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Economic Growth, Foreign Direct Investments and Official Development Assistance Nexus: Panel ARDL Approach

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Abstract: Scholars and practitioners are torn between diverging viewpoints on the contribution of foreign assistance and foreign direct investment to the economic development, economic growth, and prosperity of Africa. This paper aims to examine the long-term and causal relationship between foreign direct investment, official development assistance, and economic growth for 20 selected African countries from 2000–2018. Autoregressive distributed lags and the error correction model were used as the primary estimation techniques. The results indicated a notable positive long-term cointegrating relationship between official development assistance and economic growth, and between economic growth and foreign direct investment, as well as a cointegrating link between foreign direct investment and official development assistance. Economic growth was found to promote official development assistance, while foreign direct investment was found to encourage economic growth and official development assistance was found to promote economic growth in the long run. Since foreign direct investment and official development assistance are important to economic growth in a spiral effect, African countries are encouraged to put in place policies that attract foreign direct investment and official development assistance. Thus, African countries should align their foreign and domestic investment and official development aid policies with their national developmental goals to attract foreign donations and investments.

Keywords: economic growth; foreign direct investment; official development assistance; emerging markets

1. Introduction

Scholars, professionals, and the public in Africa and abroad are torn between several diverging viewpoints on foreign assistance and foreign direct investment's contributions to the economic development, economic growth, and prosperity of Africa (see, for example, Sijabat 2022; Ayenew 2022; Njoroge 2021; Phuc et al. 2022). Therefore, the nexus between foreign aid, foreign direct investment, and economic growth remains an unresolved empirical issue. This article aims to investigate if there is a linkage between economic growth and international capital flows, as proxied by foreign direct investments (FDI) and official development assistance (ODA). Countries use the gross domestic product (GDP) as a benchmark to evaluate their economic well-being. It may, therefore, be used to quantify both the entire amount of money generated from manufacturing industries and the total amount spent on finished products and services (fewer imports). While the gross domestic product is the single most significant gauge of economic activity, it fails to adequately reflect the well-being of the general population (OECD 2019). Nonetheless, GDP was put into perspective in this article as the proxy for economic growth.

The Organization for Economic Cooperation and Development (OECD) defines foreign direct investment (FDI) as an investment, made by a company from one jurisdiction, in another country when the target is 10 percent or more of the company's ownership. Multinational corporations (MNCs) often provide both capital and expertise to other

companies in host countries, according to the OECD's (2008) standard definition of FDI; thus, the term also covers mergers and acquisitions, direct infrastructure expenditures, and the investment of retained profits by MNCs. In the neoclassical model for economic growth, Solow (1956) argues that it is an improvement in capital accumulation and labor force that enhances economic growth. In the FDI-led growth hypothesis, technological progress is considered an endogenous factor, and FDI has a major impact on economic growth through technology transfer. Therefore, FDI inflows increase domestic capital formation, providing finance for local companies. The accumulation of capital formation and firm capitalization will result in technical progress and productivity spillovers and will accelerate the economic growth of the host countries, according to De Mello (1997) and Carkovic and Levine (2005). Thus, FDI is considered additional foreign capital to the domestic capital stock and is an important catalyst of development in emerging countries; the attraction of FDI stimulates capital formation and employment and, therefore, serves as a powerful tool for policies focused on economic growth.

In the literature, the reason for which ODA is utilized, or the donors' initial intentions, determine how it is consistently defined. Once the variations in aims have been identified, a range of goals should be achieved. Military assistance, for example, would have a more immediate impact (whether positive or negative) on the recipient country's GDP, whereas ODA that is provided to boost economic growth via infrastructure development would be anticipated to have a more substantial long-term development effect (Hansen and Tarp 2000, 2001). The various types of ODA are set apart from one another by two main categories: bilateral and multilateral assistance, each of which is more or less successful (Biscaye et al. 2017).

The OECD DAC (Development Assistance Committee) (2019) describes the official inflows provided by bilateral donors or multilateral organizations to developing nations as ODA. As defined, the primary goal is to advance the receiving country's economic growth and social well-being. It is also necessary for ODA to meet the following requirements: the aid must be initiated by the government sector. To succeed, the assistance needs to focus on economic growth and social well-being. In addition, it must be on preferential financial terms. When considering the provision of loans, a grant element of at least 25% should be included. The term precludes any kind of military cooperation or support, no matter the private or public nature of the person or country involved. China uses the term "external aid" to refer to a wide range of support, including financial gifts, loans, and both diplomatic and business-oriented assistance (Bräutigam 2011).

This study has employed ODA as the preferred foreign aid measurement, as it pertains to the traditional definition. Despite the widespread knowledge in the literature of its shortcomings, the authors are still adamant that the definition should retain most of the elements despite the shortcomings therein, as identified by Chang et al. (1998) and Lomoy (2014), who all lamented the issue of the definition being either too open or too restrictive. Chang et al. (1998) contended that technical assistance must be excluded from the official ODA inflows since it distorts real ODA measurement. In contrast, Lomoy (2014) has recognized the different roles that NGOs play in DAC recipient country development goals. Even if there are complaints about the methodology of measuring ODA, as defined by the OECD DAC (Development Assistance Committee) (2019), ODA is still the most generally recognized and accurate way to assess foreign assistance flows from traditional donor nations for developmental and economic growth initiatives in other countries. The current study hypothesizes that:

H1: *FDI has a significant effect on economic growth.*

H2: *ODA has a significant effect on economic growth.*

H3: *Economic growth has a significant effect on FDI.*

H4: *Economic growth has a significant effect on ODA.*

It was the aim of this study to provide the answers to the cointegrating and causal relationships between economic growth, foreign direct investment, and official development assistance within the African context. This is achieved with the FDI–ODA–economic growth nexus and the discrepancies within the literature results in the connections, or lack thereof, within Africa. Not only does understanding the cointegrating and causal relationship between FDI, ODA, and economic growth matter for foreign investors but it is also critical for policymakers since the information informs their bilateral aid decisions and foreign trade relations, as well as the economic development plans of their respective countries.

The paper is organized in the following manner. Section 2 constitutes a brief discussion of the theoretical and empirical literature, as applied in this article. Section 3 presents our estimation method and empirical results in Section 4. Finally, our conclusions and recommendations are presented and policy implications are laid out in Section 5.

2. Theoretical and Empirical Literature

Romer (1986) and Lucas (1988) argued that the economic growth of a host nation is dependent on international capital flows, such as FDI, which influences technology, skills, and the training of the local workforce. The endogenous growth supporters, who hold that technological advances drive economic development, believe that this kind of growth takes place gradually. MNCs are believed to be the necessary catalytic institutions that enable the creation and transferability of knowledge internationally (deliberately and unthoughtfully). MNCs play a crucial role in the development of many emerging markets, as investment from other countries is critical to developing countries' economic development. Therefore, policies are designed to encourage such investment. The nexus between economic growth and FDI is echoed by Cicea and Marinescu (2021), who argued that the connection between foreign direct investment and economic growth is very strong. Contrary to the theoretical prediction results, Odhiambo (2022) found a unidirectional causal flow from economic growth to FDI in Kenya.

According to Adams (2009), likewise, African nations experience substantial economic development as capital flows introduce new technologies and skills to improve local capital and efficiency. Furthermore, Adams (2009) argued that FDI is an important but not sufficient condition for economic development. These results are consistent with both the contemporary and the neoclassical schools of thought on endogenous growth. The United Nations Conference on Trade and Development (UNCTAD 2017) holds the view that FDI inflow significantly contributes to global economic growth and development and is believed to continue on an upward trajectory over the next few years. According to a study by Kumari et al. (2021), FDI causes economic growth and economic growth causes FDI, which confirms its bi-directional causality.

Official development assistance was found to stimulate economic growth as it supplements domestic sources of finance, such as savings; thus, it increases the amount of investment and capital stock (Wehncke et al. 2022). As Morrissey (2001) pointed out, there are several ways by which ODA contributes to economic growth: ODA increases investment, in terms of both physical and human capital; ODA increases the capacity to import capital goods or technology; ODA does not have indirect effects that reduce investment or savings rates; ODA is associated with technology transfer, which increases the productivity of capital and promotes endogenous technical change.

Kimura and Todo (2007) argued that direct links exist between FDI inflows from MNCs, following donor country ODA choices. A rise in FDI inflows is good news for future company growth possibilities because it lowers risk and makes the business climate more confident (Marozva and Makoni 2018). Moreover, Carro and Larrú (2010) suggested that a rise in ODA may mean a period of low FDI inflows, thus preventing developing nations from being exposed to the volatility of FDI inflows. Harms and Lutz (2006) concluded that FDI's impact on infrastructure is favorably linked with ODA but is adversely correlated with rent-seeking activities. MNCs compete with each other to receive foreign-assistance

rents, which, in turn, causes FDI inflows to decrease as a consequence of the rent-seeking effect. The rise in utilized capital and the reduction in FDI from MNCs are both explained by the production increases that are observed in isolation (Anyanwu 2012).

ODA and FDI inflows are affected by a favorable relationship with good governance levels and a high degree of financial sector growth (Karakaplan et al. 2005). In addition, using ODA for human development goals leads to a rise in foreign direct investment and total production outputs. According to Bhavan et al. (2011), better assistance delivery increases the recipient nations' human development indicators (HDIs). No evidence was found to indicate that ODA drives out or reduces private-sector investment. However, Selaya and Sunesen (2012) found that although the use of a mixture of aid and FDI for the financing of complementary inputs tends to increase the efficiency of employed capital, it has the opposite effect when the physical capital is simply transferred from one donor country to a recipient (that is, via cash transfers).

Hudson (2015) asserted that while a small number of studies have focused on the roots of the difficulties that many African nations are experiencing with aid volatility, many of the others still conclude without a satisfactory explanation. Additionally, a lack of understanding of the origins of these problems and how to prevent them has resulted in massive developmental failures in the past (Brooks 2018). Hudson and Mosley (2008) discovered that aid uncertainty remained high in countries that rely on the aid pledges of one or more major members of the OEDC DAC. In their paper, Hudson and Mosley (2008) said that short-term recipient countries' needs played a role in ODA allocations, many of which were inconsistent because of a lack of coordination across development organizations.

From the start, aid advocacy has insisted that recipient nations must implement policy reforms to ensure the intended development and economic growth effect that follows assistance expenditures. OEDC DAC members, as well as other aid agencies, have not, however, been evaluated concerning the need for policy reform or their efficacy. Development aid alignment is a vital instrument for the joint efforts of donors to improve aid efficiency in the developing world as they seek to promote GDP growth (Minasyan et al. 2017). A country's domestic politics and international policy directly affect the overall success of its aid. Bermeo (2011) argued that aid, infused with democracy, is more likely to flow from democratic countries to other democratic countries. These democratic countries will use aid to promote their view of democracy, which they then put into practice in their own countries. Conversely, those who are based in non-democratic countries will not use aid to promote democracy.

The two most significant contributions to increasing the efficacy of assistance are donor policy stability and in-country policy congruence. The increased economic development of the receiving nation is the result of remittance between countries, dedicated assistance policy choices, and other factors (Gary and Maurel 2015; Minasyan and Nunnenkamp 2016; Donou-Adonsou et al. 2020).

Clemens et al. (2012) and, more recently, McArthur and Sachs (2019) have noted that distinguishing between the different types of help or aid remains difficult. There are problems when it comes to aid–growth analysis (in the short, medium, and long terms); this is especially true where research suggests that different types of assistance work against each other (Roodman 2014).

A mixed package of government development assistance and investment in African agriculture may pave the way for long-term, stable economic improvements and overall economic growth, as suggested by McArthur and Sachs (2019). According to their theory, since African farmers depend on agriculture, in the case of an increasing population, agricultural assistance in the form of technology transfer may lead to exponential growth in both agricultural output and other economic indices, such as employment. However, Elakkad and Hussein (2021) reported contradictory results wherein foreign aid negatively affects economic growth.

Osabutey and Okoro (2015) believed that less domestic political risk in SSA might help attract foreign direct investment. It also seems that investments that help to make the climate for business friendlier, where there are accountability and strong institutions, are more likely to attract FDI inflows, as Freckleton et al. (2012) suggested. While these mentioned studies found a negative correlation between political risk and FDI inflow, Okafor et al. (2011) found a significant positive correlation between political risk and FDI location decisions. One argument suggests that to drive up the level of risk and reward, moving forward with more daring investments should be considered, which might be proven to be true within the African context.

3. Methodology

3.1. Data

Using the World Bank's world development indicators as the primary and only source of data, this study purposively sampled 20 African countries over a period of nineteen years (2000–2018). Using annual panel data, the following variables (series) were selected for each of the 20 countries to form part of the sample and to test the cointegration and causation relationship between economic growth, foreign direct investment, and official development assistance. The annual data for GDP growth (GDPG), FDI, and ODA were extracted for the following African countries: Botswana, Burkina Faso, Chad, Democratic Republic of the Congo, Cote d'Ivoire, Egypt, Ghana, Kenya, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Tanzania, and Uganda.

The study applied annual data on a sample of 20 selected emerging African markets using various econometric models. The study and data covered the period from 2000 to 2018. The variables in the study were GDPG, FDI, and ODA. The data for these inflows were sourced from the world development indicators of the World Bank. As in empirical studies, such as that of Singhania and Saini (2018), these variables are measured as net inflows, as a ratio of GDP; they represent the net changes (i.e., inflows minus outflows) in the investment position of foreign investors in the country. A country with positive net foreign investment inflows is one that is attracting new foreign capital, while a country with negative net foreign investment inflows is experiencing outflows of foreign capital (Jensen 2003).

The unit root test summary in Table 1 describes the four main unit root tests performed in Stata (LLC, IPS, ADF–Fisher chi-square, and PP–Fisher chi-square) with three distinctive deterministic option terms: intercept, intercept and trend, and none. The summary shows that all the variables are of first-order integration (thus, they are stationary at first difference). Therefore, the variables are cointegrated as they are not stationary at that level. Cointegration for the variables is confirmed by the significant coefficient in the long-run equations.

Tables 2 and 3 present the correlations and descriptive statistics, respectively, for the variable under investigation. GDPG represents economic growth, ODA is the proxy for foreign donations, and FDI represents foreign direct investment. The variables are weakly correlated; therefore, the problem of multicollinearity is at a minimum. The models were tested for cross-sectional dependence; Pesaran's (2021) CD test was not significant, implying that the cross-sections were independent.

The descriptive statistic summary in Table 2 indicates that the mean for variable GDPG (GDP growth) is 5.11%. The mean is slightly lower than the average GDP growth rate for other comparative emerging market economies (see, for example, Li and Lin 2019). The minimum GDP growth rate reflected a negative growth rate of 7.65%, which coincides with the 2007/9 global financial crisis period. The maximum GDP growth rate that was observed was 33.62%, which could be the result of a country in the sample bouncing back from a low or negative base. The standard deviation from the sample mean is 3.54.

Table 1. Panel unit root test output summary.

Variable	Intercept	Intercept and Trend	None	Decision
		Levin, Lin, and Chu		
GDPG	−3.24513 ***	−2.63942 ***	−19.4766 ***	I (1)
FDI	−3.26732 ***	−2.69142 **	−3.24556 ***	I (1)
ODA	−11.2131 ***	−10.5598 ***	−17.5185 ***	I (1)
		Im, Pesaran and Shin		
GDPG	−4.59412 ***	−4.78774 ***	–	I (1)
FDI	−3.37848 ***	−2.34253 **	–	I (1)
ODA	−11.2677 ***	−8.91797 ***	–	I (1)
		ADF—Fisher Chi-square		
GDPG	89.4249 ***	89.8989 ***	340.022 ***	I (1)
FDI	76.5488 ***	63.7009 **	62.1084 *	I (1)
ODA	194.313 ***	142.508 ***	290.774 ***	I (1)
		PP—Fisher Chi-square		
GDPG	203.569 ***	223.083 ***	454.845 ***	I (1)
FDI	99.1686 ***	92.1037 ***	63.0683 *	I (1)
ODA	902.439 ***	298.856 ***	430.491 ***	I (1)

NOTE: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ denotes the levels of significance. Source: Authors' compilation from Stata outputs.

Table 2. Correlation analysis.

Variables	NODA	GDPG	FDI
NODA	1.0000		
GDPG	0.1955 ***	1.0000	
FDI	0.1492 ***	0.2097 ***	1.0000

NOTE: *** $p < 0.001$ denotes the levels of significance.

Table 3. Descriptive statistics.

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Jarque-Bera	Observations
ODA	7.332358	6.067913	62.18660	0.014323	6.771152	2612.459	380
GDPG	5.108262	5.257401	33.62937	−7.652310	3.539179	2259.523	380
FDI	3.666213	2.436347	46.27524	−4.845830	5.159860	11249.88	380

The mean for the variable FDI was 3.67% of the GDP. Over a comparative period, the African countries in our sample did not compare well to FDI inflows with other emerging markets, such as those in Asia, Southeast Asia, and India (Cherif and Dreger 2018; Singh 2019; Zhang et al. 2020). The minimum value that FDI contributed to GDP for the sampled African countries under review was −4.85%. This negative value illustrates a nett capital outflow, thus FDI outflows exceeded nett inflows for the specific African country within the pool. The maximum percentage of FDI that contributed to GDP is 46.28%. A possible reason for the large percentage could be because of over-reliance on FDI for in-country investment or funding by one of the sampled countries (Pogátsa 2018; Ha 2019). The standard deviation from the sample mean is 5.16.

ODA, as one of the main independent variables, has a mean of 7.33%. Thus, of the sampled African countries, on average, 7.33% of their gross national income over

the analysis period consisted of ODA from donor countries. The official development assistance mean for the selected African countries is extremely high when compared to a combined index of similar studies on emerging or developing markets, which indicated a comparative mean of 2.11% (Kim and Lekhe 2019). The minimum value of ODA that contributed to the gross national income of the sampled countries is 0.01%, while the maximum is 62.18%. A possible explanation for the large deviations could be the adverse economic and socio-economic circumstances that some African countries in the sample faced over the analysis period, which necessitated official development assistance from DAC members, or merely the over-reliance on assistance by failed African states from those countries willing to provide and commit to aid funding (Isaksson and Kotsadam 2020; Dolan and McDade 2020). The lasting impact of natural disasters, conflicts, and welfare programs that necessitated assistance from DAC members on funding over extended periods could also lead to higher-than-expected ODA values (Yahyaoui and Bouchoucha 2021). The standard deviation for ODA is 6.77.

3.2. Empirical Methods

This study will seek to test for long-term cointegrating relationships between the variables of the study by applying the autoregressive distributed lags (ARDL) bounds testing approach suggested by Pesaran et al. (2001). In studies where $N > 1$ and $T > 1$, a panel ARDL is the preferred estimation technique, as opposed to a traditional ARDL with a single time series (Pesaran et al. 2001). The panel ARDL model will be employed to determine the cointegrating relationship between the dependent and independent variables. The panel ARDL model specifies and has the advantage that the variables can be of different levels of integration, as long as they are not of higher-order I (2) (Pesaran et al. 1999). In addition, a panel ARDL is also appropriate for smaller sample sizes, and it concurrently assesses long-run relationships coupled with short-run parameters (Narayan 2004) and includes the long- and short-run effects of the variables in the model (Pesaran et al. 2001). The optimal lag lengths of the different variables are determined using the Akaike information criterion (AIC) and the Bayesian information criterion (BIC)/Schwarz Bayesian criterion (SBC) in Stata. The optimal lag length is presented by the smallest values of the two criteria.

Given that the hypothesis of homogeneity between long-run parameters cannot be assumed, a Hausman (1978) test (to test the null hypothesis of homogeneity) is performed to determine the most appropriate estimator, between either the pooled mean group (PMG) or the mean group (MG) estimators or the dynamic fixed effect estimator (DFE). Pesaran et al. (1999) argued that PMG is preferred when either the N or T value is small. The main difference between the MG and the PMG estimators is that the PMG estimators pool the MG estimator's features such as averaging the individual equations for each cross-section to produce consistent estimators (Pesaran et al. 1999). The PMG estimator allows for country heterogeneity in error variances, the short-run coefficients, together with the intercepts, and the speed of adjustment to the long-run equilibrium values with a proposal of homogenous long-run slope coefficients across countries (N) (Loayza and Ranciere 2006). The following equation is estimated to examine the relationship between foreign direct investment, official development assistance, and economic growth in the selected African countries.

The ARDL and the vector error correction model (ECM) were run concurrently to capture the speed of adjustment when there is disequilibrium (Pesaran et al. 1999; Pedroni 1999, 2004; Apergis and Payne 2009). The benefit of running the panel ARDL with the ECM is that it captures both the cointegration and the short-run effects of the variables under study (see Engle and Granger 1987; Engle and Yoo 1987; Hoffman and Rasche 1996). The model that is estimated has the form of an ARDL (p, q, q, . . . , q):

$$GDPG_{it} = \sum_{j=1}^{p} \delta_{ij} GDPG_{i,\,t-j} + \sum_{j=0}^{q} \beta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \tag{1}$$

where Y_{it} is the dependent variable, $X_{i,\,t-1}$ is the vector of the explanatory variables for group i, μ_i is the country-specific fixed effect, and j is the studied country, with p and q as the

lag lengths ([Pesaran et al. 1999](#)). Equations (2)–(4) are the proposed model specifications of the panel ARDL system of equations that are specific to this study. Thus, the reparametrized ARDL (p, q, q, . . . , q) error correction model is specified as:

$$GDPG_{it} = \varnothing_i(GDPG_{i,\,t-1} - \gamma_{1i}FDI_{i,t} - \gamma_{2i}ODA_{i,t}) + \sum_{j=1}^{p-1}\delta_{ij}\Delta GDPG_{i,\,t-j} + \sum_{j=0}^{q-1}\beta_{1i}\Delta FDI_{i,t-j} + \sum_{j=0}^{q-1}\beta_{2i}\Delta ODA_{i,t-j} + \mu_i + \varepsilon_{it} \quad (2)$$

$$FDI_{it} = \varnothing_i(FDI_{i,\,t-1} - \gamma_{1i}GDPG_{i,t} - \gamma_{2i}ODA_{i,t}) + \sum_{j=1}^{p-1}\delta_{ij}\Delta FDI_{i,\,t-j} + \sum_{j=0}^{q-1}\beta_{1i}\Delta GDPG_{i,t-j} + \sum_{j=0}^{q-1}\beta_{2i}\Delta ODA_{i,t-j} + \mu_i + \varepsilon_{it} \quad (3)$$

$$ODA_{it} = \varnothing_i(ODA_{i,\,t-1} - \gamma_{1i}FDI_{i,t} - \gamma_{2i}GDPG_{i,t}) + \sum_{j=1}^{p-1}\delta_{ij}\Delta ODA_{i,\,t-j} + \sum_{j=0}^{q-1}\beta_{1i}\Delta FDI_{i,t-j} + \sum_{j=0}^{q-1}\beta_{2i}\Delta GDPG_{i,t-j} + \mu_i + \varepsilon_{it} \quad (4)$$

where GDPG represents economic growth, FDI represents foreign direct investment, ODA represents official development assistance, γ represents the long-run coefficients of the independent variables, δ and β are the short-run coefficients, ε_{it} is the error term, $\varnothing$ is the speed of adjustment to the long-run equilibrium, and i and t represent the country and period, respectively. The lag order (p, q) is selected using the above-mentioned criterion. The lagged variables and the differences variables of the ARDL, respectively, test for the long-run and the short-run relationships of the variables, which will, in theory, find the cointegrating relationships between the variables. Before running the models, it can be assumed that all pre-test diagnostics have been conducted using Stata. All the variables were stationary at the first difference and the optimal lag length was determined using the AIC (Akaike information criterion) and SIC (Schwarz information criterion). The analysis was based on the conceptual framework shown in Figure [1](#).
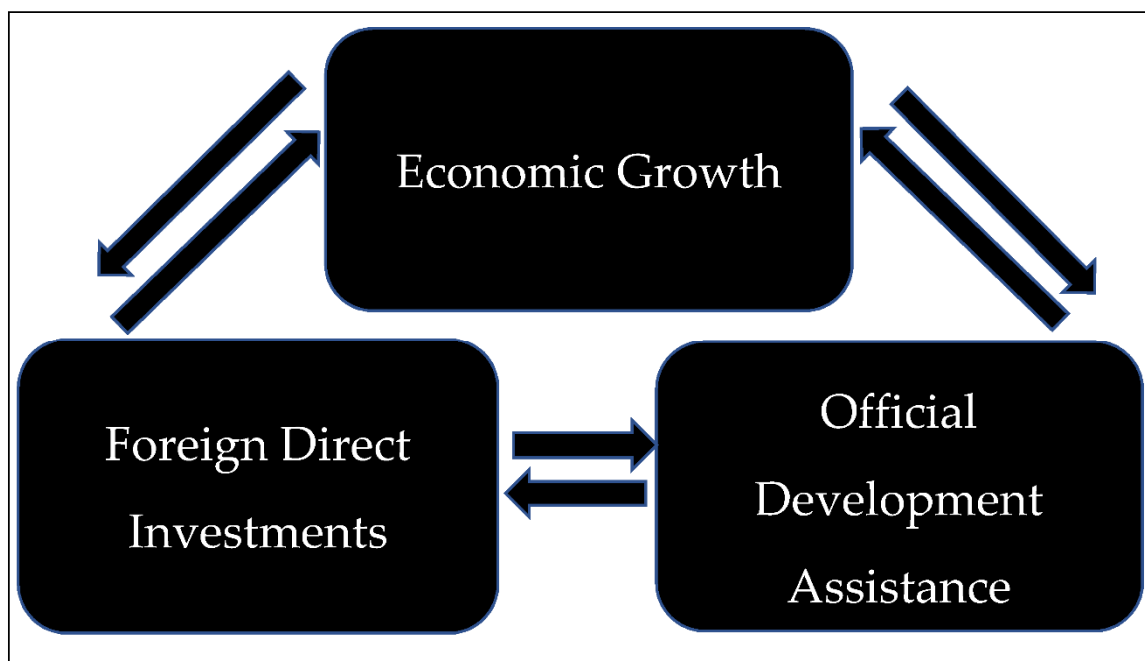

Figure 1. Source: Author's compilation.

4. Estimation Results

Dynamic panel data models were used to investigate the nexus between GDPG, FDI, and ODA. These have advantages over aggregate time series data, including the possibility that underlying microeconomic dynamics may be obscured by aggregation biases, and the scope that panel data offers to investigate heterogeneity in terms of adjustment dynamics between different types of countries. [Bond](#) ([2002](#)) argues that even in situations where the coefficients of lagged dependent variables are not of interest, allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other

parameters. The Schwarz information criterion (SIC) was used for optimal lag selection as it had the lowest value; the selected model is (1,1,1). The Hausman test guided the decision on whether to accept or reject the null hypothesis and to use the correct model; the Hausman test results showed that the pooled mean group (PMG) was the preferred estimation technique to run the ARDL and ECM models on the panel data for the African countries. Therefore, our interpretation will focus on the PMG output. Cointegration is determined from the statistical significance of the error correction term in these models. Table 4 provides the ARDL and ECM model outputs, from which our long- and short-run relationships and the causation analysis between the dependent variable GDPG and the independent variables FDI and ODA are established.

Table 4. ARDL and ECM results, with the dependent variable of GDPG.

VARIABLES	PMG	MG	DFE
	Δ.GDPG	Δ.GDPG	Δ.GDPG
LONG-RUN			
L.FDI	−0.00457	−0.106	0.189 ***
	(−0.15)	(−0.25)	(3.45)
L.ODA	0.106 **	−1.554	0.127
	(2.76)	(−1.00)	(1.91)
ECT(−1)	−0.846 ***	−0.987 ***	−0.765 ***
	(−10.26)	(−13.10)	(−15.09)
SHORT-RUN			
Δ.FDI	0.265	0.236	0.0357
	(1.80)	(1.75)	(0.65)
Δ.ODA	−0.157	−0.546	0.0525
	(−0.95)	(−1.28)	(1.17)
_cons	3.943 ***	5.308 ***	2.823 ***
	(8.75)	(5.07)	(5.65)
N	360	360	360

** $p < 0.01$; *** $p < 0.001$ denote the levels of significance. Δ is the difference operator, t statistics in parentheses. Source: Authors' compilation from Stata outputs.

The error correction term (ECT) in Table 4 indicates a coefficient of −0.846, implying that there is an adjustment of approximately 84.6 percent back to equilibrium each year. Accordingly, it takes about 1.18 (1/0.846) years for changes in the ODA and FDI to have a full effect on the long-run GDPG and, thus, restore the deviation to the equilibrium state.

The long-run equation is given by the statistically significant ODA coefficient of 0.106, thus implying that there exists a positive long-run relationship between the GDPG and ODA. A change in the ODA will lead to an increase in the GDPG of 10.6 percent in the long run.

However, foreign direct investment, although seemingly causing economic growth, is not significant. Therefore, it cannot be concluded that foreign direct investment causes economic growth in the long run. In addition, the results in Table 1 specify that neither foreign direct investment nor official development assistance causes economic growth in the short run, which implies, indeed, that the relationship between economic growth and official development assistance seems to be effective in the long run. Thus, it is a long-term rather than a short-term occurrence.

Table 5 provides the ARDL and ECM model outputs, from which the long- and short-run relationships and the causation analysis between the dependent variable, FDI, and independent variables, GDPG and ODA, are established.

Table 5. ARDL and ECM results, with the dependent variable FDI.

	PMG	MG	DFE
VARIABLES	**Δ.FDI**	**Δ.FDI**	**Δ.FDI**
LONG-RUN			
L.ODA	0.0354	−0.0487	−0.0210
	(0.68)	(−0.16)	(−0.12)
L.GDPG	0.363 ***	0.310	−0.297
	(4.83)	(1.12)	(−1.25)
ECT(−1)	−0.493 ***	−0.664 ***	−0.291 ***
	(−5.92)	(−9.40)	(−7.39)
SHORT-RUN			
Δ.ODA	0.306	0.395	−0.00885
	(1.23)	(1.43)	(−0.20)
Δ.GDPG	0.157 **	0.130	0.0355
	(2.70)	(28)	(0.65)
_cons	0.711 **	1.646	1.625 **
	(3.21)	(1.59)	(3.16)
N	360	360	360

** $p < 0.01$; *** $p < 0.001$ denote the levels of significance. Δ is the difference operator, t statistics in parentheses. Source: Authors' compilation from Stata outputs.

The error correction term in Table 5 indicates a coefficient of −0.493, implying that there is an adjustment of approximately 49.3 percent back to equilibrium each year. Accordingly, it takes about 2.03 (1/0.493) years for changes in the GDPG and ODA to have a full effect on the long-run FDI and, thus, restore the deviation to the equilibrium state.

The long-run equation is given by the statistically significant GDPG coefficient of 0.363, thereby implying that there exists a positive long-run relationship between the GDPG and FDI. A change in the GDPG will lead to an increase in the FDI of 36.3 percent in the long run.

Nonetheless, although ODA positively appears to be causing an increase in foreign direct investment in the long run, the effect is not significant. Furthermore, the results show that economic growth in the short run also significantly causes an increase in foreign direct investment, which indicates a definite long- and short-run causal relationship between foreign direct investment and economic growth. Sadly, official development assistance, while positively influencing foreign direct investment, does not significantly cause FDI. We, therefore, conclude that there is no significant causation between official development assistance and foreign direct investment in the short- or long term.

Table 6 provides the ARDL and ECM model outputs, from which the long- and short-run causation analysis between the dependent variable, ODA, and the independent variables, GDPG and FDI, is established.

The ECT in Table 6 indicates a coefficient of −0.441, implying that there is an adjustment of approximately 49.3 percent back to equilibrium each year. Accordingly, it takes about 2.27 (1/0.441) years for changes in the GDPG and FDI to have a full effect on the long-run ODA and, thus, restore the deviation to the equilibrium state.

The long-run equation is given by the statistically significant FDI coefficient of −0.237, thus implying that there exists a negative long-run relationship between the ODA and FDI. A change in the FDI will lead to a decrease in the ODA of 23.7 percent in the long run.

From the results in Table 3, we can confidently state that FDI negatively causes ODA in the long run but that economic growth, although seemingly responsible for causing a decrease in official development assistance, is not significant; therefore, we cannot conclude that economic growth causes official development assistance in the long run.

Unfortunately, neither foreign direct investment nor economic growth causes official development assistance inflows into Africa in the short run, which implies, indeed, that the relationship between official development assistance and foreign direct investment

seems to be a long-run kind of relationship. Thus, the casual relationship is a long-term phenomenon, rather than a short-term one.

Table 6. ARDL and ECM results, with the dependent variable, ODA.

	PMG	MG	DFE
VARIABLES	**Δ.ODA**	**Δ.ODA**	**Δ.ODA**
LONG-RUN			
L.FDI	−0.237 **	0.414	−0.105
	(−3.29)	(0.53)	(−1.34)
L.GDPG	−0.131	0.892	0.0543
	(−1.77)	(0.72)	(0.45)
ECT(-1)	−0.441 ***	−0.587 ***	−0.660 ***
	(−6.07)	(−7.48)	(−12.98)
SHORT-RUN			
Δ.FDI	−0.199	−0.286	−0.0131
	(−1.01)	(−1.29)	(−0.20)
Δ.GDPG	0.00792	0.0442	0.0773
	(0.13)	(0.36)	(1.17)
_cons	4.495 ***	5.125 ***	4.850 ***
	(3.52)	(4.42)	(8.41)
N	360	360	360

** $p < 0.01$; *** $p < 0.001$ denotes the levels of significance. Δ is the difference operator, t statistics in parentheses. Source: Authors' compilation from Stata outputs.

The causation summary in Table 7 articulates the causality relationships between economic growth, foreign direct investment, and official development assistance in the selected African countries under study. The ECT indicates the speed of model adjustment for all models and shows joint causality in all cases (when the dependent variables are replaced by the regressors) and is always between 0 and −1 in all the models. Table 7 provides an overall illustration of the outcomes discussed in conjunction with Tables 4–6 and illustrates that, in all cases, we found only unidirectional causation between the variables in the long run; however, causation would only be directed toward one of the two independent variables within any given model, regardless of the dependent variables used in the regression. As per expectation, FDI was found to cause GDPG, while contrary to expectation, GDPG caused ODA. This calls for further analysis of a potential transmission mechanism that could be present between FDI, GDPG, and ODA. The results might be different if the financial market development factor is put into perspective (see, for example, Makoni and Marozva 2018).

Table 7. Causation summary.

	Long-Run Coefficients			
Dependant Variables	**GDPG**	**FDI**	**ODA**	**ECT**
ΔGDPG		−0.00457	0.106 **	−0.846 ***
		(−0.15)	(2.76)	(−10.26)
Causality		NO	YES	YES
ΔFDI	0.363 ***		0.0354	−0.493 ***
	(4.83)		(0.68)	(−5.92)
Causality	YES		NO	YES
ΔODA	−0.131	−0.237 **		−0.441 ***
	(−1.77)	(−3.29)		(−6.07)
Causality	NO	YES		YES

** $p < 0.01$; *** $p < 0.001$ denotes the levels of significance. Δ is the difference operator, t statistics in parentheses. Source: Authors' compilation from Stata outputs.

From a planning and/or policy perspective in Africa, knowing what the direction of causation is for African countries, as discussed in this paper, will make it easier for governments, MNCs, and investors to focus on the cause-and-effect relationship between economic growth, foreign direct investment, and official development assistance, and align their decisions accordingly.

5. Conclusions and Recommendations

This article investigated the cointegrating relationships between economic growth, foreign direct investment, and official development aid within the African context through the application of the panel ARDL approach. Our findings confirmed that there is a positive long-term cointegrating relationship between official development aid and economic growth and between economic growth and FDI, along with a significant negative long-term cointegrating link between FDI and official development assistance. The results were reaffirmed by the significance of the ECT, as derived from all the regression models.

Moreover, our results show a unidirectional long-run causality running from GDPG to ODA, from ODA to FDI, and from FDI to GDPG. This implies that economic growth promotes foreign aid, while foreign aid enhances foreign domestic investments, and economic growth improves with an increase in foreign domestic investments in the long run for the selected African countries. Importantly, this study proved that GDPG, ODA, and FDI are interlinked and are important to the development of Africa. Since FDI inflows are good for economic growth, ODA should be promoted; the results showed that FDI seems to follow ODA, which may be because ODA is used as a yardstick to test the riskiness of investment associated with the receiving country.

Therefore, countries with policies that result in sustained economic growth create a conducive environment for ODA and, ultimately, FDI. This sustained economic growth will attract foreign aid; countries with high inflows of foreign aid also seem to attract foreign domestic investments. Since FDI and ODA are important to economic growth in a spiral pattern, African countries should put in place policies that attract FDI and ODA. It is recommended that African countries should align their foreign and domestic investment and official development aid policies with their national strategies, to attract investment, and for development aid to meet the intended development and economic growth objectives. This finding is of paramount importance to dispel the notion that developing countries should aim to be economically sovereign. Scholars are encouraged to look further at the channels by which ODA and FDI influence economic activity.

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