



IMPACT OF EXCHANGE RATE VOLATILITY ON FOREIGN DIRECT INVESTMENT IN NIGERIA (1986-2018)

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Abstract: Arguments abound in literature as to whether exchange volatility can stimulate foreign direct investment in developing economies. The objective of the study is to examine the impact of exchange rate volatility on FDI in Nigeria for the period 1981-2018. Secondary Time series data were collected from CBN Statistical Bulletin. The time series data used were annual data. They include: foreign direct investment, exchange rate, trade openness, interest rate and dummy variable for economic recession. The study adopted Augmented Dickey-Fuller test to check for stationarity of the time series variables used in the study. The variables were integrated at order one $I(1)$, except trade openness which was $I(0)$. Engle-Granger cointegration analysis showed evidence of long run relationship among the variables. In order to examine the effect of real exchange rate volatility on FDI, the study conducted preliminary test to check for the presence of clustering volatility and ARCH effect in the residual. It was discovered that volatility does not exist in the residual. As a result, the parsimonious Error Correction Modeling was chosen as the estimation technique. Findings reveal that exchange rate volatility has no significant relationship with FDI since the probability of the t -statistic exceeds the 5 per cent critical value over the period under study ($P(t)=0.7235 > 0.05$). The result indicated that one per cent increase in exchange rate volatility leads -0.09 per cent decline in foreign direct investment. In addition, it was discovered that a uni-directional causality relationship exists between exchange rate and foreign direct investment over the period under study ($P(F) = 0.0034 < 0.05$). Therefore, the study recommends an increase of monetary policy rate from the current 11.13 per cent in March 2021 to about 19 percent could go a long way to attracting FDI, all other things being equal, for exchange rate to stabilize.

Introduction

Increase in foreign direct investment inflows has been one of the major macroeconomic

objectives of any nation. Several studies have been carried out in the last decade to examine the factors that influence foreign direct

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investment inflows in the country, one of such factors that recently have been a source of debate is exchange rate and its volatility. The existing literature has been split on this issue, with some studies finding a positive effect of exchange rate volatility on foreign direct investment whereas others finds a negative effect. A positive effect can be justified with the view that foreign direct investment is export substituting.

Justification for a negative impact of exchange rate volatility on foreign direct investment can be found in the irreversibility literature pioneered by Dixit and Pindyck (1994). A direct investment in a country with a high degree of exchange rate volatility will have a more risky stream of profits. As long as this investment is partially irreversible, there is some positive value to holding off on this investment to acquire more information. Given that there are a finite number of potential direct investments, countries with a high degree of currency risk will lose out on foreign direct investment to countries with more stable currencies (Foad, 2005).

One of the countries that fall into this category (countries with a high degree of currency risk) is Nigeria. With a population of about 170 million people, vast mineral resources, and favourable climatic and vegetation features, Nigeria has the largest domestic market in Sub-Saharan Africa. The domestic market is large and potentially attractive to domestic and foreign investment, as attested to by portfolio investment inflow of

over N1.0 trillion into Nigeria through the Nigerian Stock Exchange (NSE) in 203 whereas in 2018 the domestic and foreign investment rose marginally to 1.4 trillion (Central Bank of Nigeria Statistical Bulletin, 2019) which shows insignificant difference. Investment income, however, has not been encouraging, which was a reflection of the sub-optimal operating environment largely resulting from inappropriate policy initiatives.

Except for some years prior to the introduction of the Structural Adjustment Programme (SAP) in 1986, gross capital formation as a proportion of the GDP was dismally low on annual basis. It has been 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 about till 2004 when 7.1% was recorded. In 2015 it increased to 7.8%, declined a little to 7.65 in 2017 and increased to 8.01% in 2018 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

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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.

The Naira (Nigerian currency) exchange rate witnessed a continuous slide in all the segments of the foreign exchange market (that is, Official, Bureau De Change and parallel markets). In the official market, the exchange rate depreciated progressively from N8.04 per US dollar in 1990 to N81.02 per dollar in 1995 and further to N129.22 in 2003 and N133.00 in 2004. In the 2010, the exchange rate further depreciate o 148.8127 per dollar, in 2015 exchange rate becomes 192.3016 and in 2018 exchange rate depreciated further to 306.7 per dollar while in 2019 it depreciated to 358per dollar to Naira. Consequently, the premium between the official and parallel market remained wide throughout the period.

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. The unabated fluctuation in exchange rate volatility has been a crucial issue for policy makers since the last four decades in Nigeria. As a result of the above, it becomes relevant for a study like this to investigate if exchange rate volatility has impact on foreign direct investment in Nigeria for the period of economic deregulation in Nigeria.

Statement of the Problem

Since September 1986, when the market determined exchange rate system was introduced via the second tier foreign exchange market, the naira exchange rate has exhibited the features of continuous depreciation and instability. This instability and continued depreciation of the naira in the foreign exchange market has resulted to declines in foreign direct investment, decline in the standard of living of the populace, increased cost of production, which also leads to cost push inflation. It has also tended to undermine the international competitiveness of non-oil exports and make planning and projections difficult at both micro and macro levels of the economy. A good number of small and medium scale enterprises have been strangled out as a result of low dollar/naira exchange rate and so many other problems resulting from fluctuations in exchange rates can also be identified. This movement of the exchange rate along the path

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of depreciation since 1986 has raised a lot of questions on the impact of exchange rate policies on the Nigerian economy.

The 1980s witnessed increased flows of investment around the world. Total world outflows of capital in that decade grew at an average rate of almost 30%, more than three times the rate of world exports at the time, with further growth experienced in the 1990s (Kosteletou and Liargovas, 2000). Despite the increased flow of investment, especially to developing countries, Sub-Saharan Africa (SSA) countries still lag behind other regions in attracting foreign direct investment. The uneven dispersion of FDI is a cause of concern since FDI is an important source of growth for developing countries. Not only can FDI add to investment resources and capital formation, it can also serve as an engine of technological development with much of the benefits arising from positive spillover effects. Such positive spillovers include transfers of production technology, skills, innovative capacity, and organizational and managerial practices.

Some Economists dispute the ability of change in the real exchange rate to improve the trade balance of developing countries because of elasticity of their low export (Hinkle, 1999), others believe that structural policies could however change the long term trends in the terms of trade and the prospects for export led growth. Instabilities of the foreign exchange rate is also a problem to the economy.

Previous studies that modeled exchange rate volatility in Nigeria have not attempted to examine the impact of economic recessions that took place in Nigeria's economy over the period under study. The present study intends to unearth this fact. It is based on these aforementioned problems that this study seeks to determine the impact of exchange rate volatility on foreign direct investment in Nigeria

Research Questions

In the course of this research work, the following are the research questions:

- What is the impact of exchange rate volatility on foreign direct investment in Nigeria?
- What is the causal relationship between exchange rate volatility and foreign direct investment in Nigeria?

Objectives of the Study

The broad objective of this study is to ascertain the impact of exchange rate volatility on foreign direct investment in Nigeria. Specifically, the objectives are:

- ❖ To ascertain the impact of exchange rate volatility on foreign direct investment in Nigeria.
- ❖ To evaluate the causality relationship between exchange rate volatility and foreign direct investment in Nigeria.

Hypotheses of the Study

In carrying out this study, the following hypotheses are tested.

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(i) **H₀**: Exchange rate volatility has no significant impact on foreign direct investment in Nigeria.

(ii) **H₀**: Exchange rate volatility has no causality relationship with foreign direct investment in Nigeria.

Scope of the Study

This research work is designed to cover the period 1981-2018, a period of thirty seven years. The study will investigate the impact of exchange rate volatility on foreign direct investment in Nigeria. The study will be limited to foreign direct investment as the dependent variable whereas exchange rate, external reserve, import, export and interest rate as the independent variables.

LITERATURE REVIEW

The Concept of Exchange Rate volatility

Exchange rate is the rate at which a currency is exchanged for another currency. It can also be said to be the price of one country's currency in relation to another country. It is the required number of units of a currency that can buy another number of units of another currency. It is referred to as the ratio at which a unit of currency of one country is expressed in terms of another currency. According to Jhingan (2004), the exchange rate between the dollar and the pound refers to the number of dollars required to purchase a pound. The rate is normally determined in the foreign exchange market. The foreign exchange market is a market where currencies of different countries are bought and sold. It is a market where the values of local and

foreign currencies are determined. As noted by Jhingan (2004), the national currencies of all countries are the stock-in-trade of the foreign exchange market, and as such, it is the largest market to be found around the world which functions in every country.

In this study, devaluation will be used interchangeable with depreciation. While devaluation means reduction in the value of a currency in terms of a designated unit of gold, depreciation means reduction of the value of a currency in terms of a specific foreign currency. Since IMF stopped measuring currencies in terms of gold in 1984, these terms are generally used interchangeably. Economic history has shown that there are two common concepts of exchange rate namely nominal exchange rate and real exchange rate. The nominal exchange rate (NER) is a monetary concept which measures the relative price of two countries' moneys or currencies, e.g., naira in relation to the U.S. dollar (e.g., #198.00:US\$ 1.00) and vice versa. But the real exchange rate (RER), as the name implies, is a real concept that measures the relative price of two goods-tradable goods (exports and imports) in relation to non-tradable goods (goods and services produced and consumed locally (Obadan, 2006). Also, the nominal exchange rate is the number of unit of domestic currency that must be given up to get a unit of foreign currency. In other word, nominal exchange rate is the price of domestic currency in term of foreign currency.

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Concept of Foreign Direct Investment

An investment is an asset or item that is purchased with the hope that it will generate income or appreciate in the future. In an economic sense, an investment is the purchase of goods that are not consumed today but are used in the future to create wealth. In finance, an investment is a monetary asset purchased with the idea that the asset will provide income in the future or will later be sold at a higher price for a profit (Chen and Boyle, 2020).

Foreign direct investment (FDI) is an investment in a business by an investor from another country for which the foreign investor has control over the company purchased. The Organization of Economic Cooperation and Development (OECD) defines control as owning 10% or more of the business. Businesses which define foreign direct investments are often called multinational corporations (MNCs) or multinational enterprises (MNEs). An MNE may make a direct investment by creating a new foreign enterprise, which is called a Greenfield investment, or by the acquisition of a foreign firm, either called an acquisition or Brownfield investment. FDI may provide some great advantages for the MNE but not for the foreign country where the investment is made. On the other hand, sometimes the deal can work out better for the foreign country depending upon how the investment plans out. Ideally, there should be numerous advantages for both the MNE and the foreign country, which is often a developing country. We will examine the

advantages and disadvantages from both perspectives, starting with the advantages for multinational enterprises (MNEs) will be done.

Nexus between Exchange Rate volatility and foreign direct investment

The theoretical arguments linking volatility to FDI have been divided between production flexibility arguments and risk aversion arguments. According to production flexibility arguments, exchange rate volatility increases foreign investment because firms can adjust the use of one of their variable factors following the realization of nominal or real shocks. The production flexibility argument relies on the assumption that firms can adjust variable factors, for the argument would not hold if factors were fixed.

According to the risk aversion theory, FDI decreases as exchange rate volatility increases. This is because higher volatility in the exchange rate lowers the certainty equivalent expected exchange rate. Certainty equivalent levels are used in the expected profit functions of firms that make investment decisions today in order to realize profits in future periods (Goldberg and Kolstad, 1995). Campa (1993) extends this claim to include risk-neutral firms by using the argument of future expected profits. He hypothesizes that as investors are concerned with future expected profits, firms will postpone their decision to enter as the exchange rate becomes more volatile. Risk neutral firms will thus be deterred from entering foreign markets in the presence of high levels of exchange rate

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uncertainty. The theoretical result is confirmed empirically for inward investment to the US in the wholesale industries, particularly in cases where the sunk costs of entry are high. Goldberg and Kolstad (1995) note that when evaluating risk-aversion approaches versus production flexibility approaches it is important to distinguish between short-term exchange rate volatility and long-term misalignments.

Risk-aversion arguments are more convincing under short-term volatility because firms are unlikely to be capable of adjusting factors in the short-run. In the short-run, factors of production are usually fixed, and as a result firms will only be risk-averse to volatility in their future profits. However, the production flexibility argument appears in convincing under the long-term misalignments because firms are now able to adjust their use of variable factors (Jayaratnam 2003).

Theoretical Literature

Theories of Foreign Exchange Rate

The Mint Parity Theory

This theory is associated with the working of the international gold standard. Under this system, the currency in use was made of gold or was convertible into gold at a fixed rate (Jhingan 2004). Here, the value of the currency unit was defined in terms of certain weight of gold and the Central Bank of the country concerned was always ready to buy and sell gold at the specified price. The rate at which the naira could be converted into gold is called the mint price of gold.

The Purchasing Power Parity Theory

This Theory states that spot exchange rate between currencies will change to the differential in inflation rate between countries. The theory states that the equilibrium exchange rate between two inconvertible paper currencies is determined by the equality of their purchasing power. That is, the exchange rate between two countries is determined by their relative price levels (Obadan, 2006).

The origin of purchasing power concept has been traced to the 16th century Salamanca School of Spain. During the nineteenth century, classical economists, like Ricardo, Mill, Goshen and Marshall endorsed and developed more or less qualified PPP views. The theory, in its modern form, is credited to Gustav Cassel, a Swedish economist, who developed and popularized its empirical version in the 1920s (Rogoff, 1996). The nominal exchange rate should reflect the purchasing power of one currency against another and that a purchasing power exchange rate existed between any two countries which are measured by the reciprocal of one country's price level against another Cassel (1916). The central tenet of the PPP is that the equilibrium exchange rate is proportional to the relevant purchasing power parity of national currencies involved that is exchange rate fluctuations will stabilize the purchasing power of a country and hence impact significantly on investment and trade (Aghevli, Mohsin, & Montiel 1991).

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Theories of foreign direct investment

The Internal Funds Theory of Investment:

Under John Maynard Keynes's internal funds theory of investment, the desired capital stock and, hence, investment depends on the level of profits. Several different explanations have been offered. Jan Tinbergen, for example, has argued that realized profits accurately reflect expected profits.

Since investment presumably depends on expected profits, investment is positively related to realized profits. Alternatively, it has been argued that managers have a decided preference for financing investment internally.

Similarly, management may fear loss of control with the sale of additional stock. For these and other reasons, proponents of the internal funds theory of investment argue that firms strongly prefer to finance investment internally and that the increased availability of internal funds through higher profits generates additional investment. Thus, according to the internal funds theory, investment is determined by profits. In contrast, investment, according to the accelerator theory, is determined by output. Since the two theories differ with regard to the determinants of investment, they also differ with regard to policy. Suppose policy makers wish to implement programs designed to increase investment.

Neoclassical Theory of Investment:

The theoretical basis for the neoclassical theory of investment by Jorgenson (1963) is the

neoclassical theory of the optimal accumulation of capital. Since the theory is both long and highly mathematical, we shall not attempt to outline it. Instead, we shall briefly examine its principal results and policy implications. According to the neoclassical theory, the desired capital stock is determined by output and the price of capital services relative to the price of output. The price of capital services depends, in turn, on the price of capital goods, the interest rate, and the tax treatment of business income. As a consequence, changes in output or the price of capital services relative to the price of output alter the desired capital stock, hence, investment. As in the case of the accelerator theory, output is a determinant of the desired capital stock. Thus, increases in government purchases or reductions in personal income tax rates stimulate investment through their impact on aggregate demand, hence, output. As in the case of the internal funds theory, the tax treatment of business income is important.

Research Design

The study adopted the *Ex Post Facto* research design. This design is adopted because it seeks to establish the factors that are associated with certain occurrences or type of behavior by analyzing past event of already existing condition. Here, the study has no control over certain factors or variables as the events already exist and can neither be manipulated or changed.

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Model Specification for Objective I

The stochastic form of the growth models for the objective IV to VI are:

$$LFDI_t = \beta_0 + \beta_1 LTOP_t + \beta_2 INT_t + \beta_3 EXRV_t + \beta_4 DO1_t + \mu_t \quad (3.2)$$

Where,

FDI = Foreign Direct Investment

TOP = Trade Openness

EXRV = Exchange rate volatility

INT = interest rate

Economic recession = DO1, D = 1 for years of recession (1986-2019), D=0 no recession (1981-1985).

A priori Expectations:

$$f(\beta_1) > 0; f(\beta_2) > 0; f(\beta_3) > 0; f(\beta_4) < 0;$$

The ARCH/GARCH Model

In modeling volatility, the Autoregressive Conditional Heteroscedasticity (ARCH) and the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model are employed.

In developing an ARCH model, we consider two distinct specifications- one for the conditional mean and the other for conditional variance. Generalizing this, the standard GARCH (p, q) specification is expressed as:

$$y_t = \alpha + \sum_{i=1}^k \eta_i \chi_{t-i} + \varepsilon_t$$

$$\varepsilon_t \approx N(0, \sigma_t^2)$$

$$\sigma_t^2 = \omega + \sum_{i=1}^p \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^q \beta_i \sigma_{t-i}^2$$

For the purpose of this study, the presence of volatility clustering is determined by the significance of the lagged fluctuation series parameters y_t . While, the extent or degree of exchange rate fluctuation is determined by the autoregressive root, which governs the persistence of fluctuation shocks, is the sum of $\alpha + \beta$ and the indications of volatility degree are expressed as follows:-

If $\alpha + \beta \rightarrow 1$ i.e. is close to one, it indicates that fluctuation is present and persistent;

If $\alpha + \beta > 1$ i.e. is greater than 1, it indicates overshooting fluctuation; and

If $\alpha + \beta < 0.5$ i.e. is less than 0.5, it indicates no fluctuation.

Model Specification for Objective II

For the actualization of objective two which is to test the direction of causality between exchange rate and FDI, the Granger causality model is applied. Although regression analysis deals with the dependence of one variable on the other, it does not necessarily imply causation. In other words, the existence of a relationship between variables does not prove causality or the direction of influence (Gujarati 2004). The essence of causality analysis, using the granger causality test, is to actually ascertain whether a causal relationship exist between variables.



Granger Causality Model

$$FDI_t = \beta + \sum_{i=1}^n \gamma_i FDI_{t-i} + \sum_{i=1}^n \gamma_i EXR^2_{t-i} + \sum_{i=1}^n \gamma_i IR_{t-i} + \sum_{i=1}^n \gamma_i INF_{t-i} + \sum_{i=1}^n \gamma_i TOPN_{t-i} + \Omega.$$

$$EXR^2_t = \varphi + \sum_i \theta_i EXR^2_{t-i} + \sum_{i=1}^n \gamma_i FDI_{t-i} + \sum_{i=1}^n \gamma_i IR_{t-i} + \sum_{i=1}^n \gamma_i INF_{t-i} + \sum_{i=1}^n \gamma_i TOPN_{t-i} + \psi$$

$$IR_t = \varphi + \sum_{i=1}^n \gamma_i IR_{t-i} + \sum_i \theta_i EXR^2_{t-i} + \sum_{i=1}^n \gamma_i FDI_{t-i} + \sum_{i=1}^n \gamma_i INF_{t-i} + \sum_{i=1}^n \gamma_i TOPN_{t-i} + \psi$$

$$INF_t = \varphi + \sum_{i=1}^n \gamma_i INF_{t-i} + \sum_{i=1}^n \gamma_i IR_{t-i} + \sum_i \theta_i EXR^2_{t-i} + \sum_{i=1}^n \gamma_i FDI_{t-i} + \sum_{i=1}^n \gamma_i TOPN_{t-i} + \psi$$

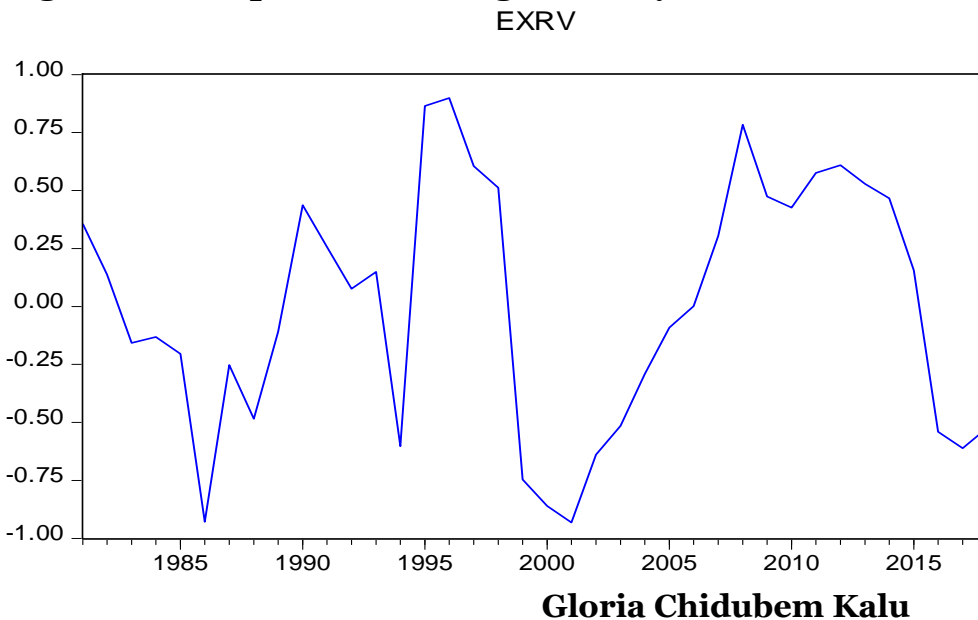
$$TOPN_t = \varphi + \sum_{i=1}^n \gamma_i TOPN_{t-i} + \sum_{i=1}^n \gamma_i INF_{t-i} + \sum_{i=1}^n \gamma_i IR_{t-i} + \sum_i \theta_i EXR^2_{t-i} + \sum_{i=1}^n \gamma_i FDI_{t-i} + \psi$$

Pre-Test Analysis for volatility

Test for the Presence of Clustering Volatility

In order to examine the effect of real exchange rate volatility on FDI, the study conducts preliminary test to check for the presence of clustering volatility and ARCH effect in the residual. In the case where clustering volatility and ARCH effect are present, the study will proceed to the estimation of GARCH (1,1), if not we will conduct ordinary least square. However, the absence of clustering volatility and or ARCH effect would mean that GARCH is not suitable for the analysis of this objective. Let us check Figure 4.1 for the presence of clustering volatility.

Figure 4.1: Graph of Clustering Volatility in Residual for Model One



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Figure 4.1 shows the graph of clustering volatility in the residual of EXRV model. It could be observed that periods of high volatility are followed by periods of high volatility for a long time. Also, periods of low volatility are followed by another periods of low volatility for a long time. The graph also shows evidence of mean reversion to zero as the fluctuations occur. Therefore, the series is a stationary series that exhibits volatility.

In order to verify the claim of the presence of clustering volatility, the study test for the presence of ARCH effect in the residual. This is presented in tables 4.2.

Test for the presence of ARCH effect for Objectives I

Result of ARCH Test for Model

Heteroskedasticity Test: ARCH			
F-statistic	0.241554	Prob. F(1,34)	0.6262
Obs*R-squared	0.253959	Prob. Chi-Square(1)	0.6143

Source: Eviews 9 Output for the ARCH test for Volatility

The Table above shows the result of ARCH test. It could be observed that the value of the probability Chi-square (0.6143) of observed residual squared in the models is greater than 0.05 (5%). This implies that we are not rejecting the null hypothesis that there is no ARCH effect in observed residuals. In other words, ARCH (1) effect is evidently absent. Since there is no ARCH effect, there is no need to estimate the ARCH model. Therefore, we will go ahead to conduct the Parsimonious Error Correction Modeling estimation for the study. the result is presented in Table 4.4 below.

In order to double check, the presence of clustering volatility in the residual, the study conducted a test for the check for ARCH effect in the residuals. The null hypothesis for this test is that there is no ARCH effect in each of the residual and the decision is to reject the null hypothesis if the probability Chi-square value of observed residual squared is less than 0.05 (5%), otherwise, the null hypothesis may not be rejected at 5% level. It is pertinent to bring to mind that rejecting the null hypothesis means that there is presence of ARCH effect in the residual and thus calls for the use of GARCH in determining the effect of real exchange rate volatility on FDI in Nigeria.

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Regression Result Error Correction Modeling

Result of the Parsimonious ECM

Dependent Variable: D(LFDI)				
Method: Least Squares				
Date: 06/20/21 Time: 14:02				
Sample (adjusted): 1982 2018				
Included observations: 37 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.188325	0.210624	-0.894127	0.3781
D(LEXR)	-0.087698	0.245687	-0.356949	0.7235
LOPN	-0.068385	0.058000	-1.179051	0.2473
D(INTR)	0.006838	0.017016	0.401868	0.6905
DO1	0.520505	0.292039	1.782313	0.0845
ECM(-1)	-0.093232	0.073063	-1.276054	0.2114
R-squared	0.169743	Mean dependent var		0.181697
Adjusted R-squared	0.035831	S.D. dependent var		0.361643
S.E. of regression	0.355105	Akaike info criterion		0.914588
Sum squared resid	3.909090	Schwarz criterion		1.175818
Log likelihood	-10.91988	Hannan-Quinn criter.		1.006684
F-statistic	1.267570	Durbin-Watson stat		2.534715
Prob(F-statistic)	0.302700			

Table 4.4 presents the result of the Parsimonious ECM analysis. The result shows that exchange rate is negatively related to foreign direct investment (FDI). One percent increase in exchange rate of Naira to the Dollar leads to 0.09 per cent decline in FDI. This implies that exchange rate devaluation or depreciation affects the flow of foreign direct investment in Nigeria over the period under

study. This outcome shows that exchange rate was not statistically significant in determining FDI over the period under study, since the value of the probability of the t-statistic exceeds 0.05 ($P(t) = 0.7235 > 0.05$)

Also, the relationship between trade openness and foreign direct investment (FDI) was negative. One percent increase in trade openness leads to 0.07 per cent decrease in

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foreign direct investment. This could mean that the policies of trade liberalization that were undertaken by policy makers in Nigeria have not yielded the desired fruits. This outcome shows that trade openness was not statistically significant in determining FDI over the period under study, since the value of the probability of the t-statistic exceeds 0.05 ($P(t) = 0.2473 > 0.05$)

The result in Table 4.4 showed that the relationship between interest rate and foreign direct investment is positive. This outcome meets a priori expectations, since foreign capital tends to flow in the directions of economies where interest rates are increasing. One per cent increase in domestic interest rate leads to 0.007 per cent increase in FDI. This implies that our economy needs higher rates of return on investment to attract foreign direct investment. This outcome shows that interest rate was not statistically significant in determining FDI over the period under study, since the value of the

probability of the t-statistic exceeds 0.05 ($P(t) = 0.6905 > 0.05$)

The dummy variable (DO1), proxy for economic recession, has a positive relationship with foreign direct investment (FDI) in Nigeria over the period under study. The result shows that the probability of the t-statistic, $P(t) = 0.0845 > 0.05$. This implies that the economic recessions over the period under study did not impact FDI significantly at 5 per cent, but at 10 per cent.

The error correction model presented in table 4.4 show a negative sign but statistically insignificant at 5 per cent. This outcome meets a priori expectation. This means that the speed by which FDI is restored to original equilibrium after a shock is 9.3 percent.

Granger Causality Analysis

The Granger causality analysis is done to determine the causality relationship between exchange rate and FDI in Nigeria over the period under study. The result is presented in Table 4.6 below:

Result of Granger causality test

Pairwise Granger Causality Tests			
Date: 06/20/21 Time: 16:37			
Sample: 1981 2018			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LEXRV does not Granger Cause LFDI	36	6.84930	0.0034
LFDI does not Granger Cause LEXRV		1.24796	0.3011

Source: E-views 9 Output for the Result of Granger causality test

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In Table 4.6 above showed a pair of null hypotheses in an attempt to examine the causality relationship between exchange rate volatility, foreign direct investment. The estimated results reported showed that a unidirectional causality runs from exchange rate to FDI in Nigeria, since the probability of F-statistic exceeds 0.05, ($P(F) = 0.0034 < 0.05$).

Evaluation of Research Hypotheses

H₀₁: Exchange rate volatility has no significant impact on foreign direct investment in Nigeria.

Decision Rule: Reject the null hypothesis if the probability value of exchange rate volatility is less than 0.05. Otherwise, the null hypothesis is not to be rejected at 5 percent level of significant.

Conclusion: The result presented in tables 4.4 shows the probability value of exchange rate volatility to be less than 0.05 ($0.7235 > 0.05$). This implies that the null hypothesis is not to be rejected. This implies that exchange rate volatility has no significant impact on FDI over the period under study.

H₀₂: Economic recession has no significant impact on foreign direct investment in Nigeria.

Decision Rule: Reject the null hypothesis if the probability value of economic recession is less than 0.05. Otherwise, the null hypothesis is not to be rejected at 5 percent level of significant.

Conclusion: The result presented in tables 4.4 shows the probability value of exchange rate

volatility to be less than 0.05 ($0.0845 > 0.05$). This implies that the null hypothesis is not to be rejected. This implies that economic recession has no significant impact on FDI over the period under study

H₀₃: There is no causality relationship between exchange rate volatility and foreign direct investment in Nigeria.

Decision Rule: Reject the null hypothesis if the probability value of F statistic of pairs is less than 0.05. Otherwise, the null hypothesis is not to be rejected at 5 percent level of significant.

Conclusion: The result presented in table 4.6 shows the probability value of F statistic of pairs to be greater than 0.05 per cent ($P(F) = 0.0034 < 0.05$). This implies that there is unidirectional causality runs from exchange rate volatility to FDI in Nigeria.

Discussion of the Results

Based on the results of data analysis, first the finding reveals that exchange rate volatility has no significant impact on FDI in Nigeria within the period the study. This present study does not meet the support of studies by Ali, Mohammed and Zahir (2017), Russ (2012) and Alaba (2003) whose studies reveal that exchange rate volatility has significant impact on FDI during the period of study.

Second, the present study shows that interest rate also has a positive and significant impact on FDI during the period of study. It is expected that high interest rate leads to increased foreign capital inflow into a country, as foreign investors would like to take advantage of high

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returns on capital. This result is corroborated by Ellahi (2011), Osunubi, Amaghiongeodiwe, (2009), Alabri and Baghestani (2015) in the study of exchange rate volatility on FDI of developing countries.

Conclusion

In order to examine the effect of real exchange rate volatility on FDI, the study conducted preliminary test to check for the presence of clustering volatility and ARCH effect in the residual. It was discovered that volatility does not exist in the residual. As a result, the parsimonious Error Correction Modeling was chosen as the estimation technique. Findings reveal that exchange rate volatility has no significant relationship with FDI since the probability of the t-statistic exceeds the 5 per cent critical value over the period under study ($P(t)=0.7235 > 0.05$). The result indicated that one per cent increase in exchange rate volatility leads -0.09 per cent decline in foreign direct investment. In addition, it was discovered that a uni-directional causality relationship exists between exchange rate and foreign direct investment over the period under study ($P(F) = 0.0034 < 0.05$).

Recommendations

Based on the result of data investigation in the study, the following recommendations are made:

- It is imperative for the monetary authorities to pursue vigorously a stable exchange rate regime by adopting sound exchange rate management system and policies that would

help to restore investors' confidence. A rising interest rate could lead to inflow of foreign capital thereby stabilizing exchange rate. Therefore, an increase of monetary policy rate from the current 11.13 per cent in March 2021 to about 19 percent could go a long way attracting FDI, all other things being equal, exchange rate would stabilize.

- Efforts should be made by government to always diversify the economy to prevent adverse effect of shocks to the economy.
- Government needs to intensify import substitution strategies and similar policies that would help increase domestic production and export so as to reduce pressure on rising exchange rate on Naira to the dollar.

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