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**Foreign Direct Investment and Economic Growth in Nigeria Revisited:  
A Sector Level Analysis**

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Given the conflicting nature of empirical findings on the impact of foreign direct investment on economic growth in developing economies to date, this research explored the growth impact of sectoral flow of FDI in Nigeria an aspect largely neglected in the existing literature. The study examined the sectorial impact of FDI in manufacturing, mining, oil and the telecommunications sectors on economic growth in Nigeria based on a theoretical framework founded on the standard growth accounting theory, the detailed analysis of the sectorial FDI (which is only available for over the period 1986-2009) was carried out. This involved the use of descriptive analysis, unit roots test, Johansen co-integration test, error correction mechanism, and fully modified least squares technique. The correlation analysis of aggregate FDI on sectorial GDP growth indicates that only the oil sector GDP has a significant positive correlation with aggregate FDI over the period 1981 and 2017. While the sectorial analysis revealed that only the flow of FDI into the communication sector has a positive and statistically significant impact on economic growth for the period considered. Given the positive significant growth impact for FDI in the telecommunication sector, and the negative significant growth impact of FDI in the manufacturing sector, the strategy for attracting and managing FDI in Nigeria must be sector specific and the National Bureau of Statistics must maintain a database of FDI on sectoral basis.

**Keywords:** Sectorial FDI, Manufacturing FDI, Mining FDI, Oil FDI, Telecommunication FDI

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## **INTRODUCTION**

Over the years, many developing nations of the world have been unable to meet up with the standards of developed nations in terms of economic growth rate due to the existing economic

issues present in their economies. To advance the economic growth of these developing nations, an urgent need to source for more vivid and realistic solutions have been identified. Amongst others, increasing the level of cross border investments as a feature of globalization and attaining a higher level of foreign direct investment have been suggested by authors, corporations and entrepreneurs (Dhingra, 2014; Masanja, 2018; Olagbaju and Akinlo, 2018). Foreign direct investment according to Steinbock (2013) is a dynamic international resource flows capable of providing the capital required for financing long term developmental projects and hence, driving sustainable growth. Developing countries such as Nigeria, even though blessed with large reserves of human and material resources enabling her to become the largest economy in Sub-Saharan Africa and a major player in the global economy continues to aim at attracting foreign direct investment since it forms an important component in economic development strategies (Asiedu, 2001; Obwona, 2001, 2004). This is the basis for the effort of the Nigerian government to improve the business climate of the nation in recent times. The New Partnership for Africa's Development (NEPAD) was also launched in this order to increase capital available to about US\$64billion through a combination of reforms, resource and thus creating an environment for foreign direct investment.

Considerably, Nigeria is now one of Africa's largest recipients of foreign investment but the over-dependence on the oil and gas sector has remained a major challenge for her economy. The economy lacks the drive to divert attention towards the non-oil sub-sectors including the mining, manufacturing, services and telecommunications sectors and as a result, a larger percentage of about 60% of the FDI which flows into Nigerian economy is made into the extractive (oil) industry (Ekperiware, 2011) while the non-extractive industry remains on a declining path except for the telecommunication sector which has progressed over time. The economic structure of Nigeria, due to this shifted attention to the Oil sector, remains undiversified with Oil being the major contributor to Nigeria's GDP and accounting for about 95% of the total exports (UNCTAD, 2003).

Nevertheless, economists argue that the gross amount of foreign direct investment which flows to an economy has a positive impact on economic growth and can lead to an enlarged market size, which in turn may attract further foreign direct investment, although this has only been seen theoretically but it has been contentious in empirical studies since the empirical linkage between FDI and economic growth is yet unclear. In Nigeria, numerous studies (Oseghale and Amonkhienan, 1987; Odozi, 1995; Oyinlola, 1995; Adelegan, 2000; Akinlo, 2004; Olagbaju and Akinlo, 2018) that have examined the influence of FDI on Nigeria's economic growth have given varied and mixed outcomes. Further, most of these studies have only focused on the Oil FDI on economic growth in Nigeria based on the fact that the Oil sector attracts major FDI in Nigeria. Olagbaju and Akinlo (2018) examined the moderating impact of the financial system on the relationship between aggregate FDI and economic growth.

Given the unhealthy gap of Oil FDI and Non-oil FDI on the performance of the Nigerian economy, there is a need to carry out a further probe on the Sector level impact of Oil and Non-oil FDI inflows in Nigeria and also access the link between Oil FDI and Non-oil FDI to the economic growth of Nigeria. Very few studies have been carried out on the Sector level impact of FDI in Nigeria and from the very few existing studies, the analysis of disaggregated Sectorial FDI have been left unattended and unable to give an in-depth and extended overview of the leading potential sectors to the economy. However, this study expands the existing knowledge and highlights the challenge of the Nigerian economy being unable to attract FDI inflows in more dynamic products and sectors with the higher potential to contribute growth.

## **2 Literature Review**

This section discusses the impact of Oil and Non-Oil foreign direct investment on Economic growth in Nigeria. It presents empirical evidence for the study.

### **2.1 Empirical Evidence on FDI and Economic Growth**

A lot of focus has been placed on the study of Foreign Direct Investment based on the assumption that it has a larger impact on the economy. In the developing world especially, results are yet unclear depending on the individual country, country's characteristics, policy environment, sectors, and economic and social conditions in general.

In Nigeria, studies have been carried out on the effect of FDI on economic growth and varying results and submissions have also been recorded over time. Adelegan (2000) for instance employed the use of seemingly unrelated regression (SURE) model to analyze the impact of FDI on economic growth in Nigeria. The study not only found that FDI is pro-consumption and pro-import but, also found that FDI is negatively related to gross domestic investment which corroborates the study of Ogiogio (1995) that concluded that the negative contributions of public investment account for any form of distortions to GDP growth in the country.

Ayanwale and Bamire (2001) however, saw the capacity of FDI to influence output at firm levels and not only at the larger economy alone. The study, therefore, conducted an analysis to examine the effect of FDI on firm-level productivity. The study reported a positive influence of foreign investment on the domestic firm's productivity in Nigeria.

Using Nigeria as a case study also, Salisu (2002) further examined the determinant and impact of FDI on economic growth in developing countries. While the study observed that inflation, debt burden, and exchange rate are significant determinants of FDI inflows to Nigeria. The impact of FDI on economic growth was found to be considerably low even though, it was a significant factor influencing the level of economic growth in Nigeria.

Bello and Adeniyi (2010) and Ogundipe and Aworinde (2011) also investigated the causal relationship among FDI, economic growth and environment. Bello and Adeniyi (2010), using the Autoregressive Distributed Lag (ARDL) approach and the annual time series data for the period spanning from 1970 to 2006 found a long run causal link between environmental quality and FDI inflows while there exists no long-run causal relationship between FDI and growth. Ogundipe and Aworinde (2011) on the other hand examined the causality between FDI and economic growth, giving reference to the pre and post-deregulation era. Using the Granger Causality analysis, Ogundipe and Aworinde (2011) found one-way causality running from economic growth (GDP) to FDI in the pre-deregulation era (1970-1985) and no causality was found during the post-deregulation era (1986-2007).

Oyatoye, Arogundade, Adebisi, and Oluwakayode (2011) further analyzed the relationship between FDI and economic growth in Nigeria for a period of 20 years covering 1987 to 2006 using Ordinary Least Square regression analysis. The study reported that a positive relationship exists between FDI and economic growth in Nigeria. The study added that based on findings, a Naira increase in the value of FDI will lead to N104.749 increase in GDP.

Akinlo (2004) in his study focused on controlling for the oil, non-oil FDI dichotomy in Nigeria. The study specifically investigated the impact of foreign direct investment (FDI) on economic growth in Nigeria, using an error correction model (ECM). The result of the study revealed that both private capital and lagged foreign capital have a positive but insignificant effect on the economic growth of Nigeria. This result is consistent with studies that argued that extractive FDI might not be growth enhancing as much as manufacturing FDI. This implies that although Oil FDI has a positive contribution to Nigeria's economy, Oil FDI inflows remain less growth

enhancing compared to other Non-oil sectors such as the manufacturing, telecommunications and agricultural sectors with the higher potential to enhance growth in Nigeria.

Fofana, Xia and Traore (2018) examined the long-run impact of Chinese FDI on economic growth in West Africa between 2003 and 2015 using Pool Mean Group (PMG) and panel Granger Causality Models. The results indicate that Chinese FDI contributes positively to economic growth in West Africa. Olagbaju and Akinlo (2018) examined the role of financial development in the relationship between FDI and economic growth in sub-Saharan Africa (SSA) using unbalanced panel data set between 1989 and 2013. The results indicate that the banking sector development has a significant influence in linking FDI to economic growth, especially in the low-income subsample.

The investigation of the empirical relationship between non-extractive FDI and economic growth in Nigeria was also the focus of Ayanwale (2007) who reported that the determinants of FDI in Nigeria are market size, infrastructure development, and stable macroeconomic policy. Using OLS technique, the study found that FDI had a positive impact on economic growth. The contributions of Ekpo (1995), a study which made use of time series data, was that the variability of FDI into Nigeria can be explained by the political regime, real income per capita, rate of inflation, world interest rate, credit rating and debt service. In his study of the determinants of FDI in Nigeria, Anyanwu (2011) identified the change in domestic investment, change in domestic output or market size, indigenization policy and change in the openness of the economy as major determinants of the FDI. He further noted that the abrogation of the indigenization policy in 1995 encouraged FDI inflow into Nigerian and those efforts must be made to raise the nation's economic growth so as to be able to attract more FDI.

As for studies that involve Nigeria, studies from other countries also have mix results. For example, using the Granger Causality tests within a panel co-integration framework for 15 industries in the primary, secondary and tertiary sectors for the period of 1987 to 2000, Chakraborty and Nunnenkamp (2008) assessed the growth implications of FDI in India by comparing industry-specific FDI and output. The study found that the growth effects of FDI vary widely across sectors. FDI stocks and output were mutually reinforcing in the manufacturing sector. In sharp contrast, any causal relationship was absent in the primary sector. They found only temporary effects of FDI on output in the services sector, which attracted the bulk of FDI in the post-reform era.

Masanja (2018) examined the impact of FDI on economic growth in Tanzania between 1990 and 2013 using Ordinary Least Square (OLS) estimation techniques that involve unit root test, co-integration test and error correction model. The author observed that mining and manufacturing sectors enjoyed higher FDI concentration while in agriculture and tourism sectors are among the sectors with least FDI inflow in Tanzania. The regression results indicate that FDI has a positive but insignificant impact on economic growth in Tanzania. Wattanakul (2018) examined the short-run and long-run relationship between FDI and GDP of Laos between 1985 and 2014 using time series analysis that involved unit root testing, Johansen co-integration and Vector Error Correction Mechanism (VECM). A long-run impact of FDI on GDP was established by the study.

Some sector level foreign direct investment and economic growth studies have also been analyzed in some countries. Alfaro (2003) which is one of the earliest studies to consider the sectoral impact of FDI on economic growth by employing data on 47 countries to examine the impact of FDI in the primary, secondary, and services sectors for the years 1981 to 1999 in a cross country regression. A negative effect was found in the primary sector, a positive one in

manufacturing and the service sector was found to be insignificant. Also, Elkomy, Ingham, and Read (2018) specifically examined the impact of sector-specific FDI on economic growth in Egypt between 1990 and 2007. The authors observed that aggregate FDI have no significant impact on economic growth in Egypt. However, FDI in information technology and telecommunication have a positive effect while FDI in the services sector has negative effects.

### 3 Research Methodology

To achieve the objectives of this study, the time series annual secondary data covering the period of 1986 to 2009 was adopted based on sector level data availability. Economic growth proxied by the growth rate of GDP was the dependent variable while FDI in the oil sector, FDI in the manufacturing sector, FDI in the mining sector, FDI in the telecommunications sector and other control variables were used as the independent variables. Data were obtained from the Central Bank of Nigeria statistical bulletin (2017). The data collected was analyzed using graphs, Phillips-Perron Unit Roots test, Johansen cointegration test, Error correction mechanism and Fully Modified Least Squares technique.

#### 3.1 Theoretical Framework

The effect of FDI on economic growth is analyzed in the standard growth accounting framework. To begin with, the capital stock is assumed to consist of two components: domestic and foreign-owned capital stock. So,

$$K_t = K_{dt} + K_{ft} \quad (1)$$

The study adopts an augmented Solow production function (Solow, 1956) that makes the output a function of stocks of capital, labour, human capital and productivity (Mankiw et al, 1992). However, we specify domestic and foreign-owned capital stock separately in a Cobb–Douglas production function (Cobb & Douglas, 1928).

$$Y_{it} = A_{it}K_{dit}^\alpha K_{fit}^\lambda L_{it}^\beta H_{it} \quad (2)$$

Where  $Y$  is the flow of output,  $K_{dt}$ ,  $K_{ft}$  represent the domestic and foreign-owned capital stocks, respectively,  $L$  is the labour,  $H$  is the human skills capital stock, and  $A$  is the total factor productivity, which explains the output growth that is not accounted for by the growth in factors of production specified.

Taking logs and differentiating Equation 2 with respect to time, we obtain the familiar growth equation:

$$Y_{it} = a_{it} + \alpha k_{dit} + \lambda k_{fit} + \beta l_{it} + y h_{it} \dots \dots \dots (3)$$

Where lower case letters represent the growth rates of output, domestic capital stock, foreign capital stock, and labour and human capital, and  $\alpha$ ,  $\lambda$ ,  $\beta$  and  $y$  represent the elasticity of output, domestic capital stock, foreign capital stock, labour and human skill capital, respectively. In a world of perfect competition and constant returns to scale, these elasticity coefficients can be interpreted as respective factor shares in total output. Equation 3 is a fundamental growth accounting equation, which decomposes the growth rate of output into the growth rate of total factor productivity plus a weighted sum of the growth rates of capital stocks, human capital stock and the growth rate of labour. Theoretically,  $\alpha$ ,  $\lambda$ , and  $y$  are expected to be positive while the sign of  $\beta$  would depend on the relative strength of competition and linkage effects and other externalities that FDI generates in the development process.

Following the established practice in the literature,  $K_d$  and  $K_f$  are proxied by domestic investment to GDP ratio ( $Id$ ) and FDI to GDP ratio ( $If$ ), respectively in view of problems associated with measurement of capital stock. The use of the rate of investment is hinged on the assumption of a steady state situation or a linearization around a steady state.

The final form of Equation 3 therefore is

$$Y_{it} = a_i + \alpha l_{dit} + \lambda l_{fit} + \gamma h_{it} + \varepsilon_{it} \quad \dots \dots \dots (4)$$

Where  $\varepsilon_{it}$  is the error term.

### 3.2 Model Specification

The study adapted the framework provided by Obwona (2001) to suite the objectives of the study. Using the aggregate production function, the country's production can be represented as:

$$Y = f(L, K, A) \quad \dots \dots \dots (5)$$

Where,

Y = Output (Gross Domestic Product, GDP)

L = Employment

K = Stock of Capital

A = Total Factor Productivity (TFP) of growth in output, not accounting for an increase in factor outputs (K and L).

The study employed the endogenous growth model which shows that the total factor productivity (A) is endogenously determined by economic factors. Since it would not be possible to separate local and foreign components of domestic investment due to unavailability of data in literature that fully captured any addition to domestic investment by foreign, the effect of FDI on economic growth operating through the total factor productivity would be assumed in this study to depend on trade policy regime; hence a proxy variable for the openness of trade policy regime (TP) needs to be incorporated in the equation (6) below:

$$A = g(FDI, DOP) \quad \dots \dots \dots (6)$$

Substituting equation (6) into (5) yields:

$$Y = f(L, K, FDI, DOP) \quad \dots \dots \dots (7)$$

In view of the fact that a reliable series on capital stock is not available for Nigeria, this study employed the ratio of gross fixed domestic capital formation to GDP as a proxy for K. This proxy variable is consistent with numerous studies (Athukorala, 2003; Ayanwale, 2007). Also, since there is no unique measurement for the openness of trade policy regime, the ratio of total merchandise trade (import + export) to GDP would be used as a proxy for the index of openness due to the non-availability of data. Further, FDI being the variable of interest, it can thus be disaggregated as follows in equation (8) below:

$$Y = (L, K, FDI_{Ag}, FDI_{Min}, FDI_{Oil}, FDI_{Man}, FDI_{Tel}, DOP) \quad \dots \dots \dots (8)$$

Equation (4) would be expressed in econometric form as stated in equation (5) below:

$$\ln GGDP_t = a_0 + a_1 \ln FDI_{Min}_t + a_2 \ln FDI_{Oil}_t + a_3 \ln FDI_{Man}_t + a_4 \ln FDI_{Tel}_t + a_5 \ln DOP_t + U_t \quad \dots \dots \dots (9)$$

Where,

GGDP= Growth rate of Gross Domestic Product

FDIAg= FDI in Agricultural Sector

FDIMin = FDI in Mining Sector

FDIOil=FDI in Oil Sector

FDIMan= FDI in Manufacturing sector

FDITel=FDI in Telecommunications sector

DOP= Degree of openness (export + import) to GDP

t = Time

U = Error term.

### 3.3 Apriori Expectation

Theoretically, the Apriori expectation is that the more oil FDI flows to the economy, the more it will add to the growth of the economy of such nation, even greater than FDI from other sectors

put together. Further, the Apriori is that the non-oil FDI variables will impact the growth of the economy positively but the impact is not as much as in the extractive sector.

Thus, the expected signs of the coefficients of the explanatory variables are:

$$a_0, a_1 > 0, a_2 > 0, a_3 > 0, a_4 > 0, a_5 > 0, a_6 > 0, a_7 > 0, a_8 > 0$$

### 3.4 Description of Variables

**The growth rate of Gross Domestic Product:** The growth rate of gross domestic product is a proxy for the output of the Nigerian economy over the periods of study.

**Degree of Openness:** Degree of Openness measured as trade – GDP ratio is measured as the ratio of the sum of import and export to GDP. It can be calculated as  $\frac{\text{import} + \text{export}}{GDP}$ .

**Foreign Direct Investment:** This measures the sum of foreign direct investment flows to the Nigerian economy through the different sectors.

## 4 Results

### 4.1 Descriptive Statistics

The descriptive analysis of the aggregate FDI and sectoral GDP between 1981 and 2017 is summarised in Table 1. The mean value of the total FDI over the period is 369 billion while the value ranges between 0.15 billion and 1,360 billion. The maximum value corresponds to the 2017 estimates. Manufacturing GDP ranges between 26.99 billion and 10.04 trillion with a mean value of 2.15 trillion. The manufacturing GDP ranks after the oil GDP which ranges between 4.28 billion and 11.32 trillion with an average value of 2.82 billion. The telecom sector GDP varies between a minimum value of 23.20 billion and a maximum value of 11.72 trillion with a mean value of 2.37 trillion. The mining sector has the least contribution to GDP with a value that ranges between 3.72 billion and 126 billion and a mean value of 28.17 billion.

**Table 1. Descriptive Statistics for Total FDI and Sectoral GDP (1981-2017)**

| Variable                 | Obs | Mean     | Std. Dev | Min    | Max      |
|--------------------------|-----|----------|----------|--------|----------|
| Total FDI                | 37  | 369.2389 | 465.7861 | 0.15   | 1360.29  |
| Manufacturing Sector GDP | 37  | 2150.246 | 2988.952 | 26.89  | 10044.48 |
| Oil Sector GDP           | 37  | 2820.66  | 3737.197 | 4.28   | 11315.03 |
| Mining Sector GDP        | 37  | 28.17135 | 35.42895 | 3.72   | 126.03   |
| Telecom Sector GDP       | 37  | 2373.596 | 3756.85  | 23.2   | 11717.56 |
| Total GDP                | 37  | 24861.44 | 34308.7  | 144.83 | 113711.6 |

Source: Authors' computation (2019).

Table 1 presents the descriptive statistics for total FDI and sectoral GDP between 1981 and 2017. The total GDP ranges between 144.83 billion and 113.71 trillion with a mean value of 24.86 trillion. The next subsection contains the correlation between the growth of FDI and growth of each sector presented in Table 1.

### 4.2 Correlation Analysis

The correlation coefficient and its p-value for the association between the growth rate of FDI and the growth rate of each sector are presented in Table 2. The results indicate that only the Oil sector has a statistically significant correlation with aggregate FDI. Thus, the impacts of FDI on economic growth is better analyzed on a sectoral basis.

**Table 2. Correlation between FDI growth and Sectoral GDP Growth (1981-2017)**

| Sector  | Correlation Coefficient | p-Value |
|---|-------------------------|---------|
| FDI Growth-Growth of Manufacturing Sector GDP | 0.1697                  | 0.3224  |

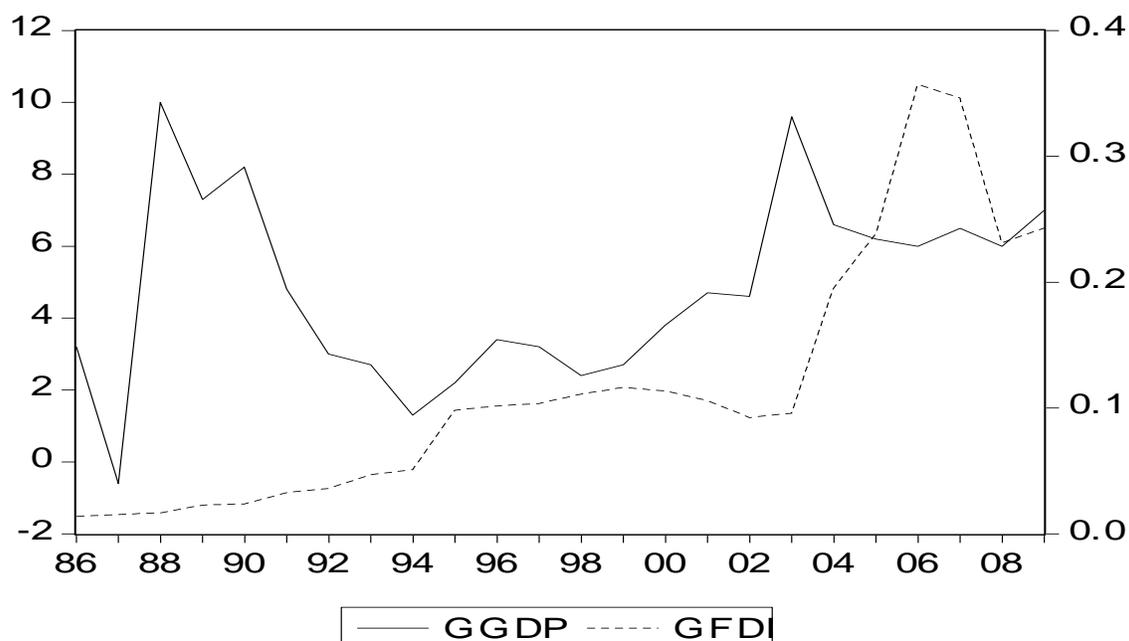
|   |         |        |
|---|---------|--------|
| FDI Growth-Growth of Oil Sector GDP     | 0.3538  | 0.0343 |
| FDI Growth-Growth of Mining Sector GDP  | 0.0663  | 0.7007 |
| FDI Growth-Growth of Telecom Sector GDP | -0.0324 | 0.8511 |
| FDI Growth-Growth of Total GDP          | 0.2056  | 0.2289 |

Source: Authors' computation (2019).

### 4.3 Trend Analysis of Sector Specific FDI and Growth

Investment naturally plays an important role in the economic growth and development process of any economy. Investment determines the nation's capacity to produce, which in turn, affects economic growth potential (Akindele, 2011). The trend analysis shows the relationship between foreign direct investment inflows into the manufacturing, mining, oil and the telecommunications sectors and economic growth in Nigeria for the periods being considered.

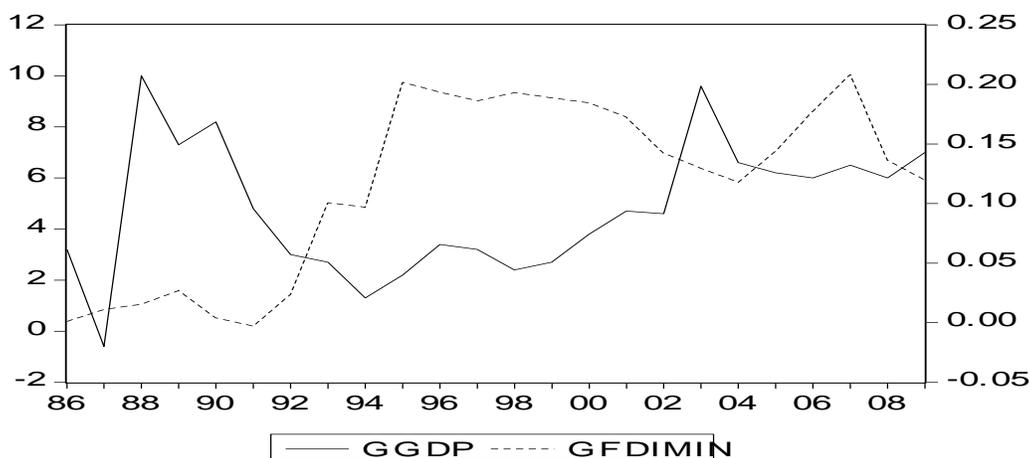
**Figure 1. Foreign Direct Investment in Manufacturing Sector 1986-2009**



Source: Authors' computation (2019).

The trend above shows that foreign direct investment in the Manufacturing sector experienced a significant slight increase from 2,810 million in 1986 to 45,719.4 million in 2003 and later experienced very significant growth from 2003 until 2007 thereafter, the flow of foreign direct investment in the manufacturing sector experienced a progressive decline. The Nigerian economy has witnessed several fluctuations with economic growth fluctuating between 7.3 and -0.6 in the period between 1986 and 2009. This was ascribed to poor macroeconomic management and industrial policies of that period which were not sufficiently discriminatory. This indicates that the the volatility of a a foreign direct investment in the manufacturing sector in Nigeria contributed to growth in the Nigerian economy.

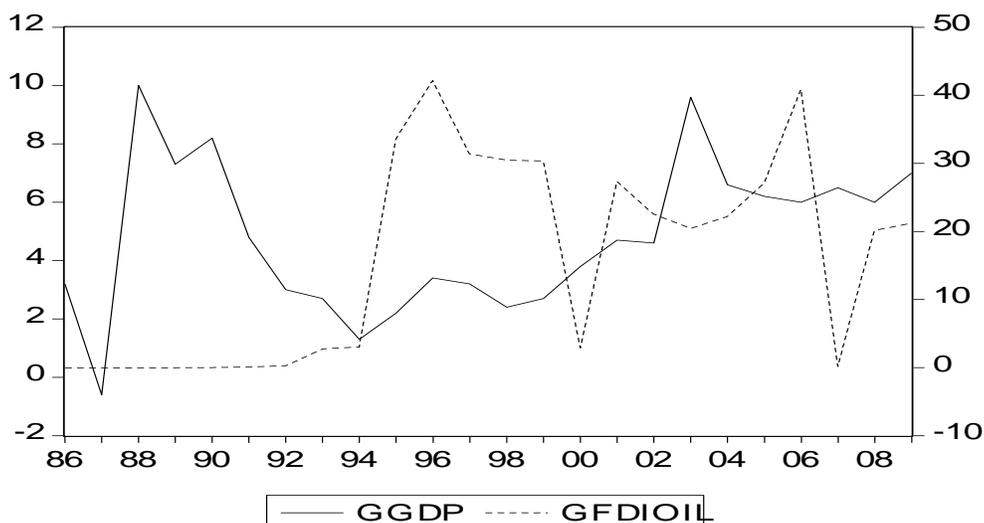
**Figure 2. Foreign Direct Investment in Mining Sector 1986-2009**



Source: Authors' computation (2019)

The trend above shows that foreign direct investment in the Mining sector experienced insignificant fluctuations from 1986 until 1992 and when the foreign direct investment significantly rose for a while 64,17.2 million to 62,145.7 million in 2004. The flow of foreign direct investment into the mining sector was steady when there was a sharp increase up until 2007 and experienced a progressive decline. The Nigerian economy has witnessed several fluctuations with economic growth fluctuating between 7.3 and -0.6 in the period between 1986 and 2009. This was ascribed to the industrial policies of that period which were not sufficiently discriminatory. This indicates that the the volatility of a a foreign direct investment in the telecommunications sector in Nigeria contributed to growth in the Nigerian economy.

**Figure 3. Foreign Direct Investment in Oil Sector 1986-2009**

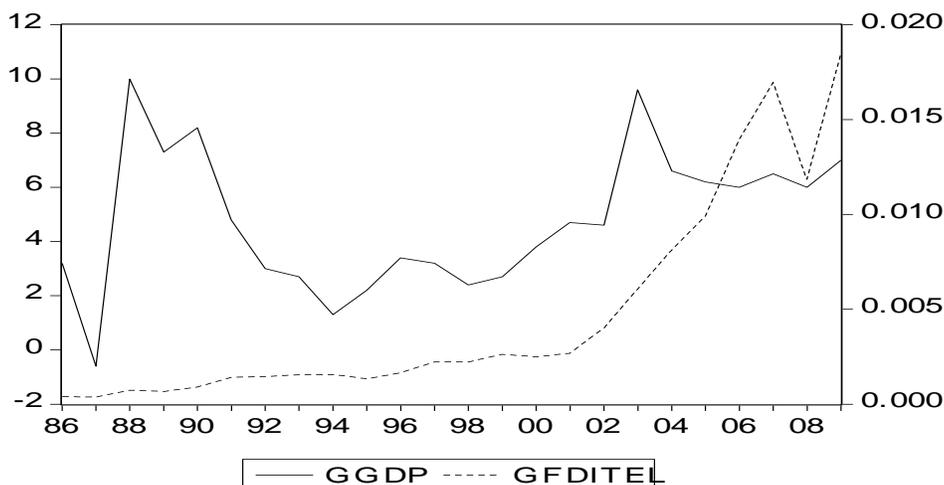


Source: Authors' computation (2019).

The trend above shows that foreign direct investment in the Oil sector has been negative and insignificant from 1986 to 1990. Oil foreign direct investment experienced a significant increase from 827,719 million in 1994 to 9,459,799 million in 1995 and progressed further to 123,832,333 million in 1996 and later decreased to 9,467,779 million in 1997. Oil foreign direct

investment experienced a decline in 2000, and from 2001, oil foreign direct investment experienced a growth till 2006 to 24,340,549 million. Oil foreign direct investment experienced a decline in 2007 and later increased to 13,586,942 million in 2008 and 15,186,986 million in 2009. The Nigerian economy has witnessed several fluctuations with economic growth fluctuating between 7.3 and -0.6 in the period between 1986 and 2009. This indicates that the volatility of a foreign direct investment in the telecommunications sector in Nigeria contributed to the Nigerian economy.

**Figure 4. Foreign Direct Investment in the the Telecommunications Sector 1986-2009**



Source: Authors' computation (2019).

The trend above shows that foreign direct investment in the Telecommunications sector experienced insignificant fluctuations from 1986 to 2001 and then, experienced an increase from 9,55.3 million in 2001 to 1,736.3 million in 2002. From 2002, FDI in the telecommunications sector experienced a growth till 2007, and experienced a decline in 2008 and later increased further to 13,238.1 million in 2009. The Nigerian economy has witnessed several fluctuations with economic growth fluctuating between 7.3 and -0.6 in the period between 1986 and 2009. This indicates that the volatility of a foreign direct investment in the telecommunications sector in Nigeria contributed to growth in the Nigerian economy.

#### 4.4 Unit Root Test

**Table 3. Results of Phillips-Perron (PP) Unit Root Test**

| Phillips-Perron (PP) Test |           |                            |         |
|---------------------------|-----------|----------------------------|---------|
| Series                    | At level  | 1 <sup>st</sup> Difference | Remarks |
| FDIMAN                    | -0.319437 | -3.719540                  | I(1)    |
| FDIMIN                    | -1.119066 | -4.348661                  | I(1)    |

|        |           |           |      |
|--------|-----------|-----------|------|
| FDIOIL | -2.601341 | -9.241129 | I(1) |
| FDITEL | 3.560053  | -5.301644 | I(1) |
| GGDP   | -3.056105 | -7.101390 | I(1) |

Source: Authors' computation, (2019).

Before examining the empirical relationship between oil and non-oil foreign direct investment on economic growth, this study examines the properties of the time series used for the analysis. The Phillips-Perron (PP) unit root test was utilized and the result in Table 1 above shows that all the variables are stationary at first difference. Therefore, there is a need for further analysis to see whether the variables could have a co-movement in the long-run. In order to do this, the study employed the Johansen cointegration test.

#### 4.5 Johansen Cointegration Test

**Table 4. Results of the Johansen cointegration test**

| Eigen Value | Likelihood Ratio | 5% critical Value | 1% critical Value | Hypothesized no of CE(s) |
|-------------|------------------|-------------------|-------------------|--------------------------|
| 0.926761    | 101.4054         | 68.52             | 76.07             | None**                   |
| 0.685549    | 43.89692         | 47.21             | 54.46             | At most 1*               |
| 0.416871    | 18.44451         | 29.68             | 35.65             | At most 2                |
| 0.229100    | 6.578896         | 15.41             | 20.04             | At most 3                |
| 0.038099    | 0.854559         | 3.76              | 6.65              | At most 4                |

Source: Authors' computation, (2019).

\*\* (\*) denotes rejection of the hypothesis at 5% (1%) significance level.

The result of the cointegration test indicated four cointegrating equations. This implies that the variables employed in the study could move together in the long-run. Thus, the study rejects the hypothesis that there is no cointegration among the variables. Since it has been established that the long-run effect existed among the variables, then, there is a need to know the short-run effect of the interactions among the variables. Therefore, the Error Correction Mechanism was adopted to show the speed of adjustment between short run and long run fluctuations.

#### 4.6 Error Correction Mechanism

**Table 5. Result of the Error Correction Mechanism (Parsimonious estimate)**

Dependent Variable: D(GGDP)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | -0.188895   | 0.426814   | -0.442571   | 0.6654 |

|                    |           |                       |           |           |
|--------------------|-----------|-----------------------|-----------|-----------|
| ECM(-1)            | -0.519842 | 0.193016              | -2.693258 | 0.0184    |
| D(FDIMAN)          | -6.16E-05 | 3.15E-05              | -1.956012 | 0.0723    |
| D(FDIMIN)          | -5.11E-05 | 4.08E-05              | -1.250909 | 0.2330    |
| D(FDIOIL)          | 1.72E-07  | 7.99E-08              | 2.156049  | 0.0504    |
| D(FDITEL)          | 0.002237  | 0.000722              | 3.099056  | 0.0085    |
| D(FDITEL(-1))      | 0.001616  | 0.000610              | 2.648406  | 0.0201    |
| D(FDITEL(-2))      | -0.002308 | 0.000877              | -2.630904 | 0.0208    |
| R-squared          | 0.579903  | Mean dependent var    |           | -0.142857 |
| Adjusted R-squared | 0.353696  | S.D. dependent var    |           | 1.806536  |
| S.E. of regression | 1.452329  | Akaike info criterion |           | 3.866545  |
| Sum squared resid  | 27.42036  | Schwarz criterion     |           | 4.264458  |
| Log likelihood     | -32.59872 | F-statistic           |           | 2.563601  |
| Durbin-Watson stat | 2.490040  | Prob(F-statistic)     |           | 0.006779  |

Source: Authors' computation, (2019).

The result of the ECM above showed that the coefficient of error correction mechanism term was negatively signed and statistically significant at 5% level of significance. The coefficient of FDI in the Manufacturing sector was negatively signed and statistically significant at 10% level of significance. The coefficient of FDI in the Mining sector was negatively signed and statistically significant at 5% level of significance. The coefficient of FDI in the Oil sector was negatively signed and statistically significant at 5% level of significance. The coefficient of FDI in the Telecommunications sector was positively signed and statistically significant at 10% level of significance. This finding revealed that all the variables employed in this study would as well move together in the short-run. Thus, the speed of adjustment from long-run to short-run was visible among the variables.

#### 4.7 Fully Modified Least Squares Technique

The fully modified least squares (FMOLS) technique is needed as it is the appropriate technique for the specified model following the outcome of the test after the stationarity of the series of the variables of interest have been examined via the unit root test.

**Table 6. Result of the Estimated FMOLS for economic growth**

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--------------------|-------------|----------|
| LOG(FDIMAN)        | -4.232222   | 1.592821           | -2.657061   | 0.0160   |
| LOG(FDIMIN)        | -0.239410   | 0.517043           | -0.463036   | 0.6489   |
| FDIOIL             | 7.44E-08    | 7.78E-08           | 0.956485    | 0.3515   |
| LOG(FDITEL)        | 3.905586    | 1.034278           | 3.776149    | 0.0014   |
| C                  | 23.29904    | 6.386303           | 3.648283    | 0.0018   |
| R-squared          | 0.389895    | Mean dependent var |             | 4.852174 |
| Adjusted R-squared | 0.254317    | S.D. dependent var |             | 2.656017 |

|                    |          |                   |          |
|--------------------|----------|-------------------|----------|
| S.E. of regression | 2.293550 | Sum squared resid | 94.68665 |
| Durbin-Watson stat | 1.922052 | Long-run variance | 2.625983 |

Source: Authors' computation, (2019).

From the result of the equation as presented above, it is observed that the long-run variance has a value 2.625983 and the Durbin-Watson statistics is 1.922052, which is evidence that there is no possibility of serial auto-correlation in the model. Furthermore, adjusted  $R^2$  which is a preferred measure of the goodness of fit is 0.254317, this implies that the explanatory variables in the model explained about 25% of the variations in economic growth while the remaining 75% of the variation in economic growth is explained by other factors.

In addition to the above, the coefficient of individual variables is examined to determine the relative contribution of each variable to economic growth in Nigeria. The coefficient of FDI in the Manufacturing sector ( $\log\text{FDIMAN}$ ) is negative and statistically significant at 5% level of significance implying that FDI in the Manufacturing sector has a negative effect on economic growth which contradicts the apriori expectation. This implies that the technology supplied by foreign countries into the local economy may not properly fit into Nigeria's surplus labour economy. Thus, the negative effect of FDI in the Manufacturing sector on economic growth can be attributed to the direction of FDI to the oil sector rather than the Manufacturing sector of the economy which can actually stimulate the growth of the economy.

The coefficient of FDI in the Mining sector ( $\log\text{FDIMIN}$ ) is negative and statistically insignificant at 5% implying that FDI in the Mining sector has a negative effect on economic growth which contradicts the apriori expectation. The coefficient of FDI in the Oil sector ( $\log\text{FDIOIL}$ ) is positive but statistically insignificant implying that FDI in the Oil sector has a positive effect on economic growth which conforms to the apriori expectation.

The coefficient of FDI in the Telecommunications sector ( $\log\text{FDITEL}$ ) is positive and statistically significant at 5 percent implying that FDI in the Telecommunications sector has a positive effect on economic growth which is in line with the apriori expectation. This implies that FDI in the Telecommunications sector is an effective means of promoting economic growth and encouraging FDI inflows into the non-oil sectors.

## **5 Conclusion and Recommendation**

### **5.1 Conclusion**

The result of the fully modified least squares technique showed that the coefficient of FDI in the oil sector was positive and statistically insignificant implying that FDI in the oil sector has a positive but insignificant impact on economic growth. This can be ascribed to non-clean technology employed in the sector which has considerably reduced the economic potentials of residents of the oil-producing areas and most especially corruption.

The coefficients of FDI in the manufacturing and mining sectors were also negative, although the coefficient of FDI in the manufacturing sector was statistically significant at 5% level of significance. This implies that while FDI of both manufacturing and mining sectors have a negative impact on the economic growth of Nigeria, this impact on economic growth would be statistically significant for the manufacturing sector but insignificant for the mining sector.

The coefficient of FDI in the telecommunication sector, however, was positive and statistically significant at 5% implying that FDI in the telecommunications sector has a positive and significant impact on economic growth in Nigeria.

Based on the above findings, there is a proper need for diversification from oil sector over-dependency which is a dominant sector in Nigeria to other non-oil sectors in Nigeria. Consequently, steps to attract FDI inflows into the non-oil sectors should be undertaken by the Nigerian government as one of the ways of boosting the Nigerian economy.

## **5.2 Policy Recommendation**

The following policies are recommended for the impact of oil FDI, and non-oil FDI on economic growth in Nigeria.

1. The Nigerian government should embark on policies that would attract more foreign direct investment (FDI) to the dynamic products and sectors with a high income elasticity of demand such as the Nigerian local content policy, industrial policies, and trade policies.
2. More friendly economic policies and business environment have to be developed by the Nigerian government in order to ensure that FDI is being attracted to all sectors of the economy.
3. The Nigerian government should make efforts to put a lasting solution to social unrest, corruption, and epileptic electricity supply in order to improve the business environment and consequently the Nigerian economy as a whole.
4. FDI should be channeled to the production of secondary products, such that FDI is made to contribute positively to the living standard of Nigeria.
5. The Nigerian government should ensure to implement policies which aim at acquiring, adopting, generating and using improved technology in a bid to develop all sectors of the economy including both industrial and extractive sectors.
6. The Nigerian government needs to make a relevant improvement to all infrastructures and provide social amenities such that it attracts more FDI.
7. The Nigerian government should endeavor to provide a clear guideline on government policies regarding priority sectors that require foreign investments in Nigeria among which sectors like mining and manufacturing should be uppermost for development.
8. The level of security at all levels in the country should be improved in order to boost the confidence of both domestic and foreign investors in Nigeria.

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