

Foreign Direct Investment, Exchange Rate Policy and Economic Growth; Lessons for Nigerian Economic Recovery

¹Aribatise Adekunle & ²Agu Victor Nnamdi

¹ Department of Economics, Wesley University, Ondo State, Nigeria

²Department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria

Email: kundun95@gmail.com

Corresponding Author: Aribatise Adekunle

ABSTRACT

The study examined the causal relationship and dynamic interaction among Foreign Direct Investment, Exchange Rate and Real Gross Domestic Product in Nigeria. These were with the view to examining the relative effectiveness of Foreign Direct Investment and Exchange rate in addressing the Nigeria's contemporary economic problems. Annual data over the period of 1986 to 2014, sourced from the World Bank Development Indicators, and the Central Bank of Nigeria (CBN) Statistical Bulletin, were used for the study. Time series econometrics (Granger Causality and Vector Error Correction Model) was applied to test the causal relationship, and the interaction among the variables respectively. The result of the Granger causality test shows that there is a unidirectional causality running from Foreign Direct Investment and Exchange rate to Real Gross Domestic Product respectively. Furthermore, the variance decomposition established that a shock on Foreign Direct Investment and Exchange rate respectively have significant and lasting impact on the Nigerian real gross domestic product long into the future. The paper recommends that FDI and Exchange rate are viable policy instruments that could inject a sustained drive for Nigerian economic recovery. Hence Government and the monetary authorities should adopt favorable exchange rate policy and encourage the inflow of Foreign Direct Investment in Nigeria so as to catalyze the economy towards sustainable growth.

Keywords: VECM, Economic Growth, FDI, Exchange Rate, Variance Decomposition

INTRODUCTION

Foreign Direct Investment (FDI) has remained a subject of discuss among academics and policy makers particularly in this current rapid wave of globalization where international capital flows are accelerating and countries are deepening their trade relationships (i.e. encouraging cross-border

investment, especially by transnational corporations (TNCs) and Firms). It is recognized as the most important source of external finance in Sub-Saharan Africa, particularly in Nigeria (UNCTAD, 2011). Arguments in support of FDI are hinged on its several positive effects such as productivity gains, potential to introduce new processes, managerial skills, and know-how in the domestic market (Alfaro *et al.*, (2004), stimulating domestic investment and improvements in human capital and institutions. These result to higher per capita GDP, increase economic growth rate and higher productivity growth, and improve the living conditions of people in the receiving country, Nigeria in this case. Therefore, FDI has the capacity to salvage a country from economic recession to recovery.

The flow of FDI is influenced by prevailing socio-economic factors in the receiving countries. These factors include; incessant political and social upheavals, wars, insecurity of investment, lack of infrastructure and basic amenities, weak regulatory and legal institutions and as well as unpredictable macroeconomic environment occasioned by fluctuating exchange rate.

Exchange rate movement is a fundamental factor in the global economy, determining the allocation of resources internationally and affecting the profitability of everyday international transactions. It is the relative price of international goods and has influence on the external competitiveness of the domestic price. Exchange rates also influence the allocation of foreign direct investment (FDI) and the profitability of such investments. Hence, it is a crucial factor of FDI flows and management of the economy during recession.

Empirically, studies have examined the relationship between FDI and economic growth (Zhang, 2001, Carkovic and Levine, 2005; Naija et al, 2013; Braunstein and Epestein, 2002). Studies have equally attempted to examine the relationship between exchange rate and economic growth (Monye, 2012; Rodrick, 2007; Bazlul *et al.*, 2012, Akpan and Atan, 2012; El-Ramly and Abdel-Haleim, 2008 etc). Furthermore, the relationship between the exchange rate and FDI has long been discussed in literature (Guo and Trividi, 2002; Buch and Kleinert, 2008, Campa; Schmidt and Broll, 2009).

These studies focused on FDI-growth, exchange rate-growth and FDI-exchange rate nexus across the globe, little attention has been given to the interaction

among FDI, exchange rate and economic growth in Nigeria simultaneously. However, the effect of exchange rate and FDI on economic growth in Nigeria has not been accorded enough attention in the literature, hence this study. Therefore, the study examined the dynamic impact of foreign direct investment and exchange rate on economic growth in Nigeria.

The paper is arranged in 6 sections. Section one is the introduction while section two reviews the literatures on the study. The methodology and the empirical results are presented in sections three and four respectively. Section five concludes and makes policy recommendations based on the study.

LITERATURE REVIEW

Studies abound in economic literature that investigates the interaction among FDI, Exchange rate and Economic growth across the globe. Majority of the studies suggest that FDI have strong significance in driving any economy. In a panel data analysis on the relation between FDI and economic growth for a sample of 18 Latin American countries over the period of 1970 to 1999, Bengoa and Sanchez (2003) established that FDI is positively correlated with economic growth in the host countries. In a similar study, Akinlo (2003) considers the effect of FDI in Africa using pooled annual data from twelve countries. The results indicated that twice-lagged FDI has a positive effect on growth. He suggested that it would takes some time for the effects of FDI accumulation to be felt on the economy, and identified capital accumulation, as opposed to increasing productivity, as the channel through which FDI impacts growth.

In a country specific study Najia *et al.*, (2013) examined the impact of FDI on economic growth of Pakistan for the period of 1981-2010. The study adopted the least square method. The co-integrating relationships among the variables were ascertained and found to hold. Their findings indicate that Pakistan's economic performance is negatively affected by foreign investment while its domestic investment has benefited its economy. However, studies in Nigeria seem to suggest otherwise. Contrarily, Ayasahagba and Abachi (2002) investigating the effects of foreign direct investment on economic growth in Nigeria from 1980-1997, showed that foreign direct investment had significant impact on economic growth in Nigeria. Akinlo (2004) also investigated the impact of Foreign Direct Investment on economic growth in Nigeria, for the period 1970-2001. The study

went further to evaluate the relative impact of extractive FDI and manufacturing FDI. The results suggest that extractive FDI might not be as growth enhancing as manufacturing FDI. This is in line with Ayanwale and Bamire (2004). They reported a positive and significant effect of FDI on firm's productivity of both domestic and foreign firms in Nigerian Agro-allied sector. In other related studies, Ilemona (2010), and Esther and Folorunso (2011) established empirically that Foreign Direct Investment has significant impact on economic growth in Nigeria.

Studying the linkages between FDI and exchange rate Manop *et al.*, (2006), examined the impact of exchange rates on US Foreign Direct Investment (FDI) inflows to a sample of 16 emerging market countries using panel data for the period 1990-2002. Three variables were used to capture separate exchange rate effects. The nominal bilateral exchange rate to the \$US captures the value of the local currency (a higher value implies a cheaper currency and attracts FDI). Changes in the real effective exchange rate index (REER) proxy for expected changes in the exchange rate: an increasing (decreasing) REER is interpreted as devaluation (appreciation). The results showed that, *ceteris paribus*, there is a negative relationship between the expectation of local currency depreciation and FDI inflows. Cheaper local currency (devaluation) attracts FDI while volatile exchange rates discourage FDI. In a more recent study, Ogun *et al.*, (2012) examined the extent to which real exchange rate movements stifle FDI inflows in selected sub-Saharan African (SSA) countries, using the Granger causality and simultaneous estimation techniques. The causality tests suggest statistical dependence between Real exchange rate movements and FDI for a few of the countries, the regression analyses show a statistically significant relationship between the variables used, the general picture emerging is that FDI flows are sensitive to real exchange rate movements in sub-Saharan Africa.

Nyamrunda (2012) examines the stochastic trends of the exchange rate and the net FDI inflows into Tanzanian for the period 1960 to 2011. The study employed the Augmented Dickey Fuller test (ADF), Vector error Correction Model (VECM) and the Johansen's cointegration test to measure the time series properties of the variables used. The study found that there is a significant long-run relationship between the exchange rate of Tanzanian shilling (which is on the list of weak currencies in the world), and the net FDI inflow. Mwegu and Ngugi (2005) considered the effects of the exchange rate level on FDI inflows in

Kenya. The results showed that real exchange rate depreciation has a positive effect on FDI inflows in the country. This supports the proposition that exchange rate depreciation attracts FDI inflows to host economies. This is in contrast to the view represented by Campa (1993). In their study, Amuedo-Dorantes and Pozo (2001) found no statistically significant relationship between the level of the exchange rate and inward FDI flows into the United States. Similarly, Philip et al (2011) investigated the effect of exchange rate regime on FDI inflows in Ghana. The study modeled the causal relationship between FDI inflows and exchange rate regimes over a 39 year period (1970-2008). The study employed the Ordinary Least Squares and the Cointegration technique. The findings indicated that exchange rate regime has no discernible effect on Ghana's FDI.

Investigating the effect of exchange rate volatility on foreign direct investment (FDI) in Nigeria Osinubi and Amaghionyeodiwe (2009) used secondary time series data from 1970 to 2004. The study employed the error correction model as well as OLS method of estimation. The results suggest, among others, that exchange rate volatility need not be a source of worry to foreign investors. Also, the study further revealed a significant positive relationship between real inward FDI and exchange rate. This implies that, depreciation of the Naira increases real inward FDI. It is noteworthy from this review that studies exploring the relationship between exchange rate and FDI in Nigeria are very scarce.

Rodrik (2007) in his study used a panel of 184 developing countries from 1950-54 through 2000-04, on the real exchange rate and economic growth. The study found a positive relationship between exchange rate undervaluation and economic growth. The study however showed that undervaluation (a high real exchange rate) stimulates economic growth. This is true particularly for developing countries, suggesting that tradable goods suffer disproportionately from the distortions that keep poor countries from converging. Similar to this study is Prasad *et al.*, (2007) which also compliments Rodrik's findings only that he focuses more on the costs of overvaluation rather than the benefits of undervaluation. Another study by Mireille (2007) argues that overvaluation of exchange rates have constituted a major setback in the recovery process of Nigeria and Benin Republic. In addition, the author suggests that devaluation

accompanied with well-targeted measures alongside an upward adjustment in the domestic price of tradable goods, could restore exchange rate equilibrium and improve economic performance. Using a three-market Keynesian model, Bazlul *et al.*, (2012) examined the effects of exchange rate changes on Bangladesh's aggregate output, measured by GDP from 1980-2012, using the cointegration techniques. Their findings showed that the movements in the real exchange rate do affect the overall output, and that the long-run effects of real devaluations are found to be positive. In other words, exchange rate devaluation has an overall expansionary effect. However, in the short run, the impact of devaluations is likely to be contractionary.

Akpan and Atan (2012) assessed the effects of exchange rate movements on economic growth in Nigeria. Based on quarterly series for the period 1986 to 2010, the paper examined the possible direct and indirect relationship between exchange rates and GDP growth. The relationship is derived in two ways using a simultaneous equations model within a fully specified (but small) macroeconomic model. A Generalized Method of Moments (GMM) technique was explored. The estimation results suggest that there is no evidence of a strong direct relationship between changes in exchange rate and output growth. Rather, Nigeria's economic growth has been directly affected by monetary variables. These factors have tended to sustain a pattern of real exchange rate, which has been unfavorable for growth.

A Study by Adeniran *et al.*, (2014) examined the impact of exchange rate on economic growth from 1986 to 2013. Correlation and regression analysis of the ordinary least square (OLS) were used to analyze the data. The result revealed that exchange rate has positive impact but not significant, this affirms that developing countries are relatively better off in the choice of flexible exchange rate regimes. The result also indicated that interest rate and rate of inflation have negative impact on economic growth but not significant. Ayodele (2014) also examined the impact of exchange rate on the Nigerian economy from 2000 to 2012, using the ordinary least square (OLS) method. The finding showed that both exchange rate and inflation rate individually and jointly have significant impact on economic growth in Nigeria.

Lin and Pan (2006) investigated the relationship among foreign direct investment, real effective exchange rate and China's economy, having checked for the impulse response function of the variables in the model, the framework and the empirical analysis indicated that FDI, exchange rate and china's domestic economy are complexly interacting, especially in the long run. Also a study by Omankhalen (2011) using a linear regression analysis on the thirty year data to determine the relationship between inflation, exchange rate, FDI inflows and economic growth in Nigeria. The study reveals that FDI follow economic growth occasioned by trade openness which saw the entry of some major companies especially the telecommunication companies, while Inflation has no effect on FDI. However exchange rate has effect on FDI.

In summary, while the bulk of studies either focused on FDI and growth, exchange rate and growth or FDI and exchange rate, very few studies focused on the dynamic interaction of FDI, exchange rate and growth. As a result of the above, it becomes relevant for a study like this to investigate the interaction between FDI and exchange rate and its effect on the Nigerian economy.

METHODOLOGY AND DATA DESCRIPTION

The theoretical framework for this study is based on the endogenous growth theory, which emphasizes accumulation of knowledge as the driver of long-run economic growth. Within the framework of endogenous growth theory, FDI can exert an effect on economic growth through the technological/knowledge spillovers channel since FDI's projected role as a diffuser of technology or knowledge implies that it can have a direct effect on growth (Borensztein *et al*, 1998)and Exchange rate could also affect economic growth indirectly through its influences on other determinants of economic growth, such as investment (FDI) and openness to international trade and capital flows (Barro and Sala-i-Martin, 1995).

Vector Error Correction Model (VECM)

The Vector Auto regression (VAR) provides a simple framework to systematically examine the rich dynamics in multiple time series. It provides a coherent and credible approach to data description, forecasting, structural inference, policy analysis and error free method of estimating economic relations (Sim, 1980).A natural progression from a VAR representation is the

VEC model especially when the variables of interest are not stationary at their levels and are cointegrated. VECM combines the long-run relationship with a short-run adjustment process and gives a suitable tool for policy analysis when the series are non-stationary. The VECM representation as below:

$$\Delta y_t = \theta + \sum_{i=1}^n \beta_i y_{t-1} + \lambda ECM_{t-1} + \varepsilon_t \tag{1}$$

Where Δ is the differencing operator, such that $\Delta y_t = y_t - y_{t-1}$. Where y_t is an (nx1) column vector of the endogenous variables, θ is an (nx1) vector of constant terms, β represent coefficient matrices. y_t is the 3 x 1 vector of the variables included in the model (RGDP, FDI, EXCH), θ is the 3 x 1 vector of constant terms and β is the 3 x 3 matrices which include the interactive coefficients of the variables involved in equation 3.1, and lastly λ is the 3 x 1 vector of coefficients for each of the error correction terms and ε_t is the vector of disturbance term.

The vector error correction model pertaining to the three (3) variables incorporated into the model for the study is expressed below:

$$\begin{bmatrix} \Delta RGDP_t \\ \Delta FDI_t \\ \Delta EXCH_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix} + \sum_{i=0}^k \begin{bmatrix} \beta_{1i} & \theta_{1i} & \pi_{1i} \\ \beta_{2i} & \theta_{2i} & \pi_{2i} \\ \beta_{3i} & \theta_{3i} & \pi_{3i} \end{bmatrix} \begin{bmatrix} \Delta RDGP_{jt-i} \\ \Delta FDI_{jt-i} \\ \Delta EXCH_{jt-i} \end{bmatrix} + \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \end{bmatrix} [ECM_{t-1}] + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \dots\dots\dots 2$$

Where;
 $\alpha_i = \theta$; a (3 x 1) matrix of the constants; $0 \leq i \leq k$, and k is the lag length selected based on the Akaike Information criterion (AIC) and the Final Prediction Error (FPE) and $t > 0$. The AIC and FPE are considered most appropriate for the study because they minimize the chance of under estimation while maximizing the chance of recovering the true lag in a small sample of 60 observations or less (Liew, 2004; Orisadare and Agu, 2016). $\gamma > 0$; and γ is a vector of the estimated parameters in the VECM equation.

The study employed the Wald test to evaluate the causality among the variables. In order to sidestep the possibility of spurious causality (Granger and Newbold, 1974), the series were tested for unit root with the Philips-Perron (PP)

unit root test, and the cointegrating relationship established using the Johansen Cointegration test (Granger, 1988, Orisadare, *et. al*, 2016). λ and ε are as explained in equation 1 above. The proportionate impact of one standard deviation shock on each variable on another was examined using the variance decomposition tool found in the VECM.

Empirical Results

Table 1 shows the results of the Philip-Perron Unit Root test for Foreign Direct Investment, Exchange Rate, and Real Gross Domestic Product. The series were detrended using the Fixed Spectral OLS-detrended Autoregression process. The result shows that FDI, EXCH and RGDP were stationary after being differenced once.

Table 1: Philip-Perron Unit Root Tests (constant and linear trend)

Series Name	PP test at Level		PP test at 1st difference		Order of Integration	Remark
	PP Statistic	Critical value at 5%	PP Statistic	Critical value at 5%		
FDI	-1.9170	-3.5806	-12.2503	-3.5875	I(1)	Stationary
EXCH	-2.5217	-3.5806	-18.3467	-3.5875	I(1)	Stationary
RGDP	-0.6312	-3.5806	-22.8084	-3.5875	I(1)	Stationary

Source: Authors' Computation, 2017

Table 2 shows the result of the Johansen cointegration test for the series; FDI, EXCH and RGDP. The test indicates that the presence of one cointegrating equation among the series. Hence, there is a significant long run equilibrium relationship among the variables.

Table 2: Johansen Cointegration test

Hypothesized number of cointegrating equations	Eigen Value	Trace Statistic	5% critical value	Probability
None*	0.7826	68.0871	42.9153	0.0000
At most 1*	0.5708	29.9326	25.8721	0.0148
At most 2	0.2963	8.7841	12.5180	0.1941

Source: Authors' Computation, 2017

The Multivariate Granger Causality test is based on the Wald test Chi-square statistic at 5% and the probability statistics. The optimum lag length of four (4) was used for the analysis. The Granger causality test shows that there are unidirectional causal relationships from changes FDI and Exchange rate to changes in Real GDP over the period under study. This suggests that the past values of FDI and Exchange rate contain information about the behavior of Nigeria Real GDP over time.

Table 4: Multivariate Granger Causality test

Null hypothesis (H ₀)	X ² Statistics	Probability	Remark
D(RGDP) does not Granger cause D(FDI)	6.0310	0.1101	Accept H ₀
D(EXCH) does not Granger cause D(FDI)	2.0989	0.5522	Accept H ₀
D(FDI) does not Granger cause D(RGDP)	38.8763	0.0000	Reject H ₀
D(EXCH) does not Granger cause D(RGDP)	17.8307	0.0005	Reject H ₀
D(FDI) does not Granger cause D(EXCH)	0.9499	0.8134	Accept H ₀
D(RGDP) does not Granger cause D(EXCH)	0.0731	0.9949	Accept H ₀

Source: Authors' Computation, 2017

Note: sample size = 25 and degree of freedom = 3; X²= chi-square

Variance Decomposition

Shock in Foreign Direct Investment

The result shows the extent to which a standard deviation shock in FDI inflow in Nigeria affects Exchange rate and the country's real gross domestic product over time. A one-time shock on FDI affects RGDP and Exchange rate from the second lag period. However, RGDP absorbs about 10% of the shock in the second lag. The effect increases over time from 64% in the 3rd lag to about 78% in the future. This implies that the effect of shock on FDI on the Nigeria RGDP does not die out but last far into the future. Increasing or reducing FDI inflow in Nigeria has the potential to correspondingly drive and sustain or reduce the growth of economy over a long time. The gains of FDI inflow in Nigeria is hinged on its capacity to stimulate domestic investment, human capital development, open up new businesses and improve production processes in the country. These serve as mechanisms to increasing national output, per capita GDP and ultimately, sustain economic growth. The findings are consistent with Akinlo (2004), Ayanwale and Bamire (2004), Ilemona (2010), and Esther and Folorunso (2011) that a change in FDI inflow have lasting impact on

Nigeria real gross domestic product, hence have the potential to facilitate the recovery of the Nigeria economy from recession.

Shock in Exchange Rate

A standard deviation shock on exchange rate affects both FDI and RGDP from the first lag period. However, the magnitude of the impact varies among the two variables. Empirical result indicates that RGDP absorbs up to 9% of the shock in the first and up to 78% till the 10th lag period. Similarly, a standard deviation shock in exchange rate contributes increasingly to about 25% of shock on Exchange rate in the 3 lag period. Hence, a variation in Exchange rate has a lasting and significant impact on RGDP over time, and the impact hardly dies out. This buttresses the importance of exchange rate movement as a fundamental factor in global economy, particularly in international resource allocation. Exchange rate is the relative price of international goods; hence influences the allocation of Foreign Direct Investment which is the mechanism through which the shock on exchange rate affects economic growth (Barro *et. al*, 1995). The empirical finding is consistent (Ayodele, 2014) that exchange rate has significant impact on the Nigeria economy. The results also supports the propositions of Mweha and Ngugi (2005) and Omankhalen, (2011) that exchange rate has effect on FDI, and that changes in exchange rate regime such as real exchange rate depreciation has a positive effect on FDI inflows in the country, which foster economic output growth and recovery from recession.

CONCLUSION

The study examined the causal relationship and dynamic interaction among foreign Direct Investment, Exchange rate and Real Gross Domestic Product in Nigeria over the period of 1986 to 2014. These were with the view to examining the relative effectiveness of FDI and Exchange rate in fostering recovery of the Nigerian economic out of its present recession. Multivariate Granger causality test was applied to test the causal relationship among the variables while the Variance Decomposition on a Vector Error Correction model was employed to examine the interactions between FDI and RGDP, FDI and Exchange rate, and Exchange rate and RGDP.

The results established a unidirectional causality running from FDI and Exchange rate respectively to RGDP. The variance decomposition showed that

a shock on FDI and Exchange rate respectively have significant and lasting impact on the Nigerian real gross domestic product. FDI was the transmission mechanism through which Exchange rate affects real Gross Domestic Product. Therefore, both FDI and Exchange rate are instrumental variables that could catalyze the economy towards sustainable growth if manipulated appropriately through viable growth-driven policies. Therefore, to foster Nigerian economic recovery, Government and the monetary authorities should adopt favorable exchange rate policies that would encourage the inflow of Foreign Direct Investment into Nigeria.

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APPENDIX

Variance Decomposition of FDI:

Period	S.E.	FDI	RGDP	EXCH
1	118150.1	100.0000	0.000000	0.000000
2	150779.4	82.21208	10.34873	7.439185
3	279475.0	33.66463	64.16580	2.169571
4	1251990.	20.15020	79.67283	0.176969
5	6935627.	22.11464	77.87898	0.006382
6	38278762	21.69568	78.29966	0.004664
7	2.12E+08	21.77326	78.22166	0.005084
8	1.17E+09	21.78278	78.21179	0.005432
9	6.50E+09	21.78093	78.21354	0.005523
10	3.60E+10	21.78117	78.21329	0.005544

Variance Decomposition of RGDP:

Period	S.E.	FDI	RGDP	EXCH
1	45051.03	29.20000	70.80000	0.000000
2	258345.3	24.14886	75.79887	0.052271
3	1420806.	22.34888	77.62958	0.021534
4	7811425.	21.86922	78.11947	0.011303
5	43161883	21.77569	78.21764	0.006670
6	2.39E+08	21.77909	78.21511	0.005795
7	1.32E+09	21.78056	78.21385	0.005594
8	7.32E+09	21.78100	78.21344	0.005559
9	4.05E+10	21.78107	78.21338	0.005551
10	2.24E+11	21.78108	78.21337	0.005549

Variance Decomposition of EXCH:

Period	S.E.	FDI	RGDP	EXCH
1	19.56384	0.254036	9.018400	90.72756
2	27.57928	6.737522	6.690225	86.57225
3	78.30417	25.16996	59.39301	15.43704
4	424.1261	22.60445	76.77237	0.623174
5	2372.772	21.94992	78.03017	0.019911
6	13173.62	21.81671	78.17897	0.004322
7	72971.57	21.78611	78.20869	0.005198
8	404054.4	21.78213	78.21238	0.005484
9	2237142.	21.78126	78.21320	0.005538
10	12386323	21.78111	78.21334	0.005547

Cholesky Ordering: FDI RGDP EXCH