

EFFECT OF FOREIGN EXCHANGE RATE ON ECONOMIC GROWTH IN NIGERIA

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Abstract

This study examined the effect of exchange rate on gross domestic product (GDP), as a proxy of economic growth with inflation rate, interest rate and trade balance as determinants of the exchange rate. Secondary data from the Central Bank of Nigeria (CBN) Statistical Bulletin collected for a period of thirty-three years, 1990-2023 was used. Ex-post facto research design was applied. 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 there is no significant effect of inflation rate on Nigeria's Gross Domestic product (GDP), interest rate and trade balance have positive effect on Nigeria's Gross Domestic Product (GDP). This implies that interest rate and trade balance affect economic growth in Nigeria. The study also demonstrates that exchange rate fluctuations is pivotal to the economic growth of Nigeria, other economic variables used in this study exchange rate((EXR), interest rate (INR), inflation rate (INF)and trade balance (TB) may result in a direct effect on the Nigerian economic growth. The study concludes that interest rate and trade balances should be handled with utmost concern by policymakers to avoid unnecessary variations that may inflict unbearable economic hardships on the Nigerian people. The study recommends that government should focus on strategies to improve its trade balance, including promoting exports, reducing reliance on imports, encourage diversification and implement a robust monetary policy aimed at controlling inflation to enhance the living standard of Nigerians.

Keywords: Exchange Rates, Interest Rates, Inflation Rate, Trade Balance, Economic Growth

INTRODUCTION

Foreign exchange rate fluctuations have a significant, negative long-run effect on Nigeria's economic growth, driven by erosion in the value of naira, high import dependence, and volatility (Obi, *et al*, 2022). While short-term effects may vary, continuous depreciation increases production costs, drives inflation, and decreases investor's confidence. Mordi, (2022) defined exchange rate as the price of one country's currency expressed in terms of another and serves as a critical indicator of economic stability and competitiveness. The exchange rate of Nigeria which is an oil-dependent economy 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 (Ogodo Paul, Egbaseimokumo , 2025) .

Exchange rate policy involves choosing where foreign transaction will take place. Exchange rate policy is therefore a component of macroeconomic management policies, the monetary authorities in any given economy use to achieve internal balance in medium run. Specifically internal balance means the level of economic activity that is consistent with the satisfactory control of inflation. To expedite the attainment of predetermined macroeconomic objectives, the exchange rate is a crucial macroeconomic variable in the formulation of both broad economic policies and targeted reform programs. Previous studies on effects of exchange rates and economic growth in Nigeria have yielded mixed results, with some identifying a positive effects while others suggest negative effects depending

on the prevailing macroeconomic conditions (Onwuliri, *et al.*, 2024; Afolabi *et al.*, 2022; Baghebo and Mienebimo 2024; Obi, *et al.*, 2022).

These differences generate the impulse for a comprehensive understanding of the mechanisms through which exchange rate movements affect economic performance in Nigeria. This study intends to fill these gaps by examining the effects of exchange rate fluctuations on Nigeria's economic growth. Specifically, it aims to analyze the effect of exchange rate volatility on key economic indicators such as Gross Domestic Product (GDP), effect of interest rate on the Gross Domestic Product (GDP), effect of trade balance on the Gross Domestic Product (GDP). By noting major factors contributing to exchange rate instability and its implications for the economic growth of Nigeria, this study provides valuable insights for policymakers and stakeholders in designing effective strategies to promote sustainable growth and macroeconomic stability in Nigeria.

The main objective of the study is to show the effect of exchange rate on gross domestic product and hence how this affects the economic growth of the country using indicators such as inflation rate, interest rate and trade balance on the Gross Domestic Product (GDP) in Nigeria.

2. LITERATURE REVIEW

This section explains the conceptual clarification, theoretical frameworks and empirical literature. Inflation rate is the rate at which prices increase over time, resulting in a fall in the purchasing value of the money. Generally, an economy with a steadily lower inflation rate is characterized by an increase in the buying intensity of the home currency comparative expansion rate experience a deliberate reduction in their money corresponding to the market degree of their exchanging counterparts. This is generally connected by an increased credit fee. An interest rate is the price an entity pays for borrowing money or the fee they charge for lending it, expressed as a percentage. In a loan, the interest rate is the percentage of interest relative to the principal. It is either what lenders charge borrowers or what is earned from deposit accounts. The interest rate on a loan is typically noted on an annual basis and is expressed as an annual percentage rate. Higher interest rates give lenders in an economy high level of return on their investments compared to other nations. This is because higher interest rates attract foreign investment and cause the rate of exchange to rise. i.e. the value of the home currency rises against the currencies of other countries.

The current record is the balance of trade connecting a country and its trade associates, reflecting all portions between the trading countries for stock, organizations, interest, and benefits. In this manner, a setback in the current record shows that the country is spending more on new trade i.e. importation, then it earns from exports. Thus, the country is forced to borrow capital from unfamiliar sources to cover the deficiency. A nation's debt ranking is an important aspect of its exchange rate. Countries partake in huge-scale deficit financing to execute national infrastructure and support government funding. Although such activities help stimulate the home economy, countries with huge government debts are less appealing to outside shareholders. A huge public obligation could bring about expansion. The administration may print more cash to balance part of the obligation, bringing about an expansion in cash flexibly in the economy, which would inevitably result in inflation. In a case where the government is unable to support its shortfall through homegrown methods, for example, selling overlaid edged securities and expanding cash gracefully, it must build the flexibly of protections available to be purchased to foreign investors, thereby lowering the price of these securities, and devaluing the home currency relative to foreign currencies. Hence the debt will be taken care of and paid off with less real dollars in the future. It is important to note that foreign investors are less ready to possess government protections designated in the nation of origin on the off chance that the threat of default by the country is high. Henceforth, a country's commitment rating is huge. Terms of trade (TOT) measures a country's export prices relative to its import prices, expressed as the ratio of an export price index to an import price index, often multiplied by 100. It indicates the purchasing power of a nation's exports, with a ratio over 100 representing a favorable, improved position.

Formula for Terms of Trade:
$$\frac{(\text{Index of Export Prices})}{(\text{Index of Import Prices})} \times 100$$

However, where there is a rise in the price of a country's exports relative to its import prices, the home country will experience a decline in volume of exports and an increase in demand for foreign goods, resulting in a fall in the value of the home currency against the foreign country's currency. The trade balance which is also known as balance of trade is the difference between a country's imports and export. It helps to provide insight into a nation's economy and can give clues about a country's currency valuation. The balance of trade influences currency exchange rates through its effect on foreign exchange supply and demands. When a country's trade account does not net to zero- that is, when exports are not equal to imports- there is relatively more supply of demands for a country's currency on the world market.

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. Purchasing Power Parity theory under an arrangement of inconvertible paper money, the pace of trade between two monetary forms is controlled by the general buying forces of the two monetary forms in their separate nations. There are two forms of the PPP hypothesis- the absolute variant and relative rendition. As per the outright form of the PPP hypothesis, the pace of trade is dictated by the proportion of insider buying intensity of the unfamiliar cash and the inner buying intensity of the homegrown money. The pace of trade will be in balance when the buying influence of cash is equivalent in both exchanging nations.

This is represented mathematically as follows.

$$R = P_a.Q_o/P_b.Q_o$$

Where R = Exchange rate between Country A and Country B

P_a = Price in Country A

P_b = Price in Country B

Q_o = Same Quantity of goods in both countries

Empirical studies show the limitations of PPP in Nigeria due to structural and institutional factors. For example, some economists argued that the naira's exchange rate does not always adjust to reflect inflation differentials due to speculative activities and government interventions in the foreign exchange 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

This theory postulates 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. Nigeria's mono economy is of particular concern to the balance of payment theory due to its dependence on oil exports, which account for over 90% of foreign exchange earnings. In era of high oil prices, Nigeria experiences a trade surplus, leading to increase in the value of naira. However, when oil prices fall, the country faces trade deficits, currency instability, and economic down turn. For example, the oil price contraction of 2015-2016 caused a significant devaluation of the naira, triggering inflation and a recession (CBN, 2016). Studies like, Adebayo *et al.*, (2022), demonstrates that exchange rate volatility resulting from external shocks to the balance of payment has a major effect on Nigeria's economic growth. The study

explained the need for diversification to reduce reliance on oil exports and stabilize the balance of payment.

The balance of payment theory remains very essential in understanding Nigeria's exchange rate dynamics. However, Nigeria's 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 literature:

In the empirical literature, studies have been highlighted on the link between exchange rate and the economic growth. Some of the empirical studies are presented below.

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 used. 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 had no significant effect 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 better.

Onabote, Adama, Obasaju,(2022) carried a study on the relationship among exchange rate, foreign direct investment and economic growth . The study adopted Autoregressive Distributive Lag (ARDL) technique to examine the long-run co-integrating 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 that the Nigerian government should 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.

Najeem (2024) investigated the effect of Exchange Rate Fluctuation on Nigeria Economy Growth. The study utilizes both quantitative data, sourced from the Central Ban 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 effect 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.

RESEARCH METHODOLOGY

The research applies an ex-post facto design, relying on historical data without manipulation of the relevant variables. The data used for this study are annual times series from 1990-2023. They are sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin (2023). The investigation utilizes the Ordinary Least Square (OLS) technique. The technique is chosen since it is a basic liner regression model. In a straightforward regression model, there is just a single autonomous variable.

Mathematically, it is represented as follows.

$$Y = b_0 + b_1X + u$$

Where. Y = the dependent variable; b_0 = the intercept;

b_1 = the slope.

X = the autonomous variable.

$$GDP = b_0 + b_1EXR + b_2INT + b_3INF + b_4TB + u$$

Where the GDP represents the economic growth of Nigeria,

EXR represent exchange rate.

INR represents interest rate.

INF represents inflation rate.

TB represents Trade Balance.

u is the stochastic or error term.

The study also employs the Augmented Dickey Fuller test, Co-integration. Augmented Dickey Fuller is used to test for the stationarity (or trend stationarity) of time series. That is, it is used to ascertain whether a series is stationary or non-stationary.

Hypothesis for the test is as follows:

H0: there is unit root. Series is non-stationary

H1: the time series is stationary (or trend stationary). Co-integration tests analyze the long-run parameters or equilibrium in a system with unit root variables. It follows the assumption that the variance and means of a given series are constants, independent of time. It is used to determine the existence of a correlation between two or more time series in the long run. The test is also used to identify the level of sensitivity exhibited by two or more variables to another variable in a given model. The most dominant co-integration tests are the Engle-Granger Test, Johansen Test and the Phillips-Ouliaris test. In this study the Engle-Granger test is applied in the analysis. The Granger causality test is used to investigate causality between two variables in a time series. This approach employs empirical data to find patterns of correlation between two variables.

RESULTS AND DISCUSSIONS

The empirical results obtained using the EVIEWS9 software and Augmented Dickey-Fuller (ADF) Unit Root Test is presented in **Table: 4.1** below.

Table 4.1: ADF unit root test result

Variables	Test Statistic At Level		Test Statistic At 1 st Difference		Order Of Integration
	ADF	Critical Value At 5%	ADF	Critical Value At 5%	
LNGDP	-0.426519	-2.954021	-4.451060	-2.957110	I(1)
EXR	-3.303246	-2.957110			I(0)
TB	-3.237752	-2.954021			I(0)
INF	-2.154724	-2.954021	-4.349640	-2.960411	I(1)
INT	-3.450157	-2.954021			I(0)

Source: Author's Compilation using EVIEWS9

Table 4.1 depicts the stationarity level of the variable used in the model. It is observed that at 5 percent level of significance of the variables, LNGDP, and INF are stationary at first difference I(1), while EXR, TB, and INR are stationary at level I(0), since the test statistics is greater than the 5% critical values in absolute term. Therefore, it provides a justification for the use of Autoregressive Distributed Lag (ARDL) model. ARDL bound co-integration test was performed to ascertain the existence of long-run or equilibrium relationships among the variables. We rejected the null hypothesis of no co-integration among the variables if the computed F-Statistic is greater than the critical value of the I(1) bound at 5% and accepted the null hypothesis if the computed F-Statistic is lower than the critical value of the I(0) bound at 5%.

Table 4.2: ARDL Bounds Test

TEST STATISTIC	VALUE	K
F-STATISTIC	4.670238	4
CRITICAL VALUE BOUNDS		
SIGNIFICANCE	I(0) BOUND	I(1) BOUND
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's Compilation using EVIEWS9

Table 4.2 shows the computed f-statistics (4.670238) is greater than the upper and the lower bounds at 5% significant level. Therefore, there is co-integration and there exists a long-run relationship among the variables.

Table 4.3: Estimated Short-Run Coefficients of ARDL Model
Dependent variable: LOGGDP

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	0.024727	0.031257	0.791097	0.4431
TB	0.234590	0.543645	0.915080	0.3768
INF	0.228297	0.463415	0.492641	0.6305
INR	0.370599	0.739360	0.501244	0.6246
C	12.419011	23.180106	0.535762	0.6012

Source: Authors' Computation using EVIEWS

R-squared	0.998440
Adjusted R-squared	0.996519
F-statistic	519.8792
Prob (F-statistics)	0.000000

From **Table 4.3**: Official Exchange Rate (EXCR) increases LNGDP by 0.024727; Trade Balances (TB) increases LNGDP by 0.234590; Inflation Rate (INF) increases LNGDP by 0.228297; and Interest Rate (INR) increases LNGDP by 0.370599. These values are statistically insignificant because their absolute t-statistics are less than 1.96 respectively.

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). Normality test include Jaque Bera test, Heteroscedasticity tests include the Breusch-Pagan-Godfrey 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 **Tables 4.4, 4.5 and 4.6 and Figures 4.1, 4.2 and 4.3** below.

Table 4.4: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.619508	Prob. F(2,25)	0.5463
Obs*R-squared	1.558273	Prob. Chi-Square(2)	0.4588

Source: Author's Computation Using EVIEWS 9

Table 4.5: Variance Inflation Factors

Variance Inflation Factors			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
LNGDP(-1)	0.003087	3671.601	5.479513
EXR	1.83E-07	12.42219	4.437530
TB	2.43E-24	2.202028	1.667601
INF	8.53E-06	8.787938	3.837884
INR	2.46E-05	4.483482	4.135620
C	1.843620	3283.914	NA

Source: Author’s Computation Using EVIEWS 9

Table 4.6: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.229114	Prob. F(5, 34)	0.0756
Obs*R-squared	21.98616	Prob. Chi-Square(5)	0.1436
Scaled explained SS	2.858605	Prob. Chi-Square(5)	0.9999

Source: Author’s Computation Using EVIEWS 9

The probability value of 0.1436 and 0.9999 are greater than 0.05 and as such we do not reject the null hypothesis and conclude that there is heteroskedasticity among the variables.

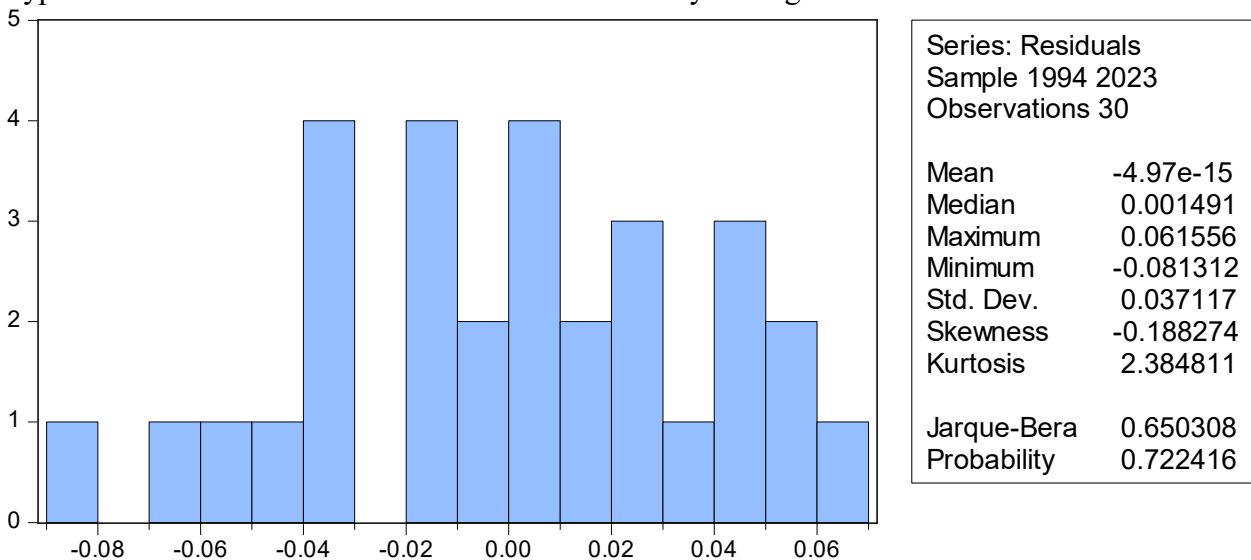


Figure 4.1 Normality Test

The Jarque-Bera value of 0.650308 is greater than 0.05 and as such we do not reject the null hypothesis and concluded that the variables are normally distributed.

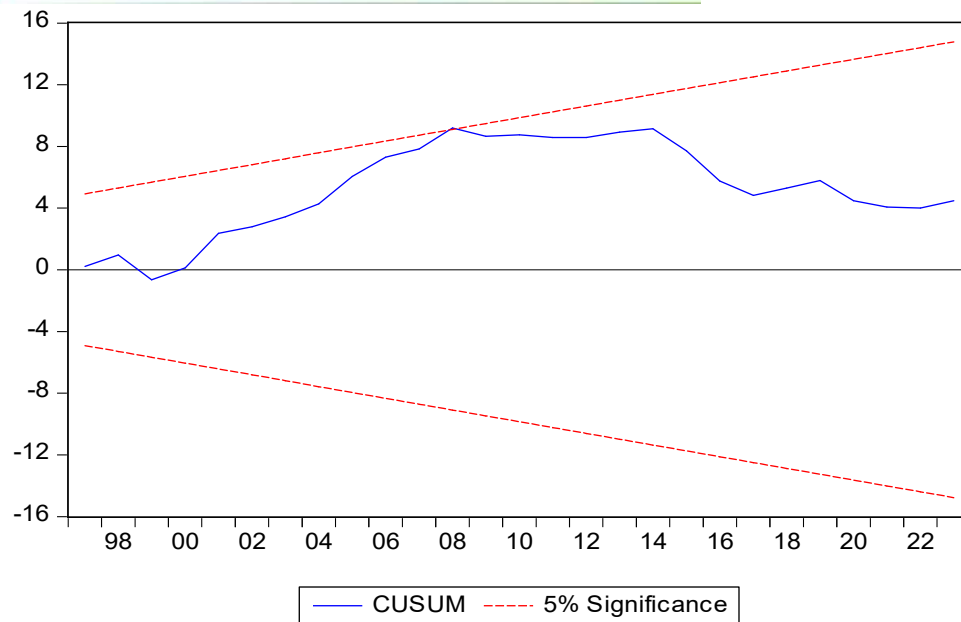


Figure 4.2 Cumulative of Sum

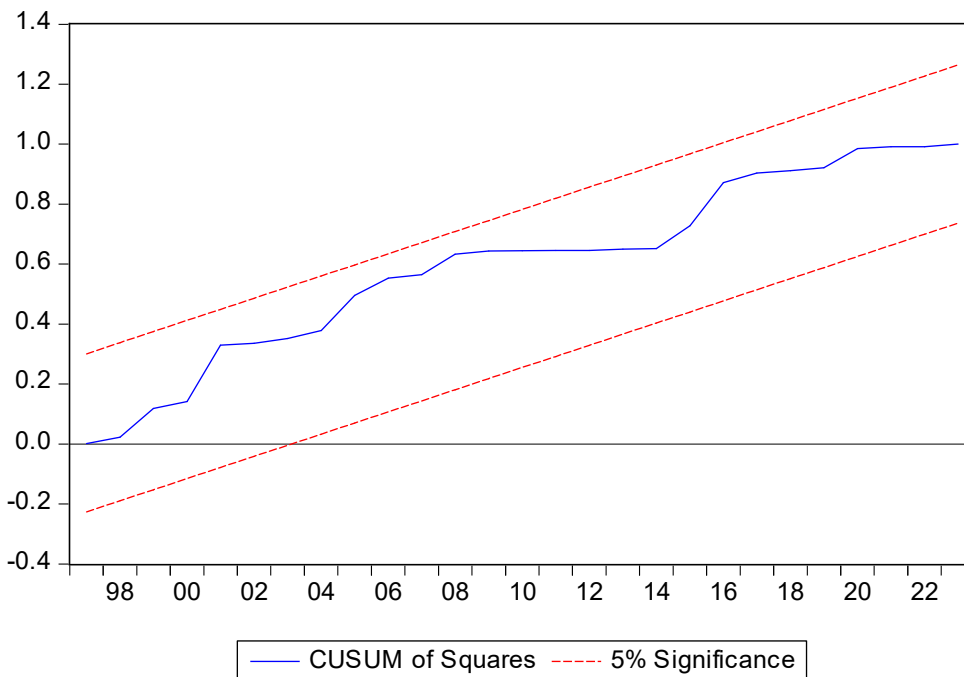


Figure 4.3 Plot of cumulative sum of square of residuals

Since the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) fall within 5% bounds, it shows that the model is stable.

Estimation of Employed Hypotheses

H₀: There is no significant effect of inflation rate on Nigeria’s Gross Domestic product (GDP).

H₁: There is a significant effect of inflation rate on Nigeria’s Gross Domestic Product (GDP).

Decision: Given that the absolute t-statistics of 0.492641 is less than 1.96, we do not reject H₀, and concluded that there is no significant effect of inflation rate on Nigeria’s Gross Domestic product (GDP). Thus, there exists an insignificant relationship between inflation rate and the economic growth in Nigeria.

Test of Hypothesis 2

H₀: Interest rate does not have an effect on Nigeria’s Gross Domestic Product (GDP).

H₁: Interest rate has an effect on Nigeria’s Gross Domestic Product (GDP).

Decision: Given that a percentage increase in interest rate increases LNGDP by 0.370599, we rejected H_0 , and concluded that interest rate has an effect on Nigeria's Gross Domestic Product (GDP). Therefore, there exists a positive relationship between interest rate and economic growth in Nigeria.

4.7.3: Test of Hypothesis 3

H₀: Trade Balance does not have an effect on Nigeria's Gross Domestic Product (GDP).

H₁: Trade Balance has an effect on Nigeria's Gross Domestic Product (GDP).

Decision: Given that a percentage increase in trade balance increases LNGDP by 0.234590, we rejected H_0 and concluded that trade balance has an effect on Nigeria's Gross Domestic Product (GDP). Therefore, there exists a positive relationship between trade balance and the economic growth in Nigeria.

Discussion of results

From the results presented in Tables 4.1 and 4.2, Augmented Dickey-Fuller adopted in testing the unit root property of the series revealed that at 5 percent level of significance, LNGDP and INF are stationary at first difference $I(1)$, while EXR, TB, and INR are stationary at level $I(0)$, which gave a justification for the use of the Autoregressive distributed lag model. The long-run relationship among the variables in our model was determined using the ARDL Bounds Test approach to co-integration and the results showed that there exist a long-run relationship between the independent variables and Economic growth in Nigeria.

The ARDL long run coefficient was used to study the relationship between the independent variables and the dependent variable. In the ARDL model, the R^2 0.998440 shows 99.8% of the dependent variable is predicted by the independent variables. From the results, the absolute t-statistics of 0.492641 is less than 1.96; this showed that there is no significant effect of inflation rate on Nigeria's Gross Domestic product (GDP). Thus, there exists an insignificant relationship between inflation rate and the economic growth in Nigeria.

Given that a percentage increase in interest rate increases LNGDP by 0.370599, we concluded that interest rate has an effect on Nigeria's Gross Domestic Product (GDP). Therefore, there exists a positive relationship between interest rate and economic growth in Nigeria. Given that a percentage increase in trade balance increases LNGDP by 0.234590, this implied that trade balance has a positive effect on Nigeria's Gross Domestic Product (GDP). Therefore, there exists a positive relationship between trade balance and the economic growth in Nigeria,

Further, **figure 4.2** shows that the model is stable, since the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) fell within 5% bounds. This result indicates that ignoring error correction in non-stationary time series analysis would lead to misrepresentation of the underlying processes to achieve true investment determination in the Nigerian economy.

In conclusion, our results show that interest rate and trade balance have effect on economic growth of Nigeria.

CONCLUSIONS AND RECOMMENDATIONS

The study examined the effect of inflation rate, interest rate and trade balance on the Gross Domestic Product (GDP). The results revealed that inflation rate has effect on Gross Domestic product (GDP) while interest rate and trade balance have effect on Gross Domestic Product (GDP) of Nigeria. Therefore, interest rate and trade balance have effect on the economic growth in Nigeria.

Our findings are in tandem with the empirical reviewed work, where some scholars argued that inflation rate; interest rate and trade balance have effect on economic growth in Nigeria, while other scholars are of the view that they do not have effect on the economic growth in Nigeria.

In line with the findings of this study, the following recommendations are made:

- i. It is important for policymakers in Nigeria to stabilize the exchange rate to improve investors' confidence, reduce uncertainty, and promote economic activity.
- ii. Nigeria government should focus on strategies to improve its trade balance, including promoting exports, reducing reliance on imports and encourage diversification of export products.

- iii. It is crucial to implement a robust monetary policy aimed at controlling inflation within manageable levels.
- iv. The CBN should ensure that interest rates are conducive to investment while also controlling inflation.

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