



**Analysis of the relationship between Exchange Rate, Interest Rate, Oil Price Shocks and Foreign Direct Investment on Economic Growth In Nigeria: 1985- 2017.**

**Umar, Musa Mohammed Yelwa Nurudeen and El-Yaqub, Ahmed B.**

<sup>1</sup>School of Economics, Finance and Banking, University Utara, Malaysia

<sup>2</sup>Department of Agricultural Economics, Ahmadu Bello University Zaria, Nigeria  
Correspondence Email: [yelwanurudeen@gmail.com](mailto:yelwanurudeen@gmail.com)

**Abstract**

*The study examined the effects of economic growth, exchange rate, interest rate, and oil price shocks on foreign direct investment in Nigeria between 1985 and 2017. The result of Var estimates of FDI is associated with 39.07% increase in FDI on average all things being equal (ceteris paribus). A percentage increase in economic growth (ECGT) account for 2.08% increase in FDI. A percentage increase in oil price (OILP) account for -2.80% decrease in FDI on average all things being equal (ceteris paribus). The FDI to sudden changes in the independent variables in Panel 2 shows that the response of ECGT to a shock in FDI; from the response of FDI to a shock in FDI initially has a noticeable impact on ECGT in period 1. From the 2 period the response gradually declined above its steady states value and remain positive in the position region. Meaning that shock to ECGT will have a positive impact on FDI both in short and long run. The Variance decomposition indicates the amount of information each variable contributes to the other variables in the model. It determines how more of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. It identifies the predominant shocks that contribute more to the changes in the dependent variables in the model, in the short run one year forecast error, medium term 5 year forecast error and in the long run 10 year forecast error. The variability of FDI to changes in ECGT, EXCHR, INTR and OILP. ECGT contributes the most to changes in FDI both in the short run, medium and long run; followed by EXCHR and INT while OILP contributes the least to FDI. In conclusion: innovation and response must be consistent with intuition, economic theory expectation. For instance, our results are consistent because with good economic growth like infrastructure, investors tend to invest more, and this leads to more economic development and creation of jobs, creating demand for production, investment goes up leading to economic growth. The study recommended that there is need to improve the FDI's climate to take advantage of the new global interest in the affairs of the country by implementing sound macroeconomic policies, spurring innovation, improving the investment climate, establishing a transparent legal framework that does not discriminate between local and foreign investors and improving the provision of infrastructure and the government should implement policies that will make the foreign investment on oil sector more efficient and re-position it for economic growth in Nigeria.*

**Keywords:** Economic Growth, Exchange Rate, Interest Rate, Oil Price shocks and FDI

Similarly, structural reforms also

**Introduction**

Economic growth of any country required to be sustained in highly competitive environment as high and sustainable economic growth depicts living standards and high productivity of the nation.

contributed for economic growth and stability which entails privatization of under-performed government owned business entities such as banking sector found to be an attractive destination for FDI investments that enhanced Nigeria's economic development and business

activity (Abiola, 2019).

The global financial crisis was one of the major reasons to decline in FDI in Nigeria as credit crunch affected various sectors and countries (World Bank, 2022). After 2010, the major crisis was over and countries were getting stable the FDI investment again inclined to 8.8 billion US \$ but later major declined was observed during 2013 when foreign investment level was shrink to 5.6 billion US \$ due to civil unrest that causes major problems including destruction of physical and human assets and capital in Nigeria and foreign direct investment was pulled out and left the country at lowest level of FDI ever. Other aforementioned factors also caused the reduction in FDI, as previous era was referred as benefited with spillover effect of foreign direct investment ( Abu and Nurudeen2010). The huge populated area of Nigeria attracted large number of investors due to its huge potential market for foreign investors. However, there is lot of work needed to be accomplished in terms of development of infrastructure and basic needs including roads development, electricity production to meet the demand of nation and need to address the security issues for protection of foreigners and their assets in order to maintain the retain the investors and for better and inclined FDI inflow (Ahmed, 2014).

Akinlo, 2017 asserted that FDI is known as one of the important and most significant factors for dynamic and international participation of inflow towards the developing countries such as African region. All tangible and non-tangible assets have been deployed and expected to deploy for economic boost under the umbrella of FDI for better economic conditions.

The international market faced collapse in crude oil and petroleum, Nigeria's exports for foreign exchange earned and faced decline in creation of acute shortage in country and affected the financial ability due to huge import bills and large external debts. The balance of payments between trade and payments found to be counterproductive and negatively influenced the economic environment due to unsuitable investments.

The above stated circumstances are very crucial and sensitive for economic conditions, for get around these kinds of tough situations federal government took several measures to support economic situation. The structural reforms and

adjustment programs (SAP) as package of economic development and policy to attain the suitable climate growth and investment in country. The appropriate policy measures have been taken under Nigerian Structural adjustment programs for aggregating output in country largely based on size, quality of foreign direct investment that can be attracted by country based on its resources and policies to attract investment (Anyawu, 2011). The reforms of monetary policy must be taken into consideration for attraction of FDI in Nigeria, as appropriate measure plays significant role in attracting FDI. The policy addresses various aspects including indigenization which is known and referred as policy for restricted investors from other countries to boost the foreign investment into domestic sectors for economic stability established since 1970s. The research scholars have found and stated that various business areas have been banned for foreign direct investment but few business areas have been liberalized and permission have been given for FDI to boost and tap these business sectors (Ayanwale, 2011).

The literature and evidence of foreign direct investment have been seen around the world and influence of FDI can also be examined on economic growth of the country, the impact of FDI has attracted large number of research scholars to focus on size of foreign direct investment and the impact of FDI on economic growth. The current study is an attempt to analyse the effects of economic growth, exchange rate, interest rate, and oil price shocks on foreign direct investment in Nigeria.

### **Methodology**

This study adopted the case study approach to provide the deep understanding of problem and address the more specific issues related to the problems faced by countries in order to maintain the appropriate utilization of FDI for economic growth. In this case, Nigeria is chosen. In the method of data analysis, Granger- Causality Test, Unit Root Test, Variance Decomposition, Impulse Response test and Regression analysis were used to investigate the relationship between FDI and economic growth of Nigerian economy. Also, the linear relationship of the dependent and independent variables is tested to show if they are significant or not. The present study entails the secondary data for

analysis. The data for FDI, economic growth, exchange rate, interest rate and oil price were fetched from the documents published by World Bank development indicators on Developing Countries. Inferential statistic method is used to investigate the impact of FDI on economic growth, exchange rate, interest rate and oil price respectively. Data can be divided into two types, namely: Primary data and Secondary data. Primary data are sourced from the field directly that is, one-on-one interviews and interactions, while secondary data are sourced from publications or organizations that have acquired and stored them.

### Model Specification

The model used in this study is adapted from Alfaro *et al* (2003), they wrote on “Foreign Direct Investment and Economic Growth in

Nigeria”. Here is the original model of Alejandro,(2016)

$$GDP = \beta_0 + \beta_1 FDI + \beta_2 GCE + \beta_3 EXR + \beta_4 IR + U$$

(1)

In modifying the equation 1, the researcher

introduced log in the equation to improve the linearity of the equation (1) to suit the studies

objectives and also used FDI as the dependent variable.

$$\ln-FDI_t = a_0 + a_1 \ln-ECGT_t + a_2 \ln-EXCHR_t + a_3 \ln-INTR_t + a_4 \ln-OILP_t + V_t \quad (2)$$

Where,

(3)

$$X_t = a_2 0 + a_2 1 y_{t-1} + a_2 2 x_{t-1} + e_2 t$$

(4)

The main objective of vector autoregressive (VAR) model in this study is to come up with examination and assessment of relationship type between FDI and development of economy and to know if there is any significant impact from the shocks. This is when the variance decomposition comes in.

Furthermore, we will need to state equation (2) in VAR form, hence we have;

$$ECGT_{t,1} = \Phi_{11} FDI_{t-1,1} + \Phi_{12} EXCHR_{t-1,2} + \Phi_{13} INTR_{t-1,3} + \Phi_{14} OILP_{t-1,4} + V_{t,1} \quad (5)$$

$$FDI_{t,2} = \Phi_{21} ECGT_{t-1,1} + \Phi_{22} EXCHR_{t-1,2} + \Phi_{23} INTR_{t-1,3} + \Phi_{24} OILP_{t-1,4} + V_{t,2} \quad (6)$$

$$EXCHR_{t,3} = \Phi_{31} ECGT_{t-1,1} + \Phi_{32} FDI_{t-1,2} + \Phi_{33} INTR_{t-1,3} + \Phi_{34} OILP_{t-1,4} + V_{t,3} \quad (7)$$

$$INTR_t = \Phi_{41} ECGT_{t-1,1} + \Phi_{42} FDI_{t-1,2} + \Phi_{43} EXCHR_{t-1,3} + \Phi_{44} OILP_{t-1,4} + V_{t,4} \quad (8)$$

$$OILP_{t,5} = a_5 + \Phi_{51} ECGT_{t-1,1} + \Phi_{52} FDI_{t-1,2} + \Phi_{53} EXCHR_{t-1,3} + \Phi_{54} INTR_{t-1,4} + V_{t,5} \quad (9)$$

Hence, the four equations above are vector autoregressive model of order 1, denoted as VAR (1). Each variable is a linear function of lag

FDI = Foreign Direct Investment

ECGT = Economic Growth

EXCHR = Exchange Rate

INTR = Interest Rate

OILP = Oil price

$a_0$  = Intercept

$a_1 - a_3$  = Other parameters to be estimated. They are impacts of each of the independent variables on the dependent variable.

$V_t$  is error term. Mathematically, a vector autoregressive model (VAR) model of lag order 1 can be written as thus:

$$Y_x = a_1 I_0 + a_2 y_{t-1} + a_3 x_{t-1} + e_{1t}$$

1 values for all variables in the set.

#### Data Analysis Techniques

The data for this study was taken from World Bank under specific time series for investigation the influence and impact of FDI on the economy of Nigeria. Thus, the present study is quantitative in nature and developed on the base of previous research design and methodologies to conduct the present research. The Statistical techniques used are Augmented Dickey-Fuller Unit root test (Dickey and Fuller, 1981; Calvo *et al*) used to test for the stationarity of the variables. Pairwise Granger-causality tests were conducted to see if there was one-way causality, dual causality or no causality among the variables.

Co-integration test suggests that there is long-run or equilibrium relationship among variables despite their non-stationarity. Variance decomposition is obtained from a VAR model; it is used to identify the contribution of each independent variable in explaining variations of the dependent variable in the

model. For the data analysis in this research work, a VAR model to capture the linear interdependencies among the variables (FDI, ECGT, EXCHR, INTR and OILP). The utilization of these models assist in avoiding various issues and challenges to crop up, on the other hand qualitative studies are suitable for utilization in econometric research designs. These challenges included the subjective issues and biased responses and challenges to incorporation of this biasness in econometric models. All of these tests were done using E-views 9.0.

$$\ln-FDI_t = a_0 + a_1 \ln-ECGT_t + a_2 \ln-EXCHR_t + a_3 \ln-INTR_t + a_4 \ln-OILP_t + V_t \quad (10)$$

Where,

FDI = Foreign Direct Investment (\$)

ECGT = Economic Growth (\$)

EXCHR = Exchange Rate (\$)

INTR = Interest Rate (\$)

OILP = Oil Price (\$)

#### Result And Discussions

Vector Auto regression (VAR)

Var estimates are simply OLS estimates of the realization of FDI is associated with 39.07% increase in FDI on average all things being equal (*ceteris paribus*). A percentage increase in economic growth (ECGT) account for 2.08% increase in FDI on average all things being equal (*ceteris paribus*). The past realization of EXCH associated with 37.49% increase in EXCH on average all things being equal (*ceteris paribus*). The past realization of INTR associated with 22.72% increase in INTR on average all things being equal (*ceteris paribus*). A percentage increase in oil price (OILP) account for -2.80% decrease in FDI on average all things being equal (*ceteris paribus*).

**Table 1:** Vector Autoregression Result

	FDI	ECGT	EXCH	INTR	OILP
FDI(-1)	0.390760 (0.34067) [ 1.14704]	-4.532017 (6.13876) [-0.73826]	6.78E-09 (3.5E-09) [ 1.96196]	1.14E-09 (2.8E-09) [ 0.40142]	1.58E-11 (1.5E-09) [ 0.01082]
FDI(-2)	0.284942 (0.33948) [ 0.83935]	0.055780 (6.11732) [ 0.00912]	1.07E-10 (3.4E-09) [ 0.03103]	1.91E-10 (2.8E-09) [ 0.06726]	4.72E-11 (1.5E-09) [ 0.03247]
ECGT(-1)	0.020826 (0.01408) [ 1.47897]	0.698216 (0.25374) [ 2.75170]	-2.76E-11 (1.4E-10) [-0.19292]	9.25E-11 (1.2E-10) [ 0.78736]	-4.92E-11 (6.0E-11) [-0.81599]
ECGT(-2)	-0.021840 (0.01583) [-1.37993]	0.431901 (0.28520) [ 1.51440]	-1.68E-10 (1.6E-10) [-1.04653]	-1.29E-10 (1.3E-10) [-0.97534]	2.45E-11 (6.8E-11) [ 0.36206]
EXCH(-1)	3466346. (2.4E+07) [ 0.14637]	3.62E+08 (4.3E+08) [ 0.84769]	0.374956 (0.24022) [ 1.56086]	-0.178878 (0.19760) [-0.90523]	-0.069291 (0.10137) [-0.68355]
EXCH(-2)	6108541. (2.3E+07) [ 0.26189]	97355500 (4.2E+08) [ 0.23163]	0.431038 (0.23661) [ 1.82173]	0.134071 (0.19463) [ 0.68885]	0.077187 (0.09984) [ 0.77308]
INTR(-1)	-5387290. (3.7E+07) [-0.14627]	-50613665 (6.6E+08) [-0.07626]	1.227200 (0.37361) [ 3.28472]	0.498308 (0.30732) [ 1.62144]	0.001857 (0.15765) [ 0.01178]
INTR(-2)	6425561. (3.7E+07) [ 0.17281]	-9.68E+08 (6.7E+08) [-1.44493]	0.970426 (0.37717) [ 2.57289]	0.277338 (0.31026) [ 0.89390]	0.060891 (0.15916) [ 0.38258]
OILP(-1)	49365175 (8.5E+07)	-2.07E+08 (1.5E+09)	-2.899154 (0.86099)	-0.535561 (0.70823)	0.317022 (0.36332)

C	-8.85E+08 (2.3E+09) [-0.38819]	-3.50E+10 (4.1E+10) [-0.85275]	72.55790 (23.1197) [ 3.13836]
R-squared	0.851634	0.987178	0.975497
Adj. R-squared	0.758905	0.979165	0.960182
Sum sq. resids	2.27E+19	7.37E+21	2334.900
S.E. equation	1.19E+09	2.15E+10	12.08020
F-statistic	9.184130	123.1883	63.69762
Log likelihood	-595.4923	-673.5619	-98.51982
Akaike AIC	44.92536	50.70829	8.112579
Schwarz SC	45.45329	51.23622	8.640513
Mean dependent	2.63E+09	1.54E+11	79.39862
S.D. dependent	2.43E+09	1.49E+11	60.53913
Determinant resid covariance (dof adj.)		5.91E+43	
Determinant resid covariance		4.32E+42	
Log likelihood		-1516.866	
Akaike information criterion		116.4345	



### Impulse Response Test

Impulse is an unexpected shock on an economic variable, the reaction of another economic variable to the impulse is referred to as response. Panel 1 represents FDI, panel 2 represents ECGT; panel 3 represents EXCHR, panel 4 represents INTR and panel 5 represents OILP. Impulse Response Function (IRF) is graphical representation for five periods. The interpretation of the graph was analyzed based on the 1<sup>st</sup> column only, which is the vertical collection.

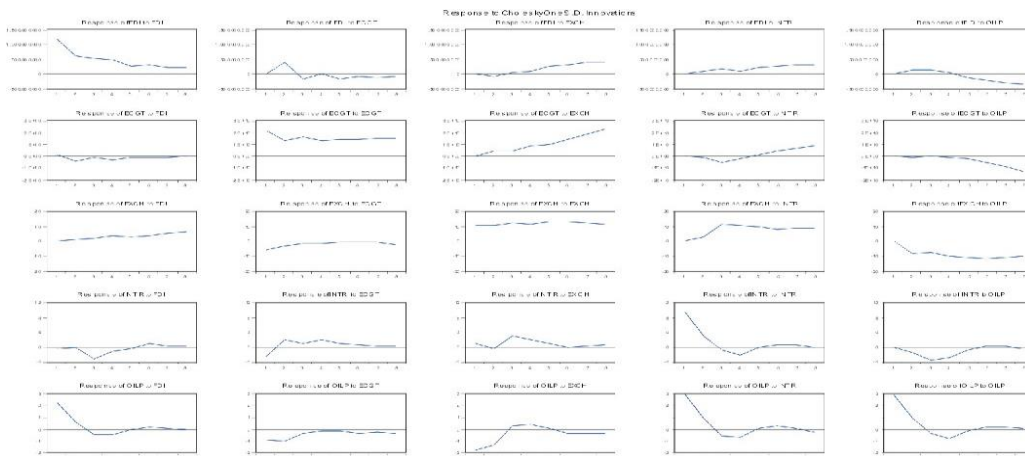




Figure: 1

*Impulse Response Graph*

Source: Author's Computation Using E-View 9.0 version.

**Figure1:** above shows the response of FDI to sudden changes in the independent variables.

Panel 2 shows that the response of ECGT to a shock in FDI; from the response of FDI to a shock in FDI initially has a noticeable impact on ECGT in period 1. From the 2 period the response gradually declined above its steady states value and remain positive in the position region. Meaning that shock to ECGT will have a positive impact on FDI both in short and long run.

Panel 3 shows that response of FDI to a shock in EXCHR is negative initially but became positive and significant later just before the 4<sup>th</sup> period.

Panel4 shows that INTR responded negatively initially but became positive just after the 5<sup>th</sup> period when it hits the steady state value from where it remains in the positive region from the 5<sup>th</sup> period 8<sup>th</sup> period. Meaning that shocks to INTR will have asymmetric impact on FDI in the short and long run.

Panel 5 shows that OILP responded consistent because with good economic growth like infrastructure, investors tend to invest more, and this leads to more economic development and creation of jobs, creating demand for production, investment goes up leading to economic growth.

positively initially but became negative just after the 2<sup>th</sup> period and it rise again in the 5<sup>th</sup> period. When it hits the steady state value from where it remains in the positive region from the 5<sup>th</sup> period 8<sup>th</sup> period. Meaning that shocks to OILP will have a positive impact on FDI in the short and long run. And also, theoretically the Nigerian economy mostly depend on crude oil as their national resources.

**Variance Decomposition**

The Variance decomposition indicates the amount of information each variable contributes to the other variables in the model. It determines how more of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. It identifies the predominant shocks that contribute more to the changes in the dependent variables in the model, in the short run one year forecast error, medium term 5 year forecast error and in the long run 10 year forecast error.

The table below provides the variability of FDI to changes in ECGT, EXCHR, INTR and OILP. ECGT contributes the most to changes in FDI both in the short run, medium and long run; followed by EXCHR and INT while OILP contributes the least to FDI.

In conclusion: innovation and response must be consistent with intuition, economic theory expectation. For instance, our results are improving the investment climate, establishing a transparent legal framework that does not discriminate between local and foreign investors and improving the provision of infrastructure andthe government should implement policies that will make the foreign investment on oil sector more efficient and re-position it for economic growth in Nigeria.

**Table 2:**Variance Decomposition Result

Variance Decomposition of FDI							
d	S.E.	FDI	ECGT	EXCH	INTR	OILP	
1	1.19E+09	100.0000	100.0000	0.000000	0.000000	0.000000	
2	1.41E+09	90.47829	92.25208	0.155702	0.442436	1.033109	
3	1.54E+09	88.25412	81.04469	0.344934	1.833361	1.659814	
4	1.62E+09	88.61368	79.72408	0.617904	2.000156	1.583494	
5	1.69E+09	83.74619	78.96717	3.421733	3.748875	1.805192	
6	1.78E+09	79.05392	77.75642	5.978456	5.536557	2.732365	
7	1.89E+09	71.72931	75.92805	9.529394	8.108737	4.415101	
8	2.00E+09	65.38511	73.54593	12.46309	9.974393	6.492473	
9	2.11E+09	59.48859	70.80863	15.16911	11.55923	8.525702	
10	2.23E+09	54.83819	67.92949	17.13715	12.78730	10.28056	

Source: Author's Computation Using E-View 9.0 version.

### Conclusion And Recommendations

Foreign direct investment bring benefits to the economy of nations specifically among developing countries, various scholars have analyzed the relationship between FDI and economic circumstance and economic stability. This study examined the effects of economic growth, exchange rate, interest rate, and oil price shocks on foreign direct investment in Nigeria between 1985 and 2017.

The results of the study presented concludes that innovation and response must be consistent with intuition, economic theory expectation. For instance, our results are consistent because with good economic growth like infrastructure, investors tend to invest more, and this leads to more economic development and creation of jobs, creating demand for production, investment goes up leading to economic growth. The study recommended that there is need to improve the FDIs climate to take advantage of the new global interest in the affairs of the country by implementing sound macroeconomic policies, spurring innovation,

Nigeria: A Markov-Regime Switching Approach". *Review of Innovation and Competitiveness*, (3)1: 21-48.

Anyawu, J. C. (2011). *Determinants of Foreign Direct Investment Flows to Africa: 1980-2007*. Africa Development Bank Working Paper Series, No 136, ADB, Tunis, Tunisia

Ayanwale, A. B. (2012). The influence of FDI on firm level productivity of Nigeria's agro/agro-allied sector. *Journal of Social Sciences*, 70(3), 43-75.

Dinda.S( 2009 ) Factors attracting FDI to Nigeria: An empirical investigation. Madras

### References

Abiola, (2019). Determinants of Foreign Direct Investment in Nigeria:A Structural VAR Approach. *International Journal of Applied Economics*, 16(1): 22-37.

Abu, O.G & Nurudeen, (2010).Determinants of FDI in Nigeria: an empirical analysis *Global Journal of Human Social Science*3(2):17-19

Ahmed, A. (2014). Strategies for foreign investment in Nigeria.A Central Bank perspective economic and financial review. *Journal of Policy Modeling*, 26(3), 254-386.

Akinlo, A. E. (2017). "Determinants of Foreign Direct Investment in