AN INVESTIGATION OF THE NEXUS BETWEEN FOREIGN DIRECT INVESTMENT AND REAL EFFECTIVE EXCHANGE RATE IN NIGERIA

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ABSTRACT

Fluctuations in the rate of exchange in the Nigerian economy and the eventual uncertainty therefrom has led to withdrawal of some foreign direct investment, deterioration and closure of local businesses. This necessitated the study to examine the foreign direct investment’s impact on real effective exchange rate in Nigeria from 1986 to 2018. The Auto-Regressive Distributed Lag (ARDL) model and Error Correction Model (ECM) were employed using time series data. The result of the ECM term indicates that the economy will recover at a high speed of 72% after disequilibrium within a year, while the analysis shows that foreign direct investment has a positive effect on real effective exchange rate. Trade openness, money supply and inflation on consumer prices also have a positive effect, whereas direct credit to private sector and interest rate has a negative effect on real effective exchange rate. The study concludes that a positive relationship exists between foreign direct investment and real effective exchange rate in Nigeria. Hence, the Nigerian government should implement policies geared towards ensuring the stability and sustainability of real effective exchange rate in order to thrive foreign direct investment in the country.

KEYWORDS: Foreign Direct Investment, Real Effective Exchange Rate, Inflation, Disequilibrium, Auto-Regressive Distributed Lag Model

1. INTRODUCTION

In boosting economic growth, foreign direct investment flows, as an essential tool has recorded higher growth rate than global growth in interregional trade and gross domestic product (UNCTAD, 2015). The economic objectives and demands of most countries, determines their developmental level (Nigerian Economic Summit 2018). One of the major focus of many countries (Nigeria inclusive) is attracting Foreign Direct Investment (FDI) in which a stable Real Effective Exchange Rate (REER) is key to its attainment. Facilitation of trade and exchange rate is brought about by direct or indirect connectivity of nations through market, assets, goods and services. (Mbanefo & Obioma, 2017). Economic progress in a nation is largely impaired by the scarcity of foreign capital inflow. A higher value of Real Effective Exchange Rate (REER) arising from the lack or deficiency of competitiveness would negatively affect foreign capital inflows to Nigeria. Expanded production operations, economies of scale, availability of larger capital, access to loan from international markets, access to trade information and so on are benefits of FDI, thereby leading to increased export in the host countries.
(Jaumatte, 2004). In addition, the ability of FDI to create new employment opportunities, improve technological development, managerial and marketing expertise and economic condition is an added impetus to the host country. (Adegbite & Ayade 2010; Alobari Paago, Igbara & Emmah 2016; and Feldstein 2000).

A positive effect is expected of FDI on REER as it is seen to enhance continuous flow of foreign exchange into the country. Increase in money supply resulting in increase in the rate of inflation would lead to appreciation of REER under a fixed exchange rate regime. (Edwards 1998, Agenor 1998). This calls for adequate planning especially in Nigeria where poverty rate in most areas is increasing at an alarming rate due to illiteracy, gender insensitivity, poor infrastructure and high population growth (Oladele 2015). In previous years, the Nigerian government granted tax incentives to foreign investors and provided an enabling environment, with the notion of improvement in the economic conditions of the nation, although it has not yielded the anticipated result. Skills acquisition in terms of technical, entrepreneurial and managerial are far below expectations from foreign direct investment in Nigeria (Agbarakwe 2019). However, the influence of foreign direct investment on globalization in Nigeria is huge.

The level of real and effective exchange rate is germane to international trade, technological advancement, human capital enhancement, generation of employment, making informed investment decisions, and invariably leading to growth of the Nigerian economy. The main question is, what effect does foreign direct investment have on real effective exchange rate in Nigeria?

The focus of this study is to assess the impact of foreign direct investment on real effective exchange rate in Nigeria and, in particular, whether increasing foreign direct investment have positive effect on real and effective exchange rate in the long run as it does to the improvement of the economic condition of the country. Realization of the objective of the study is aided by testing the null hypothesis (Ho): Foreign direct investment has no significant effect on real effective exchange rate in Nigeria. There are empirical evidence in the literature about foreign direct investment and real effective exchange rate in developed and developing countries (Houng, Nguyen & Lien 2020, Latief & Lefen 2018, Cambazoglu & Gunes 2016, Asida, Hizar, Abdul-Razib, Muloke, Kogidd & Lilye (2014), Lartey 2011, Busse, Hefeker & Nelgen 2010, among others). They reveal that host countries with financial openness experiences increase in the worth of the country’s currency as a result of increase in FDI. Evidences from Nigeria suggest that fluctuations in exchange rates makes her currency to appreciate or depreciate, which might reduce the flow of FDI (Uzoma-Nwosu & Orekoya 2019, Oviavwote & Ukawe 2018, Olusuyi, Samuel & Akinbobola 2016 among others).

Of these studies, many authors find variant effects of foreign direct investment on real effective exchange rate and hence this study intend to fill the gap in the literature on real and effective exchange rate in terms of level and shocks effect of FDI on REER using a wider scope of 1986 – 2018. This is pivotal to the study because the Nigerian economy has recently been experiencing a significant shocks
and down turns, in the level of exchange rate in spite of exchange rate policy reforms targeted at attracting FDI. In addition, the COVID ’19 pandemic, (where all economic activities in the country and indeed the world, was shut down for more than six months); and the request for conducive environment by the various sectors in the economy, gave the move to find out if the foreign direct investment has any significant effect on the real and effective exchange rate in Nigeria. Our main results showed that foreign direct investment had a positive effect on the country’s real and effective exchange rate, which confirms the theoretical knowledge.

The paper is structured as follows: Section 2 reviews some literatures on foreign direct investment and real effective exchange rate; Methodology in section 3; Analysis and result presentation in section 4 and concluding remarks in Section 5.

LITERATURE REVIEW
According to the World Bank, the inflows of investment for the acquisition of an enduring management interest (10% or more voting stock) in another enterprise in a country apart from the investor’s is referred to as foreign direct investment (World Bank, 2012). Foreign direct investment is the direct investment into a country’s production or business by another country in the form of outright purchase or expanding existing business operations (Denisa 2010). The forms of foreign direct investment includes intra-company loans, building new facilities, mergers and acquisitions, and reinvesting profits earned from overseas operations. Countries should adopt the strategy of a stable political and economic environment in order to attract foreign direct investment, which will make such nations to experience international exchange of capital, labour and productivity (Andersen & Babula 2008, Idoko & Taiga 2018). According to Martins (2002), the forms of foreign capital flows were; aids, debts and foreign direct investment. Of these, FDI aids industrialization, enhances foreign expertise, adds to productive capital, promotes exports, brand names, market linkages, and employment. From the viewpoint of opportunity cost with other forms of inflows in a country, foreign direct investment is crucial for its developmental role of accelerating globalization, although with basic repercussions on the economy of the host country by affecting manufacturing prices and culture in the country.

Theoretical Framework
The Neoclassical and International business economic theories are employed in this study. FDI and international capital flows are considered by the Neoclassicals as closing the gap in transition economies since capital is expected to flow to poor countries from rich economies as a result of scarce capital in developing countries (Chenery & Bruno, 1962). Thereby leading to profitable investment opportunity for capital in transition economies as depicted in the Heckscher-Ohlin approach to trade by Mundell (1957). The ultimate result of these opportunities for the recipient countries is often sought in terms of economic growth and development practically interpretable as rising levels of industrialization (Szirmai, 2009; Muhammad & Kashif-ur-Rehmann, 2012). As stated by the international business economist, some firm specific asset are required by multinationals in order to differentiates them from domestic firms and to compensate for the extra cost in terms of local
knowledge for foreign markets operations using the OLI framework (Dunning, 1993). This explains FDI based on Ownership specific advantage of the firm, Internationalization incentives and Location advantages. Meanwhile, given that Nigerian economy still yearns for structural change in view of the oil dominated economy, this study becomes relevant for policy direction.

**Empirical**

Kiliçarsla (2018) using Toda-Yamamoto causality test estimated on generalized autoregressive conditional heteroscedasticity model on the relationship between exchange rate volatility and FDI in Turkey. The result shows a one-way causality indicating the influence of FDI inflows as a major source of capital financing. Agbarakwe (2019) using VECM model, studied the effect of foreign direct investment and manufacturing output in Nigeria. A positive but insignificant effect was established on the manufacturing sector output growth. In the short and log run, a no relationship was established using Granger Causality Results based on VECM, between the volatility of exchange rate and Net FDI inflow into Nigeria (Uzoma-Nwosu & Orekoya 2019).

Suliman, Elmawazini & Shariff (2015) worked on low-income countries of Sub-Saharan Africa using panel data approach and Two-Stage Least Squares method, on the relationship between Foreign Direct Investment (FDI) and the real exchange rate. The results show that FDI is not only drawn to Sub-Saharan Africa by the depreciation of the real exchange rate, but the volatility of real exchange rate resulted in instability in FDI inflows. A significantly strong effect on bilateral FDI flows from developed countries was found by Busse, Hefeker & Nelgen (2010) in examining the influence of exchange rate regime on bilateral FDI flows, whereas the reverse resulted for developing countries due to the policy option of hard peg on their currency. Asida, Hizar, Abdul-Razib, Mulokc, Kogidd & Lilye (2014) using the standard bivariate relationship and ARDL model to estimate the impact of FDI and real exchange rate on economic growth in Malaysia, found a positive and significant effect on FDI and economic growth whereas the opposite was established for REER.

Oriavwote & Ukawe 2018 using the OLS, ECM and the cointegration models, on REER and FDI in Nigeria, found a significant and positive impact of one period lagged FDI on current FDI, while REER volatility has a significantly negative impact on the FDI. Fredrick, Okeke & Sheriff (2015) Using the GARCH model and the OLS technique investigated exchange rate dynamics and capital inflows in Nigeria established a greater impact of trade openness on FDI than the exchange rate.

The literatures reviewed, are in contrast and this tend to unpredectability of the results. With focus on the real and effective exchange rate, the variables of interest for foreign direct investment were considered individually whereas some did not take into consideration, all the variables of interest. This study will add to the literature using these independent variables (foreign direct investment, trade openness, money supply, direct credit to private sector, interest rate and inflation consumer prices) to analyze the effects, on real and effective exchange rate in Nigeria.
METHODOLOGY

Model Specification
This research work is anchored on Neoclassical and International business economic theories. This research adapted the estimated model of Agbarakwe (2019). Manufacturing output was exchanged for real effective exchange rate on the dependent variables while export were exchanged for trade openness, money supply, direct credit to private sector and inflation rate as factors that influences exchange rate and trade. The functional specification is as follows:

\[ \text{REER} = f(\text{FDI, TOP, MS, DCP, INT, INFCP}) \]  

The above equation can be transformed into an econometric model in a semi log form as follows:

\[ \ln \text{REER} = \beta_0 + \beta_1 \text{FDI} + \beta_2 \text{TOP} + \beta_3 \ln \text{MS} + \beta_4 \text{DCP} + \beta_5 \text{INT} + \beta_6 \ln \text{INFCP} + \mu \]  

Where, REER is Real Effective Exchange Rate; FDI is Foreign Direct Investment; TOP is Trade Openness; MS is Money Supply; DCP is Direct Credit to Private Sector; INT is Interest rate; INFCP is Inflation consumer prices; \( \mu \) is stochastic variable or error term. The likelihood of multi-collinearity between foreign direct investment and the variables in the study was rebutted by using the centered value of variance inflator factor (Finch, Bolin & Kelly 2014).

Method of Data Analysis
Augmented Dickey Fuller (ADF) test on each of the dependent variables reveals cointegration at level I(0) and first order difference I(1), which the Autoregressive Distributive Lags (ARDL) model of Pesaran, Shin, & Smith, (2001) is capable of assessing and restricting the long-run estimated coefficients of lagged level (lag three) of each of the variables.

Sources and description of data
Secondary time series data on six variables on real and effective exchange rate was adopted in this study. The independent variables include foreign direct investment (FDI), trade openness (TOP), money supply (MS), direct credit to private sector (DCP), interest rate (INT) and inflation consumer prices (INFCP); while the dependent variable is real and effective exchange rate (REER). The period 1986 to 2018 for which data are available was covered as various schemes of Foreign Exchange (FX) events such as; Adoption of second-tier FX markets, introduction of interbank FX market, Fixed Exchange rate, Autonomous FX market, Interbank FX market, Dutch Auction System (DAS) among others; occurred during this period. Central Bank of Nigeria Statistical Bulletin (2018) and the World Development Indicators (WDI) were sources of the data which was used on E-views 9 econometric tool.
RESULTS AND DISCUSSION

Preliminary Analysis
Basic graph of variables in a line and symbolic form was presented in figure 1. REER, FDI, INT and LNMS were relatively stable throughout the period. INFCP was largely unstable with a sharp increase in 1994 and relatively stable afterwards. TOP was also unstable for most of period with the highest value in 2011 for the period of study (1986 – 2018).

![Figure 1: Line and symbol basic graph](source)

Descriptive Statistics
Summary statistics (mean, median, maximum, minimum, standard deviation, skewness, kurtosis and Jarque-Bera) for foreign direct investment and real and effective exchange rate in the model for the period of 1986 – 2018 are reported in table 1. In the table, TOP’s standard deviation is relatively higher compared to other variables, revealing that trade openness is more volatile and unpredictable. Positive skewed values to the right, was observed for REER, FDI, DCP and INT variables, while, TOP and, LNMS are negatively skewed to the left. Kurtosis statistics of REER, FDI, DCP and INT is greater than 3 indicating that it is highly leptokurtic, whereas, the distribution of TOP and LNMS are highly platykurtic. Jarque-Bera statistics and P-values presented that REER, TOP, LNMS and DCP are normally distributed while the null hypothesis was rejected for FDI and INT variables.
Table 1: Descriptive Statistics of the variables

| Variables | Mean | Median | Max. | Min. | Std. Dev. | Skewness | Kurtosis | Jarque-Bera | Observations |
|-----------|------|--------|------|------|-----------|----------|----------|-------------|--------------|
| REER      | 4.609| 4.528  | 5.617| 3.915| 0.416     | 0.982    | 3.634    | 5.855       | 33           |
| FDI       | 1.751| 1.539  | 5.791| 0.352| 1.237     | 1.705    | 5.746    | 26.358      | 33           |
| TOP       | 35.274| 36.058| 53.278| 9.136| 10.467    | -0.435   | 2.849    | 1.074       | 33           |
| LNMS      | 27.926| 28.073| 31.045| 23.885| 2.307     | -0.229   | 1.768    | 2.377       | 33           |
| DCP       | 10.107| 8.218  | 22.267| 4.948| 4.378     | 1.110    | 3.639    | 7.345       | 33           |
| INT       | 18.990| 17.948| 31.650| 9.959| 3.895     | 0.928    | 5.285    | 11.926      | 33           |
| INFCP     | 19.949| 12.555| 72.835| 5.388| 18.279    | 1.611    | 4.216    | 16.307      | 33           |

Source: Author’s computation 2020

Unit Root Tests
A mixture of stationary I (0) and non-stationary I(1) series is presented in table 2 as the summary result of the unit root test.

Table 2: Unit Root Test

| Variables | ADF Test Statistics (At Levels) | Critical Values @ 5% | ADF Test Statistics (At 1st Diff.) | Critical Values @ 5% | Order of Integration |
|-----------|---------------------------------|----------------------|------------------------------------|----------------------|---------------------|
| REER      | -3.5433                         | -3.5577              | -5.803                             | -3.5628              | I(1)                |
| FDI       | -4.2677                         | -3.5577              | -7.2151                            | -3.5628              | I(0)                |
| TOP       | -3.332                          | -3.5578              | -7.0099                            | -3.5629              | I(1)                |
| LNMS      | -1.7025                         | -3.5628              | -3.8199                            | -3.5683              | I(1)                |
| DCP       | -3.6311                         | -3.5628              | -4.8088                            | -3.542               | I(0)                |
| INT       | -4.0742                         | -3.5742              | -6.4761                            | -3.5629              | I(0)                |
| INFCP     | -2.9834                         | -3.6032              | -6.1601                            | -3.622               | I(1)                |

Note - The decision is made on trend and intercept. Significant variable at level is I(0) while at first difference are I(1).

Source: Author’s compilation 2020
Table 3: VAR Lag Order Selection Criteria Using optimal lag length three (3)

| Lag | LogL  | LR       | FPE       | AIC       | SC        | HQ        |
|-----|-------|----------|-----------|-----------|-----------|-----------|
| 0   | -482.4469 | NA       | 349698.2  | 32.62979  | 32.95674  | 32.73439  |
| 1   | -337.2844 | 212.9049 | 630.3634  | 26.21896  | 28.83453  | 27.05571  |
| 2   | -251.7326 | 85.55185 | 100.2152  | 23.78217  | 28.68636  | 25.35107  |
| 3   | -98.85905 | 81.53256*| 0.842046* | 16.85727* | 24.05008* | 19.15831* |

Source: Author’s computation 2020

Stability Test
There was neither break nor departure of parameters in the Recursive CUSUM test results in figure 2 below at 5% level of significance.

![CUSUM 5% Significance](https://ijessr.com)

Figure 2: Cumulative Sum of Recursive Residual
Source: Author’s computation 2020
A slight break was observed in the Recursive CUSUM of squares results in figure 3 but eventually corrected.

![CUSUM of Squares](chart.png)

**Figure 3:** Cumulative Sum of Squares of Recursive Residual
Source: Author’s computation 2020

**Bound Test**
Table 4 reveals that the Wald F-statistic of 12.54299 was obtained which was the upper and lower critical bounds of 2.45 and 3.61 at 5% significant level, affirming a long-run relationship as established by Pesaran et al. (2001).
Table 4: Bound Test
Foreign Direct Investment
Wald F-statistic: 12.54299; K = 6

| Dependent variable | F-statistic | Lower bound | Upper bound |
|--------------------|-------------|-------------|-------------|
|                    |             | I(0)        | I(1)        |
| 10% critical bounds value | 2.12 | 3.23 |
| 5% critical bounds value | 2.45 | 3.61 |
| 2.5% critical bounds value | 2.75 | 3.99 |
| 1% critical bounds value | 3.15 | 4.43 |

Source: Author’s computation 2020

Variance Inflation Factors
The result of the variance inflation factors for each of the variable are stated in table 5. Using the centered VIF, it implies that there is absence of severe multi-collinearity between the variables since all the values are less than ten (10). This establish the non-linear relationship of the independent variables.

| Variable | Coefficient Variance | Uncentered VIF | Centered VIF |
|----------|-----------------------|----------------|--------------|
| FDI      | 0.004077              | 4.815960       | 1.569882     |
| TOP      | 5.01E-05              | 17.55062       | 1.380808     |
| LNMS     | 0.002315              | 471.5863       | 3.101686     |
| DCP      | 0.000627              | 19.64426       | 3.024193     |
| INT      | 0.000463              | 45.09920       | 1.767793     |
| INFCP    | 2.02E-05              | 3.788552       | 1.700220     |
| C        | 1.373156              | 356.3493       | NA           |

Source: Author’s computation 2020

Analysis of Long Run
Table 6 showed that FDI increases the impact of the REER in Nigeria but not significantly. The coefficient of FDI is positive, which implies one percentage increase in FDI increases REER by 0.95 percent and same percentage decrease in FDI decreases REER in Nigeria. The coefficients of TOP and MS showed a positive effect with REER although not significant. This implies that one percent increase in trade openness and money supply reduces real and effective exchange rate by 0.04 and 0.75
percent respectively. The coefficient of DCP and INT showed a negative but insignificant relationship. This implies that one percent decrease in DCP and INT would increase REER by 0.20 percent and 0.04 percent respectively. INFCP co-efficient showed a positive and significant relationship with REER.

Table 6: ARDL Long Run Coefficient (3, 3, 3, 3, 3, 3, 3) Long Run Coefficient

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| FDI      | 0.958498    | 0.754095   | 1.271058    | 0.3315|
| TOP      | 0.04571     | 0.011491   | 3.977752    | 0.0578|
| LNMS     | 0.757455    | 0.371827   | 2.037115    | 0.1785|
| DCP      | -0.200431   | 0.153341   | -1.307092   | 0.3213|
| INT      | -0.043084   | 0.08193    | -0.52587    | 0.6515|
| INFCP    | 0.071764    | 0.016834   | 4.263013    | 0.0509|
| C        | -17.146794  | 10.307544  | -1.663519   | 0.2381|

Source: Author’s computation 2020

Error Correction Model
The result of ECM presented in Table 7 is statistically significant and negative. The coefficient of adjustment is 0.72 that is 72% recovery after disequilibrium within a year.

Table 7: Error Correction Model

| Variable  | Coefficient | Std. Error | t-Statistic | Prob. |
|-----------|-------------|------------|-------------|-------|
| C         | 0.065891    | 0.111058   | 0.5933      | 0.5585|
| D(FDI)    | -0.085298   | 0.035525   | -2.401095   | 0.0245|
| D(TOP)    | -0.00267    | 0.005693   | -0.469013   | 0.6433|
| D(LNMS)   | -0.34031    | 0.452511   | -0.752049   | 0.4593|
| D(DCP)    | 0.004165    | 0.02521    | 0.165205    | 0.8702|
| D(INT)    | -0.059753   | 0.015986   | -3.737867   | 0.001 |
| D(INFCP)  | -0.002427   | 0.003291   | -0.73758    | 0.4679|
| ECM(-1)   | -0.721225   | 0.176578   | -4.084453   | 0.0004|
Discussion of Findings
The results of each of the variables reviewed in this work varies from one another. Whereas a positive relationship existed between foreign direct investment, trade openness, money supply and inflation rate on real effective exchange rate, the contrary nexus was obtained for direct credit to private sector and interest rate. Conformity with the Neoclassical and International business economic theories predictions on foreign direct investment was established, as the value and level of foreign direct investment, positively impacted on real effective exchange rate. The implication of this is that increase in foreign direct investment is desirable and essential, but it should be synchronized with other monetary and fiscal policies in Nigeria, in order to improve real effective exchange rate, external reserve, exports, microeconomic stability, and institutional quality and invariably, grow the economy. This is in line with the findings of Oriavwote & Ukawe (2018) and Suliman, Elmawazini & Shariff (2015), but contrary to that of Uzoma-Nwosu & Orekoya (2019). When FDI increases, REER also improves due to appreciation of real exchange rate of the host country, as resources would be expeditiously employed by investors in the areas of capital stock, human capital, information resources, and technological spread to be more productive and expand their businesses. Whereas, when FDI reduces, it sends a negative signal to the international market and invariably affect the real and effective exchange rate of the country as the drive for international competitiveness, innovativeness and informed decision is weakened as a result of the shock effect.

The positive impact of trade openness, money supply and inflation rate recorded in this study is consistent with the findings of Bank-Ola, Akintaro & Adediwura 2020 and Houng, Nguyen & Lien 2020. It is therefore desirable to improve the quality of trade openness, money supply and inflation rate to create a good foundation for the stability of real and effective exchange rate in Nigeria. The negative results of this study on direct credit to private sector and interest rate is consistent with the findings of Latief & Lefen (2018) as increase in direct credit to private sector and interest rates; reduces the stability of real and effective exchange rate.

CONCLUSION AND POLICY RECOMMENDATIONS
Foreign direct investment’s impact on real effective exchange rate in Nigeria from 1986 to 2018 was analyzed in this study. The error correction term indicate that the economy will rapidly recover at 72% after disequilibrium within a year. The coefficient of adjustment is high and speed of recovery will be rapid for the economy to restore after disequilibrium. The results revealed that in the long run, firstly, foreign direct investment had a positive relationship with real effective exchange rate as it is foreign capital inflows, though insignificant. However, a sustainable level should be maintained. Secondly, a positive relationship was established between trade openness and real effective exchange rate which confirms the theoretical knowledge. Thirdly, a positive and insignificant relationship existed in the study between money supply and real effective exchange rate. Fourthly, an insignificantly negative relationship was established between direct credit to private sector and real effective exchange rate.
Fifthly, interest rate has a negative and insignificant relationship and lastly, the relationship with inflation consumer prices was positive and significant. From the variables used to measure the effect of the foreign direct investment on real effective exchange rate, it is concluded that the policies put in place by the Monetary and Fiscal authorities in Nigeria should be such as to encourage stable and sustainable foreign direct investment in a conductive economic and political environment. This will bring about improvement in the nations productivity, external reserves, international trade and competitiveness, information technology and technological advancement through improvement in real effective exchange rate in Nigeria.

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