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EFFECT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIA (1981-2020)

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Abstract

Foreign Direct Investment is seen as an important source of economic growth in the present global economic environment. Most countries strive to attract FDI because of its acknowledged advantages as a tool of economic development. Thus, the study has the specific objectives of investigating empirically the effect of FDI on economic growth and sectoral output growth from 1980-2020. To achieve these objectives, data were obtained from World Bank's World Development Indicators. Neoclassical growth model was used as a theoretical background in the study. The study estimated unit root test using Augmented Dickey-Fuller test, it was discovered that government final consumption expenditure, export of goods and services, and gross fixed capital formation were significant at first difference while other variables were significant at level. As a result, regression analysis, using Autoregressive Distributive Lag technique was employed. The results show that current foreign direct investment has positive effect on economic growth, FDI 3 years ago has positive effect on manufacturing output growth and finally, current FDI has negative effect on agricultural output growth. Based on these findings, it was recommended among others, that policy makers should target policies on promoting FDI inflow in order to achieve increase in manufacturing output growth and economic growth.

Keywords: Economic growth, FDI, ARDL, Bound testing and Cointegration test

Introduction

The most and strategic factor influencing economic growth in any country is investment. It is characterized as the main key to increased level of productivity. Foreign Direct Investment (FDI) has been described as investment made so as to acquire a lasting management interest (for example, 10 percent of voting stock) and at least 10 percent of equity shares in an enterprise operating in another country other than that of the investor's country. Policy makers believe that FDI produces positive effects on host economies (Ilemona, 2010; Imoudu, 2012). FDI is seen as an important source of economic growth in the present global economic environment. Most countries strive to attract FDI because of its acknowledged advantages as a tool of economic development. Africa in particular joined the rest of the world in seeking FDI as evidenced by the formation of the New Partnership for Africa's Development (NEPAD), which has the attraction of foreign investment to Africa as a major component. Therefore, FDI is assumed to benefit a poor country like Nigeria, not only by supplementary domestic investment, but also in terms of employment creation, transfer of technology, increased domestic competition and other positive externalities (Imoudu, 2012).

Nigeria is one of the economies with great demand for goods and services and has attracted some FDI over the years. The amount of FDI inflow into Nigeria was estimated at US$3.45 billion in 2016 and reduces to US$2.41 billion in 2017 or a decrease of 30.1 percent. The figure decline further to US $0.78 billion which is equivalent to a 67.9 percent decrease in 2018. The figure, however, slightly rise to US$ 2.31 in 2019 (World Development Indicator, 2021). The absence of adequate supporting infrastructure vis: telecommunication, transport, power supply, skilled labor, discourages foreign investment because it increases transaction costs. Furthermore, poor infrastructure reduces the productivity of investment thereby discouraging inflows (Aseidu 2002). In Nigeria, it is difficult to tell what specific aspect of government policies are in operation. This is due to part of frequent policy changes in the region and the lack of transparency in macroeconomics policy. The lack of transparency in economic policy is of concern because it increases transaction cost thereby reducing the incentives for foreign investment (Awolusi, Adeyeye, & Pelser, 2017). Recently, COVID-19 outbreak that started early 2020 deteriorate

the business activities and lead to economic down-turn of countries around the world. This greatly reduces the FDI inflows to Nigeria and other economic activities within the country.

In order to assist policymakers in this regard, theoretical and several empirical studies have sought to shed light on how FDI affects growth to such an extent that this topic is one of the most researched in economics literature.Even though many studies have investigated the effect of FDI on economic growth in Nigeria, with most reporting mixed results, there are still many grounds yet to be covered, because previous studies are bedevilled with certain methodological pitfalls. It would have been more informative, if the effect of FDI on sectoral output growth is tested by such studies, which is the primary goal of the present study.

Literature Review

There is a great deal of study theoretically and empirically concerning the effect of FDI on economic growth. In theory, there are three theoretical approaches to economic growth concerning investment: the classical growth theory, the neo-classical growth theory, and the endogenous growth theory. According to the classical growth theory, the sources of output growth are capital accumulation, supply of land, growth of labour force, and change in institutions, which is determined exogenously and it is very important in determining economic growth. He also mentioned that production function comprising land, labour and capital is subjected to increasing returns to scale. The theory also argues that production function is subjected to diminishing return to scale and he classified the factors of production into two, viz: variable factor and fixed factor. Land and capital are described as fixed factors while labour and technological knowhow are characterized as variable factors (Jhingan, Girija & Sasikala, 2012). In all, the classical growth theory posited that sources of growth are land improvements, growth of labour force, growth of capital stock and growth of technology. Neo-classical growth theory 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 increase in both the steady state level of output per capita and capital per capita over time without affecting the growth rate of output. Growth rate of output remains unchanged due to law of diminishing marginal product of capital, because any further increase in capital will lead to a fall in output back to the steady state (Dornbusch, Fischer, & Startz, 2011).

Unlike the neo-classical growth theory has dominated for three decades by attributing long run growth to technological progress and population growth rate without explaining the economic determinants of technological progress. endogenous growth theory argues that the physical capital and knowledge capital are the main determinants of economic growth. The former is subjected to diminishing returns while the latter is not. The theory assumes on constant marginal product of capital, unlike the exogenous or neo-classical growth theory which assumes diminishing marginal product of capital. While the neo-classical theory predicts conditional convergence whereby countries with different savings rates but the same rate of technical progress and population growth rate will have different levels of income but the same growth rate of income, endogenous growth theory predicts that the higher the savings rate, the higher would be the growth rate of income (Dornbusch et al., 2011). Several studies have examined the effect of FDI on economic growth in Nigeria and other countries. Some of the studies are reviewed in this section. Ayanwale (2007) examined the relationship between non-extractive FDI and economic growth in Nigeria from 1970-2002 using secondary data sourced from Central Bank of Nigeria (CBN), International Monetary Fund (IMF-Imam Fulani) and Federal Office of Statistics (FOS). The explanatory variables used include infrastructural development, ratio of government consumption in GDP, openness, and human capital. The estimation technique employed in the study were Ordinary Least Square (OLS) method and 2SLS. The study revealed that the determinants of FDI in Nigeria are market size, infrastructure development, and stable macroeconomic policy. Also, FDI inflow in Nigeria contribute positively to economic growth.

Adeyeye & Awolusi (2016) empirically examine the influence of foreign direct investment (FDI) inflow on economic growth in some randomly selected African economies from 1980-2013. The explanatory variables used include human capital, international technology transfer, labor force, and gross fixed capital formation. The data in the study were sourced from World Bank's World Development Indicators (WDI), World Trade Organization (WTO), United Nations Conference on Trade and Development (UNCTAD). Ordinary Least Square (OLS) method and Generalized Method of Moments GMM techniques were used for estimation. Their study revealed that South Africa's growth is more affected by FDI than other four countries (Kenya, Central Africa Republic, Egypt, and Nigeria). Subsequently, in the following year, one more author join Adeyeye & Awolusi (2016) to revisit the earlier topic of the study. Therefore, Awolusi, Adeyeye & Pelser (2017) re-examined the impact of foreign direct investment economic growth in Africa by comparing four African countries (Kenya, Central Africa

Republic, Egypt, and Nigeria) from 1980-2014. The present study examines how country-specific factors can explain variations in the growth benefits of FDI. Same explanatory variables were included during estimation and same techniques of estimation were used as done in their previous study. The present study revealed more that government policies on FDI play significant roles in facilitating improved economic growth in African countries during the study period.

The review of theoretical literature reveals that, FDI may affect economic growth in different ways; it may enhance growth through significant positive impact, deter growth through negative impact and may not even affect growth. This contradictory proposition of the theoretical literature has also been confirmed by empirical literature on FDI-growth nexus. While some studies reported positive effect of FDI on growth, other studies reported negative effect on economic growth. In Nigeria, though substantial literature has examined the effect of FDI on economic growth, almost all studies focus on GDP as proxy for economic growth. The study therefore contributes to the literature by examining the effect of FDI on sectoral output growth in Nigeria.

Theoretical Framework

The theoretical foundations of growth of GDP per capita equation (economic growth) can be found in neoclassical growth model which is widely used in empirical studies. According to Dornbusch et al. (2011), the derivation of growth accounting equation goes thus:

Given an aggregate production function:

$Y = Af(K,\ N)$……..3.1

where A= Technological progress, K= Capital stock, N= Labour, and Y= Output

The production function above indicates that output is a function of labour, capital and technological progress. Assuming output change as a result of the change in each of the input K, N and A multiplied by their marginal productivity gives Equation 3.2 below

$$\Delta Y = MPN.\Delta N + MPK.\Delta K + F(K,N).\Delta A \quad \text{……..3.2}$$

where MPN and MPK indicate marginal productivities of labour and capital respectively. If equation 3.2 above is divided by equation 3.1, then we arrive at:

$\frac{\Delta Y}{Y} = \frac{MPN}{Y}.\Delta N + \frac{MPK}{Y}.\Delta K + \frac{\Delta A}{A}$……..3.3

Multiplying and dividing the first and second part of the Right Hand Side (RHS) by N and K respectively will give:

$\frac{\Delta Y}{Y} = \left(\frac{MPN}{Y}N\right)\frac{\Delta N}{N} + \left(\frac{MPK}{Y}K\right)\frac{\Delta K}{K} + \frac{\Delta A}{A}$ ……3.4

Assuming a perfect competitive market, so that factors are paid their respective marginal products, then, MPN = w and MPK = r, where w and r are the market wage rate and net capital rental rate. $\frac{MPN}{Y}N$ and $\frac{MPK}{Y}K$ indicate the share of labour and capital from the total income respectively as given in Equation 3.4. Replacing the labour and capital share with $1-\alpha$ and α resctively will give us the growth accounting equation below:

$\frac{\Delta Y}{Y} = (1-\alpha)\frac{\Delta N}{N} + \alpha\frac{\Delta K}{K} + \frac{\Delta A}{A}$ ……..3.5

Equation 3.5 summarizes that the growth of inputs (labour and capital) with their weights and growth of productivity on the Right Hand Side (RHS) gives the growth of output on the Left Hand Side (LHS). The above is the derivation of the growth accounting equation which, in turn, is based on the neoclassical growth framework. It is this growth accounting equation that serves as the basis for the model specification adopted in the study, which is the subject examined in the next section.

Model Specification

This section is divided into two sub-sections. Sub- section 3.2.1 presents the model used to analyse the effects of FDI and control variables on the economic growth. The model used to investigate the effect of FDI on sectoral (Manufacturing and Agricultural) output growth is presented in Sub-section 3.2.2.

Model to Analyse the Effect of FDI and Control Variables on the Economic Growth

To achieve Objective 1 of this study, the neoclassical growth model in Equation 3.5 was re-specified. This is done by putting the explanatory variables of interest in Equation 3.5 and transform the result into an econometric model of economic growth by adding intercept β_0, time and country subscripts (t and i) and the stochastic error term (U).

$$\left(\frac{\Delta y}{y}\right)_t = \beta_0 + \beta_1\left(\frac{\Delta k}{k}\right)_t + \beta_2 \mathrm{FDI}_t + \beta_3 \mathrm{GEXP}_t + \beta_4 \mathrm{EXPT}_t + \beta_5 \mathrm{INF}_t + U_t \text{…….3.6}$$

In Equation 3.6, $\frac{\Delta k}{k}$ that represents the growth of capital stock per capita is replaced by the share of gross fixed capital formation in the GDP, denoted by INV. This is because the data for $\frac{\Delta k}{k}$ is not available and the only suitable proxy for growth of capital stock per capita is the share of gross fixed capital formation in the GDP (INV). Though, share of gross fixed capital formation cannot be an exact representation of growth of capital stock per capita because they are not of the same measurements. So, Henceforth, growth of capital stock per capita ($\frac{\Delta k}{k}$) will be replaced by the log of ratio of gross fixed capital formation in GDP (INV). Thus, Equation 3.12 is re-specified below after replacing $\frac{\Delta k}{k}$ with INV.

$$\left(\frac{\Delta y}{y}\right)_t = \beta_0 + \beta_1 \mathrm{In}INV_t + \beta_2 \mathrm{InFDI}_t + \beta_3 \mathrm{InGEXP}_t + \beta_4 \mathrm{InEXPT}_t + \beta_5 \mathrm{INF}_t + U_t \quad \ldots\ldots 3.7$$

where:

$\frac{\Delta y}{y}$ = growth in real per capita gross domestic product /Economic growth.

INV = gross fixed capital formation as percentage of GDP.

FDI= Foreign Direct Investment.

GEXP= general government final consumption expenditure as percentage of GDP.

EXPT= export of goods and services as percentage of GDP.

INF = inflation rate.

t subscripts= year subscripts.

β_0, β_1, β_2,β_3,β_4,β_5,β_6, and $\beta_7$represent parameters to be estimated.

$U_{it,}$= Stochastic error term.

Equation 3.7 shows that economic growth is a function of gross fixed capital formation (INV), Foreign Direct Investment (FDI) and other control variables (GEXP, EXPT, and INF) affecting economy productivity and growth.

Model to Analyse the Effect FDI on Sectoral Output Growth

To achieve Objective 2 of this study, Equation 3.7 was re-specified. This is done by replacing the real per capita growth output$\left(\frac{\Delta y}{y}\right)$ with each of the following sectoral outputs growth viz: Manufacturing per capita output growth $\left(\frac{\Delta mo}{mo}\right)$; Agricultural per capita output growth $\left(\frac{\Delta ao}{ao}\right)$ and Industrial output per capita ($\frac{\Delta io}{io}$) one after the other to arrive at Equation 3.8, 3.9 and Equation 3.10 respectively.

$$\left(\frac{\Delta mo}{mo}\right)_t = \beta_0 + \beta_1 INV_t + \beta_2 \mathrm{FDI}_t + \beta_3 \mathrm{GEXP}_t + \beta_4 \mathrm{EXPT}_t + \beta_5 \mathrm{INF}_t + U_t \quad \ldots\ldots 3.8$$

$$\left(\frac{\Delta ao}{ao}\right)_t = \beta_0 + \beta_1 INV_t + \beta_2 \mathrm{FDI}_t + \beta_3 \mathrm{GEXP}_t + \beta_4 \mathrm{EXPT}_t + \beta_5 \mathrm{INF}_t + U_t \quad \ldots\ldots 3.9$$

$$\left(\frac{\Delta io}{io}\right)_t = \beta_0 + \beta_1 INV_t + \beta_2 \mathrm{FDI}_t + \beta_3 \mathrm{GEXP}_t + \beta_4 \mathrm{EXPT}_t + \beta_5 \mathrm{INF}_t + U_t \quad \ldots\ldots 3.10$$

Equations 3.8-3.10 show that manufacturing output growth, agricultural output growth, and industrial output growth is a function of gross fixed capital formation (INV), Foreign Direct Investment (FDI) and other control variables (GEXP, EXPT, and INF) affecting economy productivity and growth.

Definition of Variables and Sources of Data

a) Foreign Direct Investment (FDI): Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. Data are sourced from the World Bank's WDI, (2020).

b) Gross fixed capital formation (INV): Gross fixed capital formation, as described in the data source, includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the System of National Accounts (SNA), net acquisitions of valuables are also considered capital formation. Data are measured as a ratio of GDP, with both being in nominal terms and in local currency before expressing one as a ratio of the other. Data on both the numerator and denominator are sourced from the World Bank's WDI, (2020).

c) Economic growth ($\frac{\Delta y}{y}$): This is the annual percentage change in the real GDP per capita in local currency. According to the data source, GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant local currency. Data on the real GDP and mid-year population are sourced from the World Bank's WDI, (2020). The growth rate of per capita output is computed as the first difference of the natural log values and it is expressed in percentage.

d) General government final consumption expenditure ratio (GEXP): According to the data source, this includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditure on national defense and security, but excludes government military expenditures that are a part of government capital formation. Data are measured as a ratio of GDP, with both being nominal terms and in local currency before expressing one as a ratio of the other. Data on both the numerator and denominator are sourced from the World Bank's WDI, (2020).

e) Export of goods and services (EXPT) ratio: This represents the value of all goods and other services provided to the rest of the world. According to the data source, they include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are measured as a ratio of GDP, with both being nominal terms and in local currency before expressing one as a ratio of the other. Data on both the numerator and denominator are sourced from the World Bank's WDI, (2020).

f) Inflation rate (INF): Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Data are sourced from the World Bank's WDI, (2020).

g) Manufacturing output growth: Annual growth rate for manufacturing value added based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3.

h) Agricultural output growth: Annual growth rate for agricultural value added based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3.

Results and Discussion

Descriptive Statistics

Table 1 below shows the descriptive statistics for each of the variables considered in this study. The table presents the mean, median, maximum, minimum, standard deviation, skewness and kurtosis for all dependent and explanatory variables. The descriptive analysis is presented to give a brief summary of the samples and measures done in the study.

Table 1 Estimates of Descriptive Analysis

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Coef. Of Var.
GDPPG	0.94	1.553723	12.45747	-13.15315	4.695203	-0.505691	4.412405	4.988926
INV	34.51622	32.04361	85.94140	14.16873	17.53097	0.898435	3.578592	0.507905
FDI	1.557160	1.266578	5.790847	0.195183	1.254224	1.676911	5.830070	0.805456
GEXP	3.772596	2.098885	9.448340	0.911235	2.851609	0.763583	2.124549	0.755874
EXPT	19.39477	20.61429	36.02327	5.249090	8.055147	-0.133224	2.209098	0.415325

INF	19.10261	12.38637	72.83550	5.388008	17.28965	1.768943	4.890177	0.905093
AOUTG	5.787539	4.022421	55.57805	-4.382437	9.072606	4.518106	25.37266	1.56761
IOUTG	1.018411	1.816292	18.05893	-18.97455	6.702788	-0.470046	4.545343	6.581613
MOUTG	0.90012	2.07057	21.79710	-29.02961	11.1878	-0.345701	3.044555	12.42920

Explanatory Note: GDPPG = Real Gross domestic product income per capita, INV = Gross fixed capital formation, FDI = Foreign Direct Investment, GEXP = General government final consumption expenditure ratio, EXPT = Export of goods and services ratio, INF = Inflation rate, AOUTG= agricultural output growth, IOUTG = industrial output growth, MOUTG = manufacturing output growth.

The table above reports that all the variables have average values (mean and median). The mean and median of the variables both measure the central tendency but unusual values, called outliers, affect the median less than they affect the mean. However, the results above show that both mean and median are not affected by outliers. The minimum is the smallest data value while the maximum is the largest data value. Both can be used to identify a possible outlier or data value error. One way to assess the spread of the data is to compare the minimum and maximum values. Comparing both minimum and maximum values for all variables in the table above, the variables are seen to be free from data value error.

The standard deviation is used to determine how spread out the data is from the mean. A higher standard deviation value indicates greater spread in the data. The skewness measures the symmetry of the distribution (i.e. the extent to which the mean is at the centre of the distribution). The skewness value of a normal distribution is 0. A negative value indicates a skew to the left and a positive value indicates a skew to the right. From the table above, some variables are positively skewed while some are negatively skewed as they have both positive and negative values. The kurtosis measures the peakedness (or flatness) of a distribution. A normal distribution has a value of 3. A kurtosis greater than 3 indicates a sharp peak with heavy tails closer to the mean (leptokurtic). A kurtosis less than 3 indicates the opposite, a flat top (platykurtic). Export of goods and services (EXPT) and Government final consumption expenditure (GEXP) are platykurtic while other variables are leptokurtic.

The stationarity of the series

The test was carried out to examine the stationary nature of each of the variables used in the model in order to avoid the consequence of having a spurious regression result arising from conducting Ordinary Least Squares method with non-stationary series. Presented in Table 2 below is the result of a test for the presence of unit root in each of the variables used in the model. The decision rule is to reject the null hypothesis that a variable has unit root (i.e. the variable is a non-stationary series) if p-value is less than the significance level at 0.05% and accept the null hypothesis if otherwise.

Table 2: Augmented Dickey Fuller Unit Root Test

Variable	Stationary	P-value	Order of integration
AOUTG	At level	0.0000	I(0)
EXPT	At level	0.0967	I(1)
	At First difference	0.0000	
FDI	At level	0.0058	I(0)
GDPPG	At level	0.0058	I(0)
GEXP	At level	0.6443	I(1)
	At First difference	0.0006	
INF	At level	0.0529	I(0)

INV	At level	0.4440	I(1)
	At First difference	0.0006	
IOUTG	At level	0.0001	I(0)
MOUTG	At level	0.0007	I(0)

As it can be seen from the table, the results of the ADF tests reveal that some variables were stationary at level and some at first difference at the chosen 5% significance level, judging from the p-values that are less than 0.05. Variables including: AOUTG, FDI, GDPPG, INF, IOUTG, and MOUTG are stationary at level that is they regarded as I (0) series. Contrarily, variables at first difference are: EXPT and GEXP. The implication of estimating our model using Ordinary Least Squares (OLS) method is that it will lead to spurious regression results if these non-stationary series do not have long run equilibrating relationship. This therefore necessitates the test of cointegration to check if at all there is a long-run relationship among the variables. This cointegration test is examined for each model below.

Cointegraton Test

The cointegration test is used to test for the long run relationship among the variables i.e. both dependent and independent variables. The cointegration test was conducted using ARDL bound test approach. The result of the test is shown in Table 3.

Table 3: Co integration test

Model I			**Model II**			**Model III**		
Test Statistic	**Value**	**K**	**Test Statistic**	**Value**	**K**	**Test Statistic**	**Value**	**K**
F-statistic	4.654	5	F-statistic	4.756	5	F-statistics	1.391	5
Critical value bound			**Critical value bound**			**Critical value bound**		
Significance	I(0)Bound	I(1)Bound	Significance	I(0) Bound	I(1) Bound	Significance	I(0) Bound	I(1) Bound
5%	2.62	2.79	5%	2.62	3.79	1%	3.41	4.68

From Table 3, it can be seen that the study estimated cointegration test for three models. Models 1 and 11 shows there is long run relationship among the variables in the models as indicated by their F-statistics values (4.654 and 4.756) which is greater than I (1) bound values (2.79 and 3.79) respectively at 5% significance level. Contrarily, Model 111 indicates no long run relationship among variables showing from its F-statistics value which is less than I (0) at 1% level of significant. Hence, we reject the null hypothesis for Model I and II and conclude that long run relationship exists in the models. Though, we do not reject null hypothesis for Model III and conclude that no long run relationship exists in the model. Therefore, the Autoregressive Distributed Lag (ARDL) method was adopted in estimating Model 1 and Error Correction Model (ECM) to estimate Model I and II.

Estimates of the Effect of FDI on Economic Growth and Sectoral Output Growth Model

The model examines the effect of FDI on economic growth and sectoral output growth model. The model is sub divided into three: Model I estimate the effect of FDI on economic growth, Model II estimates the effect of FDI on manufacturing output growth and Model III estimates the effect of FDI on agricultural output growth.

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Table 4 Estimates of the effect of FDI on Economic Growth and Sectoral Output Growth model

	MODEL I				**MODEL II**				**Model III**			
	ECM				**ECM**				**ARDL**			
Variables	No. of obs. = 34			Variables	No. of obs. = 34			Variables	No.of obs. = 29 after adjustment			
	Coeff.	T-stat	p-value		Coeff.	T-stat	p-value		Coeff	T-stat	p-value	
D(GDPPG(-1))	1.180	3.302	0.030	D(INV(-3))	-1.259	-2.302	0.055	AOUTG(-3)	0.749	2.500	0.167	
D(INV(-2))	1.223	4.310	0.013	D(FDI(-3))	3.143	2.631	0.034	FDI	-6.630	2.685	0.028	
D(FDI(-2))	-4.974	-3.507	0.025	D(GEXP(-1))	-4.134	2.150	0.040	D(GEXP(-2))	7.150	2.742	0.025	
D(FDI)	1.599	3.203	0.033	D(EXPT(-3))	0.617	2.542	0.039	D(EXPT(-2))	0.908	3.329	0.010	
D(INF)	-0.032	-3.412	0.027	CoinEq(-1)	-0.988	-3.038	0.019	INF(-1)	0.514	2.571	0.033	
CoinEq(-1)	-2.581	-5.593	0.005									
								F-statistics	1.443			
								Prob.F(statistics)	0.306			
								R-square	0.818			

Authors computation using Eviews 9.0 (See appendix).

Explanatory Note: GDPPG = Real Gross domestic product income per capita, INV = Gross fixed capital formation, FDI = Foreign Direct Investment, GEXP = General government final consumption expenditure ratio, EXPT = Export of goods and services ratio, INF = Inflation rate, AOUTG= agricultural output growth, IOUTG =industrial output growth, MOUTG = manufacturing output growth

As it can be seen from the table, R-squared is above 50% in Model III and the p-values of the associated F-statistics for Model III is 0.306, indicating that there is no overall statistical significance for the model. However, the model has a very high goodness of fit or explanatory powers but not significant. Concerning the presence or absence of autocorrelation of the residuals, we carried out Breusch- Godfrey Serial Correlation LM Test, and the p-values are 0.083 for Model I, 0.028 for Model II and 0.500 for Model III (with the details as reported in

appendix). Given the decision rule, we reject the null hypothesis when the p-value is less than the significant level (which is taken to be 1% in this study) and vice versa, we conclude that autocorrelation is absent in the all the models. Furthermore, concerning the presence or absence of heteroscedasticity of the residuals, we carried out the Breusch-Pagan-Godfrey heteroscedasticity test and the p-values are 0.500 for Model I, 0.083 for Model II and 0.992 for Model III (with the details as reported in appendix). Given the decision rule that, we reject the null hypothesis when the p-value is less than the significant level (which is taken to be 5% in this study) and vice versa, we do not reject the null hypothesis of homoscedasticity in the equations and conclude that homoscedasticity exists in the two models. Likewise, the normality test was carried out Jarque-Bera. The test shows that the error terms are normally distributed as the probability of Jarque-Bera for each model is less than 5% significant levels. There we conclude that the error terms are normal for the three models.

Having just evaluated the overall diagnostic statistics of each of the models, the study now proceeds to examine the performance of the specific explanatory variables in the models.

Growth rate of Gross Domestic Product (GRGDP): As it can be seen from Table 4, the coefficients of GRGDP at 1-year lag period (-1) is 1.180 in Models 1, with p-value of 0.030. This indicates that the coefficient of GRGDP at a year lag period in the model is positive and statistically significant. The study therefore concludes that economic growth in a year ago has a positive effect on current economic growth.

Foreign Direct Investment (FDI): As it can be seen from Table 4, the coefficient of FDI in Model I is 1.599, in Model II at 3-year lag period is 3.143, and in Model III is -6.630 with respective p-values of 0.033, 0.034, and 0.028. This indicates that the coefficient of FDI is positive and statistically significant in Model I and Model III while negative and significant in Model III. The study therefore concludes that foreign direct investment has positive effect on economic growth in Model I. Also, FDI 3 years ago also has positive effect on manufacturing output growth in Model II and Finally in Model III, current FDI has negative effect on agricultural output growth. In line with this postulated positive effect on productivity growth and, hence, economic growth, many empirical studies, for example, Moses (2011), Al-Mamun & Sohag (2015), Awolusi et al (2017), Asongu & Odhiambo (2019) have reported that FDI have positive effects on economic growth.

Gross Fixed Capital Formation (INV): As it can be seen from Table 4, the coefficients of INV at 2-year and 3-year lag periods are 1.223 and -1.259 in Models I and II respectively, with respective p-values of 0.013 and 0.055. This indicates that the coefficient of INV is positively and negatively statistically significant in Model I and Model II respectively. The study therefore concludes that gross fixed capital formation two (2) years ago has positive effect on current economic growth in Model 3.13 and gross fixed capital formation three (3) years ago has negative effect on current manufacturing output growth in Model II. This is in line with the findings of Asongu and Odhiambo (2019) and Bahrini and Qaffas (2019) who, in their respective studies, reported that Gross Fixed Capital Formation has a negative and positive effect on economic growth in their estimation.

Government Final Consumption Expenditure (GEXP): As it can be seen from Table 4, the coefficients of GEXP at 1-year and 2-year lag periods are -4.134 and 7.150 in Models II and III respectively, with respective p-values of 0.040 and 0.025. This indicates that the coefficient of GEXP is negatively and positively statistically significant in Model II and Model III respectively. The study therefore concludes that government final consumption expenditure a year ago has negative effect on current manufacturing output growth in Model II and government final consumption expenditure two (2) years ago has positive effect on current agricultural output growth in Model III. Inclusion of this variable is in line with the findings in some of previous studies such as Ayanwale (2007), Adeyeye & Awolusi (2016), and Asongu and Odhiambo (2019), which confirmed that general government final consumption expenditure has a negative effect on output growth in their results.

Export of goods and services (EXPT): As it can be seen from Table 4, the coefficients of EXPT at 3-year and 2-year lag periods are 0.617 and 0.908 in Models II and III respectively, with respective p-values of 0.039 and 0.010. This indicates that the coefficient of EXPT is positively statistically significant in both Model II and Model III. The study therefore concludes that export of goods and services three (3) years ago has positive effect on current manufacturing output growth in Model II and export of goods and services two (2) years ago has positive effect on current agricultural output growth in Model III. This result is in line with previous studies such as Pham and Martin (2007) and Hesse (2008), and Awolusi et al (2017) who reported a positive effect of export of goods and services on output growth.

Inflation rate (INF): As it can also be seen from Table 4, the coefficient of INF is -0.032 with p-value 0.027 in Model I. In Model III, the coefficients at 1-year lag period is 0.514, with p-value 0.033. This indicates that the coefficient of INF in Model I is negative and statistically significant. While the coefficient of INF at a year lag period in Model III is positive and statistically significant. The study therefore concludes that current inflation has a negative effect on current economic growth in Model I and inflation a year ago has positive effect on

agricultural output growth in Model III. Some previous studies, e. g. Awolusi et al (2017) and Asongu and Odhiambo (2019) have tested for it and confirmed that current inflation has a negative effect on output growth in their empirical studies. Hence, this result further strengthened their findings.

Conclusion

FDI is seen as an important source of economic growth in the present global economic environment. Most countries strive to attract FDI because of its acknowledged advantages as a tool of economic development. So as to provide bases for policies aimed at promoting FDI, various empirical studies have been conducted with a view to identifying factors that affect economic growth through FDI in Nigeria. But such studies still leave some gaps to be filled, including failure to test the effect of FDI on sectoral output growth. Accordingly, this study seeks to fill the knowledge gap that exists. Thus, the study has the specific objectives of investigating empirically the effect of FDI on economic growth and sectoral output growth from 1980-2020.

Recommendations

Based on the findings highlighted above, the following recommendations are made:

a) Based on the findings that foreign direct investment has positive effect on manufacturing output growth and economic growth, therefore, policy makers should target policies on promoting FDI inflow in order to achieve increase in manufacturing output growth and economic growth.

b) Based on the findings that, gross fixed capital formation two (2) years ago has positive effect on current economic growth. Therefore, policy makers should increase the level of gross fixed capital formation now in order to rise economic growth in 2 years later.

c) Based on the findings that, government final consumption expenditure two (2) years ago has positive effect on current agricultural output growth. Therefore, authorities should increase government final consumption expenditure currently in order to increase agricultural output growth 2 years later.

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