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Article

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The effect of foreign direct investment on the economic growth of Sub-Saharan African countries: An empirical approach

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Abstract: The impact of foreign direct investment on the host country's economic growth has been a source of debate in past theoretical and empirical investigations. The PMG/ARDL model, which has a practical advantage in examining the effect of foreign direct investment in the short and long run, has received little attention in prior empirical investigations. This study investigates the effect of foreign direct investment on the economic growth of Sub-Saharan African countries. The study examined panel data from 22 nations in Sub-Saharan Africa from 1988 to 2019. The PMG/ARDL model was used to look at the short- and long-term effects of foreign direct investment on economic growth. The panel unit root test and panel co-integration test were employed to improve the model's estimation. According to the findings, in the long run, foreign direct investment has a favorable and significant effect, but it is statistically insignificant in the short run. The study concludes that foreign direct investment boosts long-term economic growth. As a result, countries in Sub-Saharan Africa should focus on attracting foreign direct investment.

Subjects: Regional Development; Economics; Finance

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Belesity Bekalu Ayenew is a lecturer of economics at Salale University. His responsibility at Salale University is providing lecture classes, conducting research, and participating in community services. His research interest includes regional integration, international financial flows, cross-country studies, impact evaluation, development, financial sector development, macroeconomic stability. He has ongoing research works related to international financial flows and impact evaluation.

PUBLIC INTEREST STATEMENT

Nowadays, foreign direct investment is considered as a source of external finance in developing countries. Developing countries are working to attract foreign direct investment due to their expectation on technology transfer, human capital development, job creation, increased competitiveness, and the improvement of export. The effect of foreign direct investment on the economy of the host countries is an active issue for researchers, policymakers, and other stakeholders. This study investigates the effect of foreign direct investment on the economic growth of sub-Saharan African countries in the short run and the long run. The study includes 22 sub-Saharan African countries over the period 1988-2019. The findings of this study show that foreign direct investment boosts long-term economic growth in the sampled countries. Thus, sub-Saharan African countries should focus on attracting foreign direct investment. In addition, countries in Sub-Saharan Africa should identify and address the challenges to foreign direct investment.

Keywords: Foreign direct investment; economic growth; pooled mean group; effect; Sub-Saharan Africa
JEL classification: F21; F43; O40; O47

1. Introduction

According to the world investment report of 2019, foreign direct investment flow into developing countries increased by 2 percent to $706 billion in 2018. Africa has the highest inflow of foreign direct investment among the different regions. In 2018, the flow of foreign direct investment into Africa increased by 11 percent. The reasons for the highest foreign direct investment inflow in Africa are the continued resource-seeking investments, slow expansion of diversified investments in a few economies, and more than double inflow records in South Africa (UNCTAD, 2019).

Over the last few decades, foreign direct investment has been a significant source of external capital in developing countries, especially in SSA (Makiela & Ouattara, 2018). Because of their weaker local capital accumulation and the expectation of a favorable spillover effect, these countries are making a concerted effort to attract foreign direct investment (Farole & Winkler, 2014). Foreign direct investment has the advantage to the economy of the receiving countries through technology transfer, human capital development, job creation, increased competitiveness, and it improves export (Kobrin, 2005; Makiela & Ouattara, 2018; OECD, 2002). However, foreign direct investment may not always be beneficial. Foreign direct investment may hurt the host economy via lowering BOP due to repatriated profits, lack of positive linkage with local enterprises, negative environmental impact, and crowding out domestic investment (Kumar, 1990; Markusen & Venables, 1999; OECD, 2002).

Aside from the theoretical debate, the results of previous empirical studies on the effect of foreign direct investment on economic growth were also controversial. Nketiah-amponsah and Sarpong (2019) employed the GMM approach to study 46 Sub-Saharan African countries. Mohd and Muse (2021) employed VAR to make a study in Ethiopia, and Jugurnath et al. (2016) used GMM to make a study in 32 sub-Saharan African countries. Similarly, Makiela and Ouattara (2018) employed the system GMM, and Joshua et al. (2021) used pooled OLS, fixed effects, random effect, and system GMM in their study in SSA. The preceding studies conclude that foreign direct investment boosts economic growth.

Different factors influence the favorable impact of foreign direct investment on economic growth. Among the several elements, the host country's infrastructure, financial development, and human capital development are critical (Alfaro et al., 2010; Alzaidy et al., 2017; Azman-saini et al., 2010; Borensztein et al., 1998; Nketiah-amponsah & Sarpong, 2019). However, the findings of Katerina et al. (2004) and Herzer et al. (2006) show there is no significant relationship between foreign direct investment and economic growth. The finding of Khobai et al. (2018) showed that foreign direct investment hurts lower extreme quantiles. The short-run result of Dinh et al. (2019) shows that foreign direct investment hurts economic growth.

GMM was used to estimate the results of the majority of earlier studies that used panel data. But the GMM fails to examine the effect of foreign direct investment on economic growth in the long run. According to the researcher's understanding, little consideration is given to PMG/ARDL, although it offers a practical advantage in examining the effect of FDI in the short and long run. The main objective of this study is to investigate the effect of foreign direct investment on economic growth in the short run and in the long run for 22 sub-Saharan African countries over the period 1988–2019. As a result, this study used the PMG/ARDL model to investigate the impact of foreign direct investment on economic growth in the short-run and long-run by employing appropriate tests to assess the validity of the regression output.

The remainder of the paper is structured as follows. The literature review is in section two, the methodology is in section three, the results and discussions are in section four, and the conclusion and recommendations are in section five.

2. Literature review

In many developing countries, foreign direct investment is considered as a source of economic development through its direct and indirect contribution. Foreign direct investment has the advantage of technological spillovers, human capital development, international trade integration, employment creation, and it creates a competitive environment for enterprises (Kobrin, 2005; OECD, 2002). Romer (1993) emphasizes the role of foreign direct investment as a tool to fill the idea gap. Multinational enterprises have the advantage of narrowing the knowledge gap between developed and developing countries by bringing new knowledge to the host country.

In contrast with the above advantages, OECD (2002) raises the drawbacks of foreign direct investment on the domestic economy. Foreign direct investment may deteriorate the BOP of the host country due to repatriated profit, lack of positive linkage with local enterprises, harmful environmental impact, social disruptions, and it may harm competition in the national market. Multinational enterprises may crowd-out domestic investment due to their superiority in technology, capital, and managerial skills over their domestic competitors (Kumar, 1990; Markusen & Venables, 1999).

In addition to the theoretical controversies, the empirical results of previous studies were also mixed. Jugurnath et al. (2016) investigate the impact of foreign direct investment on economic growth in SSA for a panel of 32 countries during the period 2008–2014. Their GMM result shows foreign direct investment has a positive and significant effect on economic growth. By applying the system GMM, Nketiah-amponsah and Sarpong (2019) examined the impact of infrastructure and foreign direct investment on economic growth in SSA. Their findings show that foreign direct investment has a favorable effect on economic growth when interacting with the host country's infrastructure. By employing the system GMM, Makiela and Ouattara (2018) conducted a study based on the sample of developed and developing countries over the period 1970–2007. Their finding shows foreign direct investment has a positive contribution to the economic growth of the host countries. Over the period 1981 to 2017, Mohd and Muse (2021) conducted a study in Ethiopia using the VAR model. According to their findings, foreign direct investment has a beneficial and considerable effect on economic growth both in the short and long run. Similarly, Nguyen (2020) conducted a study on a specific country in Vietnam over a period 1997–2018, and the finding shows foreign direct investment has a positive and significant effect on economic growth.

More importantly, the finding of Alzaidy et al. (2017), studied in Malaysia over the period 1975–2014, and Azman-saini et al. (2010) by using cross country observations from 91 countries over the period 1975–2005 shows that foreign direct investment has a positive and statistically significant effect on economic growth. But the positive impact is determined by the level of financial development. Foreign direct investment benefits countries with higher financial development than weaker financial development. Borensztein et al. (1998) studied the impact of foreign direct investment on economic growth in 69 developing countries from 1970 to 1989. Their finding shows that human capital development plays a critical role in the positive effect of foreign direct investment.

In contrast with the positive and significant effect of foreign direct investment, Katerina et al. (2004) conducted a study on foreign direct investment and economic growth in transition economies by including 17 countries from 1995 to 1998. Their findings show that foreign direct investment and economic growth have no meaningful association. Similarly, Herzer et al. (2006) conducted a study in 28 developing countries using co-integration techniques on a country-by-country basis. Their findings reveal that foreign direct investment has no statistically meaningful

effect on economic growth in the short run for the majority of the countries. Dinh et al. (2019) conducted a study on developing countries from 2000 to 2014 by applying VECM and FMOLS. Their short-run result shows foreign direct investment hurts economic growth, but it has a positive effect in the long run. Khobai et al. (2018) investigate the FDI-growth nexus in South Africa by covering a period 1970–2016 by employing quantile regressions. The findings reveal that foreign direct investment has a negative and substantial effect at the lower extreme quantiles but has no significant influence at the higher quantiles.

3. Methodology

3.1. Data type and source

The study used balanced panel data from 22 countries in Sub-Saharan Africa from 1988 to 2019. All the data were obtained from the world development indicator 2021 database. These 22 countries in Sub-Saharan Africa are chosen based on data availability; the study didn't include countries that lacked complete data on the relevant variables. Thus, countries included in this study are Benin, Botswana, Burkina Faso, Cameroon, Côte d'Ivoire, Eswatini, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Madagascar, Mali, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, and Togo. The study used GDP per capita growth as the dependent variable and foreign direct investment, gross capital formation, trade openness, remittance inflows, and population growth as explanatory variables. Table 1 shows the variable descriptions, measurements, and expected signs.

3.2. Model Specification and Method of Data Analysis

In this study, GDP per capita growth is the function of remittance inflows, foreign direct investment, gross capital formation, trade openness, and population growth. Mean group (MG), dynamic fixed effect (DFE), and pooled mean group (PMG) estimators are available for use in the ARDL model. The study employed PMG/ARDL model as proposed by Pesaran et al. (1999). The reason for selecting this model is because it is compatible with the data set used in this study. The pooled mean group estimator assumes long-run coefficients to be identical but allows short-run coefficients and error variances to differ across groups. It has the practical advantage of allowing data to be determined for each country's short-run dynamics, considering the number of time-series observations available in each case.

But whether there is a significant difference between MG, DFE, and PMG or not should be checked by the Hausman test. Thus, the study employed the Hausman test to select the appropriate estimator. The ARDL (p, q, q … … q) model can have the form;

Table 1. Variable descriptions, measurement, and expected signs

Variables	Description	Measurement	Expected sign
gdppgr	GDP per capita growth rate	%	
fdi	Foreign direct investment	% of GDP	+
gcf	Gross capital formation	% of GDP	+
topnss	Trade openness	% of GDP	+
remit	Remittance inflows	% of GDP	+
popg	Population growth	%	-

Source: Author.

$$y_{it} = \sum_{j=1}^{p} \gamma_{ij} y_{i,t-j} + \sum_{j=0}^{q} \beta'_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (1)$$

Where, t is the period (t = 1,2,3 …… T) and i stands for the country (i = 1,2,3 …… N); X_{it} (k x 1) is the vector of explanatory variables for group i; μ_i is the fixed effect; γ_{ij} is scalar to represent the coefficients of lagged dependent variable; β_{ij} are k x 1 coefficient vectors and ε_{it} is the error term.

The error correction model for the re-parameterized ARDL (p, q, q …… q) can be specified as;

$$\Delta y_{it} = \theta_i \left[y_{i,t-1} - \lambda'_i X_{i,t} \right] + \sum_{j=1}^{p-1} \gamma_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (2)$$

Where, y is the GDP per capita growth rate; X is a set of explanatory variables (foreign direct investment, gross capital formation, trade openness, remittance inflows, and population growth); θ_i represents the coefficient of the speed of adjustment to the long-run status; λ'_i represent the vector of long-run relationships, $\left[y_{i,t-1} - \lambda'_i X_{i,t} \right]$ is the error correction term; γ_{ij} and β'_{ij} are short-run dynamic coefficients.

4. Results and discussions

4.1. Panel unit root test

Before the empirical estimation, it is essential to check whether the included variables are stationary or not. Pesaran et al. (2001) suggest that for the application of PMG/ARDL estimation, variables should be stationary at I(0) and I(1) but not I(2) and above. In this study, Levin, Lin, and Chu (LLC), Im, Pesaran, and Shin (IPS), Augmented-Dickey Fuller (ADF), and Phillip-Perron (PP) tests were employed. As shown in Table 2, except for trade openness, all variables are stationary at level. Thus, GDP per capita growth rate, foreign direct investment, gross capital formation, remittance inflows, and population growth are I(0). However, trade openness is stationary at the first difference. The result of all LLC, IPS, ADF, and PP shows that trade openness is stationary at first difference. Since all the variables are stationary at I(0) and I(1), it is possible to estimate the PMG/ARDL model.

4.2. Panel co-integration test

The panel co-integration test is significant to check whether there is a long-run relationship among the variables or not. The study used Pedroni co-integration test under the null hypothesis of no co-integration. The majority of the results within and between dimensions are significant, as shown in Table 3, rejecting the null hypothesis. As a result, the Pedroni co-integration test reveals a long-term relationship between variables.

4.3. Estimation results and interpretations

Since the important tests were tested, the ARDL model is estimated by using MG, DFE, and PMG estimators. Table 4 summarizes all of the findings. The Hausman specification test was employed to select the appropriate estimator. As shown in Table 4, there are two Hausman test results.

The Hausman test1 was employed to see if the difference between DFE and PMG is significant under the null hypothesis of the PMG estimator. The probability value of 0.3870 shows the acceptance of the null hypothesis. Thus, the Hausman test1 result shows that PMG is better than DFE. Hausman test2 shows the comparison between MG and PMG under the null hypothesis PMG is a good estimator. The probability value of 0.4880 for the Hausman test2 shows that PMG is a good estimator. Therefore, in this study, only the PMG results are interpreted.

Table 2. Panel unit root test result

Variables	Test	LLC	IPS	ADF	PP	Status
gdppgr	At level	−8.299***	−10.577***	203.054***	355.462***	I(0)
fdi	At level	−3.185***	−3.872***	91.07***	150.043***	I(0)
gcf	At level	−2.694***	−3.368***	82.292***	103.868***	I(0)
topnss	At level	−1.104	−1.110	44.205	64.792**	I(1)
topnss	At first difference	−9.222***	−13.770***	263.493***	516.193***	
remit	At level	−4.794***	−2.341***	84.787***	68.867***	I(0)
popg	At level	−10.668***	−14.112***	270.117***	102.242***	I(0)

Note: ** and *** indicates 5% and 1% significance level.

Source: Author's computation.

Table 3. Panel co-integration test result

Tests	Statistic	Prob.	Weighted statistic	Prob.
Within dimension				
Panel v-Statistic	−1.5588	0.9405	−3.7356	0.9999
Panel rho-Statistic	−2.8963	0.0019***	−2.1265	0.0167**
Panel PP-Statistic	−15.6963	0.0000***	−14.8761	0.0000***
Panel ADF-Statistic	−7.2526	0.0000***	−6.6113	0.0000***
Between dimension				
Group rho-Statistic	−1.8081	0.0353		
Group PP-Statistic	−22.4801	0.0000***		
Group ADF-Statistic	−7.4704	0.0000***		

Note: ** and *** indicates 5% and 1% significance level.

Source: Author's computation.

As shown in Table 4, under the PMG result, there are two columns, the long-run and the short-run. At a 1% significance level, the error correction term (ECT) result is significant, indicating that the variables have a long-term association. Any deviation from long-run equilibrium is corrected at 85.9% adjustment speed, as shown by the value of the error correction term −0.859. The PMG result shows, in the short run, there is no significant variable that affects economic growth including, foreign direct investment. The insignificant relationship between foreign direct investment and economic growth in the short run could be due to time requirements. In the long run, foreign direct investment, gross capital formation, and trade openness are the significant variables that affect economic growth positively for sub-Saharan African countries. Since variables in the short run are insignificant, the study doesn't discuss the coefficients for each country. Thus, the study focuses on the long-run results.

In the long run, the variable of interest in this study, foreign direct investment, affects the economic growth of sub-Saharan African countries positively, and it is statistically significant at a 5% significant level. The coefficient of foreign direct investment (0.138), in the long run, shows the increase in

Table 4. Estimation results

	Dynamic fixed effect		Mean group		Pooled mean group	
Variables	**Long run**	**Short run**	**Long run**	**Short run**	**Long run**	**Short run**
ECT		−1.032***		−1.103***		−0.859***
		(0.0383)		(0.0497)		(0.0689)
D.fdi		−0.0856		0.207		−0.0575
		(0.0619)		(0.211)		(0.0936)
D.gcf		0.105**		−0.0254		0.119
		(0.0442)		(0.0814)		(0.0781)
D.topnss		−0.0615***		−0.0429		−0.0450
		(0.0214)		(0.0683)		(0.0506)
D.remit		−0.430**		−0.209		0.0506
		(0.208)		(1.186)		(1.279)
D.popg		0.0174		10.31		5.141
		(0.337)		(6.840)		(3.938)
fdi	0.106		−0.359*		0.138**	
	(0.0725)		(0.214)		(0.0673)	
gcf	0.0902***		0.219***		0.0992***	
	(0.0313)		(0.0766)		(0.0313)	
topnss	−0.00170		0.0273		0.0287**	
	(0.0113)		(0.0309)		(0.0132)	
remit	0.168*		0.0767		−0.0102	
	(0.100)		(0.401)		(0.0647)	
popg	0.464**		0.601		0.137	
	(0.202)		(1.974)		(0.209)	
Constant		−2.185**		−5.571		−2.434***

(*Continued*)

Table4. (*Continued*)

	Dynamic fixed effect		Mean group		Pooled mean group	
Variables	**Long run**	**Short run**	**Long run**	**Short run**	**Long run**	**Short run**
		(1.027)		(4.748)		(0.322)
Observations	.	.	682	682	682	682
Hausman test1	Prob>chi2 = 0.3870					
Hausman test2	Prob>chi2 = 0.4880					

Standard errors in parentheses.

Note: *** p < 0.01, ** p < 0.05, * p < 0.1 indicates 1%, 5% and 10% significance level respectively.

Source: Author's computation.

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foreign direct investment by 1% results in increasing economic growth of sub-Saharan African countries by 0.138%. The positive and significant results could arise from the positive spillover effect of foreign direct investment in sub-Saharan economies. This result is going in line with the findings of Nketiah-amponsah and Sarpong (2019), Katerina et al. (2004), Jugurnath et al. (2016), and Joshua et al. (2021), in which their finding concludes that foreign direct investment has a positive effect on economic growth. The positive and statistically significant value of foreign direct investment contradicts the findings of Khobai et al. (2018), in which their result shows that foreign direct investment retards economic growth.

The other control variables in this study are gross capital formation, trade openness, remittance inflows, and population growth. The result of Table 4 shows that remittance inflows and population growth are statistically insignificant to affect economic growth. Gross capital formation and trade openness are statistically significant, at 1% and 5% significance levels, respectively. The positive coefficient of gross capital formation (0.099) shows that a 1% increase in gross capital formation increases economic growth by 0.099%. The result confirms the finding of Bal et al. (2016) and Pasara and Garidzirai (2020), in which gross capital formation has a positive effect on economic growth. The positive coefficient of trade openness (0.0287) indicates that if trade openness grows by 1%, economic growth in Sub-Saharan African countries increases by 0.0287 percent. This result supports the studies conducted by Malefane and Camarero (2020), Keho (2017), and Victor (2019), in which their results conclude trade openness increases economic growth.

5. Conclusion and recommendation

This study examined the effect of foreign direct investment on the economic growth of sub-Saharan African countries. The study used balanced panel data from 22 countries in Sub-Saharan Africa from 1988 to 2019. The study employed pooled mean group estimator to estimate the ARDL model because it offers the advantage of investigating the effect of foreign direct investment on economic growth in the short run and long run. The study employed a panel unit root test and panel co-integration test to check the stationarity of variables and the long-run relationship with variables, respectively.

The estimation result of this study shows that foreign direct investment has a positive and statistically significant effect on economic growth in the long run. However, it is statistically insignificant in the short run. In the long run, the increase in foreign direct investment by 1% results in increasing economic growth of sub-Saharan African countries by 0.138%. In addition, gross capital formation and trade openness have positive and statistical significance in the long run. In the short run, foreign direct investment, gross capital formation, trade openness, remittance inflows, and population growth are statistically insignificant. Thus, the study concludes that foreign direct investment has a positive and significant effect in the long run only.

The study recommends sub-Saharan African countries should work more to attract foreign direct investment. Subsidies, infrastructure development, and a stable political environment are the ways for the countries to attract foreign direct investment. These countries should identify the challenges of foreign direct investment and minimize them. In addition, they should identify the positive spillover channels and work on them. Such measurement helps sub-Saharan African countries to have a positive and significant effect of foreign direct investment on economic growth in the short run. This study didn't discuss the challenges and spillover channels of foreign direct investment. As a result, this study suggested that future studies should be conducted to identify the challenges and positive spillover channels of foreign direct investment in the host countries.

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