

Effect of Exchange Rate Volatility on Nigerian Economic Growth

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Abstract

Purpose: The research work investigates the effect of exchange rate volatility on economic growth of Nigeria.

Methodology: The study utilizes secondary source of data that covers twenty-six (26) years, from the year 2000 to 2025. These periods represent more than two decades of sustained constitutional democratic governance in Nigeria, characterized by the uninterrupted operation of democratic institutions and civilian administration exposing the economy to persistent currency fluctuations and external and domestic economic shocks. The research work adopts robust time series econometric regression technique for data analysis.

Results and conclusions: The results of the research work revealed that exchange rate volatility has negative effect on Nigerian economic growth. This indicates that one unit increase in the exchange rate, Nigerian Gross Domestic Product will decrease at a determinable rate. The study also reveals that population growth rate and public expenditure have positive effect on the Nigerian economic growth but trade openness has a negative effect on the Nigerian economic growth but is statistically insignificant. In conclusion, exchange rate volatility has significant effect on the Nigerian economic growth.

Implication of findings: This research work highlights the suitability of exchange rate regime on the progress of national economy. An unstable exchange rate regime can have adverse effects on economic performance by increasing the cost of imported raw materials and discouraging cross-border trade and investment. In contrast, exchange rate stability can help the government manage external financial obligations, reduce the cost of imports, improve the balance of trade, and strengthen the economy's capacity to absorb and adjust to external shocks.

Keywords: Currency Depreciation, Exchange rate, Exchange Rate Volatility, Gross Domestic Product, and Macroeconomic.

1. Introduction

On May 29, 2024, the Federal Republic of Nigeria marked 25 years of continuous democratic governance. The country's leadership framework is guided by the Constitution, which also emphasizes economic liberalization and the protection of citizens' fundamental rights. Throughout this period of democratic rule, successive Nigerian administrations have implemented various policies and programs aimed at attracting both domestic and international businesses to expand their operations, thereby fostering economic growth and development.

Trade across the country, financial liberalization policies, and other forms of business dealings that involve two or more countries is gaining more consideration, it pave ways for economic successes, technological advancement, acquisition of required educational qualification for man power development among others. However, the bottom line is the issue of exchange of a domestic currency for a foreign currency in order to fulfill specific demands since there is limitation for the developing economies currencies in serving the purpose of medium of exchange.

Some of the variables for the measurement of economic successes include inflation rate, unemployment rate, infrastructural development, significant growth in export earnings with decrease from costs of importation, and stable exchange rate. In terms of the exchange rate, many believed that the principal factor or determinant factor of prices of essential commodities is the exchange rate. In Nigerian

experience, there has been steady increase in the prices of goods and services with no effective and efficient policies from the government to prevent that from recurring.

A major point of concern is that foreign exchange rate has two regimes. The fixed or pegged exchange rate regime and the floating otherwise referred to as the un-pegged exchange rate regime. For the two regimes each has advantages and disadvantages. It depends on the one for government policy decision. As the government move from one foreign exchange rate regime policy to another caused unstable foreign exchange rate, in another words, foreign exchange volatility. Precisely, exchange rate volatility means fluctuation in exchange rate on the basis of short term and it could be positive or negative and it originates from floating exchange rate regime (Oyovwi, 2012).

According to Barguelli et al. (2018), persistent movement from one exchange rate regime to another referred to as exchange rate volatility, this has drawn the attention of researchers to investigate the cause and recommend the way forward due to its effect on Nigerians or the economy by extension the citizens. According to Bahmani-Oskooee and Hegerty (2013), Exchange rate volatility has become a significant area of concern in both developed and developing economies due to its potential effects on export performance, employment, international trade, inflation, investment activities, and overall economic growth. In addition, Yensu et al. (2022) state that in the past four decades, in academics, as well as international money and finance communities, the subject for heated debates was focused on the relative merits of fixed versus floating exchange rates. One of the noteworthy indicators of economic growth is exchange rate volatility, including global trade and economic integration (Niyonsaba, 2023)

Chiadikobi et al. (2022) claim that policymakers equally concentrate on unfavorable effects of speculative attacks and or the invasive effects of exchange rate fluctuation on the economy and macroeconomic policy objectives of price stability, employment, economic growth, and external viability. The policymakers in this context as mentioned above are not far enough from the Management of government-owned institutions, ministries, departments, established commissions, and agencies. Privately owned multi-national companies fall in this category. According to Adeniran et al. (2014), exchange rate volatility experienced significant increase, due to return to democratic system of government from 1999; there have been policy switch from a fixed exchange rate to a floating exchange rate in order to alleviate the consequences. Based on the abovementioned, the Central Bank of Nigeria decides to devalue the naira in order to stabilize exchange rate fluctuations under the floating exchange rate system (Chiadikobi et al., 2022). A volatile exchange rate structure promotes uncertainty and high risks parlance in possible investments opportunities with alarming effects on macroeconomic outcome (Ugochukwu, 2015).

It is important to note that there is no consensus in academics on the adequate and generally accepted technique for the measurement of exchange rate volatility. This dynamism permit further research required to be carried out to determine the effect of exchange rate volatility on economic growth, hence economic growth of Nigeria, and previous studies on this subject matter came out with mixed results. The study is aimed at examining the effect of exchange rate volatility on Nigerian economic growth. Nigeria's transition to democratic governance coincided with periods of significant exchange rate volatility, exposing the economy to persistent currency fluctuations and external and domestic economic shocks (Omotayo, 2026). This study shall cover a period of 24 years, from the year 2000 to the year 2023. The following research hypotheses will be tested:

2. Literature Review

Exchange rate instability has remained an important macroeconomic concern in Nigeria, particularly under the changing economic and policy conditions experienced over the years. Ugochukwu (2015)

describes the exchange rate as the value of one country's currency expressed in terms of another country's currency. In practical terms, it indicates the quantity of domestic currency required to obtain a specified amount of a foreign currency. In the Nigerian context, the exchange rate is commonly expressed as the amount of naira required to purchase one unit of the United States dollar. The determination and management of exchange rates have attracted considerable attention from policymakers, economists, and financial researchers because of their implications for domestic and international economic activities (Ugochukwu, 2015).

The volatility of the foreign exchange rate is generally associated with frequent and substantial short-term movements in the value of a currency. Financial and economic analysts have consequently devoted considerable attention to identifying the factors responsible for exchange rate fluctuations and developing appropriate policy responses, particularly in developing economies. Understanding the sources and consequences of exchange rate movements can assist policymakers in designing measures capable of reducing excessive volatility and limiting its adverse effects on economic activities. Ugochukwu (2015) notes that exchange rate volatility becomes evident when considerable short-term variations in the value of a currency occur over a given period.

Exchange rates constitute one of the major macroeconomic variables influencing international trade and real economic activity (Morina et al., 2020). As countries become increasingly integrated into the global economy, changes in international trade and capital flows can contribute to fluctuations in currency values. Exchange rate instability tends to be more pronounced under flexible or floating exchange rate arrangements than under systems in which currency values are maintained at relatively fixed levels. Adeoye and Atanda (2011) argue that exchange rate movements under a flexible regime are largely determined by market forces, particularly the interaction between foreign exchange demand and supply.

The economic implications of exchange rate volatility have been widely discussed in the literature. Barguelli et al. (2018) report that excessive currency fluctuations can adversely affect economic growth, particularly in economies operating under floating exchange rate systems. Exchange rate uncertainty may complicate international trade and investment decisions and thereby constrain broader economic development. By comparison, exchange rate volatility tends to be relatively lower under fixed exchange rate arrangements, potentially reducing its macroeconomic consequences. Verheuvél (2016) argues that maintaining a relatively fixed exchange rate can limit currency volatility and may involve fewer macroeconomic costs in certain circumstances. Nevertheless, Yensu et al. (2022) maintain that flexible exchange rates can contribute to fiscal discipline because inappropriate fiscal policies may be reflected more quickly through movements in exchange rates and domestic prices. Reinhart and Rogoff (2002, as cited in Stančík, 2006), caution that researchers should exercise considerable care when classifying and modelling exchange rate regimes because official classifications may not always accurately capture the actual characteristics of a country's exchange rate arrangement.

Stančík (2006) identifies several factors that can influence exchange rate movements. These include the degree of economic openness, domestic and foreign money supply, the prevailing exchange rate regime, interest rate differentials, the independence of the central bank, and changes in output, income, and inflation. Unexpected economic and political developments may also contribute to currency fluctuations. The relative importance of these determinants is not necessarily the same across countries, as their effects depend substantially on the specific economic structure and prevailing macroeconomic conditions of each economy.

Changes in the relative value of currencies can have substantial implications for capital flows, imports, and exports, particularly in emerging economies. Niyonsaba (2023) observes that currency movements

can influence the allocation of capital and the pattern of international trade irrespective of the monetary policy framework adopted by a country. Excessive exchange rate fluctuations can create uncertainty for investors, households, businesses, and government authorities and may consequently generate destabilizing effects within the broader macroeconomic environment (Chiadikobi et al., 2022). Morina et al. (2020) similarly emphasize the importance of exchange rate volatility to private-sector firms and investors because currency movements can affect investment portfolios and create potential capital gains or losses.

Exchange rate depreciation, however, does not necessarily produce exclusively adverse outcomes. A decline in the value of the domestic currency can make domestic financial and physical assets relatively less expensive to foreign investors. This may encourage portfolio investment and foreign direct investment by increasing the attractiveness of domestic assets to international investors (Niyonsaba, 2023). Increased capital inflows can subsequently expand investment, stimulate economic activity, and contribute to economic growth.

Currency depreciation can improve the competitiveness of domestic exports by making local goods cheaper internationally, potentially increasing export earnings, investment, and economic growth. In contrast, currency appreciation may reduce export competitiveness and discourage international market expansion. Exchange rate stability can also promote economic stability, attract foreign capital, and support trade and investment, particularly in developing economies. However, the effectiveness of an exchange rate regime depends on its ability to respond to economic shocks. Excessive exchange rate instability can increase uncertainty, discourage international trade and investment, and cause firms to focus more on domestic markets.

The management of Nigeria's foreign exchange market has undergone several policy transformations aimed at improving market efficiency and achieving a more realistic determination of the naira's external value. Akpan and Atan (2011) report that the Central Bank of Nigeria liberalized the foreign exchange market on 20 February 2006 through the introduction of the Wholesale Dutch Auction System (WDAS). The policy was designed to reduce the arbitrage differential between the official interbank market and the Bureau de Change segment, promote convergence between exchange rates, and deepen the foreign exchange market. It was also intended to consolidate the achievements of the Retail Dutch Auction System and facilitate the determination of a more market-oriented exchange rate for the naira. Under the WDAS arrangement, authorized foreign exchange dealers were allowed to transact on their own accounts and subsequently resell foreign currency to their customers.

The development of Nigeria's exchange rate system can be traced to broader structural and institutional transformations that have occurred within the economy since independence. Ugochukwu (2015) explains that changes in the country's exchange rate arrangements have been influenced by developments in international trade, institutional structures, and changes in the pattern of domestic production. Historically, agriculture played a particularly important role in generating Nigeria's foreign exchange earnings. As the structure of the Nigerian economy evolved, however, changes in production patterns and international trade altered the sources and dynamics of foreign exchange earnings.

Nigeria is a small, open developing economy whose exchange rate is strongly influenced by global economic conditions. Its exchange rate system has evolved from a relatively fixed regime in the 1960s to greater flexibility following the 1986 Structural Adjustment Programme. Although flexible exchange rates allow market forces to determine the naira's value, they can also generate significant volatility due to external shocks, commodity-price changes, capital flows, and domestic economic imbalances.

Therefore, effective exchange rate management remains important for controlling inflation, promoting trade and investment, supporting economic growth, and maintaining overall macroeconomic stability..

Empirical review

Ugochukwu (2015) examined the relationship between exchange rate volatility and economic growth using annual observations covering the period 1980–2012. The study obtained its data from the World Bank's World Development Indicators (WDI) database and employed the Autoregressive Conditional Heteroskedasticity (ARCH) and Generalized Autoregressive Conditional Heteroskedasticity (GARCH) techniques to model exchange rate volatility. Stationarity of the variables was assessed using the Augmented Dickey-Fuller (ADF) test developed by Said and Dickey (1984) and the Phillips-Perron (PP) test (Phillips & Perron, 1988), both of which account for possible serial correlation. The findings indicated that several macroeconomic mechanisms expected to support economic growth had not operated efficiently. In particular, foreign direct investment inflows did not appear to reach the sectors where investment needs were greatest, meaning that observed economic growth had not translated proportionately into improvements in living standards. The study further identified inadequate attention to strategic sectors, particularly manufacturing and agriculture, as a constraint on economic expansion. Greater development of these sectors was considered important for broadening the revenue base and strengthening economic growth.

Barguelli et al. (2018) the study examined how exchange rate volatility affects economic growth in 45 emerging and developing economies. It distinguished between nominal and real exchange rate volatility and measured volatility using a GARCH (1,1) model. Using World Bank data and controlling for population growth, trade openness, and government expenditure, the researchers employed a dynamic panel-data approach. The findings indicate that exchange rate instability can significantly affect economic performance, particularly through its effects on international trade, investment, and employment.

Oyovwi (2012) examined the relationship between exchange rate volatility and economic growth in Nigeria using GDP and annual data from 1970–2009. Its findings indicated that exchange rate volatility had a positive effect on GDP, although its impact could also occur indirectly through variables such as interest rates and investment. The study further found that oil prices had an insignificant short-run effect on growth, attributing this partly to Nigeria's limited investment of petroleum revenues in productive sectors such as manufacturing, mining, and agriculture.

Morina et al. (2020) The study examined the effect of exchange rate volatility on economic growth across 14 Central and Eastern European countries from 2002 to 2018. Using fixed-effects panel estimation and alternative measures of exchange rate volatility, the study found a significant negative relationship between exchange rate volatility and real economic growth. The results remained consistent across different robustness measures. The authors therefore recommended policies aimed at reducing excessive exchange rate fluctuations to create a more stable environment for sustainable economic growth.

Akpan and Atan (2011) examined the relationship between exchange rate movements and economic growth in Nigeria. It found that real GDP, inflation, money supply, and lagged GDP were significant determinants of real output. The results also revealed a positive and statistically significant relationship between real exchange rate depreciation and economic growth, suggesting that a more competitive exchange rate may stimulate domestic production. Furthermore, money supply and previous exchange rate movements significantly influenced the real exchange rate, while imbalances between foreign exchange demand and supply could increase pressure for currency depreciation..

Chiadikobi et al. (2022) investigated the relationship between exchange rate volatility and economic growth in Nigeria using annual data from 1981 to 2020 and an ARCH/GARCH (1,1) model to capture the time-varying nature of exchange rate fluctuations. The findings showed that exchange rate volatility had a positive and significant short-run effect on real GDP per capita growth but a negative and significant long-run effect. The study therefore recommended maintaining a managed floating exchange rate regime, alongside policies that promote domestic production and reduce excessive import dependence, to support sustainable economic growth in Nigeria

Yensu et al. (2022) examined the relationship between exchange rate volatility and economic growth in Ghana using annual data from 2000–2020. The findings revealed significant volatility clustering in the real exchange rate, indicating that periods of high or low fluctuations tended to persist. Exchange rate volatility was negatively associated with key macroeconomic variables, including trade openness, government expenditure, money supply, foreign direct investment, output, and private-sector credit. In the long run, terms of trade, money supply, government expenditure, and capital flows were important determinants of exchange rate volatility. The study therefore recommended economic diversification and industrial development to strengthen exports and reduce Ghana's dependence on imports.

Verheuver (2016) examined the relationship between exchange rate volatility, economic growth, and international trade in South Korea, using quarterly data before and after the 1997 Asian financial crisis and a three-variable VAR model. The findings indicated that exchange rate volatility had adverse short-term effects, particularly by reducing trade growth. Although exchange rate volatility was associated with an eventual increase in international trade over the longer term, this effect was statistically insignificant. The study therefore concluded that the impact of exchange rate volatility varies across time horizons and economic indicators, with its short-term effects being more pronounced.

H₀₁: Exchange Rate Volatility has no significant effect on Nigerian Gross Domestic Product.

H₀₂: Population Growth Rate has no significant effect on Nigerian Gross Domestic Product.

H₀₃: Trade Openness has no significant effect on Nigerian Gross Domestic Product.

H₀₄: Public Expenditure has no significant effect on Nigerian Gross Domestic Product.

Theoretical framework

Optimal currency area (OCA) theory

The Optimal Currency Area (OCA) theory is one of the earliest theoretical perspectives developed to explain the choice and suitability of alternative exchange rate regimes. The foundational contributions are attributed to Mundell (1961) and McKinnon (1963). The theory suggests that exchange rate stability can facilitate international economic transactions by reducing uncertainty surrounding currency movements. A relatively fixed exchange rate can lower the costs associated with foreign exchange hedging and thereby encourage international trade and investment. Greater currency stability may also reduce the risk premium incorporated into interest rates, making investment financing more predictable.

The passage explains that fixed exchange rate regimes can enhance economic stability by providing a nominal anchor for monetary policy, increasing policy credibility, reducing currency uncertainty, and supporting trade, investment, output, and financial-market development. However, rigid exchange rate systems can also expose economies to significant risks when faced with capital outflows or external financial shocks, potentially leading to severe currency adjustments and financial crises. Therefore, the suitability of an exchange rate regime depends on the structural characteristics, economic conditions, and ability of the country to withstand external shocks.

Mundell-Fleming Theory

The Mundell-Fleming framework provides another important theoretical basis for explaining how exchange rate movements can influence economic performance in an open economy. The model emphasizes the interaction among exchange rates, interest rates, international capital movements, and economic activity. Within this framework, changes in the value of a domestic currency can affect economic growth through their consequences for international trade.

A depreciation of the domestic currency generally makes domestically produced goods and services relatively less expensive in international markets. This improvement in price competitiveness can stimulate export demand, encourage higher production, and create employment opportunities in export-oriented industries. Consequently, currency depreciation may support economic expansion where the economy has sufficient productive capacity and responds positively to increased external demand. Conversely, an appreciation of the domestic currency can make domestic exports more expensive to foreign buyers, thereby weakening their international competitiveness and potentially reducing export activity and economic growth.

The passage explains that exchange rate movements can affect economic growth through international capital flows and investment. Higher domestic interest rates relative to foreign rates may attract capital inflows, increasing funds available for domestic investment and economic expansion. Conversely, currency depreciation and macroeconomic uncertainty can trigger capital outflows, reducing investment and weakening growth. From the Mundell-Fleming perspective, the impact of exchange rate movements on economic growth is therefore not uniform, as it depends on their effects on trade competitiveness, interest-rate differentials, capital flows, investment, and broader macroeconomic conditions.

Balassa-Samuelson effect

The Balassa-Samuelson effect provides a further theoretical explanation of the relationship between exchange rate movements, relative prices, inflation, and economic performance. The theory focuses particularly on differences in productivity between the tradable and non-tradable sectors of an economy. It suggests that changes in the relative value of a country's currency can have important consequences for domestic price structures and inflation.

Tradable goods and services are those that can be exchanged relatively easily across national borders, such as manufactured products and internationally traded commodities. Non-tradable goods and services, in contrast, are predominantly consumed within the domestic economy and are less directly exposed to international competition. Examples include housing, healthcare, and several locally provided services.

The Balassa-Samuelson framework explains that productivity gains in the tradable sector can raise wages across the economy, increasing production costs and prices in the less productive non-tradable sector. Currency appreciation can further widen the relative-price gap between tradable and non-tradable goods, thereby contributing to domestic inflation. Thus, exchange-rate movements affect economic performance not only through international trade and capital flows but also through wages, domestic prices, inflation, and resource allocation between tradable and non-tradable sectors.

3. Methodology

The data for the study was sourced through secondary means. Exchange-rate and public expenditure data were obtained from the Central Bank of Nigeria (CBN) statistical bulletin. The data for Gross Domestic Product (GDP) was measured using Nigeria's annual real GDP, and data for import, export, and GDP were obtained from the National Bureau of Statistics (NBS) database. The empirical analysis

was carried out strictly for Nigerian economy and the study period covers 2000 to 2025. The study periods are imperative because Nigeria's transition to democratic governance coincided with periods of significant exchange rate volatility, exposing the economy to persistent currency fluctuations and external and domestic economic shocks (Omotayo, 2026). A robust time series econometric regression model was used for data analysis with the help of SPSS version 20.

Table 1: Variables Definition and Measurement

Variable	Meaning	Measurement	Expected Sign	Source
<i>Independent</i>				
exr	Exchange rate volatility	$Exr_i = \frac{Exrt - Exrp}{Exrp} \times 100$ Exr_i: Exchange rate volatility in a year Exrt: Current year exchange rate Exrp: Previous year exchange rate	Negative	Adeniran et al., 2014; Akanbi et al., 2017; Chiadikobi et al., 2022; Ugochukwu, 2015
<i>Control</i>				
pgr	Population growth	$Pgr_i = \frac{Pgrrt - Pgrp}{Pgrp} \times 100$ Pgr_i : Population growth in a year. Pgr_i : Population growth in a year Pgrrt: Current year population Pgrp: Previous year population	Negative	Chiadikobi et al., 2022; World Bank, n.d.
ot	Trade openness	$Ot_i = \frac{Export + Import}{GDP} \times 100$	Positive	Chiadikobi et al., 2022; National Bureau of Statistics, 2025
Pex	Public expenditure	$Pex_i = \frac{Government\ expenditure}{GDP} \times 100$	Positive	Central Bank of Nigeria, 2025; Chiadikobi et al., 2022
<i>Dependent</i>				
GDP	Gross Domestic Product	$GDPGR_i = \frac{RGDPt - RGDPp}{RGDPp}$ GDPGR_i: GDP growth rate in a year. RGDPt: Real GDP in current year. RGDPp: Real GDP in preceding year.	Positive	Adeniran et al., 2014; Chiadikobi et al., 2022; National Bureau of Statistics, 2025; Ugochukwu, 2015

Source: Author's compilation (2026)

Model specification

$$GDP_i = f\{exr, pgr, ot, pex\}$$

$$GDP_i = \alpha + \beta_1 exr_i + \beta_2 pgr_i + \beta_3 ot_i + \beta_4 pex_i + \varepsilon$$

Where

GDP: Gross Domestic Product

α : Constant term

exr: Exchange rate volatility

pgr: Population growth

ot: Trade openness

pex: Public expenditure

i: year (time)

$\beta_1, \beta_2, \beta_3, \beta_4$: Coefficient of the independent/control variables

ε : Error term

4. Discussion of Findings

Diagnostic analysis

Depicted in figure 1 in the appendix, the statistical data are approximately normally distributed. It can be discovered that the graph has shown a bell-like curve shape fairly skewed to the left. As a result, the error terms also referred to as the residuals of the regression line are approximately normally distributed. Therefore, this may permit statistical inference, as the hypothesis testing could be validated, so also confidence intervals and p-values. This satisfies an assumption for the adoption of ordinary least square regression analysis.

The Histogram or Normal P-P Plot of Regression Standardized Residual in figure 2 (in the appendix) has shown how data are distributed along the line of goodness which indicates a linear relationship between Gross Domestic Product (Outcome/dependent variable) and other predictors such as exchange rate volatility, population growth rate, and public expenditure.

The Scatter Plot in figure 3 (in the appendix) shows how data are distributed with approximately evenly cloud of dots without distinct pattern such as curve shapes and funnel-like shape. Figure 2 and 3 indicate homoscedasticity which satisfies the regression assumption that the variance of the error terms, that is, the residuals (the distance or difference between the predicted value and the actual values in the line of fitness) remain constant or unchanged across all categories of the independent variables. This ensures that the spread around the line of best fit which is the regression line is uniform as a result, making the regression model reliable, and most importantly the statistical inference valid.

Table 2: Descriptive Statistics

Variables	Mean	Standard deviation	Minimum	Maximum
GDP	3.96	2.73	-1.79	8.04
exr	8.67	11.8	-8.87	34.12
pgr	2.5	0.27	2.09	2.8
ot	277	83.54	121	442
pex	10.1	1.63	6.93	12.88

Source: SPSS V20

In Table 2 above the mean GDP growth rate of 3.96% indicates that Nigeria's real economic output increased by an average of approximately 3.96% annually over the study period. This suggests that, on average, the Nigerian economy experienced positive economic growth during the period under investigation. The standard deviation of 2.73% indicates that yearly real GDP growth rate during the period under investigation is tightly clustered around the mean. For the period under study, the minimum real GDP is negative 1.79% while the maximum real GDP is 8.08%.

The mean exchange rate volatility of 8.67% generally indicates that, over the study period, the exchange rate experienced upward movements or fluctuations at the average rate of 8.67%. A positive mean suggests that the naira-dollar exchange rates was, on average, associated with increases in the number

of naira required to purchase one US dollar. The standard deviation of 11.8% indicates that during the period of this study the exchange rate volatility have been 11.8% far away from the mean. The minimum exchange rate volatility for the study period was negative 8.87% while the maximum was 34.12%.

The mean population growth rate of 2.5% represents the average annual rate at which the population increased over the period under study. This means that, on average, the Nigeria's population increased by approximately 2.5% per year during the study period. The standard deviation of 0.27% indicates that on the average, the yearly population growth rate is clustered around the mean. The minimum yearly population growth rate for the period under investigation was approximately 2.09% while the maximum was approximately 2.8%.

The mean trade openness of 277% represents the average annual growth of the country's international trade transactions during the study period relative to the Nigerian real Gross Domestic product. The standard deviation of 83.54% indicates how wide the growth value of import and export transactions relative to the real GDP are far away from the mean. The minimum value of trade openness appears to be approximately 121% while the maximum value was estimated at 442%.

The mean public expenditure of 10.1% represents the average yearly growth rate of public/government expenditure relative to the country's GDP during the period under study. In addition, government expenditure is an important fiscal-policy instrument because government spending directly affects aggregate demand and can also influence investment, infrastructure, human capital and economic activity. The standard deviation of 1.63% indicates how tight the government expenditures for the study period have been around the mean of 10.1%. The minimum yearly growth rate of public expenditure was approximately 6.93% while the maximum growth rate of public expenditure was 12.88%.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	0.836	0.698	0.682	2.015

Source: SPSS V.20

It is an acceptable range to have Durbin Watson test falls between 1.5 and 2.5. The Model Summary table above, has indicated a Durbin Watson test of 2.015 which is between acceptable range. The Durbin Watson test is most importantly a statistical diagnostic technique in regression analysis to check for autocorrelation also referred to as serial correlation. Autocorrelation means consecutive residuals or error terms are correlated with one another and that is not required in regression analysis. With Durbin Watson test of 2.015 shows that the predicted error terms (residuals) are independent and not correlated. This shows that the standard errors are approximately estimated, p-value, and confidence intervals, are statistically reliable.

Considering the Model Summary table above, the Pearson R correlation coefficient at 83.6% indicates a strong correlation between the predicting variables which are the exchange rate volatility, public expenditure, trade openness, and population growth rate and the explained variable which is the economic growth measured by Gross Domestic Product. The adjusted R squared at the rate of 68.2% shows that 68.2% fluctuation in the nation's economic growth measured by Gross Domestic Product can be accounted for changes in the country's exchange rate volatility, public expenditure, trade openness, and population growth rate.

Table 4: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	424.957	4	106.239	60.025	0.000
Residual	183.710	75	43.239		
Total	608.667	79			

Source: SPSS V20

The ANOVA table above with P-value of 0.000 less than 5% significant level means the model is statistically fit to measure the effect of the predictors (exchange rate volatility, public expenditure, population growth, and trade openness) on explained variable (Gross Domestic Product).

One of the primary assumptions of the multiple linear regression analysis is that the predicting variables should not be correlated. The predicting variables for this research work are the independent variable and the control variables. The “Collinearity Statistics” results from the coefficient table indicate that there is no multicollinearity (independent variable and the control variables correlating). This is because the “Tolerance” for all the predicting variables is greater than 0.1 and the Variance Inflation Factors (VIF) also for all the predicting variables are greater than 1 but less than 10.

Table 5: Coefficient

Model	β	Sig.	Tolerance	VIF
1 (Constant)	-16.214	0.000		
exr	-0.062	0.000	0.877	1.141
pgr	5.148	0.021	0.763	1.310
ot	-0.001	0.767	0.314	3.186
pex	0.809	0.007	0.351	2.847

Source: SPSS V20

The coefficient table above indicates that exchange rate volatility with a parameter of -0.62 has negative effect on the Gross Domestic Product with a P-value of 0.000 less than 5% significant level. The P-value of 0.000 less than the alpha value of 5%, we can now reject the null hypothesis that says exchange rate volatility has no significant effect on Gross Domestic Product. In a nutshell, a unit increase in exchange rate volatility when other variables remain unchanged, the Gross Domestic Product will reduce at the rate of 6.2%. It is depicted as follows:

$$GDP_i = \alpha - 0.062exr_i + \beta_2pgr_i + \beta_3ot_i + \beta_4pex_i + \varepsilon$$

From the coefficient table above, this study shows that population growth rate exert positive impact on the nation's Gross Domestic Product with a parameter of 5.148. The P-value is determined at 0.000 less than 5% significant level which indicates that the null hypothesis that says population growth rate has no significant effect on the nation's economic growth measured with Gross Domestic Product can now be rejected and we accept the fact the population growth rate has significant and positive effect on the country's economic growth measured by Gross Domestic Product. Therefore, a unit increase in population growth rate, the Gross Domestic Product will increase at the rate of 5.148%. It is depicted as follows:

$$GDP_i = \alpha + \beta_1exr_i + 5.148pgr_i + \beta_3ot_i + \beta_4pex_i + \varepsilon$$

The coefficient table above shows that trade openness has a negative effect on the country's economic growth measured by Gross Domestic Product with a coefficient of -0.001. The P-value of 0.767 greater

than 5% significant level indicates that we can accept the null hypothesis that says trade openness has no significant impact on the Gross Domestic Product.

From the coefficient table displayed above public expenditure has a positive effect on the country's economic growth measured by Gross Domestic Product with a coefficient of 0.809. The P-value is 0.000 less than 5% significant level which shows that we reject the null hypothesis that says public expenditure has no significant effect on the country's economic growth measured by Gross Domestic Product. In a nutshell, a unit increase in public expenditure the Gross Domestic Product will increase at the rate of 80.9%. It is depicted as follows:

$$GDP_i = \alpha + \beta_1 exr_i + \beta_2 pgr_i + \beta_3 ot_i + 0.809 pex_i + \varepsilon$$

5. Conclusion and Recommendation

The study concludes that exchange rate volatility has a negative effect on Nigeria's economic growth, with frequent currency fluctuations creating significant economic challenges. Exchange rate instability raises the cost of imported raw materials and machinery, discourages foreign investment, and makes it difficult for firms to predict production costs, thereby limiting business expansion. Currency depreciation also contributes to imported inflation, reduces consumers' purchasing power, and may prompt higher interest rates that slow economic activity. Furthermore, depreciation increases the domestic cost of servicing foreign-denominated debt, diverting resources away from productive investments and development projects. Combined with security concerns, exchange rate uncertainty can encourage capital flight, weaken the financial system, reduce liquidity, and ultimately constrain sustainable economic growth and development.

The study recommends that Nigerian government should consider timely economic policy review and implement macroeconomic policies aiming at maintaining exchange rate stability. A stable exchange rate can reduce speculation and volatility, strengthen foreign reserves, improve market confidence, attract foreign currency inflows, reduce import dependence, and support domestic production and economic growth. It can also lower transaction costs, strengthen the economy's resilience to external shocks, improve the balance of trade, and reduce the cost of imports and financial obligations. For businesses, exchange rate stability enhances the predictability of revenues and costs, thereby reducing currency-related risks and facilitating better financial planning.

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Appendix Figure 1

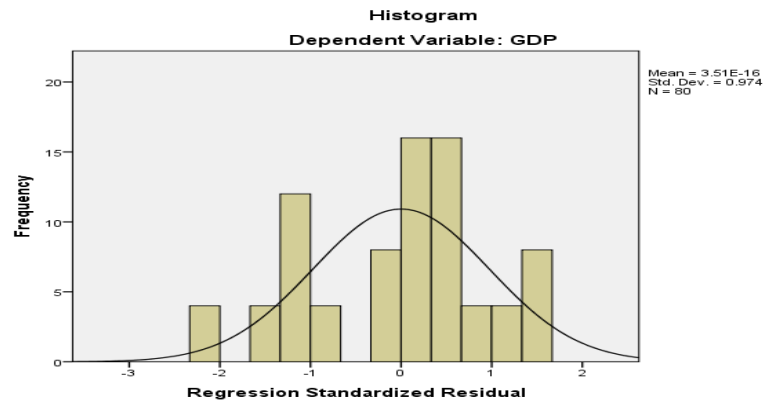


Figure 2

