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EFFECT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

This paper examines the effect of foreign direct investment on economic growth in Nigeria. In addition to complementing local investment, FDI is intended to help a developing country like Nigeria, create employment, transfer technology, enhance domestic competition and provide other beneficial externalities. The study employed Augmented Dickey Fuller methodology to carry out unit root tests. It was discovered that three of the variables are stationary at first difference. At the same time, the rest are stationary at levels. Consequently, the Autoregressive Distributive Lag (ARDL) technique is used to analyse the impact of foreign direct investment on the economic growth of Nigeria. The results indicate that aggregate foreign direct investment, foreign direct investment to the manufacturing sector, trade openness, inflation and government consumption have significant effects on economic growth in Nigeria. The study also looked at the effects of FDI inflows into the mining, manufacturing, and agriculture sectors on economic growth. Besides FDI, the effects on growth of five control variables, viz: labour force growth, gross capital formation, trade openness, inflation and government consumption expenditure, were also examined. Based on these findings, the study recommends that Nigeria accelerate relevant policies that could attract an enormous inflow of FDI and strive for price stability in the economy.

1. Introduction

In recent times, discussions have moved towards incorporating an essential mediatory relationship to achieving growth success. Like many other African nations, Nigeria has been vulnerable to the availability of certain economic fundamentals, of which foreign direct investment (FDI) inflows is an important component. Developing countries are encouraged to seek FDI and portfolio equity inflows rather than relying solely on domestic savings to generate long-term prosperity (World Bank, 2017). As a result, many governments promote FDI inflows and aim to provide as many incentives as feasible. The growth effects of FDI vary by country due to economic, political, and social differences among these developing countries. Like other African developing countries, Nigeria has benefited from FDI and continues to seek this crucial source of capital.

FDI has been one of the main development funding alternatives that developing nations, particularly sub-Saharan African countries, typically rely on to pursue a sustainable growth trajectory for their stunted economies. Both policymakers and government officials have been concerned about this. Sadly, despite the continent's perceived and evident need for FDI, most African governments' efforts to attract FDI have been fruitless. The situation is troubling, giving these countries just a glimmer of hope for economic growth and development. This study, therefore, set out to investigate the impact of FDI on economic growth in Nigeria. The study's findings will enlighten policymakers on whether FDI flows determine economic growth in Nigeria and thereby help them formulate suitable policies as to whether the flows of foreign investment into the country should be promoted.

The rest of the paper is organised as follows: Section 2 reviews the theoretical and empirical studies on the impact of foreign direct investment on economic growth, while Section 3 presents the theoretical framework, model

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specification, techniques of analysis, as well as data coverage, measurement and sources. In Section 4, the study discusses the empirical findings. Finally, the conclusion and recommendations of the study are presented in Section 5.

2. Literature Review

*2.1. **Theoretical Review***

There have been divergent views as to "which is the best theory" of growth in the mind of every researcher. The various ideas of growth theorists originate from the diversified character of the world's economic environment.

The Classical Theory of Growth (1723–1823) argues that land improvement, labour force growth, capital stock expansion and technology development are causes of growth. The idea is mostly based on Adam Smith and David Ricardo, two well-known ancient academics. According to Adam Smith's theory, capital accumulation, land supply, labour force growth, and institutional change are the causes of output growth. Apart from Adam Smith's sources of growth, David Ricardo's theory included technological know-how as one of them.

The theory of growth of Schumpeter (1936) is based on long waves of economic growth, and it says that at first, only a few firms can benefit from higher profits when new technology emerges. According to the theory, once other firms and sectors discover these opportunities for greater profit, a new phase will emerge in which many will embrace it, and the technology will expand to other industries and organisations. If this "imitators' swarm" or "imitation bandwagon" is widely distributed, more investment is needed in capital and labour. A multiplication process begins, the impacts on the entire economy are strengthening, and the growth rate is high, growing from the upward to the long-term prosperity stage. In total, Schumpeter's growth theory acknowledges that technical development affects economic growth, which supports the postulations of David Ricardo.

The neoclassical growth theory, based on the work of Solow (1956), posits growth in output to be a function of growth in inputs: capital, labour, and technological progress. Any increase in savings rate leads to only a one-shot increase in both the steady-state level of output per capita and capital per capita over time without affecting the growth rate of output. Long-run growth of output per capita depends on improvement in technology. This absence will allow output per person to converge to a steady-state value, which depends positively on the savings rate and negatively on the population growth rate (Dornbusch, Fischer, and Startz, 2011).

The endogenous theory of growth by Romer (1986) claims that physical capital and intellectual capital, as opposed to the neoclassical theory of growth, are the principal determinants of economic growth. The theory implies a constant marginal product of capital, as opposed to exogenous or neoclassical growth theory, which predicts falling marginal product of capital. According to the idea, economic growth is generated by variables within the production system rather than outside it.

Regarding FDI theory, Hymer's (1976) seminar research presented external differences among firms at both scientific and technical levels as a source of technology spillovers and transfer, which led to the development of the Positive Spillover Theory of FDI. On the one hand, the study defined FDI as a global extension of industrial organisation theory. Wang and Blomstrom (1992), on the other hand, demonstrate that technology transfers are good and important to indigenous firms' efficiency and operational hazards (that is, a volatile political climate, a poor economical situation, and a societal menace.) Similarly, Blomstrom and Kokko (1998) suggest that the presence or entrance of international corporations helps local businesses improve production efficiency.

*2.2. **Empirical Review***

This study reviews the relevant studies conducted on Nigeria and other countries from 2007 to date to focus on those based on recent methodologies, including the most recent data sets.

Ayanwale (2007) analysed Nigerian non-extractive FDI empirical link to economic development and the FDI drivers in the Nigerian economy from 1970 to 2002. A growth model is estimated using the Ordinary Least Squares (OLS) and the two-stage Least Squares method to determine the relationship between the FDI, its components, and its effect on economic growth. The results suggest that the Nigerian FDI makes positive contributions to its economic growth. The FDI in the communication sector was found to have the highest potential to grow the economy and multiples of the oil sector. Using a different estimating technique, examined the relationship between FDI, exchange rate and GDP, using time series data from 2008 to 2013. Pearson correlation analysis was used to examine the relationships, and the findings revealed relationships between FDI, exchange rate and GDP.

Imodu (2012), based on the Johansen approach to integration and Vector Error Correction technique, examined the influence of foreign direct investment on Nigeria's economic development from1980 to 2009, in which FDI was divided into a variety of components. It follows that, other than the long-term, strong and promising telecoms sector, the impacts of the disaggregated FDI - specifically, agricultural, mining, manufacture, and petroleum - on actual growth in Nigeria are extremely minimal. Using the same OLS methodology as Imodu (2012), Ugwuegbe, Okore, and John (2013) studied

the empirical link between FDI and economic development in Nigeria. The study used yearly data from 1981 to 2009. The OLS technique was used to assess the link between FDI and economic growth, and the results show that FDI had a beneficial influence on Nigeria's economic growth over time.

A further test of the effect of FDI on economic growth was carried out by Uwubanmwen and Ogiemudia (2016) using the Error Correction Model (ECM) using yearly secondary time series data from 1979 to 2013. According to the findings, FDI has both immediate and time-lag effects on the Nigerian economy in the short run but has no influence in the long run during the timeframe. However, a challenge with this study is the use of real GDP as a proxy for economic growth, as both are different economic variables that also behave differently. In another study, the effects of FDI inflows on Nigerian economic growth from 1981 to 2017 were studied by Giwa, George and Adediran (2020), utilising a robust GMM estimating approach that addressed OLS's endogenous and autocorrelation issues. According to theory, they discovered that the quality of labour has a favourable impact on real GDP and noticed the negative influence on real GDP in Nigeria on capital intensity. Vu and Noy (2009) examined sectoral data for six OECD member nations for empirical studies outside Nigeria. The findings indicate that FDI has a beneficial impact on economic growth directly and through its interaction with labour. Also, Chee and Nair (2010) investigated empirically whether finance sector expansion is necessary for FDI to boost economic growth in the Asia-Oceania area. The study uses a fixed-effects estimator and a random-effect estimator to examine the link between FDI, financial sector development, and economic growth on a sample of 44 Asia and Oceania nations from 1996 to 2005. According to the data, banking sector expansion boosts FDI's contribution to regional economic growth.

Almfraji, Almsafir and Yao (2014) examined how flows of FDI impact Qatar's business cycles by utilising data from the 1990-2010 time series. The VAR Impulse Responses and the Granger Causality Test were used, and the results demonstrate the relative long-range interaction between FDI inflows and economic development in Qatar. Using a different estimation technique when compared with that of Almfraji et al. (2014), Ndiaye and Xu (2016) studied the influence of FDI on economic development in West African Economy Monetary Union (WAEMU) nations by building and evaluating a theoretical investment model using panel data from 1990 to 2012. The study concluded that the impact of FDI on economic growth is advantageous for host nation trade and investment since the data revealed that FDI has a positive influence on economic growth.

Siddique, Ansar, Naeem, et al. (2017) used autoregressive distributive lag (ARDL) bounds co-integration and Granger causality tests to examine the relationship between FDI and economic growth in Pakistan from 1980 to 2016. The findings show that economic growth has a one-way causal relationship with FDI, physical capital, and trade. There is also bidirectional causation between physical capital and FDI and between physical capital and human capital. It is clear from the literature reviewed that the findings of the existing studies on the impact of FDI on economic growth in and outside Nigeria are mixed and inconclusive. Furthermore, there is the need for a study based on more recent data and to adopt the most recent methodology. The present study meets these needs.

3. Methodology

3.1. Theoretical Framework

The neoclassical growth theory will be adopted for this study. According to this theory, economic growth is linked to the aggregate production function. Solow's (1957) groundbreaking contribution to growth theory established the theoretical foundation for growth accounting. The growth theory assumes that the factors of production, which are labour and capital, are the major determinants of the economic growth of a nation. The underlying aggregate production function is the linearly homogeneous type whereby it is assumed that output (Y) depends positively on both capitals (K) and Labor (L) and which can be stated as follows:

$$Y = AF(L, K) \quad \ldots\ldots (1)$$

where; Y = GDP, A = level of technology, K = stock of capital and L = labour. When the total derivative of the Equation (1) is taken, the level of output will become the sum of changes in K, L and A multiplied by their respective marginal productivities, thus:

$$\Delta Y = MPL \,.\, \Delta L + MPK \,.\, \Delta K + F(L, K).\, \Delta A \quad \ldots\ldots (2)$$

where MPL and MPK are the marginal productivities of capital and labour. Equation (2) is divided by Y = AF(L, K), it becomes:

$$\frac{\Delta Y}{Y} = \frac{MPL}{Y}.\Delta L + \frac{MPK}{Y}.\Delta K + \frac{\Delta A}{A} \quad \ldots\ldots (3)$$

Multiplying and dividing the first and second parts of the right-hand side by L and K will give:

$$\frac{\Delta Y}{Y} = \left(\frac{\text{MPL}}{Y} L\right)\frac{\Delta L}{L} + \left(\frac{\text{MPK}}{Y} K\right)\frac{\Delta K}{K} + \frac{\Delta A}{A} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Assuming a perfectly competitive market and that factors of production are paid their respective marginal products so that MPL is the market wage rate (w). MPK is the rental price (r) of capital. Therefore, the total payments accruing to owners of labour and capital shares are fractions of the total output $\frac{\text{MPL}}{Y} L$ and $\frac{\text{MPK}}{Y} K$, denoted as 1 – α and α, as shown in Equation 5.

$$\frac{\Delta Y}{Y} = (1 - \alpha)\frac{\Delta L}{L} + \alpha\frac{\Delta K}{K} + \frac{\Delta A}{A} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

*3.2. **Model Specification***

This section discusses the productivity growth $\left(\frac{\Delta A}{A}\right)$ determinants and specifies its Equation. This is followed by a discussion of the econometric format of the economic $\left(\frac{\Delta Y}{Y}\right)$ growth model specified for estimation by replacing the productivity growth $\left(\frac{\Delta A}{A}\right)$ term in the above Equation 5 with the productivity growth $\left(\frac{\Delta A}{A}\right)$ equation specified in the early stage of this section.

Productivity growth $\frac{\Delta A}{A}$ is the improvement or increase in work efficiency or production. Generally, productivity growth is depicted by the rate of increase in total output or production per unit of output used in the course of production. The four postulated determinants of productivity growth considered in this paper are as discussed in the paragraphs below. They are foreign direct investment (which is further segregated into three sectors: mining, manufacturing and agriculture), trade openness, inflation, and government expenditure.

The benefits of FDI in a host country include increased company competitiveness, contributions to international trade integration, and improved enterprise growth. Therefore, FDI should be an essential determinant of productivity growth and economic growth (Kowalski, 2000). The inclusion of this variable is in line with practice in some previous studies, e.g. Tsai (1994), where it was reported that FDI promotes economic growth in under-developed countries. Thus, the sign of the coefficient of FDI is expected to be positive in this study. Trade openness through the transfer of knowledge and technical know-how improves productivity across borders, promoting competitiveness among firms and improving domestic production and economic productivity. Trade openness is also considered an explanatory variable, and it is expected to have a positive impact on productivity growth and, hence, economic growth. As one of the key variables affecting economic growth, it is informed by empirical literature such as Beck (2000). It is believed that a country with a greater degree of foreign trade openness would also be more open to foreign capital.

Price stability is important for an economic agent to make accurate resource allocation decisions. Inflation hinders the efficiency of the price system allocation. It is postulated as a productivity growth determinant in the study, and it is expected to have a negative relationship with economic growth. Empirical literature like Kowalski (2000) claims that the country's economy is stable due to inflation. If inflation is high, this might result in a growing economic issue. Government consumption expenditure, in theory, supports social welfare, firm productivity, and research and development, which improve economic growth and productivity. Empirical literature like Onifade, Cevik and Erdogan et al. (2020) found a negative impact of government expenditure on economic growth. Therefore, government consumption expenditure is expected to affect this study negatively.

Based on the above, the linear mathematical format of the productivity growth $\frac{\Delta A}{A}$ equation is as specified in Equation 6 below:

$$\frac{\Delta A}{A} = \beta_3 \text{FDI} + \beta_4 \text{TRA} + \beta_5 \text{INF} + \beta_6 \text{GOVT} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where: $\frac{\Delta A}{A}$ = total productivity; FDI = foreign direct investment; TRA = trade openness, INF = inflation rate and GOVT = government expenditure.

In view of the above Equation (6), we expect the signs of the a priori expectations of parameter estimates to be as mathematically stated thus: $\beta_3, \beta_4, \beta_6 > 0$; $\beta_5 < 0$.

The econometric model for this study is arrived at after the substitution of the productivity growth Equation (6) into the economic growth accounting Equation (5) and through the inclusion of the time subscript (t) as well as the intercept term (β_0) and error term (ε) and also by replacing $\frac{\Delta K}{K}$ with the share of gross capital formation in GDP, denoted by GCF, due to the fact that the data on $\frac{\Delta K}{K}$ is not available. While acknowledging that GCF may not be a suitable proxy for $\frac{\Delta K}{K}$, it seems to be the only one that can be considered in the context of this study and, thus, henceforth, growth of capital stock $\frac{\Delta K}{K}$ will be replaced by gross capital formation (GCF). With the above changes made to the growth accounting Equation 5, the result would be the economic growth Equation (7) that is now specified for estimation in the study.

$$\left(\frac{\Delta y}{y}\right)_t = \beta_0 + \beta_1\left(\frac{\Delta L}{L}\right)_t + \beta_2 GCF_t + \beta_3 FDI_t + \beta_4 TRA_t + \beta_5 INF_t + \beta_6 GOVT_t + \varepsilon_t \ldots\ldots\ldots (7)$$

where t denotes time, and the variables and parameters (other than β_1 and β_2 that are respectively equivalent to α and $1-\alpha$ in the growth accounting Equation 5 as well as the aforenoted intercept term and error term) are as defined in connection with the productivity growth Equation 6, just as the *a priori* expectations about the signs of the parameters too.

Finally, another equation is specified for the study by disaggregating total FDI into sectoral FDI flows into three sectors of the economy, viz; mining, manufacturing and agriculture. FDIMI, FDIMA and FDIAG respectively denote these. By replacing the FDI in Equation 7 with FDIMI, FDIMA and FDIAG, Equation 8 is arrived at:

$$\left(\frac{\Delta y}{y}\right)_t = \beta_0 + \beta_1\left(\frac{\Delta L}{L}\right)_t + \beta_2 GCF_t + \beta_3 FDIMI_t + \beta_4 FDIMA_t + \beta_5 FDIAG_t + \beta_6 TRA_t + \beta_7 INF_t + \beta_8 GOVT + \varepsilon_t \ldots\ldots\ldots (8)$$

*3.3. **Techniques of Analysis***

The basic features of the variables are highlighted based on the result of the descriptive and correlation analyses. The main inferential analyses will take the form of unit root and co-integration tests to address the time-series features of the data properly and provide a guide on the methods of regression equation estimation. The study conducts autocorrelation, heteroskedasticity, multicollinearity, normality of distribution of the residuals and stability tests, and adopts remedial measures when a test shows there is a problem to ensure that the results obtained lead to reliable conclusions.

3.4. Data Coverage, Measurement and Sources

The study employs annual data spanning 1970 to 2019, making 50 years. This period is chosen as it started immediately after the civil war and ended when the most recent data were available when collecting the data. The definition of these variables, their sources and how they are measured are as described below:

The growth rate of real GDP is computed as the first difference of annual GDP expressed as a percentage of real GDP in the preceding year, in the same manner that the growth of labour force is calculated as its first difference as a percentage of its preceding year's value. Before 1990, population growth was used to replace labour force growth because there were no data available pre-1990. The inflation rate is computed as the first difference of the consumer price index as a percentage of the index at the end of the previous year. It is measured in annual per cent. The balance of payments indicates that foreign direct investment is the total equity capital, reinvestment of earnings, other long-term capital, and short-term capital. It is expressed as a percentage of GDP. The GFC is computed as the gross capital formation expressed as a percentage of GDP, and it serves as the proxy for the growth of capital stock in respect of which statistics are not available. Trade Openness is the value of the trade—the sum of exports and imports of goods and services—measured as a percentage of GDP. GOVT, computed as general government consumption expenditure, is measured as the percentage of GDP.

Data are sourced from the World Bank database (online) except FDIMI, FDMA, and FDIAG obtained from the Central Bank of Nigeria's Statistical Bulletin (2019).

4. Results and Discussion

This section presents and discusses the results of the various analyses conducted in the study. These include descriptive analysis results, correlation analysis results, unit root results, multicollinearity test, heteroscedasticity test, autocorrelation test, normality test, stability test and the ECM regression results.

Starting with the descriptive analysis, Table 4.1 shows the statistics summarising the variables' values and distributions.

Table 1: The Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Coeff. of Var.	Min	Max
ΔY/Y (Annual real growth rate, %)	3.94	4.43	6.35	1.61	-13.13	25.01
ΔL/L (Annual labour force growth, %)	2.64	2.64	0.19	0.07	2.04	3.03
GCF (Gross capital formation, % of GDP)	20	20	10.04	0.50	1	39
FDI (Foreign direct investment, % of GDP)	1.50	1.19	1.21	0.81	-1.15	5.79
FDIMI (FDI in mining sector, % of GDP)	23.86	24.5	12.63	0.53	1	39
FDIMA(FDI in manufacturing sector, % of GDP)	24.4	25.5	13.07	0.54	1	40
FDIAG(FDI in agricultural sector, % of GDP)	13.76	12.5	10.06	0.73	1	27
TRA (Total trade, % of GDP)	36.53	35.84	12.69	0.34	16.77	66.39
INF (Inflation, Annual % change in consumer price)	18.29	12.77	15.62	0.85	3.46	72.84
GOVT (Government consumption expenditure, % of GDP)	16.6	15.5	13.07	0.79	1	40

Source: ***Author's computation using STATA 14.0***

Explanatory Note: Std. Dev. = standard deviation, Coeff. of Var. = coefficient of variation, min = minimum, max = maximum. The number of observations in all variables is 50. It should be noted that the value of the aggregate FDI is in billion dollars while that of the sectoral flow into mining, manufacturing and agriculture is in billion nairas, being the reason for the large difference in their values

median values for each variable are not too far apart.

The coefficient of variation for GDP growth rate (ΔY/Y) is 1.61, the highest of all coefficients for the variables covered in the study, implying that ΔY/Y has the highest degree of variation or volatility. This is followed in sequence by inflation, foreign direct investment, government consumption expenditure, foreign direct investment in the agricultural sector, foreign direct investment in the manufacturing sector, foreign direct investment in the mining sector, gross capital formation, trade openness and lastly, labour force growth which has the smallest variation of 0.07.

Concerning the correlation analysis, Table 4.2 is on the correlation matrix, which shows the degree and directions of association between every pair of the variables employed in the study

Table 2: The Correlation Matrix

		ΔY/Y	ΔL/L	GCF	FDI	FDIMI	FDIMA	FDIAG	TRA	INF	GOVT
ΔY/Y	Cor. Coef.	1.000									
ΔL/L	Cor. Coef.	-0.367	1.000								
	P-value	(0.009)*									
GCF	Cor. Coef.	0.184	-0.018	1.000							
	P-value	(0.199)	(0.903)								
FDI	Cor. Coef.	0.142	-0.247	-0.059	1.000						
	P-value	(0.324)	(0.084)	(0.684)							
FDIMI	Cor. Coef.	0.047	0.133	0.090	-0.082	1.000					
	P-value	(0.746)	(0.357)	(0.533)	(0.571)						
FDIMA	Cor. Coef.	0.263	0.165	0.180	0.039	0.441	1.000				
	P-value	(0.065)	(0.253)	(0.209)	(0.785)	(0.001)*					
FDIAG	Cor. Coef.	0.018	0.319	0.104	-0.128	0.525	0.735	1.000			
	P-value	(0.993)	(0.024)*	(0.471)	(0.785)	(0.000)*	(0.000)*				
TRA	Cor. Coef.	-0.001	0.264	-0.022	0.159	-0.255	-0.225	-0.225	1.000		
	P-value	(0.993)	(0.064)	(0.879)	(0.270)	(0.074)	(0.117)	(0.116)			
INF	Cor. Coef.	-0.235	0.098	-0.264	0.386	-0.237	-0.146	-0.199	0.261	1.000	
	P-value	(0.101)	(0.498)	(0.064)	(0.006)*	(0.097)	(0.313)	(0.166)	(0.067)		
GOVT	Cor. Coef.	-0.083	0.099	0.048	0.096	0.386	0.209	0.253	-0.363	-0.183	1.000
	P-value	(0.565)	(0.491)	(0.739)	(0.509)	(0.006)*	(0.145)	(0.076)	(0.009)*	(0.203)	

Sources: Author's computation using STATA 14.0

Explanatory Note: The following are the meanings of acronyms in Table 4.2: ΔY/Y = growth rate of real GDP, ΔL/L = labour force, GCF = gross capital formation, FDI = foreign direct investment, FDIMI = foreign direct investment in mining sector, FDIMA = foreign direct investment in manufacturing sector, FDIAG = foreign direct

investment in agricultural sector, TRA = trade openness, INF = inflation, GOVT = government expenditure. Cor. Coef. = correlation coefficient. P-values are in parenthesis, below the correlation coefficients. A coefficient is statistically significant if the associated P-value is not more than 0.05. The number of observations in each case is 50.

The first column shows that ΔY/Y is only correlated with ΔL/L negatively and not with any other variables. The second column also shows that ΔL/L is only correlated positively with FDIAG while exhibiting no correlation with other variables. In the third column, GCF is not correlated with other variables, while the fourth column indicates the presence of a positive correlation between FDI and INF.

The fifth column shows FDIMI to be correlated positively with FDIMA, FDIAG and GOVT while it is not correlated with other variables. The sixth column indicates the presence of a positive correlation of FDIMA with FDIAG. At the same time, other variables are not correlated with it other than the positive correlation with FDIMI as indicated above. The sixth column shows FDIAG does not correlate with other variables other than ΔL/L, FDIMI and FDIMA. The seventh column indicates that TRA is negatively correlated with GOVT while it has no other correlation with other variables. Finally, the eighth column points out that INF is not correlated with other variables except a positive correlation with FDI.

The data's r

elevant time-series properties are examined, starting with the unit root test; the results are shown in Table 4.3. The Augmented Dickey Fuller (ADF) test methodology is used to test for non-stationarity and stationarity for all the variables.

Table 3: Results of the ADF Unit Root Tests

Augmented Dickey Fuller Statistics (ADF) Test					
Variables	**ADF T-stat**	**Critical Value 5%**	**P-Value**	**Order of Integration**	**Conclusion**
ΔY/Y	-5.630	-2.933	0.000	I(0)	Stationary
ΔL/L	-3.106	-2.933	0.026	I(0)	Stationary
GCF	-6.549	-2.933	0.000	I(0)	Stationary
FDI	-4.192	-2.933	0.001	I(0)	Stationary
FDIMI	-3.599	-2.933	0.006	I(0)	Stationary
FDIMA	-2.603	-2.933	0.092	I(0)	Not Stationary
	-7.510	-2.936	0.000	I(1)	Stationary
FDIAG	-1.903	-2.933	0.331	I(0)	Not Stationary
	-7.156	-2.936	0.000	I(1)	Stationary
TRA	-2.994	-2.933	0.035	I(0)	Stationary
INF	-3.442	-2.933	0.009	I(0)	Stationary
GOVT	-1.647	-2.933	0.458	I(0)	Not Stationary
	-6.222	-2.936	0.000	I(1)	Stationary

Source: Author's computation using STATA 14.0

Explanatory Note: The following are the meanings of acronyms in Table 4.3: ΔY/Y = growth rate of real GDP, ΔL/L = labour force, GCF = gross capital formation, FDI = foreign direct investment, FDIMI = foreign direct investment in mining sector, FDIMA = foreign direct investment in manufacturing sector, FDIAG = foreign direct investment in agricultural sector, TRA = trade openness, INF = inflation, GOVT = government expenditure. The decision rule is to reject the null hypothesis that a variable has a unit root if the p-value is less than the chosen 5% significance level.

As seen from Table 4.3, the results reveal that ΔY/Y, ΔY/Y, GCF, FDI, FDIMI, TRA and INF are stationary at level. At the same time, FDIMA, FDIAG and GOVT are stationary after the first difference at the chosen 5% significance level. This means that the variables have a mixture of I(0) and I(1) series, and it also implies that the use of the Autoregressive Distribution Lag (ARDL) bounds testing approach is the suitable one to test for the long run co-integration.

Accordingly, the existence of co-integration is tested for using the ARDL Bounds test approach, and the outcome of the test is as presented in Table 4.4.

Table 4: Results of the ARDL Bounds Test

ARDL Bounds Test Result for Equation 7			
	Values	**I(0) Bound at 5% Sig. Level**	**I(1) Bound at 5% Sig. Level**
F-Stats	6.222	2.743	4.232
K	6		
Prob (F-Stat)		0.000	0.006

ARDL Bounds Test Result for Equation 8			
	Values	**I(0) Bound at 5% Sig. Level**	**I(1) Bound at 5% Sig. Level**
F-Stats	4.509	2.503	4.124
K	8		
Prob (F-Stat)		0.002	0.032

Source: Authors computation using Stata 14.0
Explanatory note: *I(0) Bound is the lower bound, I(1) Bound is the upper bound, K is the number of variables regressed against the dependent variable ΔY/Y. The decision rule is to reject the null hypothesis of no correlation if F-statistic is greater than lower and upper bound; otherwise, accept.*

Pesaran, Shin and Smith (2001) indicated that if the values of F-statistical are larger than the Upper limit I(1), the affected two or more variables are considered to be jointly integrated. The F-statistical value is higher than the upper I(1) limit value at a 5 per cent level of significance, as shown by the result of the ARDL bounds test concerning each of the Equations (7) and (8). This means that the null hypothesis of no long-run association has been rejected and that the conclusion is, therefore, that there is a long-run relationship among the variables. This results in ARDL being used to examine the long and short-term impacts of explanatory factors on the dependent variable ΔY/Y. The results are presented and assessed hereafter.

4.1. Presentation of the Estimate

To present and analyse the estimates of Equations 7 and 8 on the impacts of FDI on economic growth in Nigeria, the table of the long run Autoregressive Distributive Lag (ARDL) regression estimates is first presented. This is followed by an evaluation of the diagnostic statistics and a discussion of the performance of each explanatory variable. However, it should be noted that only the long-run result is discussed below for brevity purposes.

Table5 : Estimates of the Autoregressive Distributive Lag (ARDL)

	Equation 7			**Equation 8**		
Variables	**Coeff.**	**T-Stat**	**P-value**	**Coeff.**	**T-Stat**	**P-value**
ΔL/L	-11.936	-2.37	0.024	-6.929	-1.42	0.168
GCF	0.029	0.38	0.704	0.160	1.45	0.157
FDI	2.006	2.22	0.033	-	-	-
FDIMI	-	-	-	-0.138	-1.45	0.159
FDIMA	-	-	-	0.237	2.99	0.006
FDIAG	-	-	-	-0.215	-1.81	0.082
TRA	0.134	2.22	0.033	0.137	2.06	0.050
INF	-0.304	-4.40	0.000	-0.222	-3.29	0.003
GOVT	-0.709	-3.19	0.003	-0.483	-2.63	0.014
Adjustment Coefficient	**-0.949**	**-5.89**	**0.000**	**-1.066**	**-5.49**	**0.000**
R-squared	**0.719**			**0.769**		
No of Observation	**47**			**58**		

Sources: Author's computation using STATA 14.0
Explanatory Note: The following are the meanings of acronyms in Table 4.4: ΔY/Y = growth rate of real GDP, ΔL/L = labour force, GCF = gross capital formation, FDI = foreign direct investment, FDIMI = foreign direct investment in mining sector, FDIMA = foreign direct investment in manufacturing sector, FDIAG = foreign direct investment in agricultural sector, TRA = trade openness, INF = inflation, GOVT = government expenditure, Coeff. = coefficient, T-stat = T-statistics. A coefficient is statistically significant if the associated P-value is not more than 0.05. A negative adjustment coefficient indicates the presence of long-run convergence.

The R-squared in equation 7 is 72% and in equation 8 is 79% indicating that the equations have very high explanatory powers. The adjustment coefficients are negative, viz; -0.949 and -1.066, indicating that 95% of error is corrected in each period for equation 7 and 107% of error is corrected in each period for equation 8.

The tests carried out to check the models' assumptions on residual, autocorrelation, multicollinearity, heteroscedasticity and stability are evaluated below. The study carried out multicollinearity test using Variance Inflation Factor (VIF) test and from the result gotten, there is no high multicollinearity as the VIF of each explanatory variable is less than 10 so that the hypothesis of absence of multicollinearity in the models is accepted in the

Equations 7 and 8. Also, Breusch-Pagan's chi-square (χ^2) probability for heteroscedasticity produces a p-value of 0.431 in Equation 7 and 0.432 in Equation 8, greater than the chosen significance level at 0.05. Following

the decision rule shows that the null hypothesis of constant variance is accepted. The result, therefore, indicates that there is no heteroscedasticity in the residuals.

The Jarque-Bera χ^2 value is 0.33 in Equation 7 and 0.06 in Equation 8, greater than the 5% significance level. The study, therefore, fails to reject the null hypothesis of normally distributed error terms, leading to the conclusion that the residuals are normally distributed. Likewise, the χ^2 probability of the Breusch-Godfrey LM autocorrelation test is 0.778 in Equation 7 and 0.861 in Equation 8, higher than the chosen level of significance, which is 0.05 in this study. Thus, the study accepts the null hypothesis of no autocorrelation and concludes that there is no autocorrelation. Similarly, the parameters are stable over the sample period, considering that the movements of CUSUMSQUARE residuals are within the 5% level of boundary level lines in both Equations 7 and 8. The decision is to reject the null hypothesis if CUSUMSQUARE residuals are outside the critical lines and are to be accepted if otherwise. The study, therefore, accepts the hypothesis of an absence of instability in the model.

After evaluating the overall diagnostic statistics of the Equation, we now proceed to examine the performance of each of the explanatory variables based on the 3 'S'—the size, sign and statistical significance.

The coefficients of labour force growth (ΔL/L) for the two equations are –11.936 and –6.929 with p-values 0.024 and 0.168, indicating a negative effect on ΔY/Y in the first Equation and no effect in the second Equation which does not conform to the positive a priori expectation posited in Section 3. Therefore, the study concludes that there is no robust evidence concerning the effect of this factor on economic growth in Nigeria. This is not in conformity with the apriori expectation posited in Section 3. This may be attributed to data measurement, which is a mixture of population growth and labour force growth as labour force growth data is not available pre-1990.

The coefficients of gross capital formation (GCF) for the two equations are 0.029 and 0.160 with p-values 0.704 and 0.157, indicating the coefficients are positive but statistically insignificant, which does not conform to the positive a priori expectation posited in Section 3. This may be ascribed to data measurement, whereby GCF is used as a proxy for capita stock in respect of which the data is not available. Therefore, the study concludes that there is no effect of this factor on economic growth in Nigeria.

Concerning the positive coefficient of foreign direct investment (FDI) in the first Equation, which is 2.006 with a p-value of 0.033, which indicate that the coefficient is positive and statistically significant, which conforms with the positive a priori expectation posited in Section 3 and also with existing literature such as Kowalski (2000) and Tsai (1994). Therefore, the study concludes that there is a positive effect of this factor on economic growth in Nigeria.

As regards the negative coefficient of foreign direct investment in mining (FDIMI) in the second Equation, which is -0.138 with a p-value of 0.159, which shows that the negative coefficient is statistically insignificant which does not conform to the positive a priori expectation posited in Section 3, but the result is in line with the findings of Imoudu (2012). The negative relationship of FDIMI defies all expectations. However, this might be due to the mining sector's relatively little contribution to the broader economy. It might also imply that the country's extractive structure is not complimentary, hence not trade-enhancing. Therefore, the study concludes that there is no effect of this factor on economic growth in Nigeria.

With respect to the positive coefficient of foreign direct investment in manufacturing (FDIMA) in the second Equation, which is 0.237 with a p-value of 0.006, indicating that the positive coefficient is statistically significant, which conforms to the positive a priori expectation posited in Section 3 and also with existing literature such as Ayanwale (2007). Therefore, the study concludes that there is a positive effect of this factor on economic growth in Nigeria.

With reference to the negative coefficient of foreign direct investment in agriculture (FDIAG) in the second Equation, which is -0.215 with a p-value of 0.082, which shows that the negative coefficient is statistically insignificant which does not conform to the positive a priori expectation posited in Section 3, but the result is in line with the findings of Imoudu (2012). The negative relationship of FDIAG is contrary to expectations. However, this might be due to the country's agricultural system not being complimentary and so not promoting trade. Therefore, the study concludes that there is no effect of this factor on economic growth in Nigeria.

As to the positive coefficients of trade openness (TRA) for the two equations, viz; 0.134 and 0.137 with p-values 0.033 and 0.050, indicating the coefficients are positive and statistically significant, which conforms with the positive a priori expectation posited in Section 3 and also with existing literature such as Beck (2000). Therefore, this study concludes that this factor has a positive effect on economic growth in Nigeria.

As regards the negative coefficients of inflation (INF) for the two equations, viz; -0.304 and -0.222 with p-values 0.000 and 0.003, indicating the coefficients are negative and statistically significant, which conforms with the negative a priori expectation posited in Section 3 as well as past literature such as Kowalski (2000). Therefore, this study concludes that this factor has a negative effect on economic growth in Nigeria.

Vis-à-vis the negative coefficients of government consumption expenditure (GOVT) for the two equations, viz; -0.709 and -0.483 with p-values 0.003 and 0.014, indicating the coefficients are negative and statistically significant which in conformity with the negative a priori expectation posited in Section 3 and with existing literature such as Onifade, Cevik and Erdogan et al. (2020). Therefore, this study concludes that this factor has a negative effect on economic growth in Nigeria.

5. Conclusion and Recommendation

Based on the above methodology, the highlights of the findings and the conclusion specific to each finding are as follows:

(a) The coefficients of labour force growth are negative in both equations but statistically significant in the first Equation, while it is statistically insignificant in the second Equation, implying that there is no robust evidence to ascertain the effect of labour force growth on the Nigerian economic growth.
(b) The coefficients of gross capital formation are positive but statistically insignificant, implying that gross capital formation does not affect economic growth in Nigeria.
(c) The coefficient of foreign direct investment is positive and statistically significant, implying that foreign direct investment positively affects economic growth in Nigeria.
(d) The coefficient of foreign direct investment in the mining sector is negative and statistically insignificant, implying that foreign direct investment in the mining sector does not affect Nigerian economic growth.
(e) The coefficient of foreign direct investment in the manufacturing sector is positive and statistically significant, implying that foreign direct investment in the manufacturing sector positively affects economic growth in Nigeria.
(f) The coefficient of foreign direct investment in the agricultural sector is negative and statistically insignificant, implying that foreign direct investment in the agricultural sector does not affect Nigerian economic growth.
(g) The coefficients of trade openness are positive and statistically significant, implying that trade openness has a positive effect on economic growth in Nigeria.
(h) The coefficients of inflation are negative and statistically significant, implying that inflation has a negative effect on economic growth in Nigeria.
(i) The coefficients of government expenditure are negative and statistically significant, implying that government expenditure has a negative effect on Nigerian economic growth.

The general conclusion following the above findings is that there is no robust evidence to ascertain the effect of labour force growth on the Nigerian economy. There is also evidence that foreign direct investment inflow, foreign direct investment in the manufacturing sector, and trade openness have positive effects on economic growth in Nigeria. While gross capital formation, foreign direct investment in the mining sector and foreign direct investment in the agricultural sector have no effect, inflation and government expenditure negatively affect Nigerian economic growth.

Based on the findings of this study as highlighted above, the following policy recommendations are made.

As the study has been able to establish that the aggregate foreign direct investment and the sectoral form going to the manufacturing sector as well as trade openness exhibit positive impacts on economic growth in Nigeria, it is recommended that the authorities step up efforts by introducing a policy that would attract a huge influx of FDI in general and in particular to manufacturing industries, just as it should open the economy more to foreign trade. Also, as a result of the finding that inflation rate and government consumption expenditure have negative effects on economic growth, it is recommended that authorities should strive for price stability and reduce government spending.

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