad, foreign aid; Trade, trade openness; Gdppcg, gross domestic product per capita growth; and GCF, gross capital formation (% GDP); Pop, annual population growth; Inf, inflation.

the contribution of FDI to the economic performance of SSA is also low. The average degree of trade openness is 65.10. This is relatively high and suggests that SSA countries are increasingly relaxing all forms of trade restrictions.

The average growth in per capita GDP in the region is 1.30 while the average proportion of foreign aid to GDP is 9.64. The mean of domestic investment stood at an average of 20.87 percent. The average growth in population in the region is 2.52%, which is on the average is twice the growth in per capita GDP. The average rate of inflation is 51.63% suggesting that the average cost of living is high in the region.

8.2. Correlation matrix

Table 3 depicts the result of the correlation matrix. The result indicates that there is no high correlation between the variables; hence, there is an absence of the problem of multicollinearity among the independent variable.

Table 4 depicts the regression results of the impact of FDI, foreign aid, and trade on poverty reduction in 29 SSA countries using the feasible generalized least square (FGLS) method of estimation.

The results show that the coefficient of foreign direct investment is negative (−0.001) and it is statistically significant at 1%. This implies that foreign direct investment inflows in sub-Saharan African countries have not contributed to poverty reduction. This results is contrary to existing studies

Table 3. Correlation matrix

	Hdi	Fdi	Fad	Trade	Gdppcg	Gcf	Pop	Inf
Hdi	1							
Fdi	0.11	1						
Fad	−0.48	−0.07	1					
Trade	0.51	0.38	−0.22	1				
Gdppcg	0.10	0.12	−0.14	0.05	1			
Gcf	0.18	0.41	−0.17	0.35	0.17	1		
Pop	−0.19	0.11	0.00	−0.11	0.05	0.10	1	
Inf	0.03	−0.02	0.05	0.09	−0.07	0.13	0.06	1

Note: Hdi, human development index; FDI, foreign direct investment (% GDP); Fad, foreign aid; Trade, trade openness; Gdppcg, gross domestic product per capita growth; and GCF, gross capital formation (% GDP); Pop, annual population growth; Inf, inflation.

Table 4. FDI, foreign aid and trade dependent variable: Human Development Index (HDI)

Regressor	Coefficient	Std.Err.	Prob
Fdi	−0.001***	0.0006	0.028
Fad	−0.005***	0.0003	0.000
Trade	0.001***	0.0001	0.000
Gdppcg	0.0009**	0.0005	0.070
Gcf	0.0036***	0.0002	0.000
Pop	−0.028***	0.0032	0.000
Inf	0.06	0.02	0.805
Con	0.438***	0.0113	0.000

Note: Hdi, human development index; FDI, foreign direct investment (% GDP); Fad, foreign aid; Trade, trade openness; Gdppcg, gross domestic product per capita growth; and GCF, gross capital formation (% GDP); Pop, annual population growth; Inf, inflation; Con, constant.

*** Indicates 1% level of significance; ** indicates 5% level of significance.

(e.g., Fauzel et al., 2015; Fowowe & Shuaibu, 2014; Gohou & Soumare, 2012; Magombeyi & Odhiambo, 2017), which found that FDI leads to poverty reduction. A plausible economic reason for this is that the average level of foreign direct investment inflows to SSA, as depicted in Table 2, is very low compared to what is required to alleviate the poverty level. It, therefore, become pertinent for policymakers in the region to strategize and enact policies that will encourage substantial inflows of FDI.

The result also shows that the coefficient of foreign aid is negative (−0.005) and is statistically significant at 1%. This suggests that the various foreign aids granted by multilateral institutions, Development Assistance Committee (DAC) and non-DAC to promote economic development and welfare have not reduced the poverty level in the region. A plausible explanation for this is that foreign aids have not been appropriately channeled for the major purpose of which they were given. Political leaders divert some of those aid into their account at the expense of the poor masses. This finding support the argument and empirical findings of existing studies (e.g., Boone, 1996; Chong et al., 2009; Easterly, Levine & Roodman, 2004; Moyo, 2009) that noted that foreign aid has a negative or no impact on poverty reduction.

The finding of the study further reveals that the coefficient of trade is positive (0.001) and is statistically significant at 1%. This presupposes that the increasing involvement of SSA countries in trade within and outside the region has engendered poverty reduction. This finding does not corroborate previous studies (e.g., Beck et al., 2007; Guillaumont-Jeanneney & Kpodar, 2011; Le Goff & Singh, 2014; Singh & Huang, 2011) that noted the effect of trade on poverty reduction to either insignificant or negative.

The coefficient of per capita growth in GDP is positive (0.0009) and it is statistically significant at 1%. In the same vein, the result indicates that the coefficient of gross domestic investment is positive (0.0036) and is statistically significant at 1%. This presupposes that domestic investment has contributed positively to reducing the poverty level in SSA. However, the coefficient of population growth is negative (−0.028) and is statistically significant at 1%.

Taking into cognizance the diversity among countries in SSA, We further narrow down our analysis by grouping the selected countries in this study into three groups according to income level. These groups include the low income countries, lower-middle income, and upper-middle income.[2] The results of the regression analysis based on income is presented in Table 5.

The result reveals that foreign direct investment has no significant impact on poverty reduction in low income, lower-middle, amd upper-middle income countries. The result also shows that foreign aid has a negative and significant effect on poverty reduction in low income, lower-middle,

Table 5. FDI, foreign aid and trade dependent variable: Human Development Index (HDI)

Regressor	Low-Income Countries	Lower-Middle Income	Upper-Middle Income
Fdi	0.0009	−0.0003	−0.0003
Fad	−0.003***	−0.002***	−0.015***
Trade	0.0007***	−0.0007***	−0.0003*
Gdppcg	0.0003	0.002***	−0.0009
Gcf	0.0039***	0.0026***	0.0013**
Pop	0.003	−0.028***	0.017***
Inf	−0.04	0.001***	0.001***
Con	0.327	0.534***	0.609***

Note: Hdi, human development index; FDI, foreign direct investment (% GDP); Fad, foreign aid; Trade, trade openness; Gdppcg, gross domestic product per capita growth; and GCF, gross capital formation (% GDP); Pop, annual population growth; Inf, inflation; Con, constant.

*** Indicates 1% level of significance; ** indicates 5% level of significance; * indicates significant at 10%.

amd upper-middle income countries. The regression results further show that trade has a positive and significant effect on poverty reduction in only lower-income countries while the effect of trade on poverty reduction is negative and significant in lower-middle and upper-middle income countries.

Summarily, from the results of our empirical analysis, we only find support for hypothesis three.

9. Conclusion and policy recommendations

This study examined the impact of foreign direct investment, foreign aid, and trade on poverty reduction in 29 selected countries in sub-Saharan Africa (SSA) countries for the period of 1990–2017. The study applied the feasible generalized least square (FGLS) technique to carry out the empirical analysis and found that foreign direct investment inflows in SSA countries have not resulted in poverty reduction. Similarly, we also found that foreign aid into SSA has a negative impact on poverty reduction.

Trade, on the other hand, was found to have a positive impact on poverty reduction in SSA. However, the effect of trade on poverty reduction was negative in the lower-middle and upper-middle countries of SSA. The findings of the study also revealed that per capita growth in GDP has a positive impact on poverty reduction in SSA. Further, the outcome of the study revealed that gross domestic investment has a positive and significant impact on poverty reduction. Finally, population growth was found to have a negative effect on poverty reduction presupposing that population increase in the region has exercebate the level of poverty in the reduction.

Although these findings are surprising, they also provide some interesting food for thought and provoke further investigation. As a result of the findings of this study, we provide some conjectures as probable reasons for these results. One, SSA countries may not have succeeded in attracting the substantial FDI that is enough to promote economic development and reduce poverty. Two, given the institutional voids in most SSA countries, the institutional requirements that will translate FDI into poverty reduction are probably missing in many countries. Three, foreign aid received into much of SSA may have been utilized in sectors that have no direct impact on poverty reduction. Multilateral aid has been shown to be better able to reduce poverty than bilateral aid (Alvi & Senbeta, 2012). However, the measure of foreign aid utilized in this study did not differentiate between multi-lateral and unilateral aid. Perhaps, future studies may be able to make this distinction and investigate if the effects of different types of aid on poverty differ between different types of foreign aids. Another limitation of this study was the use of aggregate data for FDI rather than the disaggregated data that shows sectoral inflows. Consequently, we are unable to distinguish the effects of FDI on poverty in

various sectors. Future research may be able to access disaggregated data on sectorial flows and investigate the impact of FDI on poverty in different sectors.

Overall, these results may lay credence to extant research that postulate that some institutional and environmental factors such as strong institutions, deep financial markets and systems are necessary for FDI and aid to reduce poverty (Alfaro et al., 2000; Fowowe & Shuaibu, 2014).

To this end, the study recommends that policymakers in SSA should strategize and enact policies that will encourage substantial inflows of foreign direct investment. There should also be proper accountability and transparency in the usage of the various forms of foreign aid received from international agencies to ensure that aids are judiciously utilized for developmental purpose. Aids should also be channeled into social sectors such as education and health to make more impact on poverty reduction. In conclusion, governments of SSA countries need strenghten institutional frameworks in different economic sectors for more efficiency.

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Notes

1. The countries used for the study include Benin, Botswana, Burundi, Cameroun, Central African Republic, Congo, Cote d'Ivoire, Gabon, Gambia, Ghana, Guinea, Kenya, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South-Africa, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.
2. Low-income countries: Benin, Burundi, Central Africa Republic, Gambia, Guinea, Malawi, Mali, Mozambique, Niger, Rwanda, Tanzania, Togo, and Uganda. Lower-middle income countries: Cameroun, Congo Republic, Cote d'Ivoire, Ghana, Kenya, Mauritania, Nigeria, Senegal, Sudan, Zambia, Zimbabwe. Upper-middle income countries: Botswana, Gabon, Mauritius, Namibia, South-Africa.

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