IMPACT OF FOREIGN DIRECT INVESTMENT INFLOW ON ECONOMIC GROWTH OF SUB-SAHARAN AFRICAN COUNTRIES

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ABSTRACT
This study examines the impact of FDI Inflow and Economic Growth of Sub-Saharan African Countries over the period 1981–2021. The objective of the study is to examine the impact of foreign direct investment inflow on economic growth of Sub-Saharan African countries. To achieve these objectives, Panel Autoregressive Distributed Lag (ARDL) was used. The results revealed that FDI and have a positive and significant long run impact on economic growth in sub-Saharan African countries. The short-run country-wise result revealed that FDI is positively related to economic in all the selected countries. The study therefore recommended that SSA countries should formulate more FDI-led policies and structural reforms that would encourage the openness of their economy in order attract more FDI and promote larger economic growth.
Keywords: FDI inflow, Economic growth, Sub-Saharan Africa.
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1 INTRODUCTION
One of the major contributors to economic growth in recent decades is the inflow of FDI to developing countries. Economic growth and its determinants have continued to receive attention from researchers, scholars and policy makers around the globe. This made scholars and researchers worldwide to embark on exploring the field of economic growth in order to improve the growth prospects of economies. Economic growth is thus important for the survival and development of modern economies. (Acemoglu, 2009; and Farmer, 1997). With the acceleration of economic globalization and financial market integration, there has been a gradual increase in the amount of international capital and considerable global movement of capital flow. This upsurge in international capital flows, despite a temporary contraction during the global crisis, has motivated policy discussions on the associated benefits and costs of capital mobility. International capital flows have an enormous impact on national development for countries all over the world.
After the liberalization of external accounts, however, capital flows in terms of FDI to developing countries has increase, the growth of the economy in developing countries has however, not kept pace. Trade liberalization is a key economic reform policy and institutional change adopted by most countries of the world to stimulates the overall growth of its trade with international community. Trade openness aims at liberalization of the economy as well as achievement of greater openness and greater integration of the world economy (Harberzar,2014).

Over the past two decades Foreign Direct Investment (FDI) has become a vital source of funding and economic development for the African continent, increasing from approximately US$6 billion in 1995 to US$72.2 billion in 2008. However, FDI remained concentrated in

resource extraction. The global financial and economic crisis also dampened global investment flows into Africa. After the record high of 2008, the continent saw its FDI inflows fall to US$58.6 billion in 2009. This marked the end of six years of consecutive increases in FDI flows to Africa. Total investment as a percentage of GDP has remained stable in Africa in recent years: it slightly increased in relative terms, from 19.1% in 2005 to 21.6% of GDP in 2008, UNCTAD 2010.

From 5.5% of annual GDP growth between 2005 and 2008, Africa's economies grew only 2.4% in 2009. However, the UN projects a healthier growth rate of 4.7% in 2010, signaling a relatively rapid recovery from the crisis. On a country level, Africa boasts some of the worlds' biggest growth success stories. Over the last ten years, no fewer than six of the world's ten fastest-growing economies were in Sub-Saharan Africa (UNCTAD 2010). Growth in SSA is projected to firm slightly during the forecast horizon, to 3.6 percent in 2022 and 3.8 percent in 2023. This outlook is nearly a full percentage point below the 2000-19 average, however, reflecting the continued effects of the pandemic, reduced policy support, and policy uncertainty and worsening security situation in some countries. Growth in the three largest SSA economies—Angola, Nigeria, and South Africa—was an estimated 3.1 percent in 2021, an upward revision from previous estimates. In Angola and Nigeria, growth was driven by the recovery in non-oil sectors; oil production across the region remained below pre-pandemic levels because of disruptions in maintenance work and declining investment in extractive industries. In South Africa, a strong rebound earlier in the year was disrupted by severe COVID-19 outbreaks, social unrest, and power shortages. In Morocco, after an unprecedented shock in 2020, Morocco is entering a phase of normalization as the COVID-19 eases. Monetary policy continues to support the recovery with central bank injection increasing in the third quarter of the 2021, GDP growth is expected to slow to 3.2 percent in 2022. In Ghana as of 2021, the GDP at constant prices reached 66.15 billion us dollar, this continue the upward trend since 2020 when the GDP stood at 35.7 billion US dollar. Elsewhere in the region, growth in non-oil commodity exporters was supported by surging prices of metals and food commodities; meanwhile, disruptions to international travel and tourism continued to weigh on recoveries in tourism-reliant countries (Namibia, Seychelles) (World Bank 2021).

Although there has been some progress in the development of SSA countries between 2001 and 2021, the rate of real GDP growth is still slow and compare to other sister developing regions. For instance, the level of income remains still very low. It has therefore become important to determine the best way of raising the GDP growth and the level of income in order to compete with other regions of the world in terms of GDP growth. This leads to several questions that need to be answered such as what are the factors that determine economic growth of these regions? And if foreign direct investment is one of them, how much does it contribute to the economic growth of Sub-Saharan Africa. If FDI is not significant what is the contributions of other factors to economic growth of this region?

In the face of this challenge, the region has made efforts to increase investment in the continent, and much of it has been geared toward attracting FDI. Most African countries have improved the climate for business operation within their economies by increasing political and economic stability, and by implementing policies designed to attract more FDI. The African Union (AU) formed the Private Sector Development, Investment and Resource Mobilization Division, and all the regional economic blocs have investment initiatives. As a whole, the continent has also launched the New Partnership for African Development (NEPAD), which, according to Funke and Nsouli (2003), has the intensification of FDI flow towards the region as one of its key objectives.

Commitment to policy changes may also affect FDI flows. The past few years have witnessed more restrictive foreign direct investment policy measures being adopted by advanced economies while many developing countries have continued to adopt measures that facilitate

or even liberalize FDI. These policies ranges from those affecting investor entry and establishment, corporate tax incentives, investment disputes, and investment conflict prevention (World Bank, 2023). Adopting domestic policies that involve open market and trade liberalization tend to increase FDI inflow (Asiedu 2002). With such a broad spectrum of findings related to the relationship between foreign direct investment and economic growth, this study endeavors to add to the literature on foreign direct investment growth relation by deeply exploring and complementing the existing debate. Since there is no single consensus among scholars on whether foreign direct investment spurs economic growth in sub-Saharan African countries or not. For example, Tijjani . et al. (2024), shows that FDI do not contribute to economic growth in sub-Saharan Africa while Edward N and Bernard (2019) revealed that FDI promote economic growth of Sub-Saharan African countries.

2. LITERATURE REVIEW

The neoclassical growth theory explained how an economy could achieve a steady growth rate with an appropriate mix of capital, technology and labour. It states that an equilibrium position would be achieved by adjusting the amount of capital and labour in a production function. It also identifies technological change as a significant factor in influencing economic growth, and without technological advancement, economic growth cannot be achieved (Solow, 1956).

According to Solow (1956), a developing economy that successfully increases it's saving (investment) rate will have a higher output level than if it had not done so, and must grow faster for a while. But it will not achieve a permanently higher rate of growth of output. More precisely: the permanent growth rate per unit of labour input is independent of the saving (investment) rate. It depends entirely on the rate of technological progress in the broadest sense. The potential contribution of FDI to growth depends strictly on the circumstances in the recipient countries. Certain host country conditions are necessary to facilitate the spillover effects.

Dynamic Macroeconomic Theory (Sanjaya Lall 1997) stated that the timing of investments depends on the changes in the macroeconomic environment; these macroeconomic environments consist of GDP, domestic investment, real exchange rate, productivity and openness which are the determinants of FDI flows. As per this theory, FDIs are a long-term function of multinationals strategies.

Bazán (2022) estimate the dynamic impacts of foreign direct investments (FDI) and exports on economic growth in Peru for the period 1970–2020 using annual series. Autoregressive distributed lag cointegration bound test and granger causality was employed. The findings shows that the change in exports does not affect GDP, and the effect of FDI on GDP can be positive or negative depending on the comparison between the slopes of the IS and LM curves.

Vitalis and Onyia (2022) examined the impact of foreign direct Investment (FDI) on economic growth in Nigeria for the period covering 2000 to 2020. The study adopted multiple regression of the Ordinary Least Squared technique. Findings of the study reveal that a long run relationship exists among the variables. Also, the major finding of the study showed that FDI has a significant positive effect on GDP (economic growth) in Nigeria.

Laurence A. A. et al. (2019) investigates the role of institutions as an interactive factor in the FDI, trade and growth nexus in sub-Saharan Africa (SSA). We use the Structural Equation Modelling (SEM) technique with data from 34 SSA countries covering the period 1996–2016. We find evidence of a decreasing effect of FDI on economic growth, which increases monotonically without institutions in SSA.

George and Odongo (2022) examine the effects of Foreign Direct Investment (FDI), and the mediating role of FDI absorptive capacity, on economic growth in Sub-Saharan Africa for the period of 1993–2015. Using fixed effect estimation, the finding revealed that FDI coefficient

estimates below the lowest threshold level are negative, implying that the higher costs of such incentives exceed the potential benefits availed by FDI's direct contribution to economic output and spillovers

Andrew et al. (2022) Autoregressive Distributive Lag (ARDL) technique to examine the long-run cointegrating relationship for the period 1981-2018. Autoregressive Distributive Lag (ARDL) technique. Was employed, and a long-run relationship was confirmed among exchange rate, foreign direct investment and economic growth. From the findings, foreign direct investment contributes positively to economic growth, while the speed of adjustment is 78.46% and significant**.**

Edward and Bernard (2019) examine the effect of infrastructure and foreign direct investment (FDI) on economic growth in Sub-Saharan Africa (SSA) using panel data on 46 countries covering the period 2003– 2017. The data were analyzed using fixed effects, random effects, and system generalized method of moments (GMM) estimation techniques. Based on the system GMM estimates, FDI proved to be growth enhancing only when interacted with infrastructure. The interactive effect of FDI and infrastructure improves economic growth by 0.016 percent.

Udi et al (2021) ascertains the impact of FDI inflows and external debt on economic growth for SSA for the period of 1990 to 2018. The mixed order of integration from the stationarity test underpins the adoption of autoregressive distributed lag (ARDL) approach. The empirical results found that FDI inflows play a crucial role in achieving economic expansion in the region.

Gokmen (2021) examines the relationship between net FDI inflows and real GDP for Turkey from 1970 to 2019. Employing the Vector Error Correction Model, Granger Causality, Impulse Response Functions and Variance Decomposition. The results indicate that there is a uni-directional significant short-run positive effect of real GDP on net FDI inflows to Turkey.

Djokoto (2021) investigates the effect of FDI on Domestic Investment in the food manufacturing sector for developing economies in transition and developed countries from 1993 to 2016. Using the system generalized method of moments (GMM). The findings revealed that Developed economies experienced a crowd-out effect of FDI on Domestic investment in the short run.

Ozge and Akin (2020) questions the existence of the crowding-out effect by using data from Eastern European Countries, including Romania, the Russian Federation, Moldova, Poland, Bulgaria, Hungary, Slovak Republic, Ukraine. With this aim, and panel data analysis are implemented. Results obtained were consistent with theoretical expectations and showed that FDI had a crowding-out effect in the short run but, in the long run, a crowding-in impact on domestic investment.

Isaac and Simplice (2021) we examine how FDI modulates the effects of various governance dynamics on inclusive growth in SSA by testing a hypotheses to see whether these governance dynamics engender positive synergy with FDI on inclusive growth in SSA. Using several fixed effects, random effects, and the system GMM estimators for the analysis. The findings show that FDI is a significant inclusive growth enhancers in SSA.

Sohail1 and Saima (2020) investigated the impact of Foreign Direct Investment on Economic Growth of Pakistan for the period 1996 to 2015. Correlation matrix and regression analysis have been used. The result shows that there is a significant relationship between foreign direct investment and gross domestic product of the country.

Mboko Ibara (2020). analyze the role played by human capital in the relationship of foreign direct investment (FDI) and economic growth in the Central African Economic and Monetary Community (CEMAC) for the period 1970 – 2019. The generalized method of moments (GMM) in a dynamic panel system proposed by Blundell et al. (2012). The findings revealed

that human capital in the CEMAC zone contributes significantly to improving the FDI-economic growth relationship.

Ijirshar *et al*. (2019) examine the growth-differential effects of domestic investment and foreign direct investment in Africa. They paper employs dynamic panel models; pooled mean group (pmg) and mean group (mg) estimators to assess the growth-differential effects of foreign Direct Investment (FDI) and Domestic Investment (DI) among 41 selected African countries from 1970 to 2017. The study found that FDI and DI are important grease for growth of African countries in the long-run.

Trang (2019) examines and provides additional and relevant quantitative evidence on the impact of foreign direct investment (FDI) on economic growth, both in the short run and the long run in developing countries of the lower-middle-income group for 2000–2014. Johansen cointegration test, Vector Error Correction Model (VECM), and Fully Modified OLS (FMOLS. The results of the study show that FDI helps stimulate economic growth in the long run, although it has a negative impact in the short run for the countries studied.

Phuyal and Sunuwar (2018) examine the sector wise effects of FDI on economic growth in Nepal represented by gross domestic product (GDP) and FDI as dependent and independent variables respectively, thereby identifying the direct effect of FDI on GDP using 10 years (2007 to 2016) sectoral data as main source of the information. The entire result of the inferential analysis predicts that FDI of industry, tourism and agriculture sectors have a very positive and significant impact on GDP during the stipulated timeframe.

Shehu and Bello (2022) examine the relationship between foreign direct investment (FDI) and economic growth in Nigeria for the 1990 to 2020. Their paper utilized the auto-regressive distributed lag (ARDL) model. The findings revealed the existence of long-run relationship between the independent and dependent variables with foreign direct investment having a positive influence. The empirical findings from a pair-wise Granger-causality model showed the existence of a bidirectional relationship between FDI and economic growth.

Tijani et al. (2024) examine the contribution of financing investment development in Sub-Saharan African countries. Using the financial determinants of GDP, a model was developed based on the method of least squares employing data covering 2004–2018. It was revealed that both foreign direct investment and official development assistance (ODA) were found to be ineffective in promoting development, and this is attributable to its investment model (resource-seeking) and the conditions under ODA financing, respectively, in the region.

Henri (2018) investigates the long-run and short-run effects of foreign direct investment (FDI), foreign aid and migrant remittances on economic growth in 36 African countries over the period 1980–2016. Based on Pooled Mean Group (PMG) approach. The findings revealed the following; there is a positive and significant long-run relationship between foreign direct investment and economic growth in Africa as a whole.

3. METHODOLOGY

3.1 Sources of Data

Secondary data sources are utilized in this study. The data covers the annual panel data set from 1980 to 2021 for all the sample countries (N = 5). The countries are Nigeria, Ghana, South Africa, Morocco and Kenya. The choice of countries was determined primarily by the availability of data and also by categorization, in the sense that, three each were chosen from the four sub region within Africa, that is west Africa, north Africa, south Africa, and east Africa respectively. The choice of period is premised on the fact that virtually all these countries started economic reform programme during this period. The source of the data are the World Bank (Development Indicators) and African Development Bank (Development Outlook). All

the data were accessed through internet on their respective websites. The variables used in the model are measured as follows: we used economic growth proxied by real GDP per capita as the dependent variable. The independent variables include FDI measured as the net inflow of foreign direct investment and domestic investment proxied by gross capital formation. Moreover, in order to control for other factors that may affect productivity, we included variables like the exchange rate, and government expenditure. All the variables used are measure in million USD.

3.2 Model specifications

Following the established practice in the literature and the theoretical framework, in examining the relationship between FDI and economic growth. FDI can be analytically linked to growth through a differentiated impact of FDI on productivity of domestic capital, through the transmission of superior technology. Solow augmented neo-classical model is adopted as the theoretical framework and the equation to be estimated is similar to the one of Borensztein et al. (1998) and Nam and Quynh (2015) with some modification. In the spirit of Borenztein et al (1998) the analytical framework that links FDI to economic growth can be analyzed via the following formulation:

$G = c_0 + c_1 FDI + c_0 FDI \times H + c_3 H + c_4 Y_0 + c_5 A$ …… 3.1

Where, FDI is foreign direct investment, H the stock of human capital, Y_0 initial GDP per capita, and A is a set of other variables that affect economic growth. The variable FDI is measured as a ratio to GDP, and is conceptually analogous to the fraction of goods produced by foreign firms in the model. The group of variables *A* comprises the control and policy variables that are frequently included as determinants of growth.

The current model follows this approach in examining the impact of FDI on economic growth in five selected Sub-Saharan African countries from 1980 to 2020. The functional form of the model for the current study is modified to include trade openness as proxy for trade liberalization while exchange was included to serve as a controlled variable. Therefore, the econometric specification of the equation is written as:

$log\ GDPPC\ it = \beta 0 + \beta 1 logFDIit, + \beta 2 logDIit, + \beta 3 logGE + \beta 3 logEXRit + \mu it)$…….
(3.2)

where logGDPPC represents economic growth, logFDI denotes foreign direct investment, logDI represent domestic investment (proxy by gross fixed capital formation) and logGE stands for government expenditure. All the variableswere logged as a result of their highly skewed values. The priori expectations, logFDI, logDI and logGE are expected to positively influence economic growth. While logEXR are expected to inversely affect economic growth.

3.3 Panel Unit Root Test

The purpose of unit root test is to confirm the nature of the variables before the actual analysis. The rationale for testing data for stationarity is to be sure that there is form of shock that would throw the series out of its long-term equilibrium. Hence, Levin, Lin and Chu (LLC) test, ImPesaran and Shin (IPS). Will be used in this study.

3.3.1 Levin, Lin and Chu (LLC) test

The first generationpanel unit root test was coined by Levinand Lin in 1992 and published in a working paper in 2002 with Chu as co-author. The test relies on the t-stattistics estimated and is powerful compare to when individual observation unit root is estimated as β is homogenous across all regions of the panel (Levin et al., 2002). The LLC test is an extension of the Dickey Fuller/Augmented Dickey Fuller unit root test. The test is express in the following equation;

$$\Delta z_{i,t} = \phi_i + \beta_{iyi,t-1} + \sum_{k=1}^{n} k_i \Delta y_{i,t-k} + \varepsilon_{it} \quad \text{……..} \qquad (3.3)$$

Where, Δ represent the first difference operator, Z_{it} is the individual cointry, t is the time period and is given as t = 1, 2, 3,…T
The null and the alternative hypothesis are as follows

$H_0 : \beta_1 = 0$ for all countries i

$H_1 : \beta_1 < 0$ for all countries, i

Hence the null for this test is that all series are nonstationary and for the alternative all series are stationary.

3.3.2 ImPesaran and Shin (IPS, 2003) Test
This was presented by IPS to solve the problem of serial correlation by assuming heterogeneity between units in panel that are dynamic. The basic equation for the IPS panel unit root test is given as follows:

$$\Delta Y_{i,t} = \pi_i + \beta_i Y_{i,t-1} + \sum_{k=1}^{n} k_i \Delta y_{i,t-k} + \alpha_{it} + \varepsilon_{it} \quad \text{.....(3.4)}$$

The hypotheses are given as:

$H_0 : \lambda_1 = 0$ β_i for all i

$H_0 : \lambda_1 < 0$ β_i for at least one i

The null hypotheses of this test is that all series are not stationary while the alter hypothesis is that all series are stationary where i = 1,2…N which is the entity t = 1,2…N which stand for the period. Δ is the difference operator Y is a variable, β, α, π are co-eficients and μ is the error term. The IPS test apply individual unit root in each cross section.

3.4 Panel Autoregressive Distributed Lag (PLARDL) Model
The symmetric ARDL version presented by Pesaran et al. (1996) and Pesaran et al. (2001). What this means is that the linear ARDL should be estimated in this analyses to determine the linear effect of foreign direct investment on economic growth of the selected economies in Sub-saharan African countries. The linear panel ARDL representation is written as follows, as stated by Pesaran et al. (2001):

$$\begin{aligned}\Delta \log GDPPC_{it} = {} & \beta_{0i} + \beta_{1i} \log GDPPC_{i,t-1} + \beta_{2i} \log FDI_{i,t-1} + \beta_{3i} \log DI_{i,t-1} \\ & + \beta_{4i} \log GE_{i,t-1} + \beta_{5i} \log EXR_{i,t-1} + \sum_{j=1}^{p1} \phi_{ij} \Delta \log RGDPC_{i,t-j} \\ & + \sum_{j=1}^{p2} \phi_{ij} \Delta \log FDI_{i,t-j} + \sum_{j=1}^{p3} \phi_{ij} \Delta \log DI_{i,t-j} \\ & + \sum_{j=1}^{p4} \phi_{ij} \Delta \log GE_{i,t-j} + \sum_{j=1}^{p5} \phi_{ij} \Delta \log EXR_{i,t-j} \\ & + \mu_{it}\end{aligned}$$

…… (3.5)
Where Δ is the first difference operator, $\beta 0i$ is a constant, ϕij (s =1, 2, 3, 4, 5) are the short-run
Coefficients, βki (k =1,2,3,4,5) are the long-run coefficients and μit is an error term. The optimal lag orders on the first-differenced variables are selected according to the Schwarz

information criterion (SIC) or the Akaike information criterion (AIC). The linear equation could be re-formulated to include an error correction term as follows:

$$\Delta \log GDPPC_{it} = \beta_{0i} + \sum_{j=1}^{p1} \rho_{ij} \Delta \log GDPPC_{i,t-j} + \sum_{j=1}^{p2} \varphi_{ij} \Delta \log FDI_{i,t-j} + \sum_{j=1}^{p3} \phi_{ij} \Delta \log DI_{i,t-j} + \sum_{j=1}^{p4} \sigma_{ij} \Delta \log GE_{i,t-j} + \sum_{j=1}^{p5} \sigma_{ij} \Delta \log EXR_{i,t-j} + \lambda ECT_{i,-j} + \mu_{it}$$

……(3.6)

where the $ECTi,-j$denotes the symmetric error correction term for each unit derived from the long-run relationship. The parameter λ measures the error-correcting speed of adjustment of the model to long run equilibrium for each unit derived.

4.0 DATA PRESENTATION, INTERPRETATION AND ANALYSIS

4.1 Panel Unit Root Test

Before Proceeding with the real panel ARDL estimation, we decided to test the nature and order of the variables included in the study by employing the different types panel unit root tests: Levin, Lin and Chu (LLC) test, Im Pesaran and Shin (IPS) Panel unit root test were used to test for the order of the integration of the variables. The result for these tests are reported on table 4.2 below. Based on the LLC test results, the test shows that logGDPPC FDI, logDI and logGEare stationary at level (I0) whereas logEXR, is stationary at first difference. However, under the IPS test only EXR is stationary at first difference while FDI, logGE, logGDPPC, logDI are all stationary at level. With these mixture in the order of the variables, the use of the panel ARDL has therefore been validated.

Table 4.1 Panel Unit Root Test

Variables	LLC		IPS	
	Intercept	Intercept + Trend	Intercept	Intercept + Trend
At Level				
FDI	-5.1483 (0.0057)**	-6.7064 (0.0217)**	-4.9561 (0.0000)***	-5.7468 (0.0000)***
EXR	-0.4533 (0.9855)	-3.7457 (0.3387)	3.6994 (0.9999)	-0.5516 (0.6955)
LogGE	-0.9656 (0.6043)	-6.2521 (0.0208)**	3.6647 (0.9999)	-1.8714 (0.0306)**
LogDI	-1.2825 (0.7636)	-5.6394 (0.0462)**	2.5532 (0.9947)	-2.3842 (0.0086)***
LogGDPPC	0.6224 (0.8621)	-3.8824 (0.6004)	0.3868 (1.0000)	-2.6255 (0.0108)
At First Difference				
LogGDP	-9.2395 (0.0000)***	-9.3697 (0.0000)***	-6.8790 (0.0000)***	-6.6637 (0.0000)***
FDI	-13.3873 (0.0000)***	-13.5249 (0.0000)***	-10.0297 (0.0000)***	-9.5659 (0.0000)***
EXR	-8.5298 (0.0009)***	-9.5193 (0.0428)**	-6.6637 (0.0000)***	-5.1115 (0.0000)***
LogGE	-10.1722	-10.2227	-6.9122	-6.8493

	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
LogDI	-9.0589 (0.0000)***	-9.7589 (0.0001)***	-7.7852 (0.0000)***	-7.4528 (0.0000)***
LogGDPPC	-9.9905 (0.0000)***	-20.0485 (0.0000)***	-5.8479 (0.0000)***	-5.9696 (0.0000)***

Source: Researcher`s computation using Stata software 15 (2023). ***, ** and * indicate significance at 1%, 5% and 10% level respectively.

4.2 Lag selection Criteria

To estimate the Panel Autoregressive Distributed Lag (p,q,q,q) econometric model, we first of all have to need to observed and estimate the optimal lag length. We therefore use the Akaike information criterion (AIC) to determine the optimal lag structure. The optimal model is the one with the smallest value of AIC. The Optimal lag selection using Akaike information criterion (AIC) are as follows; LogGDPPC1, logFDI 2, LogDI 1, LogGE 1 and logEXR 1.Table 4.4 present the optimal lag selection order for AIC. As presented on the table ARDL (1 2 1 1 1) has the smallest value of AIC and therefore is the most appropriate model for this study.

Table 4.2 Lag Selection Criteria

Variables	Optimum Lag
logGDPPC1	
logFDI	2
logDI	1
logGE	1
logEXR	1

Source: Researcher`s computation using Stata 15 (2023).

4.3 Panel Results for Panel ARDL

The use of Panel ARDL was justified by the mixture of the integration among the variables of the study. The model was therefore employed to examine impacts of foreign direct investment on the economic growth of five selected sub-Saharan African countries. The panel ARDL model specified in equation (3.4) and (3.5) were estimated using Pooled Mean Group (PMG) and Mean Group (MG) estimators to estimate both long-run and the short-run coefficients. As express from table 4.5 above, Hausman Test probability value of 0.9875 is not significant this means that, we cannot reject the null hypothesis that PMG is the most preferred estimator. This suggest that Pooled Mean Group (PMG) is more efficient and is preferred over the Mean Group (MG). This study will therefore utilize Pooled Mean Group (PMG) as the method of analysis

From the table, the coefficient of error correction term is negative and statistically significant at 1% level of significant. This is also in line with theoretical expectation. This has proved the existence of long run relationship between logGDP, logFDI, logDI logGE and logEXR in the selected Sub-Saharan African countries. The disequilibrium from the short-run is adjusted at the speed of 0.13% every year until the long-run equilibrium.

Evidence from the respective coefficients of the explanatory variables explain their relationship with the dependent variable. The ARDL-Pooled Mean Group estimator revealed that, foreign direct investment, domestic investment government expenditure and exchange rateare all positively and statistically significant at1% 1% 5% and1% level of significant respectively which is in conformity with the priori expectation of the study. This means thatforeign direct investment haspositive long run impact on the economic growth of the selected sub-Saharan African countries. This is also in line with the endogenous growth theory which spell out that

foreign direct investment contributes to economic growth by improving the productivity of domestic firms through the transfer of modern technology. The result implies that a unit increase in foreign direct investment domestic investment government expenditure will grow the sub-Saharan African economy by US$0.047 million.

On the other hand, domestic investment government expenditure exhibits a positive and statistically significant relationship with economic growth at 1% and 4% respective level of significant. This is in line with the priori expectation hence a one unit increase in government expenditure will bring about an US$0.042 million change in economic growth of the selected SSA countries, while a one unit increase in domestic investment will increase economic growth by US$0.11 million.

On the other hand, the PMG short-run coefficients show that foreign direct investment have positive impact on economic growth but not statistically significant.

Table 4.3 Panel Results for Panel ARDL

Dependent Variable Log of Real Gross Domestic Product (GDPPC)				
	Pooled Mean Group (PMG)		**Mean Group (MG)**	
Independent Variables	**Long-run coefficients**	**Short-run coefficients**	**Long-run coefficients**	**Short-run coefficients**
logFDI	0.04784	-0.0021		
	(0.001)***	(0.090)*		
logDI	0.1117	0.1186		
	(0.001)***	(0.382)		
logGE	0.0427	0.1196		
	(0.040)**	(0.318)		
LogEXR	0.0526	0.1053		
	(0.000)***	(0.066)*		
ΔFDI			0.0080	0.0020
			(0.541)	(0.441)
ΔlogDI			-0.0665	0.0429
			(0.045)**	
(0.019)**				
ΔlogGE			0.9312	0.0407
			(0.051) *	(0.266)
LogEXR			0.1119	0.0855
			(0.119)	(0.113)
ect			-0.1310	-0.3016
			(0.001)***	
(0.004)***				
Hausman Test		0.33(0.9875)		
No. of Observations		193		
Number of Countries		5		
Tests		VIF	Prob.	
logGE		2.38		
logDI		3.59		

logFDI	2.62	
logEXR	1.30	
Pesaran CSD Test		0.129(0.8971)
Breusch Pagan test for Heteros.		0.52 (0.4702)
Durbin Watson Test for Autocor.		1.6376

Source: Researcher`s computation using "PMG" package in Stata software 15(2023). Figures in parenthesis are probability values together with the associated coefficients, ***, ** and * indicate significance at 1%, 5% and 10% level respectively

The diagnostic test is utilized to examine the model's adequacy, tests such as cross-sectional dependency test (CSD), multicollinearity, and heteroscedasticity test. The literature offers a variety of cross-sectional dependency test. The study applied one of the most current and frequently used tests: Pesaran CD test. The result of the test indicated that there is no cross-sectional dependence among the observed variables. If the value of the VIF is greater than ten it shows the presence of multicollinearity, however if the value of the VIF is less than ten, it indicates the absence of multicollinearity. the results illustrate that the model is free from heteroscedasticity issues utilizing the Breusch-Pagan test, which reveals an insignificant value at 0.4702. Durbin Watson Test for Autocorrelation has also been estimated and it was found that the estimate is free from autocorrelation

5. CONCLUSION AND RECOMMENDATIONS

This study examines the effects of foreign direct investment and economic growth of sub-Saharan African countries over the period 1981 to 2021. The study attempts to achieved the following objective; to examine the effects of foreign direct investment inflow on economic growth of Sub-Saharan African countries, the objective is achieved by using the Panel Autoregressive Distributed Lag (PARDL). The sample size of the study consists of 5 selected Sub-Saharan African countries these are Ghana, Nigeria, Kenya, Morocco and South Africa.

The results indicate that foreign direct investment have a significant positive long run impact on economic of Sub-Saharan Africa countries. This finding is in line with finding from Edward and Bernard (2019) Udi et al (2021) Trang (2020), and Henry Njangan (2018) who found foreign direct investment impacting economic growth in SSA. However, the study contradicts the findings of Tijjani et al. (2024), Agbloyo et al (2016), George and Odongo (2022) Who found that foreign direct investment does not contribute to the economic growth of SSA countries.

Given the major findings of the study and the conclusion, some recommendations are presented to help policy makers in policy formulation in Sub-Saharan Africa.

(i) Based on the result that foreign direct investment has apositive long-run effect on economic growth in sub-Saharan African countries. It is therefore recommended that; sub-Saharan African countries should formulate more FDI-led polices to continue to attract more FDI and ensurea higher degree of capital formation through increase government spending into the economy of their countries so as to promote higher economic growth.

(ii) Foreign investors are likely to invest more in countries that have their boarders open for trade than a closed boarder economy. Sub-Saharan African countries should vigorously pursue trade liberalization policy as a potent and deliberate effort to attract FDI inflows since this will create a positive impact on the economies of Sub-Saharan Africa in a way that does not interfere with the development of the domestic economy.

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