

NEXUS BETWEEN EXCHANGE RATE FLUCTUATION AND FOREIGN DIRECT INVESTMENT IN NIGERIA

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Adegoriola A.E., Emmanuel S.C. (2022), Nexus between Exchange Rate Fluctuation and Foreign Direct Investment in Nigeria. African Journal of Economics and Sustainable Development 5(2), 21-37. DOI: 10.52589/AJESD-AYBGJFWJ.

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Copyright © 2022 The Author(s). This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0), which permits anyone to share, use, reproduce and redistribute in any medium, provided the original author and source are credited. **ABSTRACT:** This study examined the nexus between exchange rate fluctuation and foreign direct investment in Nigeria from 1986 to 2020. The research was conducted using relevant econometric tools which include unit root test, co-integration test and Autoregressive Distributed Lag (ARDL) model. The results of ADF unit root test revealed that only interest rate is stationary at level while exchange rate, foreign direct investment, gross capital formation and inflation rate became stationary at first deference. The bounds test showed that there is a long run relationship between the foreign direct investment inflows, interest rate, exchange rate, gross capital formation and trade openness in Nigeria. The findings revealed a negative relationship between exchange rate and foreign direct investment in Nigeria and all the lagged value of exchange rate are statistical significant at 5% level of significant, which an indication of exchange rate importance on foreign direct investment inflows into Nigeria to a two standard error shock of exchange rate showed that exchange rate effect on foreign direct investment is persistence and significantly positive over the a period of up to 8 years after the shock. The exchange rate, though relatively stable, has a profound effect on foreign direct investment in Nigeria. The study recommended that given the perceived over-valued naira, a deliberate effort toward revaluation of the naira to reflect the true value of dollar to naira exchange rate will obviously increase the exchange rate and as such makes it cheaper to invest in Nigeria by foreign businesses.

KEYWORDS: Exchange Rate, Exchange Rate Fluctuation, Foreign Direct Investment

JEL Classification: F31, E32, F21



INTRODUCTION

The growing interest in Foreign Direct Investment (FDI) stems from the perceived opportunities derivable from utilizing this form of foreign capital injection into the economy to augment domestic savings and further promote economic growth in most developing economies (Aremu, 2005). FDI is believed to be stable and easier to service than bank credit and is usually on long term economic activities in which repatriation of profit only occurs when the project earns profit. As stated by Dunning (2009), FDI contributes to the receiving country's gross capital formation, higher growth, industrial productivity and competitiveness and other spin-off benefits such as transfer of technology, managerial expertise, improvement in the quality of human resources and increased investment.

According to Tsai (1994), the potential importance of FDI in Less Developed Countries (LDCs) growth process is getting appreciated. The importance is classified into economic, political, social and legal factors. The economic factors include infrastructural facilities, favourable fiscal, monetary, trade and exchange rate policies. The degree of openness of the domestic economy, tariff policy, and credit provision by a country's banking system, indigenization policy, the economy's growth potentials, market size and macroeconomic stability. Other factors like higher profit from investment, low labour and production cost, political stability, enduring investment climate, functional infrastructure facilities and favourable regulatory environment also help to attract and retain FDI in the host country (Ekpo 1995).

From a traditional standpoint, exchange rate did not constitute an important dimension in the analysis of economic growth, such that the first generation of neo-classical economists did not consider exchange rate in the growth models or in their practical policy incarnations that focused on savings and investment as determinants of growth. This indicates that these were closed-economy models that dictated that exchange rate, defined as the ratio of relative prices of non-traded goods (all goods being non-traded in closed economies) had no role in the growth process. However, there is a lot of evidence that many countries maintain a disequilibrium real exchange rate that is overpriced or under-priced as compared to the equilibrium level. Resource rich countries like Nigeria often maintain an overpriced exchange rate that is imposing constraints on their economic growth. On the contrary, many developing countries (including those rich in resources) pursue the conscious policy of low exchange rate as part of their general export orientation strategy. The argument against a policy of low exchange rate is that it leads to monetary expansion and hence to inflation. Calvo and Reinhart (1995) argued that the undervaluation of the exchange rate is inflationary in theory and was inflationary in practice for Latin American countries in the 1980s. It appears, however, that the effect depends on the instrument used to support low exchange rate with implications.

Rodrik (1986) developed models demonstrating how disequilibrium exchange rates in the presence of foreign trade externalities could lead to the acceleration of growth. However, these studies did not consider the problem of inflation in detail. Calvo and Reinhart (2000) argued that these fluctuations are much more harmful for developing countries than for developed economies so that a fixed exchange rate regime is preferable for developing economies. Walsh and Yu (2010) also observed a long-standing impression among policymakers that FDI is more conducive for long-run growth and development than other forms of capital inflows. Arguments for this hypothesis have been diverse, but most often based on the idea that FDI brings with it foreign technology and management skills, which can then be adapted by the



host country in other contexts. This impression is strengthened by the fact that rapidly growing economies tend to absorb more FDI, though with FDI both contributing directly to growth and with foreign companies naturally eager to invest in rapidly growing economies, the direction of the causality is not clear in Nigeria.

The literature on FDI and growth is not fully conclusive in Nigeria, even though FDI flows into the country have been high especially in the last two decades. It remains an open question, however, as to what pulls FDI into emerging economies like Nigeria. It is intuitive that FDI should flow into countries with relatively stable exchange rate and economic conditions and strong institutions, and that investors should be concerned about political instability, inflexible regulations, and poor development indicators. But there is strangely little evidence to support these arguments in Nigeria.

However, despite the increased foreign capital inflows to Nigeria, instability in the exchange rate has posed serious challenges to foreign direct investment and economic growth. Foreign investors come into the domestic economy with expectations of positive returns; despite the various types of risks that they are exposed to. The risks include the exchange rate, inflation rate, interest rate, political, and legal risks. The reinvestment of earnings in the domestic economy depends on the level of these risks, the size of returns and future expectations. Expectations of investors play an important role to determine the level of investment and in boosting economic activities of a country (Osinubi & Amaghionyeodiwe, 2009). If foreign investors are optimistic about the future, they will invest their funds.

There is, however, a debate on the impact of exchange rate fluctuations on foreign capital inflows in many countries like Nigeria. This has led to uncertainties in the domestic economies which lead to the expectation that exchange rate instability in the domestic economy reduces earnings on foreign investments and thus discourages capital inflows (Adegoriola & Agunbiade, 2019). It is, however, difficult to reconcile the adverse effects of exchange rate fluctuations with the continued large inflows into Nigeria. The relationship between FDI and exchange rate in Nigeria is yet unclear, and that recent evidence shows that the relationship may be country and period specific. Omankhanlen (2011) revealed that only a limited number of multinationals or their subsidiaries have contributed to FDI in Nigeria. It was observed that aggregate investment expenditure as a share of GDP grew from 16.9% in 1970 to a peak of 29.7% in 1976 before declining to an all-time low of 7.7% in 1985. Thereafter, the highest was 11.8% of GDP in 1990, before declining to 9.3% in 1994. Beginning from 1995, investment/GDP ratio declined significantly to 5.8% and increased marginally to 7.0% in 1997 and remained there until about till 2004 when 7.1% and a continuous decrease in 2006 to 6.6% to an all time low of 4.3% in 2021 was recorded. On the average, about four-fifth of Nigeria's national output was consumed annually.

The sub-optimal investment ratio in Nigeria could be traced to many factors including exchange rate instability, persistent inflationary pressure, low level of domestic savings, inadequate physical and social infrastructure, fiscal and monetary policy slippages, low level of indigenous technology as well as political instability. A major factor was exchange rate instability, especially after the discontinuation of the exchange rate control policy. The high lending rate, low and unstable exchange rate of the domestic currency and the high rate of inflation made returns on investment to be negative in some cases and discouraged investment, especially when financed with loans.



This high exchange rate volatility in Nigeria, among others, led to a precarious operating environment which can be attributed to the reason why Nigeria was not only unable to attract foreign investment to its fullest potentials but also had a limited domestic investment. As such, despite the vast investment opportunities in agriculture, industry, oil and gas, commerce and infrastructure, very little foreign investment capital was attracted relative to other developing countries and regions competing for global investment capital. As a result of the above, it becomes relevant to investigate the nexus between exchange rate fluctuation and foreign direct investment in the Nigerian economy.

REVIEW OF RELATED LITERATURE

Conceptual Clarification

Exchange Rate Fluctuation

Exchange rate fluctuation is defined as a variation of the prices of one currency in terms of another. It is also called volatility. By depreciating or appreciating the value of a foreign currency, profitability of foreign exchange trades will be affected. Fluctuation in this case takes into account all the movement and changes that are influential for a depreciation/appreciation of a currency. Among many fundamental studies Haile and Pugh (2013) contributed greatly in terms of the effect that exchange rate fluctuation has on the macro-economy. As a result of the abandonment of the fixed exchange rate regime, international investment flows of capital became much higher (as well as international trade and other foreign exchange transactions),but despite the growth markets were still not secured with regards to the risk foreign investors may take to put their money abroad (Chowdhury & Wheeler, 2008). As fluctuation is referred to as an unpredictable and unobservable pattern, foreign investors became more aware and tried to get more information in order to hedge against exchange rate fluctuation risk.

Foreign Direct Investment

According to the World Bank, FDI is defined as the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. An even more complete definition of FDI is given by International Monetary Fund (IMF) and Organization for Economic Cooperation and Development (OECD), which states that direct investor may be an individual, an incorporated or unincorporated private or public enterprise, a government, a group of related individuals, or a group of related incorporated and/or unincorporated enterprises which have a direct investor.

For Caves (1974) FDI brings to the host countries many positive effects to their economies such as technology transfer, managerial skills, know-how, international production networks among others. However, FDI goes way beyond promoting growth, technology and education into a country. It has many different types of utility that can serve a country: develop a country's infrastructure, rebalance its national budget surplus, mature human capital, finance capital



accumulation that could ease imbalances, and even serve as a cushion against any sort of short and long term shocks and economic development.

Theoretical Review

Neoclassical Theory of Capital Flows

According to early neoclassical theories, foreign capital flows are influenced by the highest expected return on investment. Cockcroft and Riddell (1991) stressed that future capital flows are directly influenced by incentives such as expected rate of return; security of investment, tax regimes, investment code or guidelines, and the macroeconomic stability especially with regards to exchange rate and inflation. The neoclassical theory explains that at a particular time how much capital stock a firm desires to achieve. Further, according to this theory, rate of investment is determined by the speed with which firms adjust their capital stocks towards the desired level.

Because it takes time to build and install new machines, construct new factories, warehouses etc., the firms cannot immediately achieve the desired level of capital stock. Therefore, the firms have to decide with what rate or speed per period it makes adjustment in their stock of capital to attain the desired level of capital stock. Firms use capital along with labour to produce goods and services for sale in the market. In deciding about the amounts of labour and capital to be used for production the firms are-guided by not only the prices of these factors but also the contributions they make to the production and revenue of the firms. This is because volatility in macroeconomic variables creates uncertainty for private investment in terms of both the profitability and the cost of investment. Cockcroft and Riddell (1991) recommend that addressing problems that pose a danger to foreign capital inflows would help improve the foreign investment climate. Meier (1995) argued in that line. Developed countries will tend to invest in less developed economies that have growth potential with higher rate of return and a stable macroeconomic base.

Standard Option Theory of Capital Flows

If there are fixed costs in the acquisition of a firm, firms tend to delay their investments (for example in acquisition processes) when they are facing higher exchange rate volatility. Depending on how the home currency equivalent of expected future cash flows from the target firm is correlated with other assets in the acquiring firm's portfolio, high exchange rate volatility may have a positive or negative effect on the investment decision (di Giovanni, 2005).

Given the assumptions of unrestricted, frictionless markets, and continuous trading/stock prices, Black and Scholes were able to demonstrate that synthetic options can be created from portfolios containing the underlying stock and risk free debt. The primary attraction of the Black & Scholes model is that the required input data are relatively easy to obtain. Neither expected rates of return nor are assumptions about individual investor risk preferences required. Those inputs that are required are either directly observable or can be estimated from historical data.



Trade Theory of Capital Flows

FDI may be higher in countries experiencing uncertainty regarding the exchange rate because such uncertainty acts as a barrier to trade. Multinationals engage in FDI to avoid uncertainty affecting the price of their traded goods as the exchange rate fluctuates. Thus, multinationals increase their FDI to substitute for lower trade volumes in markets associated with higher volatility (Goldberg & Kolstad, 1995). Also, cross-border investment may be a substitute for trade when tariffs or other barriers prevent the free flow of goods (Russ, 2007). If a country's asset is seen as a claim to a future stream of its currency denominated profits, and if profits will be converted back into the domestic currency of the investor at the same exchange rate, the level of exchange rate does not affect the present discounted value of the investment (Blonigen, 1997).

International trade theories are simply different theories to explain international trade. Trade is the concept of exchanging goods and services between two people or entities. International trade is then the concept of this exchange between people or entities in two different countries. People or entities trade because they believe that they benefit from the exchange. They may need or want the goods or services. While at the surface, this may sound very simple, there is a great deal of theory, policy, and business strategy that constitutes international trade.

Imperfect Capital Market Theory of Capital Flows

Changes in relative wealth affect the bids these firms make, when the purchase of an asset requires funds that are generated within the firm. Thus, depreciation in the host country, by making the relative wealth of foreign investors increasing (outbidding domestic investors) and lowering the investment cost of capital (that is launched in the domestic currency), encourages FDI into that country (Itagaki, 1981; Cushman, 1985; Klein & Rosengren, 1994; Kiyota & Urata, 2004).

Capital market imperfections are limitations that reduce the range of financial contracts that can be signed or honored. These restrictions are more common in capital markets. There are three basic reasons for that: First, lenders do not have full information about the borrower, whether they have the capacity to pay back their debt and/or whether they are willing to pay asymmetric information. Secondly, the lender needs to trust the borrower to commit and to pay back his/her debt or there needs to be a third party to enforce the contract as it is more difficult to enforce contracts ex post (limited commitment).

Finally, since the exchange does not happen at the same time, there is always room for renegotiation. In a perfect capital market case, assuming complete markets, perfect rationality of agents and under full information, the equilibrium occurs where the interest rates clear the market, with the supply of funds equal to the demand. Moreover, we can analyze the firm's investment decision and its owner's consumption/saving decision separately. In addition to that, even in case of bankruptcy risk, the resulting optimum choice of firm will be efficient as the interest rate increases to capture the bankruptcy risk. Therefore, the possibility of default of the borrower is not a main driving force that leads to imperfect capital markets.



Real Options Theory of Capital Flows

This is the flexibility of the option value that a firm has in delaying an investment decision in order to obtain more information about the future. For a firm to raise profits from FDI activities, it must take into account the different types of FDI and its timing. Therefore, the impact that the exchange rate uncertainty might have on a firm's decision to invest, is ambiguous. In the case of a risk averse firm, whenever the exchange rate uncertainty becomes higher, a market-seeking firm tends to delay its decision to invest, however if it is an export-substituting firm, the decision is to increase its FDI activity (Dixit & Pindyck, 1994).

Real option theory draws parallel between the valuation of the financial options available and the real economy. The theory has become a popular theme in most business schools in the world as well as choices available to a company regarding an investment opportunity. The term real means that it refers to a tangible asset and not a financial instrument. Examples of real options include determining whether to build a new factory, change the machinery and technology on a production line, decide whether to buy a potential lucrative oil field and when to start drilling or pumping. They do not include derivative financial instruments such as stocks or bonds. However, the trade theory will be adopted at the cost of this research since it is more related to the topic in review.

Empirical Review

Adofu and Adegoriola (2020) studied the relationship between foreign portfolio investment and Nigerian economic growth from 1986 to 2018. The Autoregressive Distributed Lag model was used as a methodology to analyze the data. Findings from the study, results showed that current value and one period lag of foreign portfolio investment showed negative and insignificant impacts on the economic growth. The study concluded that the level of fluctuation of foreign portfolio investment into Nigeria at the moment signifies that the economy needs total reform in order to gain the confidence of the foreign investors. The study therefore, recommends that the government should double its effort at improving the investment. The government should support the prevailing investors through improvement in infrastructural development; provision of services and changes within the regulatory framework by relaxing laws on profit repatriation among others.

Barguellil, Ben-Salha and Zmami (2018) examined the impact of exchange rate volatility on economic growth. An empirical investigation based on a sample of 45 developing and emerging countries over the period of 1985-2015 is conducted using the difference and system generalized method of moment's estimators. Findings suggest that the generalized autoregressive conditional heteroskedasticity-based measure of nominal and real exchange rate volatility has a negative impact on economic growth. Also, the effect of exchange rate volatility depends on the exchange rate regimes and financial openness, that is, volatility is more harmful when countries adopt flexible exchange rate regimes and financial openness.

Efiong, Ayuk and Imong (2018) investigated the effects of exchange rate fluctuations on foreign direct investment in Nigeria between 2001-2015. The study adopted a quasiexperimental research design considering the fact that time series data were analyzed. The study adopts the Vector Auto regression Wald Test and the Granger Causality test to analyse the obtained data. The study reveals a unidirectional causality run from exchange rate



fluctuation to foreign direct investment inflow into Nigeria, and no causality run between Inflation Rate and Foreign Direct Investment.

In their study on exchange rate fluctuations and foreign private investments in Nigeria, Mbanasor and Obioma (2017) used two-stage least squares (2LS) to analyse the data. The result showed the exchange rate fluctuation has a negative and non-significant impact on Nigeria's foreign private investment. This indicates that a one percent increase in foreign private investment into Nigeria may be due to 0.015 percent decrease in exchange rate fluctuations. The result of this study that exchange rate fluctuations has negative and non-significant impact on Nigeria's foreign private investment supports the above argument implying that FDI investment in Nigeria is not determine by exchange rate but on other motives such as technology, entrepreneurial skills, source of capital an overall motive to make profit irrespective of the exchange rate. In the same vein, Iyke and Sin-Yu (2017) examined exchange rate uncertainty and domestic investment in Ghana using ARDL bounds testing approach covering the period 1980–2015. The study reveals that exchange rate uncertainty has differential impacts on domestic investment in the short run. That is, while the current level of uncertainty enhances investment, previous levels of uncertainty dampen investment. In the long run, exchange rate uncertainty has a positive impact on domestic investment.

Murtala (2017) examined the impact of exchange rate fluctuations on foreign direct investment in Nigeria over the years to be precise 26 years coverage (1990-2015). The data obtained were analyzed using regression and correlation analysis techniques. Findings from the analysis show that there is a strong positive relationship between FDI and exchange rate in Nigeria on one hand and there is a weak positive relationship between FDI and GDP on the other hand. The researcher also found that there was a significant inflow of FDI from 2005-2014 due to a rise in the exchange rate in the same period. The study concludes that exchange rate, FDI, and GDP are positively correlated.

In their study on exchange rate and foreign direct investment (FDI) in Nigeria, Alobari, Paago, Igbara and Emmah (2016) used descriptive analysis as methodology for secondary data on exchange rate and FDI. The findings of the study agrees with some other research reports that Nigeria has so far attracted little of FDI and has lost much of the few it has attracted, yet there are good developmental resources to be desired which come with FDI. The study also found a relationship between FDI, Exchange rate and Economic Growth in Nigeria. Also, Jongbo (2014) studied the impact of real exchange rate fluctuation on industrial output in Nigeria which employed Ordinary Least Square (OLS) in analysing the obtained data. The results show that real exchange rate play a significant role in determining the industrial output and also in addition, availability of foreign exchange increase through contentious export drive from both oil and non-oil products will contribute tremendously to increase industrial output. The study further reveals that the capacity utilization ratio is low the cases of which may not be too far away from, partly epileptic power supply, lack of adequate and appropriate technology and so on and also that the impact in bidirectional (real exchange rate in industrial output.

Wang (2013) looks at the impact of exchange rate volatility on foreign direct investment (FDI) in BRIC countries. Specifically, Brazil, Russia, India, and China (BRIC). The sample of data was selected over the period of 1994-2012 for both exchange rate volatility and foreign direct investment for all countries. The standard deviation of monthly exchange rate changes is applied to examine the exchange rate volatility and its influence upon foreign direct investment using an Autoregressive Distributed Lag (ARDL) approach and the co-integration and Error



Correction Model. The results indicate a negative long-run relationship between exchange rate volatility and foreign direct investment for India and Russia. The existence of a short-run association was found in China, India, and Russia. However, for Brazil no connection between the two variables was observed.

Ullah, Haider and Azim (2012) investigated the relationship of foreign direct investment with exchange rate and exchange rate volatility in Pakistan. Time series data over a 30 years period between 1980 and 2010 was collected. The variables of interest included exchange rate and its movements, inflation, FDI and trade openness. Unit root test, causality analysis, volatility and co-integration technique were used to analyze the data. According to the findings FDI had a positive relationship with Rupee depreciation, exchange rate volatility deterred FDI and trade openness considerably attracted FDI while inflation was found to be insignificant to the study. The outcomes of Granger causality test proposed that exchange rate volatility granger caused foreign direct investment and not the other way round.

Ogun, Egwaikhide and Ogunleye (2012) studied the real exchange rate and foreign direct investment in Sub-saharan Africa. The study employed the Granger causality and simultaneous estimation techniques. The use of simultaneous equations is informed by the theoretical and empirical inconclusiveness on the relationship between movements in real exchange rate (RER) and foreign direct investment (FDI). The Granger Causality test further provides insight on the causal direction of the variables. Whereas the causality tests suggest statistical dependence between RER movements and FDI for a few of the countries, the regression analyses show a statistically significant relationship between these variables. While the inclusion of the pre-reform period in the study may have contributed to these results, the general picture emerging is that FDI flows are sensitive to RER movements in SSA.

THEORETICAL FRAMEWORK AND METHODOLOGY

Theoretical Framework

A string of literature exists on the forces that affect exchange rate. However, the empirical results are mixed and still seem to be in the data. Some studies have analyzed exchange rate in a neoclassical framework whereas others have used a Standard Option Theory approach for its modeling. Dornbusch (1987) theoretically explained the relationship between foreign direct investment, exchange rate and prices for an open economy by applying various approaches including Standard Option Theory model based on the law of one price, neoclassical model based on the assumption that each country is fully specialized in its home production, Counot Model based on oligopolistic market and the Dixit-Stiglitz Model based on a utility maximization function of consumers.

This study adopts the real options theory as the theoretical framework for the model as it best explains the intent of this work. The theory emphasizes the valuation of the financial options available in the real economy in line with the Nigeria exchange rate policy of flexible regime. The theory believes in determining whether to build a new factory, change the machinery and technology on a production line, decide whether to buy a potential lucrative oil field and when to start drilling or pumping, making decisions before embarking in investment. The theory proves to be better and fit to Nigeria given the potential impact of exchange rate on prices, investment, balance of payments, and interest rate, the issue of the determination of ideal



exchange rate between countries becomes imperative for the successful implementation of development programs (Dare & Adekunle, 2020). They argued that the objectives of exchange rate policy are to increase output and stability in domestic prices. A necessary condition for the achievement of the above objectives is that the exchange rate should be as stable as possible. According to him, stability permits viability of the rate in response to changes in relative prices; international terms of trade and development factors.

Model Specification

This study is based on the assumption that the inflow of foreign direct investment (FDI) affects economic growth in Nigeria (GDP), exchange rate (EXR) and other macroeconomic variables like interest rate (INR) and inflation rate (INF) in- turn affect the inflow of Foreign Direct Investment (FDI). Hence, the model:

 $GDP = f(FDI) \dots 1$ FDI = f(EXR, INR) \qquad 2

Considering the fact that FDI of an economy is not determined by EXR, INR, INF alone, the inclusion of two more important FDI inflow variables; and Trade Openness (TOP), Gross Capital Formation (GCF), is made so as to get a more realistic model: Hence, equations (1) and (2) is extended thus:

Thus, the statistical form of the model is:

 $FDI = \beta o + \beta_1 EXR + \beta_2 INR + \beta_3 TOP + \beta_4 GCF + e \dots 4$

Where:

 β_0 , β_1 , β_2 , β_3 & β_4 are all the parameter estimates while e is the error term.

 $\beta_{I} \& \beta_{2} < 0$ while $\beta_{3} \& \beta_{4} > 0$.

Since there is a level of interrelationship between the variables, the ARDL is more suitable as it captures the joint interdependency of the variables against each other. The specification of the Auto Regressive Distributed Lag (ARDL) model is given below:

 $\Delta FDI_t = \alpha^{FDI} + \sum_{I=1}^{K} \beta_i^{FDI} \Delta FDI_{t-i} + \sum_{i=1}^{K} \gamma_i^{FDI} \Delta EXR_{t-i} + \sum_{i=1}^{K} \theta_i^{FDI} \Delta INTR_{t-i} + \sum_{i=1}^{K} \eta_i^{FDI} \Delta TOP_{t-i} + \sum_{i=1}^{K} \pi_i^{FDI} \Delta GCF_{t-i}$



TOP

0.082019

0.018119 0.468774

0.000244

0.114105

1.613597

5.231634

21.80953

0.000018

2.788645

0.429659

34

| Table 1: Descriptive Statistics | | | | | |
|---------------------------------|----------|----------|----------|----------|--|
| | EXR | FDI | GCF | INTR | |
| Mean | 98.87916 | 378.3875 | 943.5486 | 18.70920 | |
| Median | 114.8886 | 179.9500 | 435.9086 | 17.87167 | |
| Maximum | 306.0837 | 1360.400 | 4012.919 | 31.65000 | |
| Minimum | 0.893774 | 0.400000 | 8.799480 | 9.433333 | |

412.7590

0.889632

3.586293

4.727327

0.094075

12865.17

5622210.

34

1173.334

1.404838

3.854181

12.21720

0.002224

32080.65

45431507

34

4.171212

0.568649

4.881649

6.848239

0.032578

636.1127

574.1673

34

RESULTS AND DISCUSSION

Std. Dev.

Skewness

Jarque-Bera

Probability

Sum Sq. Dev.

Observations

Sum

Kurtosis

Source: Author's Computation, 2021.

86.41662

0.687772

4.902563

2.693951

0.260025

3361.892

246438.5

34

The result in table 1 showed that the mean values of all the variables are positive with Gross Capital Formation (GCF) having the highest average value of 943.5486. On the other hand, Foreign Direct Investment (FDI), Exchange Rate (EXR), Interest Rate (INTR) and Trade Openness (TOP) ranked second, third, fourth and fifth respectively. Furthermore, the minimum and maximum values change from positive to positive in all cases for all the variables. The implication of this is that all the variables are increasing over time during the study period. The table also revealed that GCF, FDI and EXR have the highest standard deviations of 1173.3,412.8 and 86.4 respectively. This implies that GCF, FDI and EXR are the most volatile variables used in the study. The skewness which measures the asymmetry of the distribution of the series about the mean is positive. However, the skewness of the normal distribution is zero, but the distribution of all the variables used in the study are positively skewed and greater than zero implying that they have a long right tail and therefore are not normally distributed. In terms of kurtosis, all the variables displayed platykurtic characteristics as they have wide spread from the mean. Also, the kurtosis of the variables has values greater than three (3). Jaque-Bera statistics showed that the null hypothesis that all variables are normally distributed is rejected as the normality of all the variables is not statistically significant at 5%. Therefore, all the variables are not normally distributed, that is FDI and EXR while GCF, INT and TOP are normally distributed.

| ADF Statistics | | | | |
|----------------|-------------|------------------|----------------------|------------|
| Variables | Level | First difference | Order of Integration | Remark |
| EXR | -1.392769 | -4.037147* | I(1) | Stationary |
| FDI | - 1.347908 | -3.258817** | 1(1) | Stationary |
| GCF | -2.117151 | -2.746189* | 1(1) | Stationary |
| INF | -2.128278 | -3.300803** | 1(1) | Stationary |
| INTR | -3.082685** | -6.380011* | 1(0) | Stationary |

Table 2: ADF Unit Root Test Result

Source: Author's Computation 2021.



The result of the ADF unit root test in table 2 revealed that only interest rate was stationary at level while other variables like Exchange Rate, Foreign Direct Investment, Gross Capital Formation and Inflation Rate were not stationary at level. However, after the first difference they became stationary. This was achieved by comparing the ADF test statistics with their respective critical values at 5 %, this gives the order of integration of purely I(0) and I(1). The order of integration of the variables connote that there may be a long run relationship between and among the variables.

Table 3: ARDL Bounds Test Result

| Test Statistic | Value | Signif. | I(0) | I(1) |
|----------------|----------|---------|------|------|
| F-statistic | 5.778759 | 10% | 1.92 | 2.89 |
| K | 7 | 5% | 2.17 | 3.21 |
| | | 2.5% | 2.43 | 3.51 |
| | | 1% | 2.73 | 3.9 |

Source: Author's Computation 2021.

From the result of the bounds test, the F-statistic value falls outside the critical upper bounds, the study draws the conclusion that there is a long run relationship between variables. The long-run and the short estimate to ascertain the relationship between the variables and the adjustment speed within the short run to establish the effect of exchange rate fluctuations on foreign direct investment in Nigeria.

| Table 4: | ARDL | Result |
|----------|------|--------|
|----------|------|--------|

| Dependent variable (FDI) | LAG | | |
|--------------------------|-----------|----------|----------|
| | Current | 1 | 2 |
| EXR | -14.16** | -26.60** | -13. 98* |
| | (-1.84) | (-1.89) | (-2.56) |
| INTR | -74. 71** | -58.42** | -6.60* |
| | (-1.93) | (-1.78) | (-2.07) |
| GCF | 0.47* | 1. 73** | 0.65* |
| | (3.22) | (1.82) | (2.42) |
| ТОР | 0.31* | 0.09* | 0.20** |
| | (2.57) | (3.03) | (1.75) |
| $R^{-2} = 0.99$ | | | |

Source: Author's Computation 2021.

The result of the ARDL confirmed the prior expectations. This is because it is expected that the sign of the coefficients of exchange rate and interest rate on foreign direct investment in Nigeria to be negative. Therefore, an increase in exchange rate, by N1m will bring about N14.16, N26.60, and N13.98 reductions in foreign direct investment in the current period, first,



and second lags respectively. Also, an increase in interest rate by 1% will bring about 75%, 58%, and 6% reduction in foreign direct investment in the current and previous lags.

On the other hand, an increase in Gross Capital Formation by 1% will bring about 47%, 173% and 61% increase in foreign direct investment in the current and previous lags respectively in Nigeria. Also, 1% increase in Trade Openness will bring about 31%, 9% and 25% increase in foreign direct investment in the country. The R⁻² of 0.95 implies that the independent variables have explained about 95% of the variation in foreign direct investment in Nigeria. The remaining 5% is attributed to other factors that do affect foreign direct investment other than the variables included in the model. This is captured in the study by the error term. The Durbin - Watson statistics is 1.5 indicating the absence of serial correlation. On the major determinants of foreign direct investment, the results of the ARDL in table 3 shows that exchange rate and interest rate are the major determinants of foreign direct investment inflow into the country. This is so as their coefficients (14.16, 26.60 and 13.98) for exchange rate and (74.71, 58.46 and 6.60) for interest rate for the current, first and second lags respectively appeared to have the highest effect on foreign direct investment in Nigeria.



Response to Cholesky One S.D. Innovations ± 2 S.E.

Source: Author's Computation, 2021

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Figure 1 presents the dynamic responses of Foreign Direct Investment (FDI) Inflow into Nigeria to a two-standard-error shock of exchange rate. The effect on exchange rate on Foreign Direct Investment is found to be persistent and significantly positive over a period of up to 8 years after the shock. This implies that a positive exchange rate shock is accompanied by a positive Foreign Direct Investment inflow into the country. However, the effect of exchange rate on Foreign Direct Investment in Nigeria is usually delayed one lag period before becoming asymptotic to the steady state over the time horizon. Exchange rate has a profound effect on Foreign Direct Investment In Nigeria. This is expected because every investor will like to invest in an economy with a relatively stable exchange rate.





Figure 2: Stability Test Result

Source: Author's Computation 2021.

The stability test conducted is presented in figure 2. The result indicates that no root lies outside the unit root circle. This implies that the estimated impulse response function is not only in a stable mode but efficient in estimating how Foreign Direct Investment (FDI) Inflow into Nigeria responds to an unanticipated shocks in exchange rate.

The implication of these findings to reality is that Foreign Direct Investment (FDI) flows more into an economy that has a stable exchange rate and other related macroeconomic indices. This finding supports the studies of Efiong, Ayuk and Imong (2018); Barguellil, Ben-Salha and Zmami (2018); Iyke and Sin-Yu (2017); Bichanga (2016; Adofu and Adegoriola (2020); Oluremi, Egwaikhide and Ogunleye (2012) among others that exchange rate has a significant and positive influence on FDI. The results of the impulse response function revealed that Foreign Direct Investment (FDI) inflow into Nigeria responds more to exchange rate fluctuation compared to other indices. This finding confirmed the findings of Murtala (2017), who found that exchange rate is a major determinant of Foreign Direct Investment (FDI) inflow into any economy.



CONCLUSION AND RECOMMENDATIONS

Evidence from the findings of this study, it can be concluded that the exchange rate is highly volatile in Nigeria. In other words, the rate at which Nigerian naira exchanges for a United States dollar is relatively unstable. Furthermore, the result of the study led to the conclusion that an upward fluctuation in exchange rate will bring about an increase in foreign direct investment in Nigeria. That is to say that the Nigerian naira loses value relative to the United States dollar, when more foreign investors channel their investments into Nigeria. Whenever the exchange rate experiences a shock, the shock goes to affect the inflow of direct investment to Nigeria from foreign countries. Lastly, it is concluded that exchange rate, interest rate, trade openness and inflation rate are the major determinants Foreign Direct Investment (FDI) into Nigeria. This in a nutshell means that a change in any of EXR, INTR and INF goes to affect the inflow of FDI into Nigeria.

Based on the conclusion, it is recommended that measures should be taken to further stabilize the dollar to naira exchange rate so as to reduce business failure due to foreign exchange risk for already existing foreign investments in Nigeria. It is also recommended that given the perceived over-valued naira, a deliberate effort towards revaluation of the naira to reflect the true value of dollar to naira exchange rate will obviously increase the exchange rate and as such makes it cheaper to invest in Nigeria by foreign businesses. The government through the Central Bank of Nigeria should adopt an interest rate policy that will lower the cost of borrowing funds as this will bring about higher inflow of foreign direct investment into Nigeria. Finally, the government should implement monetary and fiscal policies that are geared towards stabilizing the inflation rate so as to attract the inflow of foreign direct investment into Nigeria.

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