The Effect of Exchange Rate on the Growth of the Nigerian Economy

Ogodo Paul, Egbaseimokumo

Oxgeep Nigeria Limited

DOI: https://dx.doi.org/10.47772/IJRISS.2024.8120160

Received: 26 November 2024; Accepted: 04 December 2024; Published: 08 January 2025

ABSTRACT

This study examined the effect of exchange rate on the economic growth of Nigeria. It specifically looked at effect of exchange rate on gross domestic product (GDP), as a proxy of economic growth with interest rate and inflation rate as determinant of exchange rate. Secondary data from the Central Bank of Nigeria Statistical Bulletin were collected for a period of thirty-seven years, 1986 to 2023. Ex-post facto research design was utilized. While some pre and diagnostic tests were carried out to confirm the integrity of the data and their relatedness in both short- and long-term basis, Autoregressive Distributed lag (ARDL) model was employed in the analysis of hypotheses. It was found that while exchange rate and interest rate had significant effect on RGDP, while inflation rate was found to be not significant on RGDP. This implies that exchange rate and interest rate significantly determine economic growth in Nigeria. The study concludes that exchange rate should be handled with utmost concern by experts in the field to avoid unnecessary fluctuations that may inflict unbearable economic consequences on the Nigerian people. The study recommends, among others, the adoption of policies measures that will affect economic growth in Nigeria in such a way that the welfare of the people can be upgraded.

Keywords: Exchange Rates, Interest Rates, Inflation Rate, Economic Growth.

INTRODUCTION

The exchange rate plays a pivotal role in shaping the economic trajectory of nations, particularly in emerging economies like Nigeria. The exchange rate is defined as the price of one country's currency expressed in terms of another and serves as a critical indicator of economic stability and competitiveness (Mordi, 2022). As an oil-dependent economy, Nigeria's exchange rate is significantly influenced by fluctuations in global oil prices, which account for over 85% of its foreign exchange earnings and 70% of government revenue (CBN, 2023). This heavy reliance exposes the economy to external shocks, with depreciation in the naira often translating into inflationary pressures, reduced purchasing power, and heightened uncertainty in investment flows.

Historically, Nigeria has witnessed periods of extreme volatility in its exchange rate system. From the fixed exchange rate regime of the 1960s to the adoption of a market-determined exchange rate under the Structural Adjustment Program (SAP) in 1986, these shifts were aimed at fostering economic growth and correcting imbalances in trade and payments. However, the challenges of speculative attacks on the naira, excessive demand for foreign currency, and fiscal indiscipline persist, undermining the effectiveness of monetary policies and hampering economic development (Akinyemi & Ogundipe, 2021). The persistent depreciation of the naira, alongside fluctuating crude oil prices, has amplified the vulnerability of the economy to external shocks, significantly influencing macroeconomic indicators such as gross domestic product (GDP), inflation, and employment rates.

Nigeria's economic growth is intricately linked to its exchange rate dynamics. Between 2015 and 2023, the naira depreciated by over 70% in the official market, with the parallel market showing even sharper declines. This volatility has heightened the cost of importing critical goods and services, weakened local industries reliant on foreign inputs, and increased external debt servicing costs. Despite efforts by the Central Bank of Nigeria (CBN) to stabilize the naira through interventions such as forex market injections, dual exchange rate policies, and monetary tightening, the underlying structural issues remain unaddressed. These include a narrow export base, over-reliance on oil revenue, and weak foreign exchange reserves (Ezeaku et al., 2023).

The instability of Nigeria's exchange rate system poses a severe challenge to achieving sustained economic growth and development. Exchange rate volatility introduces significant risks for businesses, discouraging both domestic and foreign investment. For instance, local industries face higher production costs due to the rising price of imported raw materials, which, in turn, leads to reduced competitiveness in global markets (Obi et al., 2022). Moreover, the depreciation of the naira exacerbates inflationary pressures, eroding the purchasing power of households and widening income inequality.

Despite the CBN's interventions, the widening gap between the official and parallel exchange rates reflects deep structural inefficiencies. The multiplicity of exchange rates has created opportunities for arbitrage, fostering corruption and undermining investor confidence in the economy. Furthermore, the dependence on oil exports exposes the exchange rate to significant volatility, as evidenced during the 2020 global oil price crash, which saw Nigeria's GDP contract by 1.92% (World Bank, 2023). This situation highlights the need for a robust and diversified export base to mitigate the adverse effects of exchange rate fluctuations on economic growth.

Another critical concern is the rising burden of external debt servicing. With over 60% of Nigeria's external debt denominated in foreign currencies, the depreciation of the naira has significantly increased the cost of debt repayment, diverting resources from essential developmental projects such as infrastructure, healthcare, and education (IMF, 2023). This challenge is compounded by declining foreign reserves, which have constrained the government's ability to stabilize the currency effectively.

Previous studies on the relationship between exchange rates and economic growth in Nigeria have yielded mixed results, with some identifying a positive relationship while others suggest negative impacts depending on the prevailing macroeconomic conditions (Afolabi et al., 2022). These inconsistencies underscore the need for a comprehensive understanding of the mechanisms through which exchange rate movements affect economic performance in Nigeria.

This study seeks to address these gaps by examining the effects of exchange rate fluctuations on Nigeria's economic growth. Specifically, it aims to analyze the impact of exchange rate volatility on key economic indicators such as GDP, inflation, trade balance, and investment flows. By identifying the underlying factors contributing to exchange rate instability and its implications for the economy, this study provides valuable insights for policymakers and stakeholders in designing effective strategies to promote sustainable growth and macroeconomic stability in Nigeria.

Objectives of the Study

The main objective of the study is to examine the effect of exchange rate on the growth of the Nigerian economy. The specific objectives are:

1 To determine the impact of nominal exchange rate on economic growth measured in term of real gross domestic product in Nigeria.

2 To access the impact of interest rate on economic growth measured in term of real gross domestic product in Nigeria.

3 To evaluate the impact of inflation rate on economic growth measured in term of real gross domestic product in Nigeria.

Research Hypotheses

The following null hypotheses were formulated from the research objectives to guide the conduct of the study.

H_{O1}: There is no significant relationship between exchange rate and economic growth of Nigeria.

H_{O2}: There is no significant relationship between interest rate and economic growth of Nigeria.

H_{O3}: There is no significant relationship between inflation rate and economic growth of Nigeria.

The rest of this paper contains the literature review, methodology, results and discussions and conclusions and recommendation for policy formulations.

LITERATURE REVIEW

This section discussed the conceptual clarification, theoretical frameworks and empirical literature.

Concept of Exchange Rate

The exchange rate refers to the price of one country's currency expressed in terms of another currency. It serves as a critical indicator of the relative economic performance of nations and plays a pivotal role in international trade and financial markets. Exchange rates can be classified into fixed, floating, and pegged systems, depending on how governments and central banks manage them. A fixed exchange rate is tied to another currency, such as the US dollar, while a floating exchange rate is determined by market forces of demand and supply. Pegged exchange rates are hybrid systems where the currency fluctuates within a controlled band.

The exchange rate affects various aspects of an economy, including trade balances, inflation, and foreign investment. For instance, currency depreciation can make exports more competitive but may also increase the cost of imports, leading to inflationary pressures. Conversely, currency appreciation can reduce export competitiveness but lower import prices, benefiting consumers. In emerging economies like Nigeria, exchange rate volatility significantly impacts economic stability, influencing inflation and foreign direct investment (FDI) inflows. Studies reveal that the interplay of macroeconomic factors such as interest rates, trade balances, and political stability largely determines exchange rate movements (Ezeaku et al., 2022). Additionally, global factors like oil prices and geopolitical tensions can exacerbate exchange rate fluctuations.

Recent research emphasizes the importance of sound exchange rate policies to foster economic growth and stability. For example, Olaniyi and Ogundipe (2023) argue that Nigeria's oil-dependent economy needs diversification to mitigate exchange rate volatility stemming from oil price shocks. Furthermore, adopting a flexible exchange rate regime can provide economies with the resilience needed to absorb external shocks.

The evolution of exchange of the exchange rate in Nigeria up to its present state was influence by a number of factors such as interstate, market expectation and purchasing power parity. Before the establishment of the central bank of Nigeria (CBN) IN 1958 and the enactment of the exchange control act of 1962, exchange rate was earned by the private sector and held in balance abroad by commercial bank which acted as agent for local exporters. During this period, agriculture export contributed the bulk of exchange. The fact that the Nigeria pound was tied to the British pound sterling at par, with easy convertibility, delayed the development of an active exchange market. However, with the establishment of the CBN and the subsequent centralization of exchange rate authority in the, the need to develop or build exchange market became paramount.

Economic Growth

Economic growth refers to the sustained increase in the production of goods and services in an economy over a specific period, typically measured by the growth rate of Gross Domestic Product (GDP). It is a key indicator of an economy's health and is influenced by factors such as capital accumulation, labour force expansion, technological innovation, and institutional frameworks. Economic growth is often categorized into extensive growth, which stems from increased inputs, and intensive growth, driven by improved productivity and efficiency.

Furthermore, economic growth is defined as the increasing capacity of the economy to satisfy the wants of goods and service of the members of the society. Economic growth is enabled by increase in productivity, which lowers the inputs (labour, capital, material energy etc.) for a given amount of output. Low-cost increase demand for goods and services. In other words, economic growth can also be referred to as the result of

population growth and of the introduction of new product and services.

Theoretical frameworks such as the Solow-Swan Growth Model and Endogenous Growth Theory highlight the significance of savings, investments, and technological progress in fostering growth. In developing economies, including Nigeria, growth is often influenced by the effective utilization of natural resources, investment in human capital, and policy interventions aimed at enhancing industrial and agricultural outputs. For example, investment in education and infrastructure has been shown to stimulate economic growth by boosting labor productivity and facilitating trade (Adebayo et al., 2023).

Globalization has played a dual role in economic growth. While it has enabled access to international markets and technology, it has also exposed economies to external shocks, such as financial crises and trade imbalances. Recent studies, like that by Umeh and Onyekachi (2023), underscore the importance of economic diversification in ensuring sustainable growth in resource-dependent economies like Nigeria. Policies targeting fiscal discipline, technological adoption, and private sector empowerment are essential in driving long-term growth.

Between Exchange Rate and Economic Growth in Nigeria

Exchange rate fluctuations play a significant role in influencing the economic growth of Nigeria, a country heavily reliant on international trade and foreign exchange earnings from crude oil. The relationship between exchange rate dynamics and economic growth in Nigeria is multifaceted, shaped by external shocks, domestic monetary policies, and the structure of the economy. This discussion examines the theoretical and empirical link between exchange rates and economic growth in Nigeria, with recent studies providing context and evidence.

Exchange rates affect economic growth through trade, investment, and inflation channels. A depreciation in the exchange rate can make exports cheaper and imports more expensive, potentially boosting domestic production and growth (Obstfeld & Rogoff, 1996). However, this mechanism assumes that the economy has a diverse production base, which Nigeria lacks due to its dependence on crude oil exports. Conversely, exchange rate volatility can deter foreign investment by increasing uncertainty and reducing the predictability of returns (Ghosh et al., 2018).

Recent reforms in Nigeria's foreign exchange market aim to address these challenges. In June 2023, the CBN introduced a unified exchange rate system to eliminate distortions caused by multiple exchange rates. Early indications suggest improved transparency and investor confidence, but the long-term impact on growth remains uncertain (IMF, 2023).

Moreover, the government's diversification agenda emphasizes reducing reliance on oil exports and increasing investments in non-oil sectors. Effective exchange rate policies are crucial to achieving these goals, as a stable and competitive exchange rate can enhance export competitiveness and attract foreign direct investment (FDI).

The relationship between exchange rate dynamics and economic growth in Nigeria is complex, shaped by structural and policy factors. While exchange rate depreciation can enhance export competitiveness, excessive volatility undermines investment and growth. Empirical studies emphasize the need for a balanced approach to exchange rate management, combining stability with flexibility. Recent reforms, such as the unified exchange rate system, are promising but require complementary measures to address structural weaknesses and enhance economic diversification. With sound policies and effective implementation, exchange rate management can play a pivotal role in fostering sustainable economic growth in Nigeria.

Theoretical Framework

There are several theories of the determinants of exchange rate and economic growth. Some of these theories are: the purchasing power parity (PPP) theory, the balance of payment theory, factor endowment theory, Harrod-Domar model of growth, neoclassical theory of growth, and two-gap model theory. But in this study the purchasing power parity (PPP) theory and the balance of payment theory are discussed.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue XII December 2024

The Purchasing Power Parity (PPP) Theory

The Purchasing Power Parity (PPP) theory was initially introduced by Swedish economist Gustav Cassel in 1918. The theory builds on the concept of the "law of one price," which asserts that in the absence of trade barriers and transaction costs, identical goods should sell for the same price across different countries when expressed in a common currency.

The PPP theory posits that exchange rates between two countries are determined by the relative prices of a basket of goods and services in each country. Essentially, the exchange rate should adjust to equalize the purchasing power of different currencies. For instance, if inflation in Nigeria rises faster than in the United States, the naira should depreciate relative to the dollar to maintain parity. PPP is classified into two forms: absolute PPP, which directly compares price levels across countries, and relative PPP, which considers changes in inflation rates as a determinant of exchange rate movements.

PPP links exchange rates to inflation and competitiveness. When the naira depreciates due to inflationary pressures, Nigerian goods become cheaper on the international market, potentially boosting exports. However, in a country like Nigeria, where imports dominate key sectors, depreciation also raises import costs, leading to inflation and reduced purchasing power, which can stifle economic growth.

Empirical studies highlight the limitations of PPP in Nigeria due to structural and institutional factors. For instance, Okonkwo and Eze (2023) found that the naira's exchange rate does not always adjust to reflect inflation differentials due to speculative activities and government interventions in the forex market. This disconnect limits the effectiveness of PPP in predicting Nigeria's exchange rate movements and their implications for growth.

Moreover, Nigeria's dependency on oil exports introduces volatility, as exchange rate movements are often driven more by oil price fluctuations than by inflation differentials. This dynamic undermines the stable relationship between exchange rates and purchasing power predicted by the PPP theory.

The Balance of Payment Theory

The BOP theory posits that a country's exchange rate is determined by the supply and demand for foreign exchange arising from its international transactions. A country with a trade surplus will experience an appreciation of its currency due to increased demand for its goods and, consequently, its currency. Conversely, a trade deficit leads to currency depreciation.

The theory highlights the role of foreign trade and capital flows in influencing exchange rates. In an open economy, capital inflows, exports, and remittances strengthen the domestic currency, while excessive imports and external debt repayment weaken it.

The BOP theory directly ties exchange rates to trade balance and economic growth. Currency depreciation can stimulate growth by making exports cheaper and imports more expensive, thereby improving the trade balance. However, prolonged deficits and currency depreciation can lead to inflation and reduced investor confidence, undermining growth prospects.

Nigeria's case presents a unique challenge to the BOP theory due to its dependence on oil exports, which account for over 90% of foreign exchange earnings. During periods of high oil prices, Nigeria experiences a trade surplus, leading to currency stability or appreciation. However, when oil prices fall, the country faces trade deficits, currency depreciation, and economic contraction.

For example, the oil price slump of 2015–2016 caused a significant depreciation of the naira, triggering inflation and a recession (CBN, 2016). Empirical evidence, such as the study by Adebayo et al. (2022), demonstrates that exchange rate volatility resulting from external shocks to the BOP has a profound impact on Nigeria's economic growth. The study emphasized the need for diversification to reduce reliance on oil exports and stabilize the BOP.

The BOP theory remains relevant for understanding Nigeria's exchange rate dynamics. However, the country's heavy reliance on oil exports and vulnerability to external shocks necessitate structural reforms to diversify the economy and enhance the role of non-oil sectors in foreign exchange earnings.

Empirical Literatures

In the empirical literature, studies have been searchlight on the link between exchange rate and the economic growth. Some of the empirical studies will be highlighted in this research work.

Baghebo and Mienebimo (2024) investigate balance of trade, exchange rate and economic growth in Nigeria. Annual time series data for the period 1981 to 2021 obtained from the Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistic (NBS). Heteroskedasticity Model was used in this investigation. GARCH, which is an enlarged framework of ARCH, and the Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGACH). The results shows that trade balance and exchange rate, are more sensitive to bad news. This suggests that uncertainties surrounding exchange rate contribute significantly to the fluctuations. Also the ARCH effects initially present in balance of trade and exchange rate were entirely removed by each of the heteroskedastic models considered. Similarly, the impact of balance of trade on economic growth is negative and statistically significant. Also, exchange rate has undesirable significant impact on economic growth in Nigeria. This indicates that a undesirable change in the Nigerian naira has a larger impact on its fluctuation, which mainly indicates that during an appreciation (negative change) the currency tends to be more volatile and the relationship between trade balance and economic growth in Nigeria is positive not statistically significant. This study concludes that economic growth in Nigeria highly depends on external demand when the strong depreciation of the domestic currency also acts as a stimulus to growth. This study recommends that government should encourage export driven policies on trade balance that will boost export and enhance the export of primary products so as to attract foreign exchange inflows and foreign investment in order to promote economic growth in Nigeria.

Onwuliri, Oshiole, Nwankwo, Nwakeze, and Okorie, (2024) explore Foreign Exchange Rate Exposure Mitigation and Connection to Economic Growth: The Nigerian Experience. while attempting to demonstrate the relationship between foreign exchange rate exposures and the economic growth of a developing country like Nigeria. Expofacto design was deployed for this study. Regression analysis, descriptive statistics, residual statistics, Collinearity Diagnostics and Durbin-Watson were the techniques used to analyze data and examine the relationship between the two major variables of the study. The yearly highest foreign exchange rates (Nigerian Naira to a US dollar) – as at the official market; and the yearly average of the quarterly GDP of Nigeria, constituted the datasets, for the period 2019 – 2023 respectively. The study found that a statistical and significant relationship exists between the foreign exchange exposure and economic growth. The study concludes that a better exposure mitigation could be achieved with an efficient use of hedging measures (currency forwards, currency option currency futures, cross-currency swaps, or even ‘natural’ hedging).

Najeem (2024) examine the Impact of Exchange Rate Fluctuation on Nigeria Economy Growth. The study utilizes both quantitative data, sourced from the Central Bank of Nigeria, the National Bureau of Statistics, IMF, and the World Bank, covering the period from 1960 to 2022, and qualitative data from journal reviews. Employing the Multivariate Adaptive Regression Spline (MARS) method, the research identifies nonlinear relationships between GDP and key variables, including exchange rates, interest rates, inflation, imports, and exports. The findings indicate that exchange rate fluctuations are the most significant factor affecting economic growth, with a direct and substantial impact on GDP. Additionally, the study reveals that interest rates, imports, and exports have bidirectional effects on GDP. The results underscore the need for Nigerian government reforms to stabilize the exchange rate and mitigate its adverse effects on economic growth.

Paul and Sylvester (2022) conducted a study on the influence of exchange rate fluctuation on economic growth in Nigeria for a period of 38 years (1983 to 2020). The E-GARCH model was employed to generate the volatility while the ordinary least square (OLS) was used in the analysis. The results from the empirical analysis showed that the trend in exchange rate movement have been more rapid since around 1985 when marked movements in the market began to be noticed. The volatility increased after 2000 and culminated in the deep sections seen between 2016 and 2019. Generally, the results from the OLS indicate that all the

variables such as INTR, EXRT and INFL in the model do not have any significant impact on economic growth in Nigeria. The study recommends among others that, the government should control and regulate the exchange rate in the country in order to boost trading activities and returns in the Nigerian stock market.

Onabote, Adama, Obasaju, et al, (2022) further investigated a study on the relationship among exchange rate, foreign direct investment and economic growth is explored in this study by adopting the Autoregressive Distributive Lag (ARDL) technique to examine the long-run cointegrating relationship for the period 1981-2018. A long-run relationship was confirmed among exchange rate, foreign direct investment and economic growth. From the findings, foreign direct investment contributes positively to economic growth, while the speed of adjustment is 78.46% and significant. The study recommends, among others, that the Nigerian government must create an enabling atmosphere for private businesses to prosper. The study suggested that the government pursue policies that will boost investors' confidence and enable foreign companies to invest in the country's economy. Government and private-sector agencies are encouraged to invest more in the country's education and health care infrastructure.

Abdu, Umar, Mohammed and Ajannah (2021) examined the effect of exchange rate on economic growth from 1986 to 2019 using secondary data sourced from Central Bank of Nigeria Statistical Bulletin of various issues. From 1986 being the year the monetary authority shifted from fixed exchange rate regime to flexible exchange rate regime to 2019. The regression analysis using ordinary least square was used to analyze the data. The result revealed that exchange rate has significant positive effect on economic growth while interest rate and inflation rate have significant negative effect on economic growth.

Godwin and Sergius (2021) examined the effect of exchange rate on the economic growth of Nigeria. It specifically looked at effect of exchange rate on gross domestic product (GDP), gross national product (GNP) and unemployment. Secondary data from the Central Bank of Nigeria Statistical Bulletin were collected for a period of ten years, 2009 to 2018. Ex-post facto research design was utilized. While some diagnostic tests were carried out to confirm the integrity of the data and their relatedness in both short and long term basis, Ordinary Least Square technique was employed in the analysis of hypotheses. It was found that while exchange rate had significant effect on GDP and GNP, it was no significant on unemployment. This implies that micro economic indices of GDP and GNP could be used to consciously adjust standard of living of the citizens. The study concludes that exchange rate should be handled with utmost concern by experts in the field to avoid unnecessary fluctuations that may inflict unbearable economic consequences on the Nigerian people. The study recommends, among others, the adoption of policies that will affect GDP in such a way that the welfare of the people can be upgraded.

Adeniyi and Olasunkanmi (2019) examined the impact of exchange rate volatility on economic growth in Nigeria. The study made use of ARDL co integration and Error Correction Model to capture the stated objective. The results revealed that there is existence of co integration among the variables. The findings also exhibited significant impact of export on Gross Domestic Product while import is insignificant both in the short and the long run. The study established insignificant positive relationship between exchange rate volatility and economic growth in Nigeria.

Mahonnye & Tenda (2019) examined the exchange rate impact on output and inflation. This research looked at the inflationary effect of currency devaluation and its contractionary effect on real output growth in Zimbabwe. The study used quarterly data from 1990 – 2006 and used the Johansen co-integration regression test and Vector Error Correction Model (VECM). The study found that in both the short run and long run, fluctuations in the real exchange rates are significant on real output growth and expansion.

Sakiru, Oladapo, Jayeola and Olutunji (2019) assessed empirically the impact of exchange rate on economic growth in Nigeria from 1981 to 2016. Data on GDP, Exchange rate, foreign direct investment (FDI), inflation rate, imports, exports, trade openness, final consumption expenditure (FCE), interest rate, and government expenditure were obtained from the different issues of the CBN Statistical Bulletin. Data series were assessed for stationarity with the aid of the ADF test. Bound test was conducted and the model was estimated within the ARDL framework supported by the relevant post estimation diagnostic tests. The bound test showed that there was long run relationship among the study variables. Model estimation revealed that import, lag of trade

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue XII December 2024

openness, FDI, lag of exchange rate, interest rate and inflation significantly affected the growth of the economy in the short run. In the long run, economic growth was affected by trade openness, FDI, exchange rate, government expenditure and interest rate. It was concluded that the present year exchange rate did not affect economic growth in the short run but its one-year lag did, while exchange rate had negative effect on the growth of the Nigerian economy in the long run. To achieve growth in the economy, effective exchange rate management system.

RESEARCH METHODOLOGY

The research employs an ex-post facto design, relying on historical data without manipulation or control of the relevant explained and explanatory variables. The dataset for this study is derived from secondary sources, specifically the Central Bank of Nigeria Statistical Bulletin, (2023). Time series data, is deemed suitable for this study. In essence, this design follows a quantitative approach, collecting and analysing a time series of secondary data spanning from 1986 to 2023 using econometric analytical methods. Additionally, the study incorporates the Autoregressive Distributed Lag (ARDL) model to enhance the robustness of the analysis.

Model Specification

The objective of this section is to formulate models that will assist in achieving our stated objectives. Econometric technique is used to establish a model of exchange rate and how it affects the growth of the Nigerian economy.

The growth model which captures the contributions of exchange rate and other macroeconomic variables to the Nigerian economy be represented as follows:

$$RGDP = f\left(EXR, INTR, INF\right) \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \left(1\right)$$

The OLS linear regression equation based on the above functional relation is:

$$RGDP = b_0 + b_1 EXR + b_2 INTR + b_3 INF + \mu \cdots\cdots\cdots\cdots\cdots\cdots \left(2\right)$$

Transforming equation 2 to the natural logarithm, we have:

$$\log RGDP = b_0 + b_1 \log EXR + b_2 \log INTR + b_3 \log INF + \log \mu \cdots \left(3\right)$$

A priori expectations of signs of parameters as contained in section 3.4 are: $b_1 > 0, b_2 < 0, b_3 > 0, b_4 > 0$

Where;

$RGDP$	=	Real Gross Domestic Product
EXR	=	Nominal exchange rate
$INTR$	=	Interest Rates
INF	=	Inflation rates
μ	=	error term

The unit root and the Error Correction Model (ECM) are generally presented as follows.

Unit Root Model

$$\Delta Y_t = \alpha Y_{t-1} + \sum_{i=1}^{m} B \Delta Y_{t-1} + \delta + Y_t + \varepsilon_t \text{ (For levels)}$$

$$\Delta\Delta Y_t = \alpha\Delta Y_{t-1} + \sum_{i=1}^{m} B\Delta\Delta Y_{t-1} + \delta + Y_t + \varepsilon_t \text{ (For first difference)}$$

Where;

ΔY is the first difference of the series, m is the number of lags and t is the time.

Error Correction Model

The error correction model for two variables X and Y is stated generally as:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 U_{t-1} + \varepsilon_t$$

Where; α_2 is the degree of adjustment.

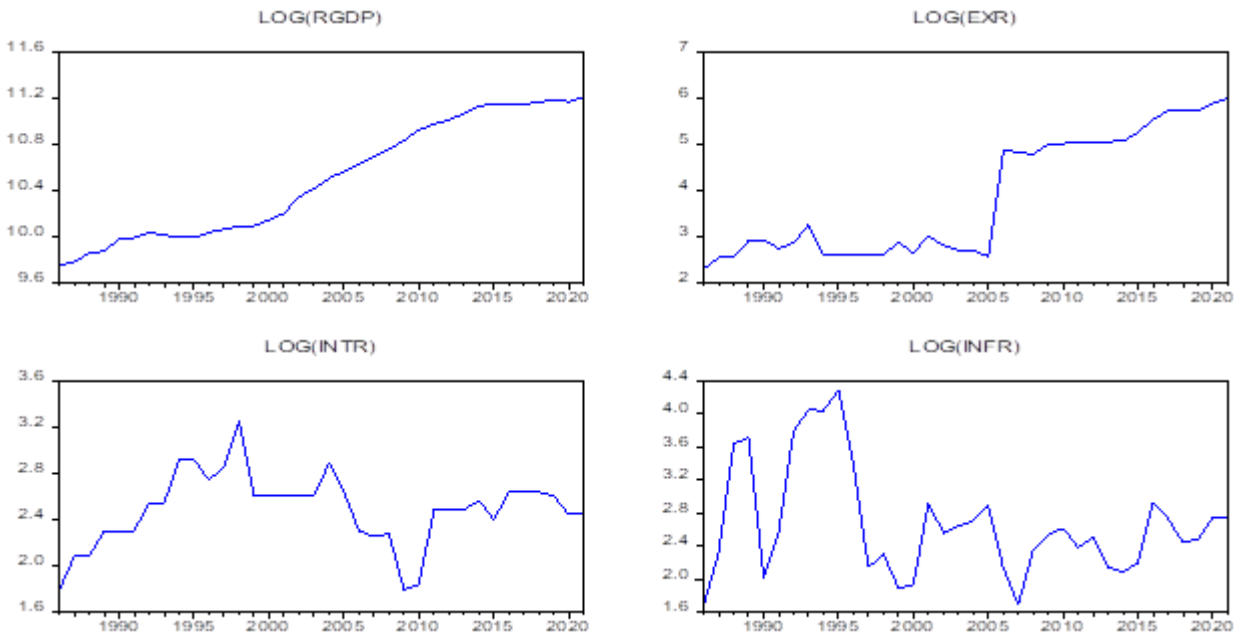
RESULTS AND DISCUSSIONS

The study used the Autoregressive Distributed Lag (ARDL) model. These estimations provide insight into the coefficients, standard errors, probability value, and diagnostic test results, allowing for a comprehensive data comprehension.

Trend Analysis for the variables

Trend analysis deals with graphical presentation of the nature and movement of the variables (RGDP, EXR, INTR and INFR) in the model. The result is given below in figure 4.1

Figure 4.1 Graphical Representations of the Variables.



From the above graph, it revealed that only real gross domestic product (RGDP) as a measure of economic growth move smoothly from the bottom to the top of the graph, implying that there is steady increase in the outputs of goods and services produced in the economy during the period of study. While exchange rate (EXR), interest rate (INTR) and inflation rate (INFR) movement swing up and down implying that their movement is in zigzag form. It means there were a lot of fluctuation during the period of study.

In summary, from the data presented above we discovered that real gross domestic product (RGDP) has a steady increase in the value from 1986 to 2023. While exchange rate, interest rate and inflation rate fluctuate within the period from 1986 to 2023.

Unit Root Results

The result of the ADF for economic growth, exchange rate and inflation are presented in table 4.1.

Table 4.1 Unit Root Test using Augmented Dickey-Fuller (ADF) Test

Variables	***Augmented Dickey-Fuller Test***		**Lag**	**Order of int.**	**Remark**
	@ level	**@ 1st Diff**			
Log(RGDP)	-3.571118	-	Maxlag=9	I (0)	Stationary
Log(EXR)	-2.300399	-6.700691	Maxlag=9	I (1)	Stationary
Log(INTR)	-2.963992	-5.408450	Maxlag=9	I (1)	Stationary
Log(INFR)	-3.577938	-	Maxlag=9	I (0)	Stationary
	1% level	-4.243644			
Test of CV	5% level	-3.544284			
	10% level	-3.204699			

Source: Author's own computation using E view 10

The above results suggest that real gross domestic product (RGDP) and inflation rate (INFR) were stationary at level, that is integrated of order zero [I (0)]. On the other hand, exchange rate (EXR) and interest rate (INTR) were stationary after taking their first differential, that is integrated of order one [I (1)]. The mixed order of integration suggests an underlying long run relationship; hence, the use of the autoregressive distributed lag (ARDL) approach is justified.

Cointegration Estimation (ARDL Bounds Test) for Model

The condition for using the ARDL is satisfied. Hence, the cointegration bounds tests employed and the F-statistic determine whether the variables have a long run relationship. ARDL integrates dynamics of the long run and short run without losing information about the long run.

Table 4.2: ARDL Bounds Test result for cointegration

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	26.82870	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Author's own computation using E view 10

Table 4.2 revealed the long-run relationship between the variables in model. The result indicated that the variable exhibits a long-run relationship. In other words, there is a long-run association among the variables in the model. This is indicated by the ARDL F-statistic value of 26.82870 which is greater than the 5% upper

bound (I1 Bound) value of 3.67. Thus, the null hypothesis of no long-run relationship exists" is rejected. This is a sufficient condition to estimate the conventional ARDL error correction model (ECM). The result of the ARDL ECM is presented in Table 4.3 below.

ARDL Estimates of the Long Run Regression

The results of the ARDL estimates of the long run relationship in the model are presented in tables 4.3.

Table 4.3. ARDL Long Run Regression Estimates for the Model

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXR)	0.711935	0.263644	2.700367	0.0131
LOG(INTR)	1.478485	0.822785	2.796929	0.0361
LOG(INFR)	0.900947	0.789859	1.140643	0.2663
C	0.743830	5.480689	0.135718	0.8933
EC = LOG(RGDP) - (0.7119*LOG(EXR) + 1.4785*LOG(INTR) + 0.9009				
*LOG(INFR) + 0.7438)				

Source: Author's own computation using E view 10

Table 4.4 above shows the long run position of the relationship between the dependent variable (Real gross domestic product RGDP) and the independent variables Exchange rate (EXR), interest rate (INTR) and inflation rate (INF). The coefficient of exchange rate (EXR), interest rate (INTR) and inflation rate (INFR) are all positively related to real gross domestic product (RGDP). But only exchange rate and interest rate have significant impact on economic growth in Nigeria under the period of study.

The ARDL error correction model result presented in Table 4.4 shows that the current value of exchange rate (EXR) has a positive effect on economic growth in Nigeria. This is seen from the result as the coefficient of exchange rate (EXR) has a positive coefficient of 0.711935. This implies that as exchange rate increase by 1 unit, it would result to about 0.711935 units increase in the outputs of goods and services produce in the economy of Nigeria all things being equal. The probability value of 0.0131 for exchange rate indicates significant level at 5 percent (0.05) level of significance. This is because the probability value is less than 5% level. Furthermore, the empirical result does not agree or conform to some empirical literature and economic theory.

Likewise, the current value of interest rate (INTR) has a positive impact on economic growth in Nigeria with a coefficient of 1.478485. This implies that if interest rate (INTR) increases by 1 unit, this would lead to increase in outputs of goods and services by 1.478485 all things being equal. This result is not in agreement with our expected result and as well with some empirical results. The probability value of 0.0361 for interest rate indicates significant level at 5 percent (0.05) level of significance as the p value is less than 5 percent significant level.

Finally, table 4.4 further revealed that the current value of inflation rate has a positive effect on economic growth in Nigeria as the coefficient of Log(INFR) has a positive value of 0.900947. This result conforms to apriori or theoretical expectation as increase in inflation rate (INFR) would lead to an increase in the output of goods and services. The positive value of 0.900947for inflation rate (INFR) indicated that a one percent

increase in the general price level would result to about 0.900947 units increase in outputs of goods and services, holding every other variable constant. The corresponding probability value of 0.2663 showed that inflation rate does not have statistical and significant impact on economic growth at 5 percent as the probability value is greater than 0.05.

ARDL-ECM Test for Short Run

Since the results of the ARDL Bound test of the model indicated that a long-run cointegration relationship existed among the variables, the ARDL-ECM test was carried out to adjust for the short run. The results obtained are presented in tables 4.4.

Table 4.4 ARDL Error Correction Regression for Model

ARDL Error Correction Regression				
Dependent Variable: DLOG(RGDP)				
Selected Model: ARDL(1, 0, 1, 4)				
Case 2: Restricted Constant and No Trend				
Date: 23/11/24 Time: 05:33				
Sample: 1986 2023				
Included observations: 32				
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(INTR)	-0.034401	0.019472	-1.766682	0.0912
DLOG(INFR)	-0.047966	0.008475	-5.659732	0.0000
DLOG(INFR(-1))	0.043610	0.008356	5.218730	0.0000
DLOG(INFR(-2))	-0.000617	0.007702	-0.080161	0.9368
DLOG(INFR(-3))	0.020956	0.007776	2.694880	0.0132
CointEq(-1)*	0.053041	0.004213	12.59100	0.0000
R-squared	0.709253	Mean dependent var		0.041582
Adjusted R-squared	0.653340	S.D. dependent var		0.038628
S.E. of regression	0.022744	Akaike info criterion		-4.561708
Sum squared resid	0.013449	Schwarz criterion		-4.286883
Log likelihood	78.98733	Hannan-Quinn criter.		-4.470612
Durbin-Watson stat	2.556802			

* p-value incompatible with t-Bounds distribution.

Source: Author's own computation using E view 10

The short run relationship between the explanatory variables (EXR, INTR and INFR) and the dependent variable (RGDP) is explained by estimating the ARDL Error Correction Model. Table 4.4 explained the short run effects of changes in the explanatory variables on economic growth in Nigeria stated in the model. The

model exhibits a high explanatory ability of 0.709253, implying that 71 percent of change in the outputs of goods and services was explained by exchange rate (EXR), interest rate (INTR) and inflation rate (INFR) as stated in the model. The error correction factor (ECM) integrates the short run dynamics with that of the long run dynamics. The error correction term ECM_{t-1} indicates the speed of adjustment from a short run deviation to the long run equilibrium. The coefficient of the ECM_{t-1} is negative (0.053041), supporting the ARDL bounds test result of cointegration. The results indicated that about 5 percent of the previous year's deviation from the long run equilibrium will be restored within a year. Furthermore, the result revealed that the Durbin-Watson (DW)-statistic of 2.193440 indicates that there is no serial correlation.

Pesaran, Shin and Smith (2001), suggested that the stability of the estimated coefficient of the error correction model should also be graphically investigated. A graphical representation of the Cumulative Sum (CUSUM) and the Cumulative Sum of Square (CUSUMSQ) of the Recursive Residual are also established. The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) plots which is shown in figure 4.7A and 4.7B respectively is a recursive estimation of the model that indicate stability in the coefficient over the sample period.

Diagnostic tests for the Model

The tests for normality, autocorrelation/serial correlation, heteroscedasticity, functional form specification normality and absence of I (2) variable are necessary. Stability of ARDL model was tested by using the recursive residuals (CUSUM). The null hypothesis of stability of the model parameters against the alternative of their instability. Normality test include Jaque Bera test, Heteroscedasticity tests include the Breusch-Pagan-Godfrey test, the ARCH LM test and the white heteroscedasticity test. Serial correlation and the functional form are tested using the LM serial correlation test and CUSUM test, respectively. These test results are summarized in different tables and figure. They are used to avoid specification problems and ensure the correctness of the model.

Normality Test (Jaque-Bera Test)

Figure 4.3 Normality Test

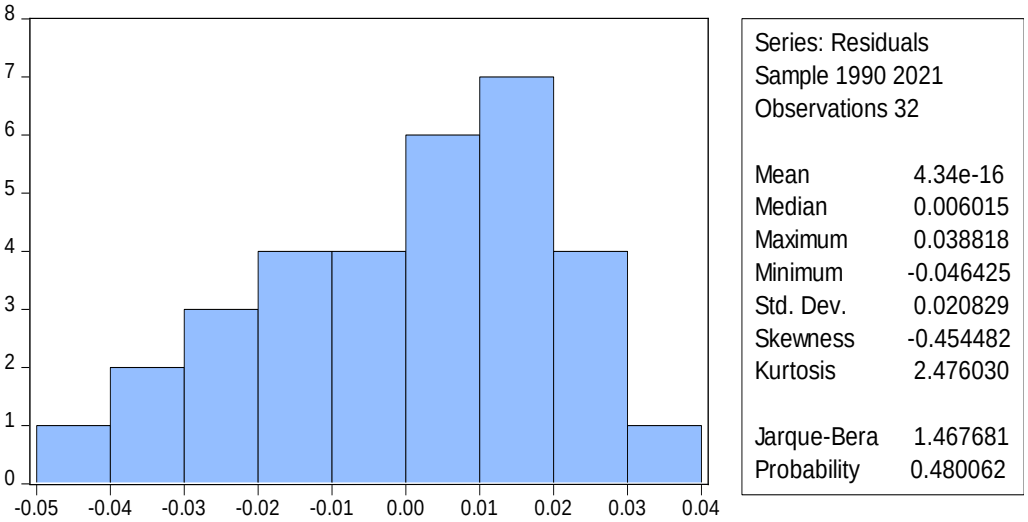


Figure 4.2 shows that the residuals of the estimated model in this study are normally distributed. This is because the Jarque-Bera statistic value of 1.467681 and its corresponding probability value of 0.480062 are not statistically significant under the 5% level of significance. Thus, the hypothesis of the residuals not being normally distributed is rejected. Therefore, we conclude that the variables in the model is normally distributed.

DISCUSSION OF FINDINGS

The over parameterized model from which the parsimonious Error Correction Mechanism (ECM) emanated is presented in table 4.4. The examination of the econometric models in Table 4.4 above shows that exchange

rate (EXR), interest rate (INTR) and inflation rate (INF) variables explains 73% of the total variations in economic growth in Nigeria. This is indicated by the values of the R^2 (0.7278). Given the F-values of 13.4786, reveals that the overall regression is statistically significant, while the Durbin–Watson statistics of 1.8356 indicated the absence of serial autocorrelation using the approximated value of 2 as the bench mark.

Also, the equation's standard error of 0.01887 signifies that in about half of the time, the predicted value of economic growth in Nigeria would be within 1.8% of the actual value.

As shown in Table 4.4, revealed that the variable exchange rate have the expected signs and conform to economic theory as well as significant both at the 1% and 5% levels of significant. Also interest rate (INTR) and inflation rate (INF) have the expected signs and do conform to economic theory and is also statistically significant using their probability values of 5 percent.

The coefficient of the error correction term is statistically significant and carries the expected negative sign at both 5% and 1% level of significant. However, the speed of adjustment is low, that is 5.3% of the adjustment to equilibrium economic growth expected to occur in the long run.

Further, this figure shows the average speed of adjustment of GDP that will move to its long-run change in the equilibrium conditions. This result indicates that ignoring error correction in non-stationary time series analysis would lead to misspecification of the underlying process to achieve true investment determination in the Nigerian economy.

Conclusively, we submit that result shows a long run relationship between exchange rate and economic growth in Nigeria.

CONCLUSIONS AND RECOMMENDATIONS

This research study examined the impact of exchange rate on economic growth from 1986 to 2023. The result revealed that exchange rate interest rate and inflation rate have positive impact on economic growth and significant which affirms to previous studies that developing countries are relatively worse off in the choice of flexible exchange rate regimes and high inflation rate. From the empirical reviewed work, some authors argued that exchange rate, interest rate and inflation rate are positively related to economic growth, while some authors argued that it is negatively related. However, from empirical analysis of the study, it was found that exchange rate is positively related to output growth.

Sequel to the finding of this study, we specifically made the following policy recommendations to the maintenance of stable exchange rate. To control exchange rate from fluctuating, these policy measures have to be adopted.

i. The government should encourage the export promotion strategies in order to maintain a surplus balance of trade.
ii. An effective policy should be made based on the fiscal and monetary policies which should be aimed at achieving a realistic exchange rate for naira.
iii. Strict foreign exchange control policies are adopted in order to help in determination of appropriate exchange rate value. This will go a long way to strengthen the naira.
iv. Interest rate should be at a minimum, in order for the purchasing power of an average Nigeria to increase.
v. Finally, the government should influence the foreign exchange rate, by positive economic reforms that will reduce the adverse effect of unstable foreign exchange rate on the Nigerian economy with respect to trade flow.

REFERENCES

1. Abdu, M., Umar, M. R., Mohammed, B. & Ajannah, J. M. (2021). Exchange rate fluctuations and economic growth nexus: An empirical evidence from Nigeria. Asian Journal of Economics, Finance

and Management, 5(2), 33 – 40.
2. Adebayo, K., Okeke, C. U., & Iwu, E. (2023). The role of human capital development in sustaining economic growth in Africa. Economic Research Journal, 18(4), 101-120.
3. Adelowokan, O. A. (2012) "Exchange Rate Pass-Through in Nigeria: A Dynamic Evidence". European Journal of Humanities and Social Sciences. Vol. 16, no.1, pp. 785 – 801.
4. Adeniyi, A. P. & Olasunkanmi, A. O. (2019). Impact of exchange rate volatility on economic growth in Nigeria (1980-2016). International Journal of Management Studies and Social Science Research, 1(4), 6 – 14.
5. Afolabi, A. A., Adeoye, B. W., & Olayemi, K. O. (2022). Exchange rate volatility and economic growth in Nigeria: Evidence from ARDL bounds testing approach. African Economic Review, 10(2), 45-67.
6. Akinyemi, E., & Ogundipe, A. (2021). The impact of exchange rate regimes on macroeconomic performance: Evidence from Nigeria. Journal of African Studies, 15(3), 112-129.
7. Baghebo M. and Mienebimo K. (2024). balance of trade, exchange rate and economic growth in Nigeria. Advance Journal of Economics and Marketing Research Adv. J. Econ. & Mark Res. Volume: 9; Issue: 4.
8. Central Bank of Nigeria (CBN). (2023). Annual Economic Report 2022. Abuja: Central Bank of Nigeria.
9. Ezeaku, H. C., Chidiebere, M., & Onuoha, J. (2022). Exchange rate volatility and economic growth: Evidence from Nigeria. African Development Review, 34(1), 45-58.
10. Ezeaku, H. C., Chukwuemeka, I. U., & Okonkwo, T. E. (2023). Exchange rate management and economic stability in Nigeria: Policy perspectives and challenges. Economic Research Letters, 8(1), 25-40.
11. Godwin A. A. & Sergius N. U. (2021). Exchange rate and economic growth in Nigeria. Advance Journal of Management and Social Sciences Volume: 5; Issue: 05.
12. International Monetary Fund (IMF). (2023). Nigeria: Country Report on Debt Sustainability. Washington, DC: IMF.
13. Mahonnye, N., & Tenda, Z. (2019). Exchange rate impact on output and inflation: A historical perspective from Zimbawe.
14. Mordi, C. N. O. (2022). Exchange rate policies in Nigeria: A historical perspective. Central Bank of Nigeria Economic and Financial Review, 60(1), 21-39.
15. Najeem, A. O. (2024). The Impact of Exchange Rate Fluctuation on Nigeria Economy Growth. IRE Journals | Volume 8 Issue 2 | ISSN: 2456-8880.
16. Obi, O. C., Amadi, S. N., & Ude, U. M. (2022). The implications of exchange rate depreciation on the Nigerian economy: A sectoral analysis. Nigerian Journal of Economic Policy, 9(4), 77-92.
17. Olaniyi, S., & Ogundipe, A. (2023). Exchange rate policy and its impact on Nigeria's economic growth. Journal of Economic Policy, 15(2), 87-101.
18. Onabote, A. A., Adama, I. J., Obasaju, B., et al, (2022). Exchange Rate, Foreign Direct Investment and Economic Growth Nexus in Nigeria. International Journal of English Literature and Social Sciences Vol-7, Issue-1.
19. Onwuliri, O. C., Oshiole, S., Nwankwo, U. C., Nwakeze, E. O. and Okorie, I. C. (2024). Foreign Exchange Rate Exposure Mitigation and Connection to Economic Growth: The Nigerian Experience (2019 - 2023). Afropolitan Journals.
20. Paul E. O. & Sylvester O. (2022). The influence of exchange rate fluctuation on economic growth in Nigeria. Research Gate. See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/365858540.
21. Sakiru, O. A., Oladapo F., Jayeola O. & Olutunji T., (2019). Impact of exchange rate on economic growth in Nigeria (1981-2016): an ARDL approach. The Journal Contemporary Economy Revista Economia Contemporană.
22. Umeh, J., & Onyekachi, F. (2023). Economic diversification and its impact on sustainable growth in Nigeria. African Journal of Economic Studies, 20(3), 67-85.
23. World Bank. (2023). Nigeria Development Update: Strengthening Economic Resilience. Washington, DC: World Bank.