

The Impact of Selected Macroeconomic Variables on Economic Growth in Nigeria

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Abstract

This study investigates the impact of selected macroeconomic variables on economic growth in Nigeria from 1981 to 2023, utilising key economic variables, including inflation rate, interest rates, trade openness, unemployment and exchange rates. The analysis employs data sourced from the World Development Indicators, leveraging the Autoregressive Distributed Lag (ARDL) approach to capture both short-run and long-run dynamics. The findings reveal a significant negative relationship between inflation and economic growth, with a particularly strong impact on interest rates and unemployment. In contrast, trade openness and exchange rates exhibit no significant influence on growth during the study period. Based on these findings, the study recommends implementing robust monetary policies to control inflation, enhancing financial inclusion to lower interest rates and fostering policies aimed at reducing unemployment to stimulate economic growth. Additionally, it suggests that future research should explore the interactions between these variables across different sectors to better inform policymakers.

Keywords: Inflation; Interest Rates; Trade Openness; Unemployment; Exchange Rates; Economic Growth; Nigeria

JEL Codes: E31, E32, E52, F43

1. Introduction

The persistent challenge of achieving sustainable economic growth in Nigeria amidst high inflationary pressures remains a critical concern for policymakers, economists and financial analysts. Nigeria's economic growth has been volatile, often characterised by fluctuations in key macroeconomic variables such as inflation, interest rate, exchange rate and trade openness. High and unpredictable inflation rates can distort economic decision-making, erode the purchasing power of households and undermine investment incentives, leading to suboptimal growth outcomes (Adebiyi & Babatunde, 2019). Despite numerous policy interventions aimed at stabilising inflation and promoting growth, Nigeria continues to grapple with macroeconomic instability, raising questions about the effectiveness of these policies in fostering a stable and conducive economic environment.

Over the years, Nigeria has implemented several monetary and fiscal policies aimed at stabilising inflation and promoting economic growth. Notably, the Central Bank of Nigeria (CBN) frequently adjusted the Monetary Policy Rate (MPR), such as in 2016, 2020, 2023 and even in 2024, to control liquidity and influence inflationary trends (CBN, 2024). Additionally, the CBN employed Open Market Operations (OMO) and recently adjusted the Cash Reserve Requirement (CRR), as seen in 2015 and 2019, and recently, to regulate the money supply and manage inflation (Adebiyi & Babatunde, 2019). To stabilise the exchange rate and curb imported inflation, the CBN introduced multiple exchange rate windows and adopted a Managed Float System in 2017 (Nwosa, 2022). Moreover, the adoption of the Inflation Targeting Framework in 2011 sought to anchor inflation expectations through the setting and communication of specific inflation targets (Adeniran, Yusuf & Adeyemi, 2021). On the fiscal side, the Nigerian government pursued trade policies and import restrictions between 2015 and 2019, such as foreign exchange restrictions and tariffs, to protect domestic industries and control inflation (Olalekan & Philip, 2021). Efforts at fiscal consolidation were made through initiatives like the Economic Recovery and Growth Plan (ERGP) (2017–2020), which aimed to reduce budget deficits and enhance economic stability (Balogun & Alimi, 2018). Additionally, the government has occasionally implemented price control measures such as fuel subsidies and agricultural input subsidies, to moderate inflationary pressures in critical sectors (Gatawa, Abdulgafar & Olarinde, 2022). Despite these policies, the persistence of high inflation and macroeconomic instability highlights ongoing challenges in policy effectiveness and implementation (Ojo, 2020).

The link between inflation and economic growth is further complicated by the role of interest rates in influencing investment and consumption patterns. High interest rates, often used as a tool to combat inflation, can crowd out private investment and limit economic expansion. This inverse relationship between interest rates and growth poses a dilemma for policymakers seeking to balance price stability with economic development (Ojo, 2020). Moreover, the volatility of the exchange rate, driven by fluctuations in oil prices and other external shocks, has added to the complexity of achieving macroeconomic stability in Nigeria (Nwosa, 2022). A depreciating exchange rate can lead to imported inflation, further exacerbating price instability and creating uncertainty for businesses engaged in international trade.

Trade openness, another critical variable, plays a dual role in shaping Nigeria's economic growth dynamics. While increased trade openness can foster economic growth by providing access to larger markets and promoting competition, it can also expose the economy to external shocks, which may exacerbate inflationary pressures (Olalekan & Philip, 2021). The degree to which trade openness influences economic growth is also contingent on the stability of other macroeconomic variables, such as exchange rates and inflation. In the context of Nigeria, where the oil sector dominates export earnings, the impact of trade openness on growth is further influenced by global oil price volatility, making the economy vulnerable to external shocks (Balogun & Alimi, 2018). Despite the substantial body of literature exploring the relationship between inflation and economic growth, empirical evidence on the role of other macroeconomic variables, such as interest rate, trade openness and exchange rate, in mediating this relationship remains inconclusive and context-specific. Some studies suggest that these variables interact in complex ways to influence growth outcomes, making it difficult to establish a one-size-fits-all approach to macroeconomic management in Nigeria (Adeniran, Yusuf & Adeyemi, 2021; Gatawa, Abdulgafar, & Olarinde, 2022).

Given the persistent economic challenges and mixed empirical findings in the Nigerian context, it is essential to re-evaluate how key macroeconomic variables influence economic growth. In particular, understanding the combined impact of inflation, interest rate, trade openness and exchange rate is vital for crafting policies that foster economic stability and long-term growth. This study, therefore, investigates the impact of these selected macroeconomic variables on Nigeria's economic growth between 1981 and 2023, with the aim of providing evidence-based insights to guide more effective economic policymaking.

The significance of this study lies in its potential to address the existing gaps in knowledge, particularly regarding the complex interactions between inflation, interest rates, exchange rates, unemployment rate and trade openness in Nigeria's economic context. With policymakers striving for more effective strategies to stabilise the economy and foster sustainable growth, understanding the precise impact of these macroeconomic variables is crucial for designing informed monetary and fiscal policies that can better navigate the country's economic challenges.

2. Literature Review

Theoretical Framework

This study is grounded in the Keynesian Theory of Economic Growth, developed by John Maynard Keynes (1936). The theory emphasises the central role of aggregate demand in driving economic output and growth. Keynes challenged classical economic views, arguing that economies could experience sustained unemployment and underutilised capacity without active management of demand. According to Keynes, a nation's output (GDP) is determined by the sum of consumption, investment, government spending and net exports, represented by the equation:

$$Y = C + I + G + (X - M)$$

Where:

Y = Aggregate output (GDP); C = Consumption expenditure; I = Investment expenditure; G = Government spending; $X - M$ = Net exports (exports minus imports)

The theory asserts that macroeconomic variables, such as interest rates, inflation, exchange rates, unemployment and trade openness, directly affect components of aggregate demand, thereby influencing economic growth. For example:

High interest rates can discourage investment (I),

Inflation can reduce consumption (C),

Exchange rate fluctuations affect net exports ($X - M$).

Unemployment reflects inefficiencies in the labor market, reducing productive capacity,

Trade openness can stimulate growth by expanding markets and fostering technology transfer (Blinder, 2008; Mankiw, 2016).

In Nigeria's context, marked by volatile inflation, fluctuating exchange rates, unemployment challenges and changing trade policies, the Keynesian framework offers a robust approach to understanding how these factors collectively influence growth. The theory emphasises the importance of demand-side management and policy interventions to stabilise and stimulate economic growth, which is particularly crucial for developing economies like Nigeria facing structural challenges (Snowdon & Vane, 2005).

Empirical Review

Oyadeyi et al. (2025) examined the threshold effects of interest rates, inflation and exchange rates on economic growth in Nigeria. Using a threshold regression technique, the study found that an average monetary policy rate of 16.5%, a prime lending rate of 20% and a maximum lending rate of 30% were optimal for fostering growth. Similarly, they discovered that headline inflation rates below 9%, core inflation of 8.7% and food inflation of 12.7% supported growth. The study also concluded that quarterly depreciation rates of up to 2.4% in the official exchange rate and 2.5% in the unofficial exchange rate were conducive to economic expansion. The authors emphasised the importance of managing these macroeconomic variables within specific thresholds for sustained growth, while recommending reforms aimed at diversifying exports and improving institutional strength in Nigeria.

Oladipo et al. (2024) explored the relationship between macroeconomic variables and economic growth in Nigeria from 2000Q1 to 2022Q3 using the ARDL model. Their findings indicated that fluctuations in the exchange rate had a significant negative effect on growth, both in the short and long run. However, inflation and interest rates did not have statistically significant effects on growth, although a positive short-run relationship between inflation and growth was observed, challenging conventional economic theory. The study concluded that the complex dynamics between these variables call for nuanced policy decisions to foster economic stability and growth in Nigeria.

Ifeanyi et al. (2024) investigated the impact of various macroeconomic variables on Nigeria's economic performance from 1980 to 2022, using Real Gross Domestic Product (RGDP) growth as a measure of economic growth. They found that inflation had a significant negative effect on growth, while interest rates and exchange rates exhibited a positive influence, despite the unexpected positive link between interest rates and GDP growth. The study recommended that Nigeria prioritise price stability, reevaluate interest rate policies and focus on maintaining a stable exchange rate environment to promote sustainable growth. Similarly, Linh (2024) examined the inflation-growth relationship in Vietnam from 1996 to 2023, focusing on determining an inflation threshold for effective policy recommendations. The study found that while inflation supported short-term economic growth, it had a mildly negative long-term impact. The research also concluded that economic growth does not influence inflation, emphasizing the importance of controlling inflation to sustain long-term growth.

Harahap (2024) analysed the impact of the Farmer's Exchange Rate (NTP) on inflation in North Sumatra, Indonesia, with economic growth as a moderating variable. The study, which used quantitative analysis from 2018 to 2022, revealed that NTP significantly influenced inflation, but economic growth did not play a moderating role in this relationship. This suggests that, in the context of North Sumatra, economic growth does not significantly alter the effect of NTP on inflation. Also, Olurin et al. (2024) explored the effects of government expenditure on inflation and economic growth in Nigeria from 1989 to 2021. They found that both government spending and inflation had positive and significant impacts on economic growth. The study recommended that Nigeria increase government spending on healthcare and social transfers while maintaining a single-digit inflation rate to promote sustainable economic development.

Akinyele and Ojo (2024) studied the effects of exchange rate fluctuations on economic growth in Ghana from 1990 to 2022 using the ARDL model. They found that exchange rate volatility negatively impacted economic growth in the long run, while the effects were mixed in the short run. The authors recommended implementing policies to stabilise the exchange rate and minimise volatility to foster sustained economic growth. More so, Kareem and Yusuf (2024) assessed the effects of inflation and government spending on economic growth in Egypt from 1980 to 2020. Using the Structural Vector Autoregression (SVAR) model, the study concluded that inflation had a detrimental impact on growth, while government spending positively influenced growth, especially in the long run. The authors emphasised controlling inflation while strategically increasing government spending to ensure long-term economic sustainability.

Ahmed and Ismail (2023) evaluated the impact of trade openness and inflation on economic growth in Pakistan from 1980 to 2021. Their study found that trade openness had a positive effect on growth, while inflation negatively affected it. The authors recommended pursuing trade liberalization policies while ensuring inflation remains under control to foster sustainable economic growth. Bello and Adeyemi (2023) investigated the impact of interest rate changes on investment and economic growth in Kenya from 1985 to 2020. The study revealed that interest rate changes had a negative short-term impact on investment but a positive effect on economic growth in the long run. The authors suggested that central banks balance interest rate policies to stimulate both investment and long-term growth.

Chukwuma and Obiora (2023) examined the relationship between trade openness and economic growth in South Africa from 1994 to 2021. Using the Fully Modified Ordinary Least Squares (FMOLS) approach, the study found a significant positive relationship between trade openness and economic growth in the long run. The authors recommended that South Africa continue implementing trade liberalization policies to boost economic performance.

Niken et al. (2023) explored the relationships between inflation, unemployment and economic growth in Ethiopia from 1980 to 2020. Using VAR and ECM models, the study found that inflation and unemployment had minimal long-term effects on growth but had notable short-term impacts. It also uncovered an inverse relationship between inflation and unemployment, which is unique to Ethiopia's growth dynamics.

Ezako (2023) studied the impact of inflation on economic growth in Burundi from 1990 to 2020, identifying an inflation threshold of 13%. Beyond this threshold, inflation significantly reduced economic growth. The study also found that investment, household consumption and exchange rates had positive long-term effects on growth, suggesting that managing inflation below 13% could foster higher economic growth.

Madurapperuma (2023) investigated the relationship between money growth, inflation and GDP growth in Sri Lanka from 1990 to 2021. The study found that increased money supply leads to higher inflation, which negatively impacts long-term economic growth. The author recommended maintaining low and stable inflation rates supported by effective monetary policies to achieve sustainable growth.

Sekwati and Dagume (2023) analysed the impact of unemployment and inflation on economic growth in South Africa from 1994 to 2018. Their findings revealed that both unemployment and inflation negatively affected economic growth, with long-term relationships confirmed through error correction models. The study underscored the need for policies addressing inflation and unemployment to support long-term growth.

Uddin and Rahman (2023) explored the effects of inflation, unemployment and corruption on economic growth in 79 developing countries from 2002 to 2018. Their study found that corruption and political instability negatively impacted GDP per capita, while inflation, governance and the rule of law positively influenced growth. This highlights the importance of good governance and stable economic policies for fostering growth.

Buthelezi (2023) examined the effects of money supply on inflation and economic growth in South Africa from 1990 to 2021. Using Markov-Switching Dynamic Regression (MSDR) and Time-Varying Parameter SVAR models, the study found that money supply had a negative impact on GDP in low-inflation states but an insignificant effect in high-inflation states. The study highlighted the trade-off between money supply, inflation and economic growth, which varied depending on the economic context.

3. Methodology

This study adopts a quasi-ex post facto research design, also known as a quasi-experimental approach, to assess the impact of selected macroeconomic variables on Nigeria's economic growth. As a retrospective analysis, the study examines historical trends, with the independent variables, namely inflation, exchange rate, interest rate and trade openness, already having occurred. Annual time series data were obtained from the World Bank's World Development Indicators (WDI) database, covering the period from 1981 to 2023. The year 2024 is excluded from the analysis, as updated data were not yet available at the time this study was conducted. This time frame offers a comprehensive view of how key macroeconomic indicators have influenced Nigeria's economic performance over the past four decades.

Model Specification

This study modifies the model proposed by Ifeanyi et al. (2024) within the Keynesian framework to investigate the impact of selected macroeconomic variables on economic growth in Nigeria. The original model included inflation rate, exchange rate, interest rate, unemployment rate and gross fixed capital formation as explanatory variables. However, in this study, gross fixed capital formation is replaced with trade openness. This modification is justified by the growing relevance of global economic integration and Nigeria's increasing participation in international trade, which significantly influences domestic economic performance. Trade openness is thus incorporated as a key macroeconomic variable to better capture the external sector's role in driving economic growth. The revised model is specified as follows:

$$GDP = f(INF, INT, TOP, EXCH, UNE) \quad 3.1$$

Where: GDP = Annual growth in Gross Domestic Product; INF = Inflation rate; INT = Lending interest rate; TOP = Trade openness; EXCH = Exchange rate; UNE = Unemployment rate

The relationship between these variables is expressed by the equation:

$$GDP_t = \beta_0 + \beta_1 INF_t + \beta_2 INT_t + \beta_3 TOP_t + \beta_4 EXCH_t + \beta_5 UNE_t + \mu_t \quad 3.2$$

Where: β_0 = Constant; $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Coefficients of the independent variables; μ_t = Error term

The data were analysed using the Autoregressive Distributed Lag (ARDL) model, developed by Pesaran and Shin (1996). The ARDL model is useful for examining both short- and long-term relationships between variables. To investigate the long-run relationship, the ARDL bound test was used, where the null hypothesis of no cointegration is tested using F-statistics. Critical values (lower bound I(0) and upper bound I(1)) are compared to the F-statistic to determine the presence of a long-term relationship.

The short-run relationship was explored using the following ARDL equation:

$$\Delta GDP_t = \alpha_{01} + \beta_{11}GDP_{t-i} + \beta_{21}INF_{t-i} + \beta_{31}INT_{t-1} + \beta_{41}TOP_{t-1} + \beta_{51}EXCH_{t-1} + \beta_{61}UNE_{t-1} + \sum_{i=1}^p \alpha_{1i}\Delta GDP_{t-1} + \sum_{i=1}^q \alpha_{2i}\Delta INF_{t-1} + \sum_{i=1}^r \alpha_{3i}\Delta INT_{t-1} + \sum_{i=1}^s \alpha_{4i}\Delta TOP_{t-1} + \sum_{i=1}^t \alpha_{5i}\Delta EXCH_{t-1} + \sum_{i=1}^u \alpha_{6i}\Delta UNE_{t-1} + \mu_{1t} \tag{3.3}$$

The Error Correction Mechanism (ECM) was used to assess how quickly variables return to long-run equilibrium after short-term disturbances. For the long-run equilibrium to be valid, the lagged ECM coefficient must be negative and exceed 10%. A coefficient lower than 10% suggests a slow or negligible adjustment to equilibrium. The error correction model is expressed as:

$$\Delta GDP_t = \alpha_{02} + \sum_{i=1}^p \alpha_{1i}\Delta GDP_{t-1} + \sum_{i=1}^q \alpha_{2i}\Delta INF_{t-1} + \sum_{i=1}^r \alpha_{3i}\Delta INT_{t-1} + \sum_{i=1}^s \alpha_{4i}\Delta TOP_{t-1} + \sum_{i=1}^t \alpha_{5i}\Delta EXCH_{t-1} + \sum_{i=1}^u \alpha_{6i}\Delta UNE_{t-1} + \lambda ECT_{t-1} + \mu_{2t} \tag{3.4}$$

Where: λ is the speed of adjustment parameter; ECT is the error correction term that reflects deviations from long-term equilibrium

Before the primary analysis, several pre-estimation checks were conducted, including the Augmented Dickey-Fuller (ADF) test to ensure stationarity, while the Akaike Information Criterion (AIC) to determine the optimal lag length for the ARDL model. The ARDL co-integration test was used to examine if a long-run relationship exists between the variables.

Post-estimation, diagnostic checks include the Histogram Normality Test, RESET test, Serial Correlation Test, Heteroskedasticity Test and Stability Test. These tests confirms that the ARDL model is robust, accurately specified and provides reliable results for the relationship between inflation and Nigeria's economic performance.

4. Presentation and Discussion of Results

Descriptive Statistics

Table 1: Descriptive Statistics Results

| | GDP (%) | INF (%) | INT | TOP | UNE (%) | EXCH (₦) |
|--------------|-----------|----------|----------|-----------|----------|----------|
| Mean | 3.046473 | 18.94662 | 17.32432 | 37.04234 | 3.560714 | 115.6556 |
| Median | 3.449434 | 12.94178 | 16.92153 | 38.22710 | 3.790000 | 114.8990 |
| Maximum | 15.32916 | 72.83550 | 31.65000 | 62.92138 | 10.09000 | 425.9792 |
| Minimum | -13.12788 | 5.388008 | 8.916667 | 9.135846 | 0.000000 | 0.617708 |
| Std. Dev. | 5.319457 | 16.45496 | 4.816691 | 11.54084 | 2.922212 | 119.1827 |
| Skewness | -0.831907 | 1.877082 | 0.357460 | -0.198794 | 0.531151 | 1.025345 |
| Kurtosis | 4.736123 | 5.437063 | 3.601321 | 2.794525 | 2.744677 | 3.230143 |
| Jarque-Bera | 10.11920 | 35.05778 | 1.527218 | 0.350519 | 2.088935 | 7.452019 |
| Probability | 0.006348 | 0.000000 | 0.465982 | 0.839239 | 0.351879 | 0.024089 |
| Observations | 43 | 43 | 43 | 43 | 43 | 43 |

Source: Author’s computation, 2025

Between 1981 and 2023, Nigeria experienced moderate economic growth, with an average GDP growth rate of 3.05% and a median of 3.45%. The economy exhibited significant fluctuations, as GDP growth peaked at 15.33% and dropped to a minimum of -13.13%, reflecting both

expansionary and contractionary periods. A standard deviation of 5.32% underscores this volatility, while a negative skewness of -0.83 indicates more frequent instances of below-average growth. The kurtosis value of 4.74 and a Jarque-Bera statistic of 10.12 ($p = 0.006$) suggest the presence of outliers and a non-normal distribution. Inflation during the same period was relatively high and volatile, with a mean of 18.95%, a median of 12.94% and a maximum of 72.84%, signaling episodes of hyperinflation. The distribution of inflation rates was strongly right-skewed (skewness = 1.88) and leptokurtic (kurtosis = 5.44), with a Jarque-Bera statistic of 35.06 ($p = 0.000$), further confirming non-normality. Lending interest rates averaged 17.32%, with moderate variability (standard deviation = 4.82%) and a slightly right-skewed distribution (skewness = 0.36). The interest rate data was mesokurtic (kurtosis = 3.60) and normally distributed, as indicated by the Jarque-Bera statistic of 1.53 ($p = 0.47$).

Trade openness in Nigeria averaged 37.04%, with a median of 38.23%, suggesting moderate participation in international trade. The range was wide, from a minimum of 9.14% to a maximum of 62.92% and the standard deviation of 11.54% shows moderate variation. The distribution was nearly normal, with slight negative skewness (-0.20), a kurtosis of 2.79 and a Jarque-Bera statistic of 0.35 ($p = 0.84$). The unemployment rate averaged 3.56%, with a relatively low median of 3.79%. Though the rate ranged from 0% to 10.09%, the standard deviation of 2.92% indicates moderate variability. The data showed slight right skewness (0.53) and a nearly normal distribution (kurtosis = 2.74; Jarque-Bera = 2.09, $p = 0.35$). Conversely, the exchange rate exhibited significant depreciation over the years, averaging 115.66 Naira to the US dollar, with extreme fluctuations from 0.62 to 425.98. The high standard deviation of 119.18 reflects sharp volatility. The data was right-skewed (skewness = 1.03) and approximately normal (kurtosis = 3.23), though the Jarque-Bera statistic of 7.45 ($p = 0.02$) indicates non-normality.

Stationarity Test

Table 2: ADF Unit Root Test Result

| Variables | ADF Unit Root Result | | | | Order of integration |
|-------------|----------------------|---------|---------------------|---------|----------------------|
| | At Level | | At First Difference | | |
| | T – statistics | P-value | T – statistics | P-value | |
| GDP | -4.0657 | 0.0029 | | | 1(0) |
| INF | -3.7316 | 0.0071 | | | 1(0) |
| INT | -2.9404 | 0.0498 | | | 1(0) |
| TOP | -3.0340 | 0.0398 | | | 1(0) |
| UNE | 0.3584 | 0.9787 | -5.9631 | 0.0000 | 1(1) |
| EXCH | 2.8631 | 1.0000 | -4.2114 | 0.0019 | 1(1) |

Source: Author's computation, 2025

The Augmented Dickey-Fuller (ADF) test results show that at the level, GDP, inflation (INF), interest rate (INT) and trade openness (TOP) are stationary, as their t-statistics fall below the 5% significance level. However, unemployment (UNE) and exchange rate (EXCH) are not stationary at level, as indicated by their t-statistics and higher probabilities. At the first difference, all variables become stationary, confirming that the series are integrated of mixed order (I(0) and I(1)). This mixed order of integration makes the autoregressive distributed lag (ARDL) model ideal

for analyzing the relationship between these variables, as it can accommodate variables with different integration orders and capture both short-run and long-run dynamics.

Cointegration Test

Table 3: F-Bound Test Cointegration Test Result

| F-Bounds Test Test Statistic | Value | Null Hypothesis: No levels relationship | | |
|---------------------------------|----------|---|------|------|
| | | Signif. | I(0) | I(1) |
| Asymptotic: n=1000 | | | | |
| F-statistic | 8.094058 | 10% | 2.08 | 3 |
| K | 5 | 5% | 2.39 | 3.38 |
| | | 2.5% | 2.7 | 3.73 |
| | | 1% | 3.06 | 4.15 |

Source: Author's computation, 2025

The F-bound cointegration test results show that the calculated F-statistic of 8.094058 exceeds the critical upper bound values at all significance levels (10%, 5%, 2.5% and 1%). This allows us to reject the null hypothesis of no long-run relationship. The presence of cointegration indicates that a long-run equilibrium relationship exists between GDP and the explanatory variables (inflation, interest rate, trade openness, exchange rate and unemployment) in Nigeria from 1981 to 2023. This suggests that, despite short-term fluctuations, these variables move together in the long run.

ARDL Analysis

Table 4: ARDL Short run Result

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|----------------------------|------------|-------------|----------|
| INF | -0.031610 | 0.032553 | -0.971017 | 0.3416 |
| INF(-1) | 0.063459 | 0.032029 | 1.981318 | 0.0596 |
| INF(-2) | 0.141373 | 0.039763 | 3.555420 | 0.0017 |
| INT | 0.632034 | 0.178253 | 3.545709 | 0.0017 |
| INT(-1) | -0.295751 | 0.181919 | -1.625726 | 0.1176 |
| UNE | -2.500958 | 0.626698 | -3.990690 | 0.0006 |
| UNE(-1) | -1.326814 | 0.766737 | -1.730469 | 0.0969 |
| UNE(-2) | -1.835633 | 0.679225 | -2.702540 | 0.0127 |
| EXCH | -0.060549 | 0.023137 | -2.617008 | 0.0154 |
| CointEq(-1)* | -0.141373 | 0.054559 | -2.591185 | 0.0163 |
| R-squared | 0.789721 F-statistic | | | 3.411471 |
| Adjusted R-squared | 0.724463 Prob(F-statistic) | | | 0.004079 |
| Durbin-Watson stat | 2.373312 | | | |

Source: Author's computation, 2025

The ARDL short-run results in Table 4.5 highlight the dynamic relationships between GDP growth and key explanatory variables. Inflation demonstrates a mixed effect: the current change in inflation has a negative, yet statistically insignificant impact on economic growth, while past inflation (lags) has a positive and significant effect, particularly the second lag. These findings suggest that inflation may have a delayed positive impact on economic growth, aligning with the Quantity Theory of Money, which asserts that inflation can spur growth in the short term but may undermine it in the long run. This result is consistent with Linh (2024), who observed that inflation provides a short-term boost to economic growth but might have harmful long-term consequences.

Interest rates exhibit a robust positive impact on economic growth in the short run, particularly the current change in rates. However, the first lag of interest rates shows a negative coefficient, implying that while higher interest rates initially stimulate the economy, their effects may reverse over time, which aligns with Adaramola and Dada (2020), who also found a positive impact of interest rates on growth in Nigeria. The negative relationship between unemployment and GDP is substantial, with both immediate and lagged effects significantly reducing growth. This supports the findings of Sekwati and Dagume (2023), who identified a similar negative relationship in South Africa, emphasizing the critical role of employment in driving economic performance. The exchange rate also negatively impacts GDP, as a depreciation in the currency leads to a decline in economic growth, corroborating the findings of Adaramola and Dada (2020), who also highlighted the detrimental effects of exchange rate depreciation on Nigeria's economy.

The model's error correction term indicates a slow adjustment process, correcting 14.14% of short-term deviations from the long-term equilibrium per period. The R-squared value of 0.7897 demonstrates that nearly 79% of the variation in GDP growth can be explained by the model, with the adjusted R-squared remaining strong at 72.45%. The F-statistic confirms the model's statistical significance, indicating that at least one of the independent variables has a meaningful impact on GDP growth. The Durbin-Watson statistic suggests slight negative autocorrelation, but this does not raise significant concerns regarding the model's assumptions. Overall, the short run result suggests that inflation, interest rates, unemployment and exchange rates play substantial roles in shaping Nigeria's economic growth, consistent with the studies of Linh (2024), Adaramola and Dada (2020) and Sekwati and Dagume (2023).

Table 5: Long-run Estimation Result

| Levels Equation | | | | |
|---|-------------|------------|-------------|--------|
| <i>Case 2: Restricted Constant and No Trend</i> | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| INF | -0.126001 | 0.061503 | -2.048701 | 0.0521 |
| INT | -0.436568 | 0.139406 | -3.131629 | 0.0047 |
| TOP | -0.045120 | 0.088657 | -0.508924 | 0.6157 |
| UNE | -0.166769 | 0.662474 | -0.251736 | 0.8035 |
| EXCH | -0.002525 | 0.016644 | -0.151717 | 0.8807 |

Source: Author's computation, 2025

In the long run, inflation (INF) exhibits a negative and statistically significant impact on GDP growth, with a coefficient of -0.1260, supported by a t-statistic of -2.0487 and a Prob. value of 0.0521. This suggests that for every one-unit increase in inflation, GDP growth is expected to decrease by 0.1260 units, holding other factors constant. The result aligns with the Quantity Theory of Money, which suggests that inflation, by increasing the money supply, reduces purchasing power and creates economic uncertainty, thus discouraging investment. This is consistent with findings from Adaramola and Dada (2020), who also reported a negative relationship between inflation and economic growth in Nigeria. For interest rates (INT), the coefficient of -0.4366 and a t-statistic of -3.1316 (Prob. value of 0.0047) indicate a statistically significant negative effect. A one-unit increase in interest rates leads to a decrease of 0.4366 units in GDP growth, reflecting the dampening effect higher rates have on borrowing and investment. This supports Neoclassical Growth Theory, which emphasises the importance of investment in driving economic growth.

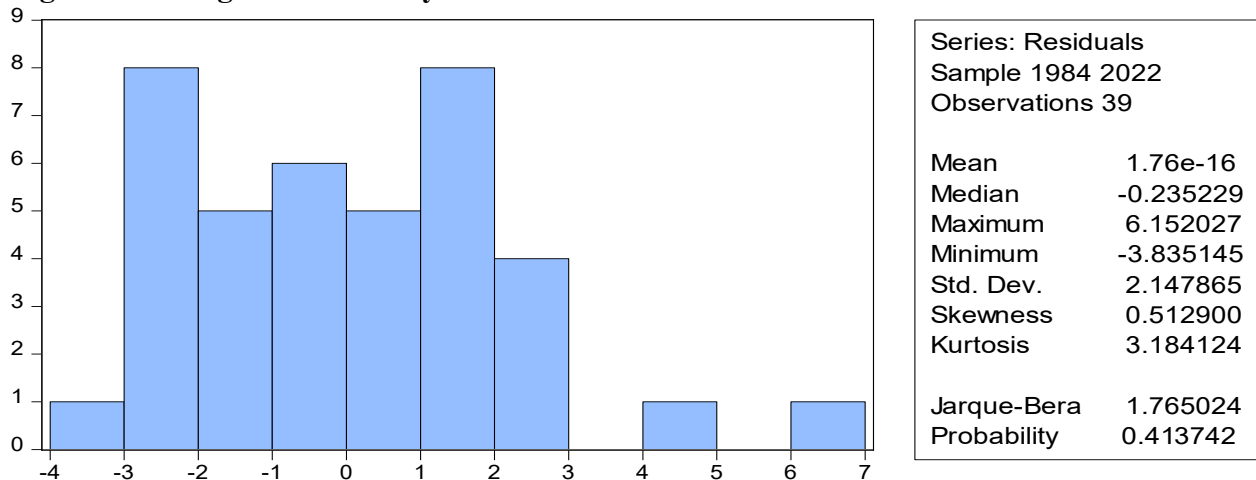
Similar negative relationships between interest rates and growth have been observed by Uddin and Rahman (2023), reinforcing the notion that lower interest rates are more conducive to stimulating economic activity, particularly in developing economies like Nigeria.

However, the effects of trade openness (TOP), unemployment (UNE) and exchange rates (EXCH) on GDP growth are statistically insignificant. The coefficients for trade openness (-0.0451), unemployment (-0.1668) and exchange rates (-0.0025) are not significantly different from zero, as evidenced by their high Prob. values of 0.6157, 0.8035 and 0.8807, respectively. The lack of significance for trade openness could suggest that the anticipated benefits of international trade have not fully materialized in Nigeria, possibly due to infrastructural constraints or trade barriers, as noted by Nkenchor and Ezeanolue (2021). Similarly, the insignificance of unemployment may reflect labor market rigidities or underemployment, where individuals may not be contributing effectively to economic productivity. This finding aligns with Ali, Sardar and Latif (2023), who argue that in developing economies, unemployment's relationship with economic growth is complex, with job creation often not keeping up with population growth. Finally, the exchange rate's lack of significance in influencing GDP growth suggests that fluctuations in currency may not have an immediate effect on economic performance. This view is supported by Okwuise et al. (2021), who contend that external factors often overshadow domestic influences of exchange rate movements on growth.

Diagnostic Tests

Normality Test

Figure 1: Histogram Normality Test Result



Source: Author's computation, 2025

Table 6: Diagnostic Test Results

| Test | Statistic | Value | Probability | Interpretation |
|-------------------------|---------------|----------|-------------|--|
| Serial Correlation Test | F-statistic | 1.377402 | 0.2741 | No serial correlation; fail to reject the null hypothesis. |
| | Obs*R-squared | 4.522763 | 0.1042 | No serial correlation in error terms. |

| Test | Statistic | Value | Probability | Interpretation |
|--------------------------------|---------------------|----------|-------------|--|
| Heteroskedasticity Test | F-statistic | 0.724190 | 0.7377 | No heteroskedasticity; fail to reject the null hypothesis. |
| | Obs*R-squared | 12.51079 | 0.6400 | Residuals have constant variance. |
| | Scaled explained SS | 4.751804 | 0.9940 | No heteroskedasticity; the model is efficient. |
| Ramsey RESET Test | t-statistic | 2.016209 | 0.0561 | The model's functional form is correctly specified (marginally significant). |
| | F-statistic | 4.065097 | 0.0561 | The model is correctly specified (marginally significant). |

Source: Author's computation, 2025

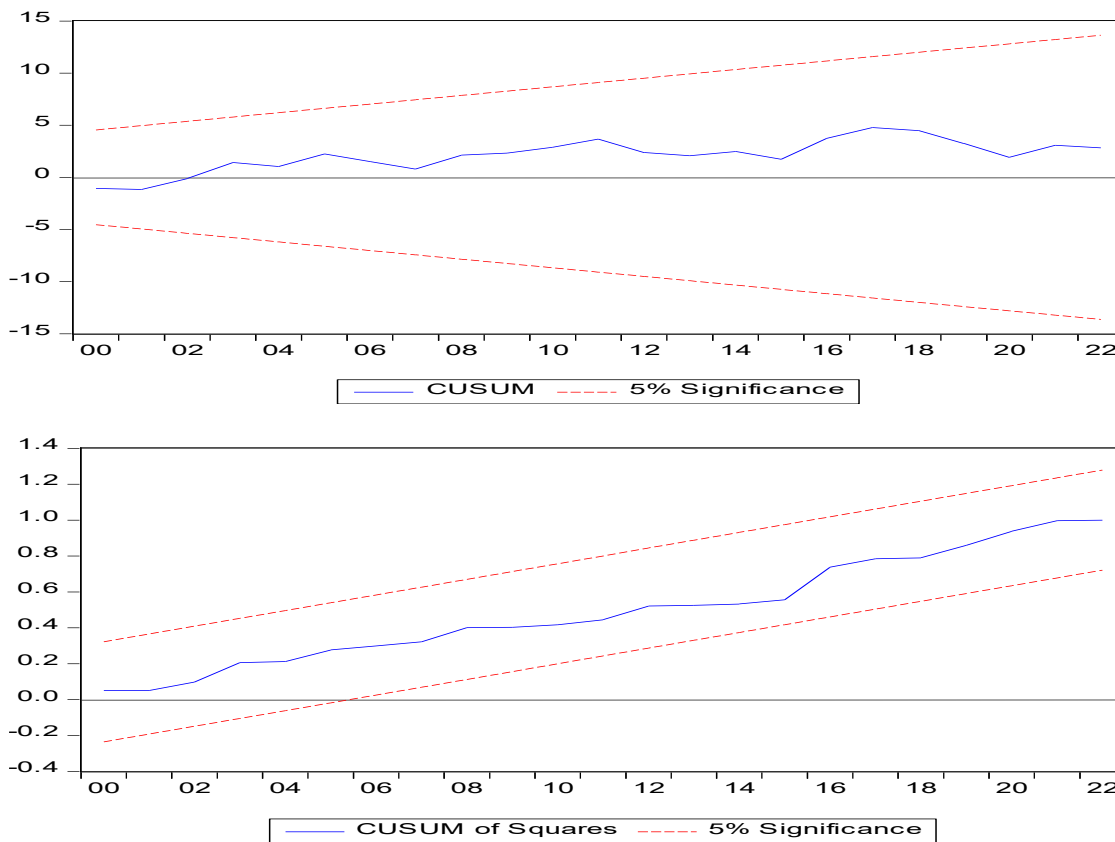


Figure 2: CUSUM and CUSUM of Squares Results

Source: Author's computation, 2025

The diagnostic tests indicate that the regression model is robust and reliable. The Breusch-Godfrey Serial Correlation LM Test shows no serial correlation, as the p-value (0.2741) is greater than 0.05, suggesting that the residuals are not autocorrelated and the estimates are reliable. The Breusch-Pagan-Godfrey Heteroskedasticity Test confirms the absence of heteroskedasticity, with p-values greater than 0.05, meaning the residuals have constant variance, supporting the validity of the regression model. The Ramsey RESET Test suggests that the model's functional form is

appropriate, with a p-value of 0.0561, which is marginally above the 5% threshold, indicating that no important variables are omitted. The Jarque-Bera Test reveals that the residuals are normally distributed, as the p-value (0.4137) is above 0.05, ensuring the validity of statistical inference. Finally, the CUSUM and CUSUM of Squares graphs show that the model parameters are stable over time, with the plots remaining within the red lines, confirming no structural breaks or parameter instability. Overall, these diagnostic checks support the model's reliability for policy analysis and forecasting.

Discussion of Findings

The findings of this study reveal a statistically significant negative relationship between inflation and economic growth in Nigeria. The coefficient for inflation was found to be -0.1260, with a p-value of 0.0521, suggesting that as inflation increases, economic growth tends to decline. This result aligns with the Quantity Theory of Money, which posits that an increase in the money supply leads to inflation, reducing the purchasing power of consumers and creating uncertainty in the economy. These effects can discourage investment, hinder economic productivity and reduce overall growth potential. The negative relationship also suggests that inflation may not only distort consumption and savings but also contribute to higher interest rates, which can further suppress growth. This finding is consistent with studies such as Adaramola and Dada (2020), which indicate that inflation has adverse effects on economic performance in Nigeria. Policymakers should therefore focus on inflation control, utilising monetary and fiscal measures to stabilise prices and maintain economic growth.

The results also show a significant negative relationship between interest rates and economic growth, with a coefficient of -0.4366 and a p-value of 0.0047. This suggests that higher interest rates have a detrimental effect on economic growth, likely due to their impact on investment and consumption. As interest rates rise, borrowing costs increase, making it more expensive for businesses and households to access credit. This can lead to a reduction in investment, slowing down economic expansion. The findings align with Neoclassical Growth Theory, which emphasises the role of investment in driving economic growth. Additionally, the study supports prior research, such as that by Uddin and Rahman (2023), which found that high interest rates tend to depress economic activity, especially in developing economies. For Nigeria, maintaining lower interest rates could stimulate investment and consumption, promoting economic growth. Policymakers should consider creating an environment where interest rates remain at levels conducive to growth, particularly by enhancing credit access for small and medium enterprises (SMEs), which play a vital role in the economy.

In contrast to the significant effects of inflation and interest rates, the study found that trade openness did not have a statistically significant impact on Nigeria's economic growth (coefficient = -0.0451, p-value = 0.6157). This suggests that trade liberalization and the increase in exports and imports may not be sufficiently stimulating Nigeria's economic growth. Several factors could explain this result, including structural inefficiencies in the domestic economy, such as poor infrastructure, regulatory barriers and underdeveloped sectors that are unable to fully capitalize

on the opportunities presented by international trade. Additionally, Nigeria's reliance on the oil sector may limit the positive impacts of trade openness on the broader economy, as oil prices and external demand for oil products are often outside the control of Nigerian policymakers. This finding aligns with the work of Nkenchor and Ezeanolue (2021), which noted that the full benefits of trade openness have not been realized in Nigeria due to these structural challenges. Therefore, there is a need to reevaluate trade policies and focus on strategic trade agreements that can open up new markets for Nigerian products, especially non-oil sectors.

The exchange rate's effect on economic growth in Nigeria was found to be statistically insignificant in this study (coefficient = -0.0025, p-value = 0.8807). This result suggests that fluctuations in the exchange rate may not have an immediate or direct effect on Nigeria's economic performance, possibly due to the country's heavy reliance on oil exports, which can cushion the economy against exchange rate volatility. However, this insignificance could also reflect the failure of exchange rate policies to create a competitive domestic economy that is responsive to exchange rate fluctuations. For instance, while a depreciation of the local currency may lead to higher export revenue, it could also increase the cost of imports, particularly for critical goods and services, thereby creating inflationary pressures. Moreover, exchange rate movements may not significantly affect GDP growth if other macroeconomic factors, such as oil prices and foreign direct investment, are more dominant in driving economic performance. This finding resonates with Okwuise et al. (2021), who found that exchange rate fluctuations had limited impact on Nigeria's overall economic growth.

Finally, the study found that unemployment did not have a significant impact on economic growth in Nigeria (coefficient = -0.1668, p-value = 0.8035). Despite the high unemployment rate in Nigeria, this result suggests that the direct effect of unemployment on GDP growth may be minimal within the time frame of the study. One possible explanation is that the unemployment rate may not fully capture the true extent of labor market inefficiencies in Nigeria. High levels of underemployment and informal employment, where individuals may be working but not contributing effectively to the formal economy, could mask the true impact of unemployment on economic growth. Additionally, factors such as low labor productivity, skill mismatches and regional disparities in employment opportunities might also contribute to the limited direct effect of unemployment on GDP. This finding aligns with the work of Ali, Sardar and Latif (2023), who argued that the relationship between unemployment and economic growth is more complex in developing economies, where labor market inefficiencies may not immediately translate into measurable changes in GDP.

5. Conclusion and Recommendations

This study has examined how inflation, interest rates, trade openness, unemployment and exchange rates affect Nigeria's economic growth. The results show that inflation and interest rates have a significant negative impact on growth, while trade openness, exchange rates and unemployment have little to no direct effect in the short term. The findings suggest that managing

inflation and interest rates is crucial for fostering stable growth. Though trade policies and labor market issues also matter, their impact on economic growth in the short run appears limited.

Based on these findings, the Central Bank of Nigeria should focus on better managing inflation through policies such as inflation targeting and improving transparency. This will help maintain economic stability and foster growth.

Policymakers should create a stable interest rate environment that encourages investment, particularly in sectors crucial for economic growth. Incentives for businesses and adjustments in lending rates can stimulate economic activity.

Nigeria should pursue policies that promote trade openness, reduce trade barriers and diversify its economy. Strengthening exports and infrastructure can improve growth prospects in the long term. The government should invest in vocational training and skill development to improve employability. Supporting small businesses and entrepreneurship will also create jobs and boost economic productivity.

This study contributes to the body of knowledge by providing empirical insights into the macroeconomic determinants of economic growth in Nigeria, specifically highlighting the significant roles of inflation and interest rates in influencing GDP growth over the period 1981 to 2023.

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