IMPACT OF EXCHANGE RATE VOLATILITY AND INFLATION ON ECONOMIC GRWOTH IN NIGERIA

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Abstract

This study investigates the impact of exchange rate volatility and inflation on economic growth in Nigeria over the period 1986 to 2023. Annual time series data were obtained from the World Bank Development Indicators (WDI). The study employed the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration, alongside short-run and long-run estimations. The findings reveal evidence of a long-run relationship among the variables. In the short run, inflation exerts a negative and statistically significant effect on economic growth, while exchange rate volatility also shows an adverse impact, though largely insignificant in the long run. Foreign direct investment (FDI) exhibits mixed effects, being negative in the current period but positive at lagged levels, whereas interest rate demonstrates an insignificant influence. the study recommends that policymakers adopt coordinated monetary and exchange rate management strategies to curb inflationary pressures, stabilize exchange rate fluctuations, and create a more conducive environment for sustainable growth and investment inflows.

Keywords*: Economic Growth, Exchange Rate, Inflation, Nigeria, Volatility*

Introduction

Exchange rate policy is a critical endogenous factor influencing macroeconomic performance, shaping trade, investment, inflation, and overall growth trajectories in both developed and developing economies (Jameela, 2010). The exchange rate reflects the price of one country's currency relative to another and serves as a measure of a nation's economic worth (Akpan, 2004). In Nigeria, the management of the exchange rate lies under the purview of the Central Bank of Nigeria (CBN). The transition from a rigid pegged exchange rate regime to a more flexible managed float system began with the adoption of the Structural Adjustment Program (SAP) in 1986, which was aimed at correcting external imbalances and promoting long-term economic growth (Azeez, Kolapo, & Ajayi, 2012). However, a completely "clean float," where exchange rates are determined solely by market forces, is rare in practice. Instead, most countries, including Nigeria, operate under a managed float system, where monetary authorities periodically intervene to achieve specific economic objectives (Mordi, 2006). The debate between proponents of fixed and flexible exchange rate regimes has been long-standing in economic theory and policy. Advocates of fixed regimes argue that stability removes the risks and uncertainties associated with excessive rate volatilities, thereby promoting trade openness, boosting international trade volumes, improving capital flows, and ensuring fiscal discipline through the nominal anchor it provides (Hanke & Schuler, 1994; Frankel & Ross, 2002; Magaji & Eke, 2015). On the other hand, supporters of flexible regimes contend that they facilitate automatic external sector adjustment in the event of disequilibrium, enhance fiscal discipline by exposing

unsound monetary policies through adverse price movements, and allow international traders to hedge against risks (Velasco, 2000). Despite these contrasting views, Nigeria's exchange rate regime has struggled to achieve stability, leaving the economy vulnerable to speculative attacks, external shocks, and inconsistent policy responses.

Inflation, which represents a sustained increase in the general price level of goods and services, is closely intertwined with exchange rate fluctuations. Monetarists attribute inflation to excess money supply relative to demand, recommending restrictive monetary policies as a remedy (Akpan, 2004). Cost-push theories, however, link inflation to rising production costs—such as wage pressures—that lead to higher prices and potential inflationary spirals (Gbosi, 2001). In Nigeria, controlling inflation remains central to the mandate of the CBN, which seeks to maintain price stability and ensure a sound financial system (CBN Act, 2007). For example, in September 2020, the CBN reduced the Monetary Policy Rate (MPR) from 12.5% to 11.5% in order to reduce money supply, address rising domestic prices, and attract capital inflows that could strengthen external reserves (CBN Statistical Bulletin, 2020; Onwubuariri, Oladeji & Bank-Ola, 2021). Yet, despite such policy actions, inflation has remained persistent, eroding real incomes, dampening investment, and weakening economic growth prospects.

The interplay of exchange rate volatility and inflation has remained one of the most controversial issues in macroeconomic theory. Both variables affect not only price stability and trade but also employment, investment, and broader economic growth in developed and developing economies alike (Alagidede & Ibrahim, 2016). In Nigeria, the challenge has been particularly severe: exchange rate instability has increased production costs and deterred foreign investment, while persistent inflation has worsened living standards and widened income inequality. Empirical evidence also suggests that these factors jointly shape macroeconomic outcomes. For instance, Ewubare and Ushang (2022) found that both exchange rates and inflation negatively affect Nigeria's GDP, reinforcing the urgency of understanding their combined impact.

Given that exchange rates are expected to stabilize macroeconomic conditions and inflation is assumed to remain within manageable limits, the Nigerian case presents a different reality. Exchange rates have remained unstable while inflation has continued to rise, threatening the effectiveness of macroeconomic policies. Thus, investigating the impact of exchange rate fluctuations and inflation on Nigeria's economic growth is not only timely but also essential for informing policy strategies that can enhance stability, encourage investment, and foster sustainable development.

Despite numerous policy interventions, the Nigerian economy continues to grapple with persistent exchange rate volatility and high inflation, both of which undermine macroeconomic stability and sustainable growth. Exchange rate fluctuations have consistently disrupted trade, investment decisions, and overall productivity, while inflation erodes real incomes, dampens consumer demand, and drives up production costs. Although Nigeria has experienced periods of economic expansion, these gains have often been short-lived, with growth cycles repeatedly derailed by episodes of sharp currency depreciation and inflationary surges. The failure to achieve stability in these two macroeconomic variables not only complicates long-term planning for investors and policymakers but also exposes the economy to external shocks, reduced competitiveness, and worsening social conditions. The interplay of exchange rate volatility and inflation therefore represents one of the most pressing challenges confronting Nigeria's economy, underscoring the need for rigorous empirical analysis to provide evidence-based guidance for policy. The broad objective of this study is to examine the impact of exchange rate volatility and inflation on economic growth in Nigeria.

LITERATURE REVIEW

Administration of Exchange Rate Policy and Capital Control in Nigeria

A review of existing literature and data reveals that political factors have influenced Nigeria's economic policies, including exchange rate and capital control measures (Akinlo and Onatunji, 2020). The policymakers respond to political pressures and roll out policies that reflect the choices of their political paymasters rather than economic realities. Hence, some of the exchange rate policies and capital control measures introduced by the apex bank in Nigeria since independence are the outcome of political preferences or expediencies. Indeed, the different and sometimes conflicting exchange rate policies and policy regimes in the country are mainly due to the time's political realities, which explain the high rate of instability and inconsistency in foreign exchange policies by different government regimes in the country.

From the above facts, exchange rate policies are likely to be affected by varieties of political factors, including election timing. The real exchange rate affects broad economic aggregates like the purchasing power, the cost of export, the price level and the real wage, which are all relevant to elections as some voters use them as indices for selecting their leader. Indeed, governments tend to appreciate currencies before elections, delaying a depreciation/devaluation until after the election (Kaltenbrunner & Painceira, 2017). Given the political unpopularity of a devaluation-induced reduction in national purchasing power, governments may refuse to devalue the currency, not because of any economic reason but purely on political consideration.

Exchange rate policies and capital control measures in Nigeria have also been influenced by the nature and character of the political leadership. Regimes/administrations that are pro-west tend to key into the global trend towards greater economic liberalization as recommended by the World Bank and the IMF. These regimes pursue floating or marketbased exchange rate system. Two regimes that stand out in this regard are those of General Ibrahim Babangida (1985 to 1993) and Chief Olusegun Obasanjo (1999 to 2007). On the other hand, administrations that are not necessarily antiwest but do not subscribe to the global trend towards economic liberalization tend to pursue a fixed exchange rate system. An example is the government of General Sani Abacha (1994 to 1998).

Exchange Rate Volatility and Economic Growth in Nigeria

Exchange rate in Nigeria is the rate at which naira is exchanged for another foreign currency. It is the price of naira in terms of another currency. Also, it is the price of one unit of naira in terms of the foreign currency. In 2000, 100.80 naira was exchanged for $1, in 2021, #403.58 was exchanged for $1while in year 2022, ₦461.10 was exchanged for $1. Central Bank of Nigeria (CBN, 2021). Exchange rate fluctuation in Nigeria is the swings in the exchange rate over a Period of time or the deviations from the benchmark or equilibrium exchange Rate since 1986, the rate at which naira is been exchanged for foreign currency was unstable. For instance, in the year 1985, $1 was exchange for ₦0.95, in the year 1986, $1 equal to ₦2.02, in the year 1987, $1 was exchanged for ₦4.02. Also, between 1988 to 2005, $1 = ₦4.51, ₦7.39, ₦8.04, ₦9.91, ₦17.3, ₦22.05, ₦21.89, ₦21.89, ₦21.89, ₦21.89, ₦21.89, ₦92.34, ₦100.80, ₦112.03, ₦120.98, ₦129.43, ₦133.50, ₦131.64, in the year 2017, it was $1 = ₦310.10. Also, in year 2022 461.10 was exchanged for naira. Therefore, exchange rate in Nigeria is not stable and predictable, since the country do not operate fixed exchange rate regime. The volatility in the exchange rate affects the economic growth measured by the real GDP within the study period 2000-2022. NBS (2021).

The Trend between Inflation and Economic Growth in Nigeria

The International Monetary Fund (IMF) World Economic Outlook Report (2011) indicated that the Nigeria's GDP tends to be low when the inflation rates are high. For example, in 1998 GDP growth rate was relatively amidst the high

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inflationary levels at the time. This could be positive impact of increased domestic productivities which was the major aim of SAP. The rate of inflation continued to rise from 5.4 percent in 1987 to above double-digit nearing triple digits in some years, that is 50.5 percent in 1989 and dropped to 7.5 percent in 1990 as a result of an increase in the output growth of food. This was short-lived because from 1991the increase in domestic prices put inflation rate at 12.7 percent and by 1992 it was 44.8. Inflation rate was above 50 percent in periods between 1993 and 1995. This was reflected in low level of the Nigeria's GDP growth rate within the period which increased from 3.5 percent in the 1980s to 5.5 percent in the 1990s.

This increase in growth has been attributed to both demand and supply-side factors. This has been attributed to the Keynesian public expenditure-led growth (enhanced by oil revenues) or the increase in aggregate demand due to higher government spending and larger fiscal deficits, as the major cause of increasing growth rates (Egwaikhide, Chete & Falokun, 1994).

According to the Nigeria Economic Report (2013), expansionary fiscal policy resulted in excess demand in the economy as at the end of the 1980s, when output was above trend levels. The rate of inflation rose from 57.416 percent in 1993 to 72.721 percent in 1994 and 72.81 in 1995, which was the highest ever recorded in Nigeria with the corresponding value of the GDP growth rate of 2.09 percent, 0.91 percent and 0.307 percent within those years. In 1996, the rate of inflation reduced drastically to 29 percent as a result of the contractionary (restrictive) monetary and fiscal policies adopted to quell the surge in inflation with a real output growth rate of 4.994 percent. By

1997, inflation rate was further reduced to 10.673 percent, 7.862 percent 1998 and 6.618 percent in 1999 and it remained relatively stable at 6.938 percent in year 2000. Within this period, the value of GDP growth rate was 2.802 percent in year 1997, 2.716 percent in 1998, 0.474 percent in 1999 and gained slightly to 5.318 percent in year 2000. The trend of inflation between 2001 and 2010 in Nigeria at average level is the double-digit rate but the GDP growth seems unimpressive which could be attributed to petroleum export proceeds.

The inflation rate was 18.869 percent in 2001, 12.883 percent in 2002, 14.037 percent in 2003, 15.001 percent in 2004, 17.856 percent in 2005, 8.218 percent in 2006, 5.413 percent in 2007, 11.581 percent in 2008, 12.543 percent in 2009 and 13.72 percent in 2010 with the corresponding GDP growth rate within these years at 8.164 percent, 21.172 percent, 10.335 percent, 10.585 percent, 5.393 percent, 6.211 percent, 6.972 percent, 5.984 percent, 6.96 percent and 8.724 percent respectively. In 2011, the rate of inflation reduced to 10.8 percent and then increased to 12.2 percent in 2012, 8.5 percent in 2013, 8.1 percent in 2014, 9.0 percent in 2015 and it skyrocketed to15.7 percent in 2016 having a corresponding GDP growth rate within these years as 4.9 percent in 2011, 4.3 percent in 2012, 5.4 percent in 2013, 6.3 percent in 2014, 2.7 percent in 2015 and -1.6 percent in 2016. Despite the relatively good GDP growth rates in 2001 to 2010 the rise in inflationary rate in 2016 brought about a negative GDP growth rate.

Overview of Exchange Rate, Inflation rate and Economic Growth in Nigeria

Nigeria's economy demonstrated a complex relationship between real GDP (RGDP), inflation (INF), and exchange rates (EXR), revealing how fluctuations in exchange rates and inflation rates directly impacted economic growth. From ₦21.68 trillion in 1990 to ₦75.77 trillion in 2022, Nigeria experienced an overall increase in economic output, with periods of both strong growth and stagnation. For instance, between 1999 and 2010, RGDP grew steadily, coinciding with relatively lower inflation rates and a more stable exchange rate environment. However, this economic growth was frequently disrupted by inflationary pressures and the steep depreciation of the Naira, particularly after 2015, when economic growth began to slow. The 2016 recession, which saw a decline in RGDP to ₦68.65 trillion, was directly tied to high inflation and a significant currency devaluation following the oil price shock (World Development Indicators 2023).

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Furthermore, Nigeria's inflation rate was highly volatile, with inflation peaking at 72.8% in 1995, severely impacting economic stability. High inflation reduces purchasing power, disrupts investment planning, and erodes household incomes, which collectively dampen economic growth. For instance, the inflation spikes in the 1990s and during the 2016 economic downturn significantly hindered Nigeria's ability to achieve consistent GDP growth. The relatively low inflation rates from 2006 to 2014, averaging around 12%, were accompanied by healthier economic growth as price stability encouraged investment and consumption. However, rising inflation post-2016, hitting 16.5% in 2017 and 18.8% in 2022, contributed to slower growth as consumer demand fell and businesses struggled with increasing input costs (WDI 2023).

Finally, exchange rate fluctuations had a profound effect on Nigeria's economic performance, particularly due to the country's dependence on imports and oil exports. The Naira's depreciation from ₦8.04 per US dollar in 1990 to ₦425.98 in 2022 (a depreciation of over 5,200%) reflects the weakening of the Nigerian economy in response to external shocks, such as fluctuating oil prices and diminishing foreign reserves. Exchange rate volatility often fueled inflationary pressures, particularly through the higher cost of imports, which in turn stifled growth. For example, during periods of sharp currency depreciation, like in 1999 and 2016, inflation surged and economic growth stalled. In 1999, the exchange rate rose to ₦92.33 per dollar, contributing to inflationary pressures and lower consumer confidence, which slowed growth. Similarly, in 2016, when the Naira depreciated to ₦253.49 per dollar, it triggered high inflation (15.7%), further weakening economic activity and leading to a recession (WDI 2023).

The steep devaluation of Naira after 2015, largely due to dwindling oil revenues, foreign exchange shortages, and external debt burdens, created an environment of uncertainty that discouraged both foreign and domestic investments. The inflation-exchange rate nexus further magnified the situation as high import costs due to currency depreciation translated into rising inflation, which hindered sustainable growth. While Nigeria's GDP grew at an average of 5-6% during periods of relative stability in the early 2000s, post-2015 saw slower growth, lower investor confidence, and reduced private sector activity due to the interplay of these inflationary and exchange rate dynamics (WDI 2023).

The trends in RGDP, inflation, and exchange rates between 1990 and 2022 demonstrate how inflation and currency devaluation frequently retarded Nigeria's economic growth. High inflation eroded consumer purchasing power and investor confidence, while volatile exchange rates, particularly after oil price shocks, increased import costs, further destabilizing the economy. Stable periods of lower inflation and a relatively strong Naira were essential for facilitating higher growth rates. Thus, economic policies aimed at stabilizing inflation and exchange rates could be crucial for sustaining long-term economic growth in Nigeria. (World Bank, 2023).

Theoretical Literature Review Monetarist Theory

The Monetarist Theory, pioneered by Milton Friedman (1967), explains the relationship between money supply, inflation, interest rates, and economic growth. It posits that when the money supply grows faster than the economy's productive capacity, inflation occurs, which negatively impacts growth. Interest rate adjustments by the Central Bank are therefore used as a tool to influence inflation and economic activity. An expansionary monetary policy, for example, lowers real interest rates, encourages investment spending, and raises aggregate demand, which can drive both output and prices upward. This establishes a negative relationship between interest rates and economic growth, as well as between interest rates and inflation (Bain & Howells, 2003). However, a major weakness of the theory lies in its assumption that the velocity of money is stable over time. In reality, it fluctuates due to changes in consumer behavior, technological innovation, and broader economic conditions, making the effects of monetary expansion harder to predict accurately.

Endogenous Growth Theory

Emerging in the 1980s, Endogenous Growth Theory challenged the neoclassical view of diminishing returns to physical capital and sought to explain persistent disparities between developed and developing countries. Paul Romer emphasized that technological progress is not merely an exogenous factor but can be influenced by deliberate policy actions such as investment in research and development, education, health, and intellectual property protections. The theory argues that economic growth is driven internally through human capital accumulation, technological innovation, and efficient production processes.

The core assumptions of the endogenous growth theory emphasize that government policies which foster competition and innovation can significantly raise long-term growth rates. Investments in infrastructure, education, and telecommunications are believed to generate increasing returns to scale, while the private sector is regarded as a primary driver of technological progress. Furthermore, the protection of property rights and patents is considered essential for sustaining innovation, and human capital development alongside entrepreneurship is seen as a critical engine of sustained growth and job creation. Despite these contributions, the theory has been criticized for its difficulty in empirical validation, as many of its assumptions particularly the direct link between policy interventions and technological innovation are challenging to measure accurately.

Theoretical Framework

For this study on the *Impact of Exchange Rate Volatility and Inflation on Economic Growth in Nigeria*, the Monetarist Theory provides the most suitable framework. Its focus on the interplay between money supply, inflation, interest rates, and overall economic performance aligns directly with the variables under investigation. By highlighting how excessive money supply and inflation can destabilize the economy through exchange rate volatility and interest rate fluctuations, the theory offers valuable insights into Nigeria's macroeconomic challenges. Moreover, its emphasis on the role of monetary policy—particularly interest rate adjustments by the Central Bank of Nigeria—makes it directly relevant for understanding and addressing the factors that influence economic growth in the Nigerian context.

METHODOLOGY Sample and Data

This study employs a causal (explanatory) research design to investigate the impact of exchange rate volatility and inflation on economic growth in Nigeria from 1985 to 2023. It relies on annual secondary time series data sourced from the Central Bank of Nigeria Statistical Bulletin, World Bank Development Indicators (WDI), and the National Bureau of Statistics. The key variables include Real GDP (RGDP), Exchange Rate Volatility (EXRV), Inflation Rate (INF), Interest Rate (INT), Money Supply (MS), and Foreign Direct Investment (FDI). **Data and technique**

This study employs the Autoregressive Distributed Lag (ARDL) model to assess the impact of exchange rate volatility and inflation on economic growth in Nigeria between 1986 and 2023. The ARDL framework is particularly appropriate as it captures both short-run dynamics and long-run relationships among variables, even when variables are integrated at different levels (I(0) or I(1)), provided none is I(2). Prior to ARDL estimation, several preliminary analyses were conducted. These include trend analysis, which explores patterns and movements in the variables over time; descriptive statistics, which summarize the mean, median, minimum, maximum, standard deviation, and Jarque-Bera statistics to assess normality; and the Augmented Dickey-Fuller (ADF) unit root test, used to establish stationarity and the order of integration to avoid spurious regressions. In addition, correlation analysis was applied to examine the strength and direction of associations among exchange rate volatility, inflation, foreign direct investment, interest rate, and real GDP. Finally, the Granger causality test was employed to determine the causal relationships between the variables, assessing whether past values of one variable provide predictive information for another beyond its own history

Model Specification

The study adopted the model developed by Adeniran et al. (2014) and employed the growth rate of real GDP as a proxy for economic growth. In addition to exchange rate, other independent variables employed are net foreign direct investment, inflation rate, and interest rate. For the purpose of this study, these variables will be substituted into an Autoregressive Distributed Lag (ARDL) framework to capture both the short-run dynamics and long-run relationships among them.

The functional form of the model is specified as follows:

$$RGDP = f(EXR_t + FDI_t + INF_t + INT_t) \text{----------(3.1)}$$

Where:

The study employs five key variables to capture macroeconomic dynamics in Nigeria. Real GDP (RGDP) is measured as the natural logarithm of real gross domestic product (constant 2015 US$) to represent economic growth while accounting for inflationary effects. Exchange rate (EXR) is defined as the annual average official naira–US dollar rate, with volatility computed using measures such as standard deviation or GARCH models. Foreign direct investment (FDI) is expressed as net inflows relative to GDP, reflecting external capital contributions to the economy. Inflation (INF) is measured as the annual percentage change in the Consumer Price Index (CPI), indicating general price level changes. Finally, interest rate (INT) is captured by the annual average lending or monetary policy rate, serving as a proxy for borrowing costs and the stance of monetary policy. Hence, the specific ARDL model for this study is expressed as follows:

$$\Delta InLRGDP_t = \alpha_0 + \sum_{i=1}^{p} \phi_i \Delta InLRGDP_{t-i} + \sum_{j=0}^{q1} \beta_{1j} \Delta InEXR_{t-j} + \sum_{j=0}^{q2} \beta_{2j} \Delta INF_{t-j} + \sum_{j=0}^{q3} \beta_{3j} \Delta InFDI_{t-j} + \sum_{j=0}^{q4} \beta_{4j} \Delta INT_{t-j} + \varepsilon_t \text{---(3.2)}$$

Where the error-correction term is:

$$\Delta InLRGDP_t = \phi + \sum_{i=1}^{p} \phi_i \Delta InLRGDP_{t-i} + \sum_{j=0}^{q_1} \beta_{1j} \Delta InEXR_{t-j} + \sum_{j=0}^{q_2} \beta_{2j} \Delta INF_{t-j} + \sum_{j=0}^{q_3} \beta_{3j} \Delta InFDI_{t-j} + \sum_{j=0}^{q_4} \beta_{4j} \Delta INT_{t-j} + \lambda ECM_{t-1} + \varepsilon_t \text{--(3.3)}$$

In equation (3.3), the coefficient (λ) of the ECM term called the speed of adjustment is expected to be negative in order to restore the model to equilibrium, i.e. $\lambda < 0$.

The long run form of the ARDL is specified as follows:

$$InRGDP_t = \alpha_0 + \alpha_1 InEXR_t + \alpha_2 INF_t + \alpha_3 InFDI_t + \alpha_4 INT_t \text{ ----------(3.4)}$$

Analysis and Results

This section presents the results of the empirical analysis involving descriptive analysis, unit root test analysis, trend analysis, ARDL, and the post estimation test.

Trend Analysis

Table 4.1 Trend Analysis Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	30.09432	0.156281	192.5649	0.0000
INF	-0.001701	0.002411	-0.705542	0.4856
INT	-0.029701	0.020459	-1.451746	0.1563
LEXR	0.330227	0.033649	9.813861	0.0000
LFDI	-0.070584	0.044546	-1.584527	0.1229

Source: Authors Computation Using E-views 10

The results show that inflation (-0.0017, p = 0.486) and interest rate (-0.0297, p = 0.156) both exerted negative but statistically insignificant effects on Nigeria's economic growth, suggesting that while high prices and lending rates constrained purchasing power, investment, and credit, they were not decisive drivers of long-run growth. In contrast, exchange rate emerged as the most influential factor, with a positive and highly significant impact (0.3302, p < 0.01), highlighting its central role in shaping growth through trade competitiveness, export earnings, and investment inflows. Foreign Direct Investment (FDI), however, displayed a negative but insignificant relationship (-0.0706, p = 0.123), likely due to its dominance in the oil sector, weak spillovers to the broader economy, and profit repatriation. Overall, the findings emphasize the importance of exchange rate management in Nigeria's growth trajectory, while signaling the limited long-term role of inflation, interest rates, and undiversified FDI.

Descriptive Statistics

The descriptive statistics was conducted to describe the mean, median, maximum, minimum and standard deviation values of the variables in the model.

Table 4.2 Descriptive Statistics Results

	INT	INF	LFDI	LEXR	LRGDP
Mean	7.004538	19.58356	0.021674	4.203139	31.23943
Median	7.210833	12.87658	0.179590	4.834758	31.22645
Maximum	11.06417	72.83550	1.454441	6.469551	31.98691
Minimum	0.724167	5.388008	-1.986651	0.562197	30.47480
Std. Dev.	2.261140	17.35017	0.859644	1.484181	0.516789
Skewness	-0.922050	1.731429	-0.660325	-0.742410	0.076505
Kurtosis	4.362181	4.749928	2.562829	2.529336	1.414840
Jarque-Bera	8.103374	23.20769	2.983486	3.740419	3.909888
Probability	0.017393	0.000009	0.224980	0.154091	0.141572
Sum	259.1679	724.5918	0.801931	155.5161	1155.859
Sum Sq. Dev.	184.0592	10837.02	26.60354	79.30056	9.614549
Observations	37	37	37	37	37

Source: Authors Computation Using E-views 10

The descriptive statistics highlight the distributional behavior of the study variables—interest rate, inflation, foreign direct investment (FDI), exchange rate, and real gross domestic product (RGDP). Interest rate averaged 7.00% with moderate variability, negatively skewed distribution, and leptokurtic features, showing a concentration of higher rates, while the Jarque-Bera test confirmed non-normality. Inflation exhibited substantial volatility, averaging 19.58% and

peaking at 72.83%, with positive skewness and fat-tailed distribution, also confirming non-normality, consistent with Nigeria's inflationary instability. FDI as a share of GDP remained low on average (0.0217) but fluctuated widely, occasionally recording outflows, though its distribution was closer to normal. Exchange rate volatility averaged 4.20, with moderate variability, negative skewness, and a slightly platykurtic distribution, showing no significant deviation from normality. Finally, RGDP averaged 31.24 (log values), reflecting gradual and stable growth with low variability, near symmetry, and no significant departure from normality. The statistics reveal that while macroeconomic variables like inflation and interest rate show instability and non-normal behavior, GDP and exchange rate demonstrate more stability in distributional terms.

Correlation analysis Table 4.3 Correlation Analysis Result

	INT	INF	LFDI	LEXR	LRGDP
INT	1.000000				
INF	-0.079244	1.000000			
LFDI	0.005171	0.054040	1.000000		
LEXRV	0.549736	-0.376608	0.054290	1.000000	
LRGDP	0.395327	-0.410330	-0.069682	0.892083	1.000000

Source: Authors Computation Using E-views 10

The correlation analysis reveals mixed relationships among the study variables. Interest rate (INT) exhibits a weak negative correlation with inflation (–0.08), suggesting limited effectiveness of higher rates in curbing inflation, while showing moderate positive associations with exchange rate volatility (0.55) and economic growth (0.40), indicating closer links with monetary and growth dynamics. Inflation (INF), on the other hand, is moderately negative with both exchange rate volatility (–0.38) and growth (–0.41), reflecting its adverse effect on stability and output. Foreign direct investment (FDI) demonstrates very weak correlations with all variables, underscoring its limited role in Nigeria's macroeconomic performance over the period. Exchange rate volatility (EXR) shows the strongest positive correlation with economic growth (0.89), highlighting its pivotal influence on Nigeria's growth trajectory, alongside a moderate positive link with interest rates (0.55). Finally, economic growth (RGDP) is strongly driven by exchange rate dynamics, moderately linked with interest rates, and negatively associated with inflation and FDI, suggesting that exchange rate stability and monetary factors are more critical drivers of growth than inflation management or external capital inflows.

Unit Root Test

Table 4.4 Unit Root Test Result

Variable	ADF statistic	5% Critical Value	Probability Value	Status	Order of integration
VARIABLES AT LEVEL					

INF	-3.533848	-2.945842	0.0126	Stationary	I(0)
INT	-4.539126	-2.945842	0.0009	Stationary	I(0)
LEXR	-2.529780	-2.943427	0.1169	Not Stationary	Unknown
LFDI	-3.263412	-2.948404	0.0245	Stationary	I(0)
LRGDP	-0.282009	-2.954021	0.9172	Not Stationary	Unknown
VARIABLES	**T FIRST DIFFERENCE**				
INF	-2.968694	-2.960411	0.0491	Stationary	I(0)
INT	-6.692168	-2.948404	0.0000	Stationary	I(0)
LEXR	-6.260494	-2.945842	0.0000	Stationary	I(1)
LFDI	-3.582996	-2.960411	0.0121	Stationary	I(0)
LRGDP	-3.896745	-2.945842	0.0050	Stationary	I(1)

Source: Authors Computation Using E-views 10

The unit root test results presented in Table 4.4 indicate that the variables exhibit a mixed order of integration. At levels, inflation (INF), interest rate (INT), and foreign direct investment (LFDI) were stationary, confirming their integration at order zero, I(0). Conversely, exchange rate (LEXR) and real gross domestic product (LRGDP) were nonstationary at level but became stationary after first differencing, establishing that they are integrated of order one, I(1). This outcome demonstrates the appropriateness of employing the Autoregressive Distributed Lag (ARDL) model for analysis, as it can effectively accommodate variables integrated at both I(0) and I(1).

Heteroscedasticity, Autocorrelation and Normality Test Table 4.5 Residual Diagnostics Test

DIAGNOSTIC TEST	F-STATSTICS	PROBABILITY
Breusch-Godfrey Serial Correlation LM Test	60.61020	0.5701
Heteroskedasticity Test: Breusch-Pagan-Godfrey	2.087936	0.1055
Normality test: Jarque-Bera	2.172520	0.337476

Source: Authors Computation Using E-views 10

The Breusch-Godfrey Serial Correlation LM Test reports a probability value of 0.5701, which is well above the 5% significance threshold. This indicates that the null hypothesis of no serial correlation cannot be rejected, confirming that the residuals are free from autocorrelation.

The Breusch-Pagan-Godfrey Heteroskedasticity Test yields a probability of 0.1055, also greater than 0.05. This suggests that the null hypothesis of homoscedasticity holds, implying that the residuals exhibit constant variance and are not affected by heteroskedasticity.

Lastly, the Jarque-Bera Normality Test returns a probability of 0.3375, which is not statistically significant at conventional levels. This confirms that the residuals follow a normal distribution, fulfilling one of the key assumptions for valid regression inference.

ARDL Bounds Test for Co-integration

Table 4.5 ARDL Bounds Test for Co-integration

Selected Model: ARDL(1, 2, 1, 2, 1)

Test Statistic	Value	Signif.	I(0) Bounds	I(1) Bounds
F-statistic	9.447299	10%	2.45	3.52
k	4	5%	2.86	4.01
		2.5%	3.25	4.49
		1%	3.74	5.06

Source: Authors Computation Using E-views 10

This bounds test result shows that the computed F-statistic (9.447299) is well above the upper bound critical values at all conventional significance levels (10%, 5%, 2.5%, and 1%). Specifically, at the 5% level, the upper bound critical value is 4.01, and since 9.447299 > 4.01, we reject the null hypothesis of no cointegration. This confirms the existence of a long-run equilibrium relationship among the variables (economic growth, inflation, interest rate, exchange rate volatility, and foreign direct investment). In other words, despite short-term fluctuations, the variables tend to move together in the long run within the Nigerian context.

Estimation of ARDL Long-Run Coefficients Table 4.6 Estimation of Long Run Coefficient Based on ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-1.126604	0.941484	-1.196625	0.2454
LEXR	-1.766131	2.448993	-0.721167	0.4792
LFDI	3.553659	2.385940	1.489417	0.1520
LRGDP	-16.05622	5.868411	-2.736042	0.0127
c	726.6409	252.3524	2.879468	0.0093

Source: Authors Computation Using E-views 10

The ARDL long-run estimates provide nuanced insights into the relationship between macroeconomic variables and Nigeria's economic growth. The coefficient of interest rate (INT) is negative but statistically insignificant, indicating that while higher borrowing costs may constrain investment and growth, the effect is not consistently strong in the long run. Similarly, exchange rate (LEXR) also shows a negative but insignificant coefficient, suggesting that although exchange rate fluctuations can destabilize trade and investment, their long-term influence on growth appears muted, possibly due to gradual market adjustments. Foreign direct investment (LFDI) carries a positive sign, implying potential growth-enhancing effects, yet its insignificance highlights the limited absorptive capacity of Nigeria's economy, as institutional weaknesses and infrastructure deficits dilute the impact of external capital inflows. Interestingly, real GDP (LRGDP) exhibits a negative and statistically significant coefficient, signaling the presence of adjustment dynamics in the long-run equilibrium. This suggests that deviations from steady-state growth are corrected over time, but structural rigidities may hinder sustained expansion. The significant positive constant further underscores the role of unobserved structural and institutional drivers beyond the specified variables. The results reveal that while macroeconomic fundamentals matter, their long-run effects on growth in Nigeria are often subdued by deeper structural challenges and adjustment mechanisms.

Estimation of ARDL Short-Run Coefficients

Estimating ARDL short-run coefficients is important as it reveals the immediate effects of changes in independent variables on the dependent variable, separating these short-term dynamics from the long-run equilibrium relationship. Through the error correction term (ECT), it also shows the speed at which deviations from the long-run path are corrected.

Table 4.7 Results of the Short Run and Error Correction Model (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	0.695744	0.115486	6.024490	0.0000
D(INT)	0.568856	0.775858	0.733197	0.4719
D(LEXRV)	-14.78328	6.523818	-2.266048	0.0347
D(LEXRV(-1))	-11.04211	6.243231	-1.768653	0.0922
D(LFDI)	-5.309440	2.382540	-2.228479	0.0375
D(LFDI(-1))	-3.880835	2.390512	-1.623433	0.1202
D(LRGDP)	-253.8373	41.77586	-6.076172	0.0000
D(LRGDP(-1))	-124.7299	46.28374	-2.694898	0.0139
CointEq(-1)*	-1.318418	0.142965	-9.221963	0.0000

R-squared	0.805906	Mean dependent var	0.166545
Adjusted R-squared	0.743796	S.D. dependent var	15.52994
S.E. of regression	7.860719	Akaike info criterion	7.183560
Sum squared resid	1544.772	Schwarz criterion	7.587597
Log likelihood	-113.1205	Hannan-Quinn criter.	7.321348
Durbin-Watson stat	2.032354		

Source: Authors Computation Using E-views 10

The short-run ARDL/ECM results highlight the dynamic interplay between macroeconomic variables and Nigeria's economic growth. Inflation exerts a positive and significant lagged effect, suggesting that in the short term, price increases may stimulate output through demand-pull pressures or temporary profit incentives. In contrast, interest rate changes show no significant impact, reflecting the weak transmission of monetary policy in Nigeria's structurally constrained financial system. Exchange rate volatility emerges as a major constraint, with both contemporaneous and lagged coefficients indicating significant negative effects on growth, underscoring how instability in the naira undermines investment, trade, and overall performance. Foreign direct investment (FDI), unexpectedly, also shows a negative short-run influence, particularly contemporaneously, which may be attributed to Nigeria's dominance of resource-seeking and import-heavy FDI with limited domestic spillovers and substantial profit repatriation. Real GDP

itself demonstrates significant negative adjustment dynamics, reinforcing the structural rigidities that limit sustained short-term growth momentum. Importantly, the error correction term is negative, highly significant, and exceeds unity in absolute value, confirming a stable long-run relationship and indicating rapid albeit overshooting adjustment back to equilibrium. This suggests that while shocks strongly disrupt short-run growth, the economy quickly reverts to its long-run path, though structural weaknesses remain a persistent challenge.

CONCLUSION

In conclusion, this study confirms that inflation significantly undermines Nigeria's economic growth in the short run, a finding consistent with Olugbenga and Oluwabunmi (2019), Benjamin (2019), Onwubuariri et al. (2021), Danladi (2022), and Odoh and Edith (2023), who similarly reported that inflation erodes purchasing power, reduces competitiveness, and fosters macroeconomic instability. The results also reveal that exchange rate volatility negatively affects growth, though largely insignificant in the long run, aligning with the works of Benjamin (2019), Nkemdilim and Azukah (2021), and Odoh and Edith (2023), while diverging from Babatunde et al. (2016), Godwin and Sergius (2021), and Adeniran et al. (2021), who found positive or neutral effects. Foreign direct investment (FDI) presents a mixed outcome, with current inflows showing negative effects but lagged inflows indicating positive contributions—partly consistent with Benjamin (2019) and Nkemdilim and Azukah (2021), who emphasized the unstable and conditional role of FDI in Nigeria's growth. Furthermore, the Granger causality results reveal bidirectional causality between inflation and exchange rate volatility, and between inflation and FDI, supporting earlier findings by Danladi et al. (2016) and Olugbenga and Oluwabunmi (2019), while differing from Ogu et al. (2021) and Danladi (2022), who stressed the negative role of interest rates. Overall, the findings highlight that Nigeria's growth trajectory is shaped by persistent macroeconomic instability, structural weaknesses, and weak policy transmission, underscoring the need for coordinated and evidence-based reforms to promote sustainable growth.

Implications

The findings of this study have critical implications for Nigeria's macroeconomic management and policy formulation. The significant negative impact of inflation on growth underscores the urgent need for credible and consistent antiinflationary policies, as persistent price instability erodes household welfare, discourages investment, and undermines competitiveness. The evidence that exchange rate volatility hampers economic performance, though insignificantly in the long run, highlights the importance of adopting exchange rate frameworks that reduce uncertainty and speculative pressures while supporting external competitiveness. The mixed role of FDI suggests that Nigeria must move beyond resource-seeking inflows to attract more diversified, productivity-enhancing investments that create linkages with the domestic economy. Furthermore, the observed bidirectional causality between inflation, exchange rate volatility, and FDI demonstrates the interdependence of these macroeconomic variables, implying that policies targeting one aspect must consider spillover effects on the others.

Limitations and Recommendations for future Studies

This study is limited by its focus on aggregate national data, which may obscure sector-specific effects of exchange rate volatility and inflation on different segments of the Nigerian economy, such as agriculture, manufacturing, and services. It also employs linear econometric approaches that may not fully capture potential nonlinearities or threshold effects in the inflation–growth and exchange rate–growth relationships. Furthermore, while the study emphasizes macroeconomic variables, it does not explicitly incorporate institutional quality, governance, or political stability, which are critical factors influencing Nigeria's economic outcomes.

To address these limitations, future research should consider sectoral analyses to uncover industry-specific dynamics, as well as the use of nonlinear or threshold models to identify critical points where inflation or exchange rate volatility significantly alters growth trajectories. Comparative studies with other emerging or sub-Saharan African economies are also recommended to provide broader insights into the exchange rate–inflation–growth nexus. In addition, incorporating governance, political stability, and institutional quality as moderating factors would deepen the analysis. Finally, given Nigeria's recent policy reforms such as exchange rate unification and fuel subsidy removal, future studies should focus on the post-2023 period to evaluate their long-term implications for economic stability and growth.

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