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## Assessment about the Influence of Petroleum FDI on Nigerian Economic Enlargement

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### **Abstract:**

*FDI contributes to the industrial development of a developing country as a result of its accompanying transfer of advanced technology, human capital development and employment creation, make the local industries more competitive and promote backward and forward linkages. FDI in Nigeria is largely in the Petroleum sector. This study investigates the impression of FDI in Petroleum sector on economic enlargement in Nigeria. Having tested for stationarity of the variables of which some were found to be stationary at difference and others at first difference, to produce both long term as well as short term coefficients the Autoregressive Distributed lag Model has been applied. It has resulted 23.9% adjustment in the case of a deviation from the long run. Finally, minimum but positive influence has been observed in the area of Nigerian economic development. The recommended policies include the provision of an enabling environment, the need for investment policies that will be favorable to local investors, formulation and implementation of favorable exchange rate policies as well an improved state of infrastructures in the country amongst others.*

**Keywords:** Petroleum, FDI economic growth

### **1. Introduction**

FDI contributes to the industrial development of a developing country as a result of its accompanying transfer of advanced technology, human capital development and employment creation. FDI can also make the local industries more competitive and promote backward and forward linkages. It can also create spillover effect on the local economy. Primarily, natural resources and local market volume determine as well as magnetize the capacity of African countries. Regrettably, Africa has not reaped maximum benefit from this opportunity. In 2014, only 5.4% of the total world FDI was directed to Africa (World investment Report , 2017). This compares unfavourably with 34.7% for Asia, 12.8% for Latin America and the Caribbean, 17.4% for North America and 20.5% for Europe for the same period (World investment Report , 2017). The major hindrance to many investors looking to invest on the continent are political instability, terrorist attack and civil wars.

Nigeria has been seen as an attractive destination for FDI given the huge market and abundance of natural resources. FDI increased from USD2, 040.18 million in 2002 to USD4, 978.26 million in 2005. A plausible factor that accounted for this is the increased confidence of foreigners in the domestic economy as a result of the shift from the military to the democratic governance. More also, the various economic reforms and incentives offered to foreign investors aided in attracting foreign investors to the Nigeria's economy during the period. The upward trend continued until 2009 when FDI increased to USD 8,649 million. In 2010, FDI decreased by 29% to USD6,099 million, picked up to USD 8,915 million in 2011 and resumed a downward trend settling at about a decade low of USD 3,064.2million in 2015. As at 2016, FDI inflows stood at USD 4,448.73 million(UNCTADSTAT). The Nigerian economy slipped into recession after witnessing two consecutive quarters of negative growth rate in June 2016. This can be attributed to the slump in the price of oil which also led to a decline in FDI. FDI in Nigeria was concentrated in the petroleum sector between 1996 and 2005 with more 60% of the FDI going to the petroleum sector. However recent figures show that FDI is more diversified as we have other sectors such as banking, finance, and telecommunication gulping a larger share of FDI.

#### *1.1. Statement of the Problem*

Given the considerable amount of FDI in Nigeria, it is yet to maximize the benefit of FDI in the form of adoption of foreign technology and know-how via licensing agreements, human capacity development, and introduction of new processes, and products by foreign firms. Other gains of FDI such as improved managerial skills, access to market and international production networks have not been adequately harnessed.

Alfaro (2003) examined the effect of FDI on growth in the primary, manufacturing and services sectors and discovered that FDI in the primary sector has a negative and significant effect on growth, in manufacturing, it has a positive and significant effect while services have an ambiguous effect.

One may posit that the sector to which FDI is directed is the reason Nigeria is yet to reap the optimum dividend of FDI. Given the monolithic nature of the Nigeria economy and the volatility of oil prices and the fact that majority of FDI in

Nigeria is directed to petroleum related sector it is important to investigate the impact of petroleum sector FDI on economic growth in Nigeria.

### 1.2. Objective of the Study

Following are some research objectives:

- To observe the brunt of petroleum FDI on the economic enlargement of Nigeria.
- To establish the impact of interest rate on Nigerian economic expansion;
- To determine the brunt of Exchange rate on Nigerian economic augmentation.

## 2. Empirical Literature Review and Theoretical Framework

Some relevant previous works had done to investigate the influence of FDI on economic growth and development and finally has following findings:

Impact of FDI on economic growth in Pakistan had been examined by Najabat and Hamid (2017). Correlation and multiple regression analysis have been applied to analyze the data for the period of 1991-2015. Finally, FDI found to have positive impact on economic growth of Pakistan. OLS technique has been applied to find determinant of FDI by research conducted by Ojong, Arikpo & Ogar (2015). Dickey Fuller and Phillip Perron unit root test have been tested to check the stationary status. In South Africa, with a timeline from 1990 to 2013, impact of FDI had been studied by Tshepo (2014). After applying unit root test, the Johansen co-integration test and Granger causality test had been applied to test the long-run relationship among the variables. Long term relationship has been generated with the relationship among FDI, GDP and employment in South African prospective. Impression of FDI on Nigeria Economic growth had been observed in a work conducted by Adeleke et al. (2014) using ordinary least square (OLS) technique. This study had denoted FDI as an engine behind economic growth.

A study had found the impact of FDI on enhancement of economy for a time period from 1985 to 2010 (Olusanya and Oyebo, 2012). As a conclusion this study found that FDI, Human capital and labour force majorly cause a decline in GDP in Nigeria. Moreover, human capital has not been observed to be insignificantly connected to GDP. As a reason it may be found that shortage of skilled labour in the country may not attract the technology being transferred by foreign investment. Finally, Gross capital formation (Direct investment) positively impacted economic growth. Danja (2012) studied the applicability of FDI and the impact they make to the Nigerian economy. Using ordinary least square, the result shows a strong relationship between FDI and gross fixed capital formation. However, FDI did not contribute much to the growth and development of the Nigerian Economy. According to the study, this was as a result of repatriation of profits, contract fees and interest payment on foreign loans, concluding that FDI cannot contribute much to economic development of Nigeria, if it is directed solely to supply of capital than to investment projects. FDI should rather be directed towards improving and expanding managerial and labour skills.

Opaluwa, Ameh, Alabi & Abdul (2012) having analysed the pre and post era of FDI on the manufacturing sector in Nigeria in order to examine its impact on the sector, asserts that the recent fall in oil prices, beginning in the last quarter of 2014 led to the decline of GDP in the manufacturing sector.

Umoh et al. (2011) examines the bi-directional relationship between FDI and growth in Nigeria. The single-equation models and simultaneous equation models were used to examine the FDI-growth relationship. The result shows that there is a bi-directional relationship between FDI and economic growth. This means that FDI leads to economic growth and when a country experiences economic growth, it brings about more FDI. They recommend foreign investors to directly invest in projects that significantly increase production capacity, incorporate new technologies in tradable sectors and improve the country's infrastructure base.

Alfaro (2003) employed OLS method to examine the effect of FDI on growth. Various types of relationship have been noticed between FDI and economic enlargement. Result indicated that FDI although positive but not able to significant impact on growth. In case of manufacturing and services sectors, negative and significant effect had been noticed for growth.

Most of FDIs in Nigeria are targeted at the oil industry and extractive industry. This is partly due to lack of infrastructure needed to attract investors into the manufacturing industry. In spite of efforts by the Nigerian government to attract FDI, the sector of concentration has tilted to the extractive industry. This is because FDI, like to most sub Saharan African countries, have been motivated by availability of commodities as well as large market size(population). Moses (2011) employed the OLS technique to examine the sectoral impact of oil and non-oil FDI on Nigeria economic growth for the period of 1970-2008. It has been revealed that oil sector based FDI has more positive impact compared to non-oil sector based FDI. A co-integration-based analysis has been done to find the impression of FDI in oil-based sector by Kareem (2012) for a time frame between 1980 to 2007. The result shows that FDI at current year is negatively associated with GDP. They inferred that this was due to the time lag required for such investment to be translated to any significant impact.

In a word it can be said that influence of FDI for Nigeria had been focused in many studies but, few had focused on the impact of petroleum FDI for Nigeria. This study has focused on the impact of petroleum FDI for generating economic enhancement based on recent data. The theoretical underpinning of this research therefore is anchored on the neo-classical (Senbeta, 2008) (Imoisi, Uzomba, & Olatunji, 2012) growth model which is considered very important in explaining the importance of FDI flows at the global level with enormous benefits to the local economy such as increase in the supply of labour, increase in the stock of capital and increase in technological productivity in an economy.

### 3. Research Methodology

#### 3.1. Research Design

Based on the existing theoretical and empirical literature, this study adopts ex-post factor research design as it embraces the use of secondary data in examining the performance of FDI in the petroleum sector on the economic growth of Nigeria. The study utilizes secondary data from UNCTAD, CBN and NBS. Data on FDI inflow in the petroleum sector is obtained from World Investment Directory 2008 and Nigeria Investment Promotion Commission unpublished data. Data on economic growth proxy by real Gross Domestic Product from 1986 to 2016 was obtained from UNCTAD and triangulated with data from Central Bank of Nigeria and National Bureau of Statistics obtained on a quarterly basis. Data on Interest rate and exchange rate from 1986 to 2016 was obtained from the Central Bank of Nigeria statistic database.

#### 3.2. Model Specification

The aggregate production function is specified as follows:

$$GDP_t = A_t K_t^\alpha L_t^\beta$$

Where, GDP is the aggregate production of the economy at time t;  $A_t$ ,  $K_t$  and  $L_t$  denote the Total Factor Productivity (TFP), capital stock and labour respectively. According to Senbeta (2008), we assert that FDI, low real interest rate and real exchange rate among others affect Total factor Productivity. In a study carried out by Imoisi, Uzomba, & Olatunji (2012), they employed OLS method to examine the long run relationship between exchange rate, interest rate and Gross Domestic Product in Nigeria from 1975 -2008. The result showed that increase in interest rate retards investment and subsequently economic growth. Also, a depreciation of exchange rate retarded growth. Although the study included domestic private investment as one of the explanatory variables, we adapt the model to include FDI in the petroleum sector as our study considers the impact of FDI in the petroleum sector on economic growth.

The model in its structural form is stated as follows:

$$RGDP = f(FDI_t^\beta, INTR_t^\gamma, EXCHR_t^\delta)$$

Stating it in its econometric form

$$RGDP = \alpha + FDI_t^\beta + INTR_t^\gamma + EXCHR_t^\delta + \mu$$

Taking the natural logs of both sides of the equation we get

$$\ln gdp = \alpha + \beta \ln FDI_p + \gamma \ln INTR + \delta \ln EXCHR + \mu$$

Where  $RGDP$  is Real Gross Domestic Product,  $FDI_p$  is Foreign Direct Investment in Petroleum sector,  $INTR$  is Interest rate,  $EXCHR$  is exchange rate  $\alpha$  and  $\beta$ ,  $\gamma$  and  $\delta$  are parameters to be estimated and  $\mu$  is the error term.

From the model, the GDP at current market prices (GDP) is the dependent variable. The independent variables in the model are Exchange Rate ( $EXCHR$ ), Interest Rate ( $INTR$ ) and Foreign Investment ( $FDI_p$ ) Data collected on these represent the outcome of the FDI. These are expected to affect the rate of growth of Nigerian economy negatively or positively.

#### 3.3. Estimation Techniques

##### 3.3.1. Unit root test

The main condition for becoming stationary is the presence of white noise i.e. integrated of order zero. This test is being applied to find whether the time series is stationary over time or not. This is also important for determining co-integration as well as for error correction. The Augmented Dickey-Fuller (ADF) is the test to find the order of integration.

##### 3.3.2. Autoregressive Distributed Lag Model (ARDL)

The ARDL ( $p, q_1, q_2 \dots q_{1k}$ ) model specification is given as follows.

$$\Phi(L, p)y_t = \sum_{i=1}^k \beta_i (L, q_i) x_{it} + \delta w_t + u_t \quad (3)$$

Where

$$\Phi(L, p) = 1 - \Phi_1 L - \Phi_2 L^2 - \dots - \Phi_p L^p$$

$$\beta(L, p) = 1 - \beta_1 L - \beta_2 L^2 - \dots - \beta_q L^q \text{ for } i = 1, 2, 3, \dots, k, u_t \sim iid(0; \delta^2).$$

$L$  is a lag operator such that  $L^0 y_t = X_t$ ,  $L^1 y_t = Y_{t-1}$ , and  $w_t$  is a  $s \times 1$  vector of deterministic variables and other exogenous variables with fixed lags.  $p = 0, 1, 2, \dots, m, q = 0, 1, 2, \dots, m, i = 1, 2, \dots, k$ : namely a total of  $(m + 1)^{k+1}$  different ARDL models.

In this study, the justification for using ARDL are the followings: its efficiency in the small samples studies to establish cointegrating among variables (Ghatak & Siddiki, 2001)(Tang, 2003), it can be used at different levels of integration e.g. I(1) and I(0), it allows decision to be made to include any endogenous and exogenous variables for the treatment of deterministic elements, the order of VAR, and the number of lags to be used (Pesaran & Smith, Structural Analysis of Cointegration-VARS, 1998). Moreover, the ARDL allows for more optimal lags for different variables; but Johansen co-integration method requires a uniform number of optimal lags. In study by studies, Tang (2003) he used ARDL Bounds test approach with 18 annual observations to estimate the study of the Japanese economy. Therefore, in this study with 31 observations the use of ARDL Bounds test method of analysis is preferable.

### 3.4. Estimation Procedure and Criterion

Ordinary Least Square method has been applied to carry out the econometric analysis and to set up the association between variables included in this current research. The parameters of the model shall be estimated using the Ordinary Least Squares (OLS) techniques. The unit root test, Auto Regressive Distributed Lag (ARDL) model will be carried out on the data to generate both long run and short run coefficient of the model. The economic apriori expectation will evaluate the parameter in terms of standard economic theory expectations with  $\alpha$  positive,  $\beta$  positive,  $\gamma$  negative and  $\delta$  positive.

## 4. Data Presentation and Analysis

The analysis of the results involves subjecting the parameter estimates of the model to various theoretical (a priori) expectations, statistical first order test and econometric second order tests to determine their reliability or robustness. However, there is first a need to consider the trend of the data.

### 4.1. Data Analysis

#### 4.1.1. Trend Analysis

This section shows the trend of all the subject variables from 1986 to 2016.

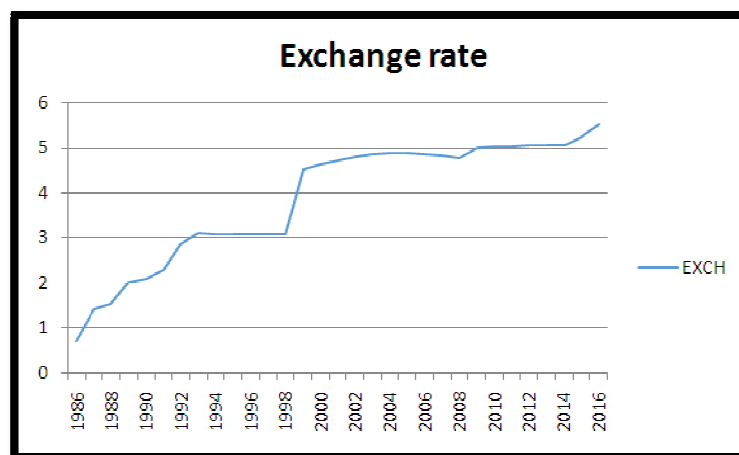


Figure 1: Graph Showing the Trend of Exchange Rate for Nigeria between 1986 and 2016

From the graph in Figure 1, the exchange rate began rising all through the years from 1986 to 1993 after which it was steady at 3% through 1998. The post 1998 years saw a sharp rise in the rate of exchange following a steady but flat trend between 1999 and 2015 before reaching an all high in 2016.

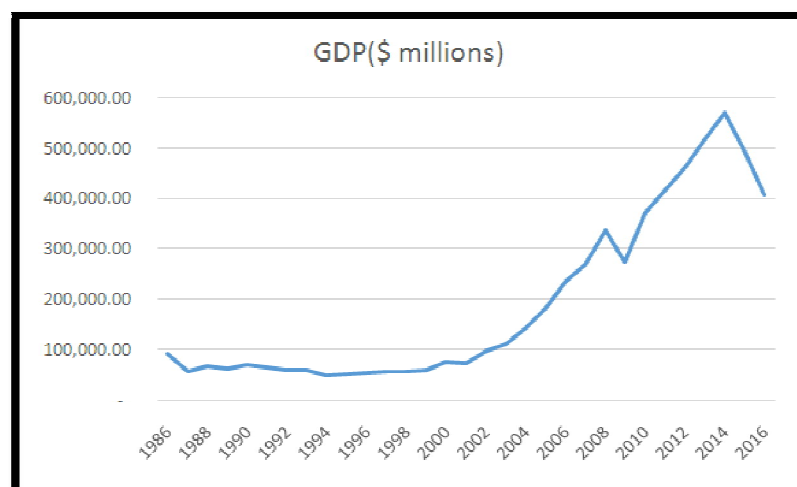


Figure 2: Graph Showing the Trend of the Gross Domestic Product in Nigeria between 1986 And 2016

From the graph in Figure 2, showing the trend of GDP, the GDP maintained a flat trend between 1986 to 1999 with minimal growth between the period. Post 2002 showed a sharp rise in GDP until 2008 when there was a decline. The GDP

picked up in 2010 and maintained an upward trajectory until 2014 when there was a sharp decline. The graph shows a relatively flat GDP curve.

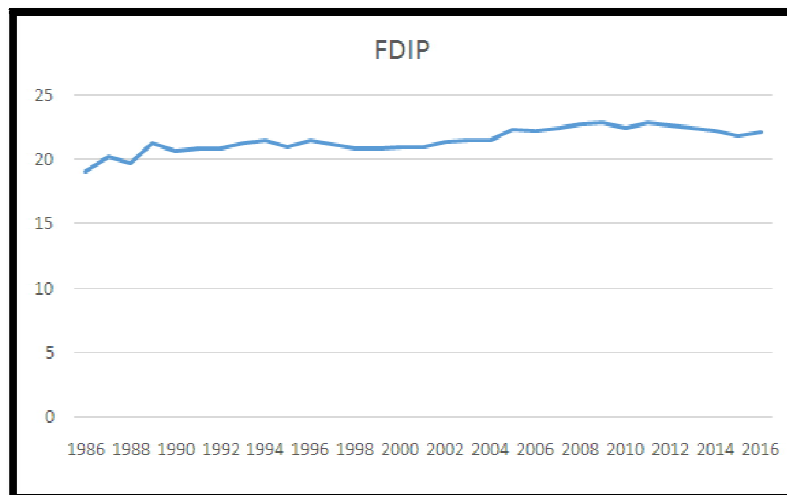


Figure 3: Graph Showing the Trend of Foreign Direct Investment in the Petroleum Sector in Nigeria between 1986 and 2016

The fig 4.3 shows the trend of FDIP for the years between 1986 and 2016. The growth of the FDIP has been relatively steady but flat.

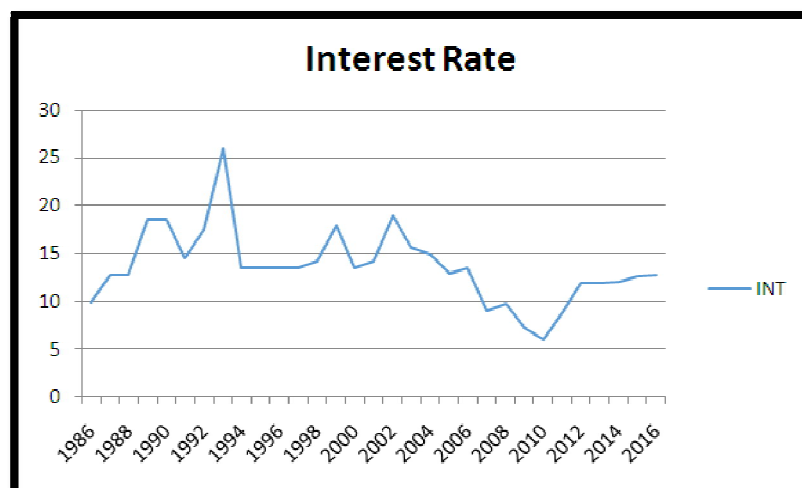


Figure 4: Graph Showing the Rate of Interest For Nigeria between 1986 and 2016

From the fig 4.4, the interest rate follows a zig-zag pattern rising and falling between years. It started out at a rate slightly below 10% and then keeps fluctuating reaching an all high in 1993 at over 25%. However, in 1994, the interest rate fell to about 13% and sustained at that till it began to fluctuate again between 1998 and 2009 reaching its lowest in 2010 before rising and maintaining a rate slightly above 13% in 2016.

4.1.2. Unit Root Test

The Results of the analysis of data using the Augmented Dicker fuller (ADF) unit root test is shown below.

- H<sub>0</sub>: There is unit root

Var	T-Statistic	P-Value	Order of Integration
D(EXCH)	-5.545730	0.0001	I(1)
D(FDIP)	-9.296586	0.0000	I(1)
D(GDP)	-6.082855	0.0000	I(1)
INT	-3.018011	0.0446	I(0)

Table 1: Showing the Result of Unit Root Test

From the table above, levels at the 5% level of significance, the variables exchange rate (EXCH), foreign direct investment in the petroleum sector (FDIP), and Gross Domestic product (GDP) were not observed as stationary but has become stationary at first difference while the variable interest rate (INT) was stationary. With this result the appropriate

technique to employ is the Auto Regressive Distributed Lag Model (ARDL). The ARDL model is appropriate in cases where there

#### 4.1.3. Auto Regressive Distributed Lag (ARDL) Model

The results of the ARDL model are presented below.

##### 4.1.3.1. ARDL Cointegrating and Long Run Form

Dependent Variable: GDP

Selected Model: ARDL (1, 3, 3, 4)

ARDL Co-integrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCH)	-0.169917	0.077184	-2.201455	0.0480
D(EXCH(-1))	0.260541	0.089015	2.926946	0.0127
D(EXCH(-2))	-0.152074	0.077494	-1.962396	0.0733
D(INT)	0.023085	0.008827	2.615160	0.0226
D(INT(-1))	0.005381	0.007794	0.690402	0.5031
D(INT(-2))	0.015530	0.008763	1.772244	0.1017
D(FDIP)	-0.033836	0.090577	-0.373562	0.7152
D(FDIP(-1))	-0.226504	0.095014	-2.383912	0.0345
D(FDIP(-2))	-0.013828	0.060594	-0.228214	0.8233
D(FDIP(-3))	0.236533	0.062424	3.789107	0.0026
CointEq(-1)	-0.239365	0.062118	-3.853375	0.0023

Table 2

From the table above, all the differenced variables represent the short run form of each of the variables with different lag values from one to three. The exchange rate variable is statistically significant with a probability of 0.048, which is lesser than 5%. Also, the interest rate variable is statistically significant with probability of 0.0226 which is again less than 0.05 while the FDIP variable is highly insignificant at 71.52% with a negative coefficient of 0.033836. This implies that the variables are cointegrated. However, the error correction in the model shows that it takes about 23.9% to adjust back to the long run from the short run when there are short term deviations.

##### 4.1.3.2. ARDL Bounds Test

The table below gives the F-statistic and for the ARDL bounds test.

Test Statistic	Value	K
F-statistic	9.548365	3
The table below gives the critical values for the ARDL bounds test.		
Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Table 3

From the above tables, the variables are highly insignificant. The F-statistics which is a joint test calculated for all underlined variables (i.e. GDP, FDIP, Exchange rate and interest rate) fall outside the critical bounds at the 1 and 5 percent levels of significance. The calculated F-statistic is higher than the (Pesaran, Shin, & Smith, Bound testing approaches to the analysis of level relationships, 2001) upper bound critical value at 99% level of significance, so there is need to reject the null hypothesis which states that there is no cointegration, which suggests that the variables under consideration are cointegrated and they have the long-run relationship.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCH	0.785268	0.192268	4.084236	0.0015
INT	-0.047390	0.068207	-0.694799	0.5004
FDIP	0.151299	0.395330	0.382715	0.7086
C	6.173685	8.966766	0.688507	0.5042

Table 4: Long Run Form

From the table above which shows the long run form of the coefficients, exchange rate variable has a positive and statistically significant coefficient of 0.7852 while interest rate coefficient is negative and highly insignificant. Similarly, FDIP variable coefficient is positive and insignificant with a coefficient of 0.159288.

The estimated coefficients of the long-run relationship between GDP, FDIP, EXCH and INTR are expected to be significant, that is:

$$GDP = 6.173685 + 0.151299(FDIP) + 0.785268(EXCH) - 0.047390(INT)$$

The result of the equation from the table below revealed that economic growth is being positively associated with the foreign direct investment in the petroleum sector and exchange rate components have positive impact on economic enhancement. In the long run, interest rate has negative impact. 78.5268% increase in the rate of growth of GDP, has been noticed as one percent increase happen in FDI. With the same amount of increment of FDI has able to cause 15.1299% increment in the rate of growth rate of GDP, whereas, a one percent rise in the interest rate leads to reduction of growth of GDP by 4.739%. This shows that all the components contribute to the growth of Nigerian economy in the long-run positively except interest rate which is negative and relatively not significant at 10% level over the period under review.

#### 4.1.3.3. Granger Causality Test

Below is the result of the Granger causality test.

Null Hypothesis:	Obs	F-Statistic	Prob.
FDIP does not Granger Cause EXCH	29	1.50096	0.2431
EXCH does not Granger Cause FDIP		1.02913	0.3726
GDP does not Granger Cause EXCH	29	0.05260	0.9489
EXCH does not Granger Cause GDP		4.01939	0.0312
INT does not Granger Cause EXCH	29	0.08467	0.9191
EXCH does not Granger Cause INT		2.10916	0.1433
GDP does not Granger Cause FDIP	29	4.86061	0.0169
FDIP does not Granger Cause GDP		1.45302	0.2537
INT does not Granger Cause FDIP	29	0.79032	0.4652
FDIP does not Granger Cause INT		5.53153	0.0106
INT does not Granger Cause GDP	29	0.85289	0.4387
GDP does not Granger Cause INT		2.37199	0.1148

Table 5

Of all the variables, the exchange rate granger causes GDP but GDP does not granger cause exchange rate. Also, the GDP granger causes FDIP but FDIP does not granger causes GDP. Furthermore, the FDIP granger causes interest rate but interest rate does not granger cause FDIP in Nigeria.

This implies that our variables act independently and do not depend on each other. So, the model is not a simultaneous model.

#### 4.2. Interpretation of Results

Having tested for stationarity of the variables of which some were found to be stationary at difference and others at first difference, both long run and short form coefficients of the model has been generated by the Autoregressive Distributed lag Model with a speed of adjustment of 23.9% in the case of a deviation from the long run. Economic enlargement is being found to be directly related to inflow of foreign direct investment in the petroleum sector and is statistically significant with 95% confidence interval but foreign direct investment in the petroleum sector is not directly related to Nigerian economic growth. Furthermore, appropriate exchange rate regime is directly related to the economic growth but economic growth is not necessarily related to sound exchange rate. The estimated intercept is 6.173685 while estimated coefficients of FDIP is 0.151299, while the exchange rate coefficient was 0.785268 and that of interest rate was a negative but significant -0.047390 which were not different from the apriori expectations. The result shows that all the components contribute to the growth of Nigerian economy in the long-run positively except interest rate which is negative and relatively not significant at 10% level over the period under review.

### 5. Recommendation and Limitation of the Study

#### 5.1. Recommendation

In the light of the above findings, the followings recommendations are proposed: -

- Government should provide enabling environment that will be conducive for doing business in Nigeria, so as to attract the inflow of FDI.
- Government should try to maximize FDI in the oil sector in promoting FDI in the non- oil sector through backward and forward linkages.
- There is need for government to formulate investment policies that will be favorable to local investors in order to compete with the inflow of investment from foreign countries.

- Favorable exchange rate policies should be formulated and implemented to facilitate exchange rate – export growth economically at the Nigerian economy.
- The government should improve the state of infrastructures in the country. This will encourage meaningful investments in the economy.
- The Central Bank of Nigeria should come-up with policies that will help to stabilize the Naira exchange rate vis-à-vis the major currencies of the world, like the United States Dollar. This will boost the investors' confidence in the economy.

### 5.2. Limitation of the study

The limitation to this research was availability of data from one source. Data on FDI in the petroleum sector was obtained from World Investment Directory (1990-2005) and Nigeria Investment Promotion Commission (2007-2016), unpublished. Data had to be extrapolated for years not available. This definitely affects the interpretation of the data.

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