Article title: Effect Of Exchange Rate Volatility On Foreign Direct Investment In Nigeria
Authors: Basit Oladeji[1], Mistura Musa[2]
Affiliations: Department of Economics, Obafemi Awolowo University Ile-Ife, Nigeria[1]
Orcid ids: 0000-0002-0287-0208[1]
Contact e-mail: oladejibasit094@gmail.com
License information: This work has been published open access under Creative Commons Attribution License http://creativecommons.org/licenses/by/4.0/, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Conditions, terms of use and publishing policy can be found at https://www.scienceopen.com/.
Preprint statement: This article is a preprint and has not been peer-reviewed, under consideration and submitted to ScienceOpen Preprints for open peer review.
DOI: 10.14293/S2199-1006.1.SOR-.PPBL3HY.v1
Preprint first posted online: 03 November 2022
Keywords: FDI, Foreign Direct Investment, Foreign Investment, Exchange Rate Volatility

EFFECT OF EXCHANGE RATE VOLATILITY ON FOREIGN DIRECT INVESTMENT IN NIGERIA (1980 – 2018)

BY

OLADEJI BASIT AND MUSA MISTURA

DEPARTMENT OF ECONOMICS, FACULTY OF SOCIAL SCIENCES, OBAFEMI AWOLOWO UNIVERSITY, ILE – IIFE, OSUN STATE, NIGERIA.

ABSTRACT

For the period of 1986 to 2018, this study examined the relationship between foreign direct investment and the foreign exchange rate in Nigeria. Based on historical data, the movement of the FDI-exchange rate relationship in Nigeria was examined in order to identify key problems with the creation and implementation of policies to promote FDI inflows. The study made use of a number of quantitative analytical techniques, including regression analysis, Granger causality test, correlation matrix, and descriptive statistics, all within an ECM and cointegration framework. In order to draw meaningful conclusions, the results of the empirical study provide some crucial evidence.

First, no causal relationship between foreign direct investment and exchange rate existed during the research period, according to the estimations of the causality test. Second, there is a sizable long-term link between the exchange rate and foreign direct investment. The aforementioned result implies that the link between foreign capital inflows and exchange rate in Nigeria from 1986 to 2018 is both a short-run and long-run phenomena and that the extent of the impact of capital inflows and currency rate in particular is quite high and had a strong depreciating effect on FDI. In light of these findings, it is recommended that suitable policies be developed to stabilize the currency rate in order to promote the inflows of foreign capital while maintaining prudent regulations.

Keywords: FDI, Foreign Direct Investment, Foreign Investment, Exchange Rate Volatility

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In accordance with the World Bank's criteria from 1996, foreign direct investment is a venture undertaken to obtain a lengthy business interest (often 10 percent ownership or greater of company's equity) in a corporation that is operating in a sovereign country other than the parent nation. Foreign capital flows are classified as either official development aid or export credits. Foreign private investment refers to the stock of tangible products and financial instruments owned by foreign investors in the host country. Fundamentally, "capital inflows" relate to the movement of financial resources between nations, which benefits the recipient nation's economy. The host country is often constrained by limited investment due to low domestic savings due to its inherent features (Odili, 2015). By 2019, international Capital flows had surpassed $1.5 trillion, with $635 billion (over half) coming to businesses in developing nations (World Investment Report, 2019).

Scholarly efforts have been undertaken to provide a thorough explanation for the competition between developing and emerging economies to continually entice capital from other countries into their own. The primary argument for this economic choice is based on the fundamental supposition that FDI not only brings in the much-needed finance to developing nations like Nigeria, but also fosters job creation, boosts productivity, hones management abilities, and introduces cutting-edge technology. It is anticipated that each of these elements would accelerate economic development (Todaro, 1977). This shows that foreign capital resources are a crucial tool and a strategic driver for economic growth and development.

Nigeria has recently lagged behind other countries in luring foreign direct investment, despite an increase in investment flows internationally, particularly to developing nations like those in Sub-Saharan Africa. Nigeria is among the markets with a high demand for goods and services and has attracted FDI throughout the years. Before declining to $5.58 billion, $4.69 billion, $4.45 billion, and $2.00 billion in 2012, 2014, 2016, and 2018, respectively, FDI inflow towards Nigeria hit a peak of $8.8 billion. The worst-hit year was 2018, with inflows totaling $2 billion, down more than 42.98% from 2017 and more than 300% since 2011. Therefore, a variety of factors, such as the stability or otherwise of macroeconomic indicators (exchange rate, GDP), instability, corruption, and other socio-political elements, have an impact on foreign capital flows (Edo, 2011).

Economic experts have therefore focused their attention on the variables responsible for the influx of FDI into developing countries in light of the growing consensus about the importance of FDI to the economic growth of emerging countries. It is important to identify the factor(s) responsible for this paradox since Nigeria, a developing nation, desperately needs an infusion of FDI yet only receives a little amount while struggling to maintain the ones already received. According to empirical data in Nigeria, the behavior of the currency rate is among the different factors that could be affecting FDI movements.

The exchange rate may be considered of as the cost of a foreign currency in one's domestic currency, both in terms of levels and changes. As a result, the behavior of exchange rates can have an impact on both the distribution of this investment expenditure across different nations as well as the overall volume of FDI (Goldberg, 2006). An exchange rate regime, in contrast, consists of a set of regulations, structures, and agreements that govern how various nation-states carry out their internal financial transactions. The flexible rating system, or the gold

exchange standard, is now in use in Nigeria. This flexible exchange rate system is primarily governed by market mechanisms, which employ supply and demand pressures. According to Jhigan (2005), among other things, the country's exports, imports, and structural factors have an impact on the currency rate. A country's exchange rate improves when its exports surpass its imports since there is a higher demand for its currency. However, if a nation's imports are higher than the export sales, request for forex tends to increase, which causes the exchange rate to increase. Clearly, any move that tends to boost export volume above import rate will raise the value of the domestic currency in relation to foreign currencies.

Based on investor projections of future returns and their level of confidence in those prospects, FDI is generally considered as a forward-looking activity. Foreign direct investment (FDI) into the country may be discouraged by exchange rate instability since it increases uncertainty, dampens investment, and makes foreign investors more wary of entering the country (Saidu, Nnanna and Oko, 2018). More specifically, fluctuating exchange rates may have an impact on both the total volume of foreign direct investment and how it is distributed across different nations (Goldberg, 2006). This is due to the fact that a depreciating currency can have two negative effects on foreign direct investment. Fundamentally, it lowers labor and manufacturing costs in that nation in comparison to those of its competitors outside. If all else remains the same, the nation that is experiencing an actual currency collapse has an increased "locational advantage" or appeal as a market for attracting investments for productivity gains. Foreigners considering making an offshore investment in this country via this so-called "relative wage" method will benefit more overall from the weakening of the currency (Goldberg, 2006).

The effects of the currency value on FDI frequently depend on a number of straightforward assumptions. To begin with, any change in the currency rate must be

accompanied by a shift in the average costs of production amongst nations; it cannot be offset by a rise in wages and manufacturing costs in the market wherever capital investment will be deployed. The importance of the "relative pay" channel may diminish if exchange rate variations are expected, which brings us to our second point. Given that interest rate parity conditions unify risk-adjusted projected returns on investments across countries, predicted exchange rate changes could raise the cost of financing the capital projects (Goldgerg, 2006). This argument holds that when currency fluctuations are unanticipated and do not otherwise appear in the predicted costs of project finance for the FDI, their effects on FDI are more significant. However, whether fluctuations in exchange rates have a direct impact on FDI is unknown.

While the exchange rate is a key macroeconomic factor that is used to gauge FDI inflow and international competitiveness, the volatility in the domestic exchange rate has recently been a major cause of concern in Nigeria. Fundamentally, the demand and supply sides of a country's currency are what drive exchange rate swings. Therefore, it is seen as a reflection of how desirable a country's currency is, and there is a tendency for an inverse correlation to exist between the two. In other words, a country's currency will become more competitive as its exchange rate declines in value. Exchange rate instability directly affects how advantageous import and export will be. Additionally, it indicates the quantity of a thing that should be produced, as well as the amount that should be exported or imported, the balance of payments, and the amount of cash set aside. The price of imports, exports, and the balance of payments can all be impacted by exchange rates. By investing in foreign currency, local investors have a great chance to get a large return thanks to the exchange rate's operations. Investors prefer a system in which the real and predicted exchange rate values are only little to nothing difference, like foreign exchange traders. Since exchange rates are crucial to maintaining macroeconomic

stability in any nation, it is clear that it exert a big influence in generating foreign investment into the home nation.

1.2 Statement of the problem

Despite the multiple macroeconomic issues related to exchange rate variations that may be brought on by significant capital inflows, the relationship between FDI inflow and exchange rate appears to receive less attention in poor countries in general and the Nigerian economy in particular. The majority of study in this area has focused on how changes in currency rates affect FDI flows in Nigeria. This is frustrating because it seems like there are innumerable obstacles in the way of Nigerian policymakers' efforts to draw in the most necessary FDI and catch up with wealthy economies. For Nigeria's economic development and progress, this development instills very little confidence. Even worse, the structure of existing FDI inflows is frequently biassed towards mining and mineral exploration, suggesting that FDI inflow into the nation has been focused on resource-seeking when the market extent may be a major worry (Soumyananda, 2014). There have been variances in the influx of foreign private capital into the Nigerian economy since the commencement of the reform program (SAP) in 1986, which may point to a greater hazard to the domestic economy from unstable exchange rates (Odili, 2015).

However, there has been a serious shortage of research on the connection between FDI and currency rate changes, and among the few endogenous studies that have been conducted on this subject are (see Nwosa and Amassoma, 2014; Odili 2015; Saidu, Nnanna and Oko, 2018). These studies show a negative relationship between exchange rates and the volume of foreign direct investment into Nigeria. On the other hand, a number of researchers, including (Rasaq,

2013; Omorokunwa and Ikponmwosa, 2014; Alobari et al, 2016; Murtala 2017; Mokuolu, 2018), reported a favorable link. The studies mentioned above only explored how exchange rate instability affected entries of foreign capital, ignoring the causal relationship between the exchange rate and FDI streams. Furthermore, these studies simply focused on exchange rate without considering a number of important variables that might have a big impact on FDI inflows to any country. Hasan and Salim (2017), Arawomo and Apanisile (2018), Aderemi et al. 2020, and Chukwudi et al. 2020, among several others, provide evidence for one crucial variable, such as market extent, while analyzing the variables that are capable of affecting FDI movements in Nigeria.

Also, the possible impacts of domestic currency rate variations on FDI flows into Nigeria are a subject of divergent opinions. A majority of research has shown a positive impact, but some have found the opposite. These studies include Ellahi (2011), Omorokunwa and Ikponmwosa (2014), Alobari et al (2016), Murtala (2017), and Mokuolu (2018). Above all, Harchaoui et al. (2005), referenced by Murtala (2017), noted that the volume of foreign investment may be impacted by currency fluctuations in two distinct ways. According to the study, the incremental profit from making an investment of capital (naira) is expected to increase as the local currency disparages since both local and foreign sales yield better returns. However, the rising variable costs and the increasing cost of imported capital cancel out this beneficial effect. Theoretical research does not clearly indicate which impact is more important. Thus, the empirical investigation on the overall influence of exchange rates movements on foreign capital inflows continues.

Even while these studies have significantly added to the body of knowledge in this field, their methodology is flawed, and they typically fail to demonstrate a causative relationship

between fdi and the currency value in Nigeria [See, for instance, Nwosa and Amassoma (2014), Odili (2015), Saidu, Nnanna, and Oko (2018), Rasaq (2013), Omorokunwa and Ikponmwosa (2014), Alobari et al. (2016), Murtala (2017), Osemene, Kolawole, and Olanpeleke (2017), Philip and Omolade (2017), Hasan and Salim (2017)]. Furthermore, most research on the exchange rate-FDI nexus has been equivocal, and it has occasionally failed to show a causal connection between ups and downs in the currency rate and FDI.

This study advances from others in that it tries to perform an exhaustive assessment of the link between the exchange rate and FDI inflows. Particularly, given the market size as measured by "GDP," this study seeks to determine "the amount, direction, and bidirectional causality among currency value and FDI in the Nigerian economy. The findings of the study will shed light on practical methods for retaining foreign investments in addition to highlighting the crucial importance of exchange rate variations in FDI influxes in Nigeria. Furthermore, knowing the direction of causality in both foreign capital inflows and currency rate is of relevance for policymakers designing policies to attract foreign capital as a blueprint for taking the initiative and appropriate policy development.

1.3 Research Questions

Following the backdrop and in accordance with the issue description above, this study is founded on the following essential questions:

i. What effect do exchange rate changes have on FDI?

ii. Is there a causal link between FDI and exchange rate fluctuations?

iii. What effect can the currency value have on the amount of FDI that enters the Nigerian economy?

1.4 Study's Objectives

The main objective of this study is to look at the dynamic and causal relationship between FDI and the exchange rate in Nigeria. The specific objectives are as follows:

i. Investigate the cause and effect link among exchange rate instability and FDI.

ii. Determine the relationship between changes in exchange rates and foreign direct investment given the size of the market (GDP).

iii. Determine the extent to which changes in the exchange rate have an influence on FDI inflows.

1.5 Rationale for the Study

This study is inspired by the fact that economic theory suggests that exchange rates have a substantial influence on FDI movements in Nigeria, but actual findings on the specific consequences is rather contentious. By taking into consideration past FDI numbers and explicitly providing evidence on the size at which exchange rate effect FDI inflows to the Nigerian economy, this study adds an important novelty to the literature that is significant not only to policymakers but also to academics. As a result, it can give helpful information to policymakers in order for them to implement suitable policies aimed at luring foreign investment into the Nigerian economy.

1.6 The Study's Scope

The study chooses Nigeria as a case study since the country has a high level of macroeconomic volatility. And the research spans the years 1986 to 2018. The year 1986

represents the beginning of the structural adjustment program era in Nigeria, and various distortions emerged as a result of its implementation. This time period was also chosen due to data availability and economic structural changes. This study will look at the following variables: FDI, Previous FDI, EXRT, and GDP.

1.7 Research Organization

There will be five sections towards this study. The research's background, problem description, objectives, justification, expected contribution, and scope of the study are all included in the introduction's first chapter. The second chapter is about the literature review, which includes a conceptual, literary, and empirical review. The third chapter discusses research methods, including model formulation, estimating methodologies, and data source description. The fourth chapter focuses on data analysis and interpretation in relation to the outcomes. Finally, in Chapter 5, you will find the summary, suggestions, conclusions, and references.

CHAPTER TWO

LITERATURE REVIEW

This section is structured into theoretical and empirical reviews of the Nigerian exchange rate, impact, and efficacy of FDI. The theoretical review examines pertinent ideas, assumptions, and propositions that guide the practical and theoretical relevance of the theories under consideration. The empirical review examines the research and conclusions of earlier publications by researchers on Foreign Direct Investment concerns.

2.1 Theoretical Literature

Since the 1970s, several economic theories concerning fluctuations in exchange rates and direct investment from overseas have been proposed and developed. Two Gap Model (Investment Theory), Dornbush Exchange Rate Overshooting Theory, Production Flexibility & Risk Aversion Arguments, and the Neo Classical Theory are among the theories. These models were examined in this study to ascertain how fdi and exchange rate variability are related.

2.1.1 Two Gaps Model (Investment Theory)

According to the theory, there are two gaps that must be closed in order for developing countries to develop: the disparity between domestic savings and the capital outlay required for take-off, as well as the difference between export earnings and the imports requisite for growth. This theory claimed that emerging countries should seek foreign investment to boost growth since they had insufficient savings. The concept of national income accounting contends that these gaps are not independent.

2.1.2 Theorem of Dornbush Overshooting of Exchange Rates

The "sticky-price monetary model," as it is commonly called, was developed by Dornbush in 1976. A straightforward macroeconomic framework for the investigation of exchange rate behaviour was produced by this theory. The Dornbush exchange rate overshooting hypothesis provides an expressive response to the significant observed exchange rate instability and proved that such volatility seems to be uniform with the evolution of rational expectation hypothesis. It also assumes that price levels would react to these discrepancies over time rather than immediately adjusting to short-term changes in equilibrium. Besides, the model included the assumption that price stickiness is compensated for by lags in economic time-series data, including rates of interest and exchange rates. In light of this, the sticky-price economic model allows for short-term spiking of nominal currency rates over their long-run equilibrium point (Dornbush, 1976).

2.1.3 Production Flexibility and Risk Aversion Arguments

Because firms can modify the use of one of several variable factors in response to nominal or real disturbances, proponents of production flexibility argue that exchange rate volatility stimulates foreign investment. This argument may not hold if variables were fixed since it is predicated on the idea that firms may modify variable elements. Because companies are unlikely to be able to modify parameters in the near term, risk-aversion arguments are more persuasive in the presence of short-term volatility. According to this theory, FDI decreases when exchange rate volatility increases because more volatility lowers the predicted exchange rate's certainty equivalent. Certainty equivalent levels are used in the projected profit functions of

businesses that make decisions about investments today in order to generate returns in future periods (Campa, 1993).

2.1.4 The Neoclassical Investment Theory

One of the fundamental characteristics of poorer nations, according to the neoclassical view, is that their labor and land resources are generally underused, and they have low savings rates. As a result, their capital's productive efficiency is expected to be higher than that of industrialized nations. This school of thinking contends that interdependence among nations benefited the least developed countries more than the developed ones. This viewpoint is predicated on the crucial premise that, in a steady state, money will flow from rich, established nations, to poor, emerging nations, where investment returns will be highest, finally transforming the latter's underdeveloped economies into advanced ones (Atsu, and Offiong,2014).

2.2 Empirical Review

Overall, FDI has several overall consequences on the host nation's economy, ranging from its influence on economic growth to the welfare of the host nation. Aside from commerce, one might argue that foreign direct investment (FDI) is a significant necessity for internationalization, but the variables which drive it, as well as the link between FDI and those factors have been a major topic of debate among researchers. In other words, there is controversy over the variables that affect FDI inflows. While some research may concentrate on institutional and socio-political causes, others will argue in favor of economic issues.

Edo (2011) made the notion that institutional instability, extreme levels of corruption, insecurity, and macroeconomic instability prevent FDI from entering a country. By analyzing how institutional quality affected FDI flows into Nigeria from 1980 to 2011, Ntim and Emilia (2014) provided more evidence in support of their position. To investigate the connection between various macroeconomic factors, the Vector Error Correcting Model (VECM) is used.According to the findings of the empirical investigation, political stability and corruption have a significant role in determining FDI inflows to Nigeria. Human capital and economic openness are further important factors. For Nigeria to draw in any significant international investment, the research advises upgrading its political and economic institutions.

In a similar vein, Soumyananda (2014) looks at what factors influenced foreign direct investment into Nigeria between 1970 and 2006. According to the findings of this study, market size is not a crucial factor in luring long-term foreign investment to Nigeria. According to the findings, the majority of FDI to Nigeria is resource-seeking. Results also point to considerable influences on Nigeria's natural resource draining from trading partners like the UK and China. Foreign direct investment (FDI) and insecurity were shown to be negatively correlated by Owolabi and Ayenakin (2015) when they looked at how insecurity influenced FDI in Nigeria. There is, however, no appropriate or reliable alternative for institutional instability and security.

Additionally, a 2019 research by Ekine, Dennis, and Charity studied the impact of foreign investment somewhat on performance of the Nigerian economic growth. According to the study's results, there is a strong association between the performance of the Nigerian economy and the inflow of foreign direct investment, which is statistically significant at the 5% level. Also it indicates that somehow a healthy economy is heavily dependent on the inflow of these crucial factors. Some scholars, on the other hand, are fascinated by economic factors like GDP market

size, interest rates, inflation, currency rates and their volatility, and market size. With a strong focus on exchange rate, this research is in some ways grounded on the later set of scholars. Arawomo and Apanisile (2018) looked into the strategic drivers of FDI in the Nigerian communications industry while examining determinants of FDI in Nigeria. The Central Bank of Nigeria's Statistical Report served as the source for Flow of FDI into the telecom sector, interest rate, foreign currency rate, and inflation. Graphs, the t-test, and the Autoregressive Distributed Lag were used to analyse the data (ARDL). The study comes to the conclusion that market size, trade openness, government spending, inflation, and interest rate are the major factors influencing Flow of fdi into the Nigerian telecom sector. Moreover, Aderemi et al. (2020) found that the historical Foreign investment, market size, exchange rate, and gdp growth have become the main drivers of Foreign investment inflows to Nigeria and that these macroeconomic factors have a positive and significant impact on FDI inflows in Nigeria [see also Emmanuel and Sulieman, (2020)].

FDI and fluctuating currency rates

The stability of the currency value appears to be a key concern for investors when deciding whether to make an international investment. The literature on exchange rate instability and foreign investment in Nigeria tends to concentrate on two key issues: the relationship between FDI and Fluctuating exchange rate level and the implications of this instability on FDI. The existence of a significant influence of exchange rate on FDI has been supported by a large body of empirical data.

Omankhanlen (2011) utilised time series data that spans the period 1980-2009 to examine the effects of FDI on the Nigerian economy and the role that exchange rate and inflation play in enticing FDI in a paper on the link between inflation and foreign direct investment (FDI). The results showed that FDI had a clinically negligible positive influence on GDP, demonstrating that the FDI influx during the covered period had little impact on the economy's expansion. The findings also indicated that, even though inflation did not significantly affect FDI inflow over the time period studied, foreign currency rates did significantly influence FDI influx. Nwosa and Amassoma (2014) also looked at how the exchange rate and capital inflows (foreign direct investment and foreign portfolio investment) related to one another throughout the 1986–2011 period in the Nigerian economy. Both the Granger causality and the Error Correction Modeling (ECM) techniques were used in the investigation. The causality estimations showed that there was no significant correlation between the exchange rate and capital inflows (foreign direct investment and foreign portfolio investment) over this time. According to a long-term regression study, foreign direct investment had a negative influence on exchange rates, but portfolio investments had a positive effect. The fact that the short-term result was the same as the causation finding shows that neither foreign direct investment nor foreign portfolio investment had a significant impact on the exchange rate. The study came to the conclusion that there is a long-term link between FDI and the currency level in Nigeria.

In a referenced report, Osemene, Kolawole, and Olanpeleke (2017) focused in particular on the importance of macroeconomic indicators within Nigeria as FDI drivers as well as the causal link involving Fdi and gdp within the country. Using time series annual data that was gathered from 1984 to 2015, the study employed a VECM model and a co-integration test to account for anomalies. The study found that while foreign direct investment is negatively

connected with output growth, export, inflation, and interest rates, it is positively correlated with import and currency value. In predicting FDI in Nigeria, each of these variables was statistically significant. The study argued that FDI contributes to the expansion of the Nigerian economy. Thus, it is advised that the government of Nigeria foster import liberalization by lowering tariffs; cut back on the importation of consumer and intermediate products; and incentivize local firms to create such commodities.

A study with regards to the influence of FDI on GDP and the influence of currency rate on foreign investment in Nigeria was undertaken by Alobari et al. (2016) to learn more. Using a descriptive study of the exchange rate and FDI, data from the CBN Statistical Bulletin was used. According to the study's findings, Nigeria has only recently received a small amount of FDI and which has therefore lost a significant portion of those few investors. However, FDI brings with it good, progressive resources that are to be sought. The findings also revealed that a significant correlation exists between FDI, the currency value, and economic growth in Nigeria, and they thus provided advice for local businesses, the government, and other important players.

In light of this, Murtala (2017) sets out to investigate the relationship between the currency rate and FDI, as well as any potential effects of FDI on the GDP in Nigeria from 1990 to 2015. The results of the regression analysis show that there is a strong positive link between FDI and the exchange rate in Nigeria and a slightly positive association between FDI and GDP. The data also demonstrates that FDI rose dramatically between 2005 and 2014 as a result of a rise in exchange rates throughout that time. According to the study, there is a positive relationship between the exchange rate, FDI, and GDP. According to the report, in order to increase FDI and boost GDP, Nigeria's government should fully liberalize its exchange rate system and do away with set multiple exchange rates.

FDI and its relationship with economic growth in the Nigerian economy are the main subjects of Mokuolu's (2018) investigation into the effects of exchange rates and interest rates. The yearly time series data for a period spanning 48 years were analyzed using the Autoregressive Distributed Lag model build (ARDL) method. The findings indicated a strong positive correlation between FDI inflows and the GDP-based economic growth indicator. The macroeconomic variables that were employed in the study followed the pattern that was anticipated. If the interest rate is moving in the opposite direction from what is anticipated, FDI Nigeria will still occur. This is implied by the interest rate's negative sign. The outcome of the nation's a priori posited positive exchange rate condition was proven to be as expected. The study's conclusion is that regardless of how we see FDI, it is still important for the economic growth of developing nations, and it is advised that positive action be done in light of the findings.

Impact of exchange rate volatility on FDI

Different types of analysis have been employed to determine the influence of exchange rate volatility on foreign direct investment. Due to the lack of a clear consensus, the impact of exchange rate instability becomes increasingly debatable. Osinubi and Amaghionyeodiwe (2009) used a standard deviation model to analyze the impact of exchange rate volatility on FDI in Nigeria in an effort to determine how exchange rate volatility affects the entry of FDI to the Nigerian economy. The study did this by using both the OLS technique of estimate and the error correction model and the findings indicate, among other things, that foreign investors need not worry excessively about exchange rate volatility. The analysis also reveals that actual inward

FDI and exchange rate have a sizable positive association. This suggests that the Naira's devaluation enhances actual inbound FDI. Furthermore, the results show that the structural adjustment program (instituted in Nigeria in 1986) had a detrimental effect on real inward FDI, which may have been caused by the deregulation that was followed by exchange rate volatility.

By utilizing the Granger Causality test, the Ordinary Least Square (OLS), and the Correlation Matrix, Rasaq (2013) examines the impact of exchange rate volatility on important macroeconomic indicators. The study's conclusions showed that, although having a negative impact on the nation's inflation rate, exchange rate volatility had a beneficial impact on the gross domestic product, foreign direct investment, and trade openness. Therefore, it was advised that in order to improve its terms of trade, the country needed to expand its exports and decrease its over-dependence on the oil industry in order to enhance its revenue. Additionally, an increase in local manufacturing will lessen the issue brought on by exchange rate volatility. Similarly, Alaba (2003) used the GARCH measure of volatility and the error correction approach in an effort to investigate the impact of currency rate variation on foreign direct investment (FDI) in SSA nations. According to his study's findings, market exchange rate volatility has no appreciable impact on FDI inflows in either the industrial or agriculture sectors.

Omorokunwa and Ikponmwosa (2014) performed research on the dynamic relationship between currency rate volatility and foreign private investment in Nigeria from 1980 to 2011. The Augmented Dickey Fuller (ADF) test was used to determine stationarity, the Error Correction Model (ECM) was utilized to analyze the data and the Engle and Granger two-step method was used to do the co-integration technique. The study's findings, among other things, demonstrate that exchange rate volatility has relatively little impact on the flow of foreign direct investment (FDI) into Nigeria, both in the long run and in the short term. The findings also

showed that, in the near term, currency rate volatility has a minimal impact on foreign portfolio investments, but also that, in the long term, it has a substantial beneficial impact. Accordingly, the paper made the case that, among other things, policymakers needed to create a reliable mechanism for managing the country's currency rates.

Odili (2015) used time series data that encompassed the years 1980 to 2013 to examine the impact of stock market performance and exchange rate volatility on the inflow of foreign direct investment into Nigeria. In order to adjust for errors, the study's estimations used the ordinary least square method. The study's findings demonstrated that exchange rate volatility has both a long-term and short-term negative and considerable impact on the flow of foreign direct investment into Nigeria. According to reports, Nigeria would undoubtedly draw direct foreign investment if its capital market is strong and stable. In order to improve domestic production of export goods, the research recommends the implementation of appropriate exchange rate management systems and regulations.

Moreover, Saidu, Nnanna, and Oko (2018) looked at the effect of real exchange rate variation and its volatility on FDI inflows into Nigeria between the years of 1970 and 2014. The study employed the GARCH (1, 1) formula to calculate the degree of volatility, and the ARDL model to calculate the pertinent findings. The findings showed that the effects of currency rates and exchange rate volatility are more of a short-term occurrence; whereas devaluation would promote the inflow of FDI, volatility makes foreign investors more wary with rising levels of uncertainty. Therefore, a higher level of uncertainty may discourage foreign direct investment (FDI) from entering the nation.

2.3 Summary of Gap in the Literature

Based on a review of previous studies in the literature, it is clear that a number of authors, including Soumyananda (2014), Ntim and Emilia (2014), Osemene, Kolawole and Olanpeleke (2017), Philip and Omolade (2017), Arawomo and Apanisile (2018), Emmanuel and Sulieman (2020), and Aderemi et al. (2020), have focused primarily on the key factors influencing foreign direct investments in Nigeria Rasaq (2013), Alaba (2013), Omorokunwa and Ikponmwosa (2014), Nwosa and Amassoma (2014), Odili (2015), Alobari et al. (2016), Murtala (2017), Mokuolu (2018), and Saidu, Nnanna, and Oko (2013) are studies on the relationship between exchange rate, exchange rate level, and volatility (2018). Additionally, these studies have made a significant contribution to the treatment of topics relating to the overall importance and influence of foreign direct investments on the macroeconomic performance in Nigeria.

However, the empirical literature assessment suggests that research on FDI inflows and exchange rate level/volatility in Nigeria is still underway, and data from the literature actually produced a range of conclusions. The relevance of this study is due to the fact that the literature on the topic of the impact of exchange rate volatility on FDI is inconsistent, with some studies finding a positive impact, other studies showing no impact, and others finding a negative one.

CHAPTER THREE

METHODOLOGY

The research techniques used to verify the accuracy of this empirical study will be covered in this chapter. The theoretical framework, model specifications, analytical techniques, definition and measurement of variables, and data sources are the first of the chapter's five sections.

3.1 Theoretical Framework

To explain the role and significance of FDI on the expansion and development of a nation, many schools of thought have developed theories. The study uses the Two-gap Model method, a Harrod-Domar growth model extension, as the basis for its empirical analysis of the dynamic relationship between the exchange rate and FDI inflows in Nigeria. The Two-gap method was chosen because of its assessments of the need for foreign direct investment to close the savings-investment gap and the export revenue and import revenue gap that exist in third-world countries, of which Nigeria is one. The usefulness of this strategy is based on the notion that these two gaps restrict the economic progress of emerging nations.

According to the two-gap approach to economic development, the ability of developing countries to achieve a goal rate of growth is hindered by both the savings gap and the foreign exchange gap. The nature of national income accounting processes dictates that the investment-savings gap ($I - S$) and the export-import gap ($X - M$) are identical. It is widely known that balance of payments (BOP) deficits would always emerge if a country invests more

than it saves. In a similar vein, a surplus of imports compared to exports indicates that an economy is consuming a lot more wealth than it is producing. In order to reach the desired growth rate in the economy, Chenery & Strout (1956) claim that foreign investment is a solution to close these two gaps.

A savings gap will develop when domestic savings are lower than the amount of investment needed to meet the growth objective, according to Chenery & Bruno (1962) and Chenery & Adelman (1966), in particular. By using foreign investment to fill the savings gap, the economy may grow at the desired rate. This leads to the hypothesis that the connection between the desired foreign currency requirements and net export income is constant. A foreign exchange gap arises if net export revenues fall short of necessary foreign exchange, which can potentially be addressed by foreign investment.

As a result, using the aggregate spending method, the two gaps are represented in terms of the national income accounting (NIA) identities as follows.

$$E - Y \equiv I - S \equiv X - M \equiv F \qquad (1)$$

Where the term “E” is national expenditure, “Y” is national output and income, I is investment, “S” is saving, “X” is exports, M represents imports and “F” represents net capital inflow. As a result, when total spending, "E," exceeds total production, "Y," the economy needs an injection of foreign capital, "F," to make up the difference in income. However, the shortfall would result from domestic savings being lower than the necessary investment, which is a savings gap($I - S$), and from foreign exchange being more necessary for import than net revenues from export, which is a foreign exchange gap($X - M$). However, the dominating deficit at a given moment determines the amount of foreign aid needed to make up the shortfall. A savings restriction is considered to exist in the economy if the savings gap is greater than the foreign exchange deficit.

On the other side, the economy has a foreign exchange constraint if the foreign exchange deficit is greater than the savings gap. Since each of these gaps is unique and unrelated to the others, a distinct amount of foreign investment would be necessary for each gap to be filled. Basically, the savings and foreign exchange gaps might be closed if local investors had access to international financial markets by funding domestic (excess) investments with savings from high-income countries, or by an infusion of capital. According to Bender and Lwenstein (2005), the capital inflow might come in the form of official development assistance, foreign direct investment, foreign portfolio investment, and FDI infusions.

Thus, it follows that

$$I - S = F \qquad (2)$$

and

$$X - M = F \qquad (3)$$

Equations (2) and (3), like (1), express that the gap in each of savings gap and foreign exchange gap is equal to Foreign Investment.

As such, if FDI is the aid required for savings gap, then it holds that; $F = FDI$

3.2 Model Specification

The following model, which is consistent with the Two-Gap postulation and is based on the theoretical framework thusly described above, will allow us to capture the dynamic nexus and influence of exchange rate on foreign direct investment in Nigeria: $FDI = F(EXR, GDP_t)$

The mathematical form of the model is expressed as follow

$$FDI_t = \beta_0 + \beta_1 EXR + \beta_2 GDP_t + \beta_3 GDP_{t-1}$$

This model includes the variable "GDP" to account for the size of the market. Thus, the model is stated in its econometric form by adding the stochastic error factor to equation (2);

$$FDI_t = \beta_0 + \beta_1 EXR + \beta_2 GDP_t + \beta_3 GDP_{t-1} + \mu \quad \text{----------} \quad 3$$

It is crucial that we convert equation 2 above into its logarithmic version before moving on. The linearization of the non-linear variables is aided by the logarithmic transformation of the choice variables, which also ensures that all the variables are in rates, allowing us to compute elasticity. Thus, the equation is as follows:

$$\ln FDI_t = \beta_0 + \beta_1 EXR + \beta_2 \ln GDP + \beta_3 \ln GDP_{t-1} + \mu \quad \text{----------} \quad 4$$

Where; LNFDI_t = Log of FDI at present

EXR = Exchange rate

LN GDP_t = Log of GDP at present

LNGDP = Log of Past GDP Figures

β_0 = Constant coefficient

The coefficient parameters that need to be calculated are $\beta_1, \beta_2, \beta_3,$ and β_4, respectively, which also stand in for the elasticity of the exchange rate, the national income, and previous GDP levels.

μ = stochastic error term

The a priori expectation of the signs of the coefficients is given as;

$\beta 0$, β_1> or <0, β_2>0, β_3>0, β_4> 0

Economic theories are equivocal on the precise impact of currency rates on foreign inflows, hence a link between FDI and exchange rates is anticipated to be unclear, however a relationship between FDI and GDP, previous FDI numbers, and past GDP figures is anticipated to be positive.

3.3 Analytical Methods

Unit Root Test 3.3.1

The Augmented Dicker-Fuller (ADF) unit root test, which was extensively explored in Dickey and Fuller, is the stationery test used in this work (1979). This test looks at the time series data used in this study's time series for stationarity. A regression of the initial difference in the series against lagged series, lagged difference terms, and, if desired, a constant and a temporal trend are some of the processes involved. This may be said in the following way:

$$\Delta Y_t = \beta_t + \beta Y_{t-1} + \sum_{i=1}^{p-1} \alpha_i \Delta Y_{t-i} + \mu_t,\ t = 1, \ldots\ldots\ldots, T$$

Where Yt is the endogenous variable, the term Δ is a difference operator, the term βt is a deterministic term, which may consist of the constant, drift, and trend, β and αi are the respective coefficients of Yt-1 and ΔYt-i, while P is the number of lags and the difference terms, ΔYt-i is added to remove serial correlation in the residual term ut.

Granger Causality 3.3.2

The Granger causality test is used to estimate the causal link between FDI and exchange rate changes. Granger (1969) created a test to determine whether or not adding historical data to a variable X makes it easier to predict future values of variable Y. If incorporating previous values of X improves the prediction of Y in comparison to utilizing only past values of Y, then X is said to Granger-cause Y. In the same rationale, Y is said to Granger-cause X if the previous values of Y enhance the prediction of X in comparison to utilizing simply the past values of X. A feedback connection occurs if both X and Y are discovered to be Granger-causes of each other.

Assuming a certain autoregressive lag length p, the following strategy is used to apply the Granger test:

$$\ln FDI_t = \sum_{i=1}^{\infty} \alpha_i \ln GDP_{t-1} + \sum_{t=1}^{\infty} \beta_i \ln EXR_{t-1} + \epsilon_t$$

$$\ln EXR_t = \sum_{i=1}^{\infty} \tau_i \ln EXR_{t-1} + \sum_{t=1}^{\infty} \vartheta_i \ln GDP_{t-1} + \varphi_t$$

When one variable's coefficient does not equal zero in one equation while the other variable's coefficient is zero in the complementary equation, Granger causality is present. For instance, $\beta i \neq 0$ and $\vartheta i = 0$ for all I, then there is Granger causality from economic growth to imports.

3.3.3 Cointegration Testing Using ARDL Approach

The model is estimated using Pesaran et al. (2001) distributed lag (ARDL) technique to cointegration in order to look at the dynamic and long-term relationships between the variables (2001). With this method, it is possible to estimate an equation's short-run and long-run coefficients. The short run dynamics are not limited by the long run equilibrium relationship since the coefficients of this technique are unrestricted. In comparison to other cointegration techniques (such the completely modified OLS, dynamic OLS, and Johansen, 1988), the ARDL approach has the benefit of performing better in small samples (Pesaran & Shin, 1999). The approach's ability to deal with integrated variables of order zero (I (0)), integrated variables of order one (I (1)), or a mixture of I(0) and I(1) is another advantage it has over other approaches (Pesaran & Shin, 1999). Methods for cointegration, such as those developed by Engle and Granger (1987), Johansen (1988), and Stock and Watson (1988), focus on situations in which the underlying variables are only integrated of order one (I (1)) (Pesaran, Shin & Smith, 2001).

The ARDL approach is helpful because it uses the lags as instruments to adjust for endogenous variable issues and residual serial correlation.

Equation 3's ARDL framework is as follows:

$$\Delta \ln FDI_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta \ln GDP_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta \ln EXR_{t-i} + \beta_1 \ln EXR_{t-i} + \beta_3 \ln FDI_{t-1} + \mu_t \quad (5)$$

The first step in the ARDL model testing technique is to do the bound test for the null hypothesis that there is no cointegration; H0 = β1= β2 = β3= β4= β5= β6= 0 versus the alternative hypothesis that there is cointegration; H1 ≠ β1≠β2≠β3≠β4≠ β5≠β6≠0 using an F-test. Narayan (2004) reports two sets of critical values: the upper critical limit that assumes all series are I(1) and the lower critical bound values that assume all series are I (0). Without taking into account the underlying regressors' order of integration, a conclusion can be drawn if the estimated F-statistic exceeds the critical bound.

3.3.4 Long Run and Short Run Effects (ECM)

The conditional ARDL (p, q1, q2, q3) model for FDI is as follows after establishing the long-run connection.

$$\ln FDI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \ln EXR_{t-i} + \sum_{i=1}^{q1} \alpha_{2i} \ln GDP_{t-i} + \sum_{i=1}^{q2} \alpha_{4i} \ln FDI_{t-i} ++ \mu_t \quad (6)$$

The ADRL technique determines the ideal lag duration for each variable by applying model selection criteria such as the Schwartz-Bayesian Criteria (SBC) and the Akaike's Information Criteria (AIC). While AIC is renowned for choosing the longest relevant lag length, SBC is regarded as the parsimonious model and chooses the shortest feasible lag length.

An error correction representation exists when variables have long-term relationships with one another. In order to estimate the error correction model, the last step is required. The outcome of the error correction model demonstrates how quickly the long-run equilibrium is restored following a short-term shock. The series is stated as having the following ECM representation:

$$\Delta \ln FDI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta \ln EXR_{t-i} + \sum_{i=1}^{q1} \alpha_{2i} \Delta \ln GDP_{t-i} ++ \sum_{i=1}^{q2} \alpha_{4i} \Delta \ln FDI_{t-i} + \gamma ECM_{t-1} + \mu_t \quad (7)$$

where term "γ" denotes the adjustment speed parameter and ECM stands for error correction term. To further support the notion that a long-term (cointegrated) link exists, the coefficient "γ" is anticipated to be adverse and statistically significant.

The diagnostic and stability tests are carried out to ascertain the quality of fit of the ARDL model. A model's serial correlation, normalcy, and heteroscedasticity are all examined using the diagnostic tests. Utilizing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals, the structural stability test is performed (CUSUMSQ).

3.4 Estimation Procedure

To estimate the model's parameters, this study uses the Autoregressive Distributed Lag (ARDL) method. The advantages of this method above alternative approaches, which were emphasized in the preceding section, led to its selection. Since the ARDL approach can handle both I(0) and I(1) variables, prior diagnostic tests for unit root or order of integration are not necessary; nonetheless, it is still crucial to make sure that all the variables are stationary and that none of them are stationary at the second difference (i.e., I(2)). In order to confirm that all of the variables are stationary, the unit root test was performed. The direction of causation between the

variables in the model will be established using the pair-wise Granger causality test. The author will then proceed to test for cointegrating relationships between the variables using the bound test technique as stated in the preceding section after determining the order of integration of the variables. In order to analyze the long run and short dynamics among the variables as well as the error correction term, the long run and cointegrating form of the models (i.e. equations 6 and 7) will be estimated once the presence of cointegration among the variables has been verified. In order to assess the model's goodness of fit, confirm that the residuals are serially uncorrelated, homoskedastic, and normally distributed, and verify that the explanatory variables are structurally stable, post diagnostic tests will also be carried out. The model will be estimated, and the results will be evaluated, using the econometrics software program E-views-10.

3.5 Definition and Measurement of Variables

Direct foreign investment (FDI): It refers to an investment made by a firm or person in one nation in commercial interests in another country, either through the establishment of business activities there or the purchase of assets there, such as ownership or control of a foreign corporation.

Gross Domestic Product (GDP) is a term that may be used to refer to both the nation's current output of finished products and services as well as domestic production inside a country within a certain time period, often a quarter or a year. GDP and GNP are equivalent terms. The two metrics, however, are not equivalent in any real economies.

Exchange rate: This is the cost to exchange one national currency for another. It is also viewed as the exchange value of one currency for another.

CHAPTER FOUR

PRESENTATION OF RESULT AND INTERPRETATION

The presentation of the findings of the empirical analysis of the model used in this study and its interpretation are the main topics of this chapter. The descriptive statistics of the chosen variables are analyzed first, then the variables are correlated. Thus, section 4 presents the results of the unit root test. Upon ascertaining the variables' order of integration, the Johansen cointegration test was done to see if there was a long-term link between the variables. Section 5 presents the cointegration test's outcome and interpretation. The Engle-Granger Pair-wise Causality Test technique is used next to investigate the direction of causality between the regressed and the regressor(s) in the model, all of which is covered in section 6 of the chapter. The estimate of the Error Correction Model used for the study is outlined in Chapter 3, and the results are then interpreted.

4.1 Descriptive Statistics

We start the analysis of the data by giving the descriptive statistics for the various variables employed in the study in order to investigate the dynamic nexus and influence of exchange rate on foreign direct investment in Nigeria. We may examine the time series data's statistical characteristics using descriptive statistics, and we can quickly determine whether its probability distribution is normal by doing so. In the table 4.1 below, the variables' descriptive statistics are presented.

	EXTR	FDI_t	FDI_{t-1}	RGDP
Mean	101.8484	2.83E+09	2.84E+09	2.66E+11
Median	118.5667	1.87E+09	1.87E+09	2.17E+11
Maximum	306.0837	8.84E+09	8.84E+09	4.92E+11
Minimum	1.754523	1.93E+08	1.93E+08	1.20E+11
Std. Dev.	85.97696	2.69E+09	2.68E+09	1.31E+11
Skewness	0.662245	0.942228	0.947036	0.589990
Kurtosis	2.903119	2.584625	2.593002	1.802940
Jarque-Bera	2.425031	5.120098	5.160592	3.884797
Probability	0.0297448	0.044301	0.023752	0.014336
Sum	3360.998	9.35E+10	5.160592	3.884797
Sum Sq. Dev.	236545.2	2.32E+20	0.075752	0.143360

Observations	33	33	33	33

Source: Author's Computation (2021)

Table 1 above illustrates the real GDP's mean value of $266 billion and standard deviation of $131 billion. Over the research period, it had values as low as $120 billion and as high as $492 billion. Foreign direct investment (FDI) was found to have a mean value of $2,840 billion, a standard deviation of $2,680 billion, a minimum value of $1,930 billion, and a high value of $8,840 billion. The average USD exchange rate over the years has been 101.8484/$. Additionally, its value per US$1 fluctuates between #1.754523 and #306.0837. GDP, EXTR, and FDI appear to have a normal distribution at the 5% level of significance according to the Jarque Bera statistic and its p-value.

4.2 Correlation Matrix

The correlation matrix is used to illustrate the kind and strength of the relationship between the dependent variable and the model's explanatory factors. Additionally, it provides a rapid approach to determine whether the variables are multi-colinear. According to Gujarati, Porte, and Gunasekar (2012), multicollinearity is an issue if the correlation coefficient between two variables is more than 0.8. Multicollienearity is a statistical phenomenon that happens when two or more independent variables within a given model are proven to exhibit a high degree of correlation with one another. In this case, modifying the model or the data may result in sporadic variations in the estimated coefficients of the variables. Table 4.2 below displays the correlation matrix's outcome.

	FDI_t	EXTR	FDI_{t-1}	R_GDP
FDI_t	1.000000	0.674020	0.814405	0.804190
EXTR_	0.674020	1.000000	0.460216	0.906641
FDI_{t-1}	0.814405	0.460216	1.000000	0.625169
R_GDP	0.804190	0.906641	0.625169	1.000000

Source: Author's Computation (2021)

According to the correlation matrix in table 4.2 above, real GDP and exchange rates are positively and significantly correlated with foreign direct investment. As a result of the variables' low degree of correlation—less than 90%—the matrix also shows that there is no indication of multicolinearity among them. This has the consequence that the calculated model coefficients are accurate enough to draw valid conclusions.

Table 4.2 Unit Root Test (ADF) Result

VARIABLES	**ADF Statistic**		**LAG**	**REMARK**
	LEVEL	**1ST DIFFERENCE**		
LNRGDP	2.763134	-2.126855**	1	I(1)
LNEXRT	1.874678	-4.984841**	0	I(1)
$LNFDI_t$	0.250481	-3.006818**	0	I(1)
$LNFDI_{t-1}$	-1.423177	-6.180049**	0	I(1)

Source: Author's computation (2021), using E-views 10.0

Note: ** denotes rejection of null hypothesis of unit root at 5% level of significance.

The lags are selected automatically based on the optimal lag length selection of the SIC criteria.

According to table 4.3 above, which shows the results of the stationarity test on the variables using the Augmented Dickey-Fuller test technique, none of the variables in the model are stationary at level. However, following the first difference, they all become stationary. This indicates that all of the model's variables are stationary variables. We next carry out the cointegration test to look at the long-term relationship between the variables in the model since all the variables are stationary and have the same order of integration, which is a condition for completing the Johansen cointegration test.

4.3 Johansen Cointegration Test

As previously stated, it is crucial to examine if there is a long-term equilibrium connection between the variables. This study employs the Johansen unrestricted co-integration test. When the variables co-integrate, it shows that the variables have a long-term association. Table 4.4 below presents the cointegration test's results.

Table 4.3 Johansen Cointegration Test Result

No. of CEs	Trace Stat	Critical Value	Prob**	No. of CEs	Max Eigen	Critical Value	Prob**
None *	63.19038	47.85613	0.0010	None *	36.43410	27.58434	0.0028
At most 1	26.75628	29.79707	0.1077	At most 1	15.37127	21.13162	0.2637
At most 2	11.38501	15.49471	0.1889	At most 2	10.14386	14.26460	0.2027
At most 3	1.241145	3.841466	0.2652	At most 3	1.241145	3.841466	0.2652

Source: Author's computation, (2021) using E-views 10.0

Trace and Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

*** denotes rejection of the hypothesis at the 0.05 level**

****MacKinnon-Haug-Michelis (1999) p-values**

The long-term convergence of the variables is shown in table 4.3 above, demonstrating the presence of a long-term link between the variables. The Trace test statistics and the Max Eigen value indicate that the long-term association exists at a 5% level of significance. A long-term link between the variables is thus proven since they are co-integrated. The investigation may now move on to estimate the Error Correction model.

4.4 Granger Causality Test

To ascertain the direction of effect and causation between the variables in the model, Granger causality tests are performed. In Table 4.4 below, the findings on the presence of Granger causal links between the variables are summarized.

Table 4.4 Granger Causality Test Result

Null Hypothesis	F-stat	Prob.	Decision
LNFDI does not Granger Cause LNGDP	4.00014	0.0306	Reject
LNGDP does not Granger Cause LNFDI	2.37346	0.1130	Accept
LNEXRT does not Granger Cause LNFDI	1.59466	0.2222	Accept
LNFDI does not Granger Cause LNEXRT	0.16224	0.8511	Accept
LNEXRT does not Granger Cause LNGDP	2.92715	0.0714	Accept
LNGDP does not Granger Cause LNEXTR	2.80671	0.0788	Accept
FDI_101 does not Granger Cause FDI_1	16.5756	2.E-05	Accept

FDI_1 does not Granger Cause FDI_101	0.25999	0.7730	Accept

Source: Author's computation, (2021) using E-views 10.0

No. of observations (31)

Table 4.4 above demonstrates that for all the pairings of variables, the null hypothesis of no granger causality cannot be rejected at a 5% level of significance since the probability value is greater than 0.05. Therefore, we agree with the null hypothesis that there is no causal relationship between the majority of variable pairs. This leads to the conclusion that the model's FDI and its determinants do not have a causal relationship. However, it has been found that the relationship between GDP and foreign direct investment is unidirectional, with the direction of causality running from FDI to real GDP.

4.5 Estimation of the Error Correction Model

Since the results of the cointegration test conducted earlier demonstrate the presence of a long run connection between the variables, we will now estimate the ECM equation described in the previous chapter to determine short run equilibrium and the speed of adjustment in the event of a shock. We only include one difference in the error correction model as the variables are only integrated to order one. The model's ability to quickly attain equilibrium after an external shock is demonstrated by the error correction term. It should be negative, indicating a return to equilibrium; positive, indicating a deviation from equilibrium. The coefficient should be in the range of 0 and 1, with 0 denoting no adjustment one period later and 1 denoting complete adjustment within one period. The residual from the long run model is used to create the error correction term in the ECM (ECT). As a result, the error correction term will be important if co-integration exists. Table 4.5 below presents the outcomes.

Table 4.5 Error Correction Model Result

Dependent Variable: DLNGDP				
Method: Least Squares				
Sample (adjusted): 1986 – 2018				
Included observations (after adjustment): 30				
Variable	**Coefficient**	**Std. error**	**T-stat**	**Prob.**
D(EXTR_)	-18724979	6216153.	-3.012310	0.0056
D(EXTR_(-1))	-29389457	0.468640	-1.83E+08	0.002717
D(EXTR_(-2))	-40028064	0.299452	-1.28E+08	-0.003013
D(R_GDP)	0.036339	0.011293	3.217752	0.0033
D(R_GDP(-1))	-0.053066	0.024512	-2.164886	0.0427
D(R_GDP(-2))	-0.017163	0.021473	-0.799294	0.4335
D(LNFDI_101)	31755533	2.74E+08	5.512895	0.0000
LNFDI_101(-1)	1.00E+09	3.79E+08	2.651637	0.0153
LNFDI_101(-2)	-4.09E+17	3.56E+17	-1.147432	0.2671
CointEq(-1)	-0.463445	0.152024	3.048497	0.0063
Model Criteria/Goodness of Fit				
R-squared	0.726460			
Adj. R-squared	0.603367			
F-statistic	5.901711			0.000474
DW	2.081761			
Residual Diagnostics				
Serial Correlation LM test (χ^2)	0.329640			0.7234
Heteroskedasticity Test (χ^2)	1.065499			0.4411
Jarque-Bera Stat.	0.293445			0.863533
Jarque-Bera Stat.	0.29			0.8635

Source: Researcher's computations (2021)

4.5.1 Discussion of result

According to the estimation of the error correction model shown in table 4.5 above, the coefficient of the error correction term is reported to be negative and statistically significant at the 1% level. This proves that there is a long-term link between the variables. The lagged error correction term's coefficient is -0.46, which suggests that 46% of the disequilibrium caused by the shock from the previous year returns to the long run equilibrium in the current year. The study performed by Alobari et al. in 2016 and 2017 as well as by Murtala and Mokuolu supports this finding (2018).

The short run impacts are shown by the coefficients of the changes of the independent variables in the ECM findings. Foreign direct investment is significantly influenced in the short run by the real GDP, exchange rate, and historical FDI figures. The currency rate, which is one of the factors that affect foreign direct investment, has an interesting elasticity of -18724979, meaning that for every dollar that the exchange rate increases, there would be an 18,724,979 loss in FDI. Real GDP makes a favorable and considerable contribution to FDI in Nigeria's economy. According to the coefficient, an increase in GDP of 1% will result in an increase in FDI into the nation of 3.6%. This supports the results of Chukwudi et al (2020), who suggested that the size of the market (as measured by real GDP) is important in attracting foreign investment into the nation.

To assess the overall quality of the model, the R2 value is 0.73, indicating that the independent variables explain approximately 73% of the variance in the dependent variable, while the remaining 27% is explained by factors outside the model. The F-stat (5.9) with a significant p-value of 0.000474 indicates that the data fit well and that all explanatory factors

have a substantial influence on FDI in Nigeria when taken together. The Dubin-Watson statistic is 2.08, which is slightly higher than 2, indicating that there is no serial correlation in the model.

4.5.2 Diagnostic Test

1. Autocorrelation Test

The goal here is to see if there is any serial correlation in our model. In a model, there is a serial correlation if the consecutive values of the random variable (t) are dependent on each other. The Breusch-Godfrey Serial Correlation LM Test will be used in this investigation to test for serial correlation. The test results reveal that the prob (X2) for the model is 0.7234, which is more than 0.05. As a result, we accept the null hypothesis that there is no serial autocorrelation in the random variables at 5% significance level and conclude that there is no serial autocorrelation in the model.

2. Test for Heteroskedasticity

We also look for heteroskedasticity to see if the error term has a consistent variance. That is if it follows X^2cal distribution.

The hypothesis is:

H_0**:** $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ (Homoskedasticity)

H_1**:** $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$ (Heteroskedasticity)

The Breusch-Pagan-Godfrey test was used for this. The test results show that the probability of the (X2) for the model is 0.4411. Because this number is larger than 0.05, we can reject the null

hypothesis that there is no heteroskedasticity in the variance of the error term at the 5% level of significance and conclude that the variance of the error term is homoscedastic; the variance of the error term is constant.

3. Normality Test

Finally, the normality test is carried out to check whether the model residuals are regularly distributed. The X2 distribution with two degrees of freedom is used for the normality test using the Jarque-Bera criteria. The analysis's findings indicate that the model's JB statistic has a value of 0.29 and a p-value of 0.8635. This JB statistics has a p-value greater than 0.05 and is quite low. This suggests that we may accept the null hypothesis that the residuals are regularly distributed.

Last but not least, the residual diagnostics test demonstrates that the residual from the estimated model is well behaved and complies with the criteria of a best linear unbiased estimator (BLUE). This suggests that the estimated model's whole body of findings is valid and trustworthy when used to inform policy.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study's main objective is to investigate the dynamic and causal link between the exchange rate and foreign direct investment in Nigeria between 1986 and 2018. In particular, the study aims to establish the causal linkage between the variables exchange rate, real GDP, and previous FDI numbers by empirically examining the dynamic relationship between FDI, GDP, and these variables. Since exchange rate is one of the most important macroeconomic factors for promoting economic growth and development in developing nations, it is the subject of the study's greater attention (Nigeria inclusive). The study is distinctive in that it makes an effort to analyze how exchange rates affect foreign direct investment using historical data and quantitative methods. An empirical model that took into account factors including foreign direct investment, the currency rate, and real GDP was used to carry out the study's aims. These factors were chosen based on the data that was available and how they had been used in other studies. The World Development Indicators' different editions served as the sole source of secondary data for these variables (WDI, 2020).

The model's selected variables' qualities were assessed by the research using a variety of analytical methodologies. These include the Johansen cointegration test to ascertain the long-term relationship between the variables, descriptive statistics of the variables, a correlation matrix to examine the degree of association between the variables, a unit root test to ascertain the stationarity of the variables, and a correlation matrix to examine the correlation between the variables. The study may proceed with using the Error Correction Model (ECM) to estimate the

long run and short run correlations between the variables in the model since there is a cointegrating (long run) link between the variables. Below is a list of the main empirical findings that were discovered during the course of the investigation.

- The correlation matrix reveals a significant degree of linkage among the model's variables, with real GDP having a favorable relationship to both the exchange rate and foreign direct investment.
- The unit root test result showed that all of the model's variables were stationary and had the same order of integration, I(1).
- The Johansen cointegration test demonstrates that there is a long-term link between the variables included in the model.
- Because the ECM coefficient is negative and statistically significant, the ECM estimates show that the interaction between the variables is statistically significant over the long term.
- According to the short-run calculated coefficient, real GDP positively and significantly affects FDI. In contrast to the exchange rate, which has a considerable negative impact on FDI, prior FDI figures have a negligible impact on FDI.
- By analyzing the size of the long-run coefficients, it was shown that a 1% rise in GDP will result in a 3.6% increase in FDI entering the nation, while a 1 unit increase in exchange rate will cause a loss in the value of FDI of 18,724,979.

5.2 Concluding Remarks and Policy Suggestions

For the period of 1986 to 2018, this study examined the relationship between foreign direct investment and the foreign exchange rate in Nigeria. The study specifically looked at the

relationship between foreign capital inflows, real GDP, and exchange rate as well as the proportional impact of these inflows on the exchange rate in Nigeria. Based on historical data, the movement of the FDI-exchange rate relationship in Nigeria was examined in order to identify key problems with the creation and implementation of policies to promote FDI inflows. In order to establish the theoretical foundations of the relationship between FDI and exchange rate in Nigeria, several theoretical and empirical literatures have also been critically evaluated. In order to carry out the particular goals of the research, these reviews offer helpful information and direction. Additionally, the study made use of a number of quantitative analytical techniques, including regression analysis, correlation matrix, and descriptive statistics, all within an ECM and cointegration framework. In order to draw meaningful conclusions, the results of the empirical study provide some crucial evidence.

First, no causal relationship between foreign direct investment and exchange rate existed during the research period, according to the estimations of the causality test. Second, there is a sizable long-term link between the exchange rate and foreign direct investment.

The aforementioned result implies that the link between foreign capital inflows and exchange rate in Nigeria from 1986 to 2018 is both a short-run and long-run phenomena and that the extent of the impact of capital inflows and currency rate in particular is quite high and had a strong depreciating effect on FDI. In light of these findings, it is recommended that suitable policies be developed to stabilize the currency rate in order to promote the inflows of foreign capital while maintaining prudent regulations.

REFERENCES

Ekine, D. I., Ewubare, D. B., & Ajie, C. (2019). The relationship between foreign portfolio investment, foreign direct investment and economic performance of nigerian economy:(1980-2017): An Empirical Analysis. *IOSR Journal of Economics and Finance.(IOSR-JEF)*, *10*(4), 57-64.

Dinda, S. (2014). Natural resources determining FDI in Nigeria: an empirical investigation. *International Journal of Research in Business and Social Science*, *3*(1), 75.

Ogunmuyiwa, M. S., & Ogunleye, O. J. (2011). Measuring The Impact Of FDI On Economic Growth In Nigeria.

Omankhanlen, A. E. (2011). The effect of exchange rate and inflation on foreign direct investment and its relationship with economic growth in Nigeria. *EA1*, *1*.

Zakari, M. (2017). The impact of exchange rate fluctuations on foreign direct investment in Nigeria. *Journal of Finance and Accounting*, *5*(4), 165-170.

Mokuolu, J. O. (2018). Effect of Exchange Rate and Interest Rate on FDI and Its Relationship with Economic Growth In Nigeria. *European Journal of Economic and Financial Research*.

Danmola, R. A. (2013). The impact of exchange rate volatility on the macro economic variables in Nigeria. *European Scientific Journal*, *9*(7).

Osinubi, T. S., & Amaghionyeodiwe, L. A. (2009). Foreign direct investment and exchange rate volatility in Nigeria. *International journal of applied econometrics and quantitative studies*, *6*(2), 83-116.

Alaba, O. B. (2003, September). Exchange rate uncertainty and foreign direct investment in Nigeria. In *A Paper Presented at the WIDER Conference on Sharing Global Prosperity, Helsinki, Finland* (Vol. 6, No. 7).

Omorokunwa, O. G., & Ikponmwosa, N. (2014). Exchange rate volatility and foreign private investment in Nigeria. *Asian Journal of Business Management*, *6*(4), 146-154.

Okwuchukwu, O. (2015). Exchange rate volatility, stock market performance and foreign direct investment in Nigeria. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *5*(2), 172-184.

Muhammad, S. D., Azu, N. P., & Oko, N. F. (2018). Influence of real exchange rate and volatility on FDI inflow in Nigeria. *International Business Research*, *11*(6), 73-82.

Adgbite, E. O., & Ayadi, F. S. (2010). The Role of Foreign Direct Investment in Economic Development: A Study of Nigeria. The World Journal of Entrepreneurship, Management and Sustainable Development, 6(1-2), 133-147.

Akinlo, A. E. (2004). Foreign Direct Investment and Growth in Nigeria an empirical Investigation, Journal of Policy Modeling, 26, 627-639. https://doi.org/10.1016/j.jpolmod.2004.04.011

Asiedu, E. (2002). On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different? World Development, 30(1), 107-119. https://doi/10.1016/S0305 750X(01)00100-0

Baek, J. (2014). Exchange Rate Effects on Korea-U.S. Bilateral Trade: A new Look. Research in Economics,68(3),214-221.https://doi.org/10.1016/j.rie.2014.05.002

Bahmani-Oskooee, M., & Nasir, A. B. M. (2004). ARDL Approach to Test the Productivity Bias Hypothesis,

Review of Development Economics, 8(3), 483-488. https://doi.org/10.1111/j.1467-9361.2004.00247.x

Banerjee, A., Dolado, J., & Mestre, R. (1998). Error Correction Mechanism Tests for

Cointegration in A Single-Equation Framework. Journal Time Series Analysis, 19(3), 267-283. https://doi.org/10.1111/1467-9892.00091

Barrell, R., Hall, S. G., & Gottschalk, S. D. (2003). Foreign direct investment and exchange rate volatility in imperfectly competitive markets. National Institute of Economic and Social Research (NIESR), Discussion Papers.

Brozozowski, M. (2003). Exchange Rate Variability and Foreign Direct Investment: Consequences of EMU Enlargement. Centre of Social and Economic Research, Case Study No. 258. https://doi.org/10.2139/ssrn.1441247

Chaudhry, N. I., Mehmood, A., & Mehmood, M. S. (2013). Empirical Relationship between Foreign Direct Investment & Economic Growth: ARDL Co-integration Approach for China. China Finance Review International, 3(1), 26-41. https://doi.org/10.1108/20441391311290767

Cheng, L. K., & Kwan, Y. K. (2000). What are the determinants of the location of foreign direct investment? The Chinese experience. Journal of International Economics, 51(2), 379-400. https://doi.org/10.1016/S0022-1996(99)00032-X

Ali, Y. S., Mohamed, I. I., & Zahir, M. O. (2017). Impact of change in exchange rate on Foreign direct investment: Evidence from Somalia. Journal of Economics and Sustainable Development.

Amasoma, D., Nwosa, I. P. & Fasoranti, M. M. (2015). Exchange rate volatility and foreign

Capital inflow nexus: evidence from Nigeria. A Journal of the Faculty of Humanities and Social Sciences, Federal University, Oye-Ekiti.

Andrew, J. A. & Glauco, D. V. (1998). Do exchange rates have any impact upon UK inward Foreign direct investment? Applied Economics, Taylor & Francis (Routledge), 2008. 39 (20), pp.2553-2564.

Calvo, G., Leiderman, L. & Reinhart, C. (1993). Capital inflows to Latin America: The role of external factors. IMF Staff papers, pp. 108-155.

Cockcroft, L. and R, Riddell (1991). Foreign direct investment in Sub-Saharan Africa.Working paper WPS 619, Washington, DC: The World Bank.

Dornbusch, R., (1976). Expectations and exchange rate dynamics. Journal of Political Economy, 84 (6), 1161-1176.

Fernandez-Arias, E. & Montiel, P. J. (1995). The surge in capital flows to developing countries: An analytical overview. The World Bank Economic Review, vol. 10, No. 1, 51-77.

Froot, K. A., & Stein, C. J. (1991). Exchange rates and foreign direct investment: An Imperfect capital market approach. Quarterly Journal of Economics, Vol. 106 pp1191-1217.

Funyina, T. K (2015). The effect of exchange rate volatility on foreign capital flows Inflows in Zambia (Master's thesis, University of Zambia, Lusaka).

Gbadamosi, B. (2017). Why we intervened in forex market-CBN. Available at

www.punchng.com/

Haynes, S. E. (1988). Identification of interest rates and international capital flows. The Review of Economics and Statistics, vol. 70, No 1.

Hymer, S. (1976). The international operations of nation firms: A study of foreign direct Investment, Cambridge. MLT Press International Monetary Fund, 1998. Balance of Payment manual, fifth edition, IMF Publication.

José, F. S. M. (2015).Impact of real exchange rate volatility on foreign direct investment Inflows in Brazil (Master's thesis, Instituto Universitàrio de Lisboa, Brazil).

Mbanasor, B. O. & Obioma, J. (2017). Exchange rate fluctuations and foreign private Investments in Nigeria. International Journal of Economics and Business Management Vol. 3 No. 8.

Meier, G. M. (1995). Leading issues in economic development. New York: Oxford University press.

National Bureau of Statistics Publications (Various compilations). www.nigerianstat.gov.ng

Obi, C. (2016). The impact of foreign exchange volatility on foreign direct investment in Nigeria. Global Journal of Management and Business Research: C Finance.