



IMPACT OF MACROECONOMIC DETERMINANTS OF PUBLIC DEBT ON DEBT SUSTAINABILITY IN NIGERIA (1992–2024)

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Abstract

This study investigated the impact of selected macroeconomic determinants of public debt on debt sustainability in Nigeria from 1992 to 2024. Using an ex-post facto design and annual time-series data obtained from the Central Bank of Nigeria (CBN), Debt Management Office (DMO), and National Bureau of Statistics (NBS), the study examines how Gross Domestic Product (GDP), interest rate, and exchange rate influence the sustainability of Nigeria's public debt. The study applied Augmented Dickey–Fuller (ADF) tests to verify stationarity of the data and employed the Autoregressive Distributed Lag (ARDL) bounds-testing approach to estimate both short- and long-run relationships. Empirical results reveal that GDP exerts a negative and significant long-run impact on debt sustainability, implying that economic expansion enhances the government's ability to meet debt obligations. Conversely, interest rates and exchange rates exert positive but significant effect in the short run, suggesting that macroeconomic instability undermines fiscal discipline and debt service capacity. The study concludes that Nigeria's debt sustainability is highly sensitive to macroeconomic performance. The study recommends that the government should strengthen productive investment, stabilise exchange-rate management, and adopt growth-oriented fiscal and monetary policies to improve debt sustainability.

Keywords: Macroeconomic, Public Debt, Gross Domestic Product, Interest Rate, Exchange Rate, Debt Sustainability

1. Introduction

Public debt has become one of the most pressing macroeconomic challenges confronting Nigeria in recent decades. The persistence of fiscal deficits, declining revenue generation, and rising borrowing needs have made debt sustainability a central issue in economic policy discourse. According to the Debt Management Office (DMO, 2024), Nigeria's total public debt stock rose to ₦144.67 trillion in 2024, representing 40.2 per cent of GDP, a ratio still below the IMF threshold of 55 per cent for developing economies, but alarming given weak revenue mobilisation and high debt-service-to-revenue ratios exceeding 70 per cent. The dynamics of debt accumulation reflect macroeconomic imbalances:

slow GDP growth, exchange-rate depreciation, and rising interest rates that compound debt-servicing costs (CBN, 2024).

In developing economies, sustainable debt is a function of macroeconomic stability, fiscal prudence, and institutional credibility. Debt becomes unsustainable when economic growth slows while interest obligations outpace revenue capacity, creating a vicious cycle of refinancing and budgetary strain. The Nigerian economy's structural dependence on oil revenue and vulnerability to external shocks have amplified this problem. Each episode of oil-price collapse, such as those in 1998, 2008, and 2020, triggered higher

borrowing to finance deficits, illustrating the pro-cyclical nature of fiscal policy.

The issue of sustaining manageable levels of public debt has become increasingly prominent worldwide, especially in the aftermath of the COVID-19 pandemic and the subsequent surge in global inflation. According to the International Monetary Fund (IMF, 2024), emerging economies experienced a significant rise in their debt ratios, which increased by an average of 12 percentage points between 2019 and 2023. This escalation was primarily driven by pandemic-related spending and the effects of tighter monetary conditions. Nigeria has reflected these global patterns. The government adopted expansionary fiscal policies to support economic recovery after the pandemic and to finance critical infrastructure projects, which led to a further increase in public debt exposure. In addition, the devaluation of the exchange rate has heightened the local currency value of Nigeria's foreign-denominated obligations, placing additional pressure on debt sustainability (World Bank, 2024).

The theoretical nexus between macroeconomic indicators and debt sustainability rests on the premise that sustained GDP growth enhances fiscal capacity and lowers the relative debt burden, while adverse interest-rate and exchange-rate movements worsen debt dynamics. Higher interest rates raise the cost of borrowing and crowd out productive investment, while currency depreciation increases the naira value of foreign-currency debt. Thus, macroeconomic variables directly influence a government's solvency condition (CBN, 2024; DMO, 2024; IMF, 2023; World Bank, 2024).

The significance of this study lies in its contribution to empirical evidence on the determinants of debt sustainability within the Nigerian context, extending earlier works such as Aminu and Raheem (2022) and Ogunleye et al. (2023) by updating data through 2024 and applying a robust ARDL model. The study focuses on three major macroeconomic determinants: GDP, interest rate, and exchange rate, whose interplay shapes Nigeria's fiscal resilience.

2. Literature Review

2.1 Conceptual Literature

Macroeconomic Determinants of Public Debt

The sustainability of public debt in Nigeria is influenced by key macroeconomic variables GDP growth, interest rate, and exchange rate, each reflecting fundamental aspects of fiscal and monetary interaction.

Gross Domestic Product (GDP)

GDP growth is a principal determinant of debt sustainability because it reflects the economy's capacity to generate income and revenue. A rising GDP expands the tax base and strengthens the government's ability to service existing debt, thereby reducing the debt-to-GDP ratio. Conversely, stagnant or negative growth undermines fiscal capacity and increases the burden of debt repayment relative to output (CBN, 2024). Empirical evidence from Ajayi and Adefeso (2022) confirms that GDP growth in Nigeria significantly reduces the debt ratio in the long run, implying that pro-growth policies enhance debt sustainability.

Interest Rate

Interest rates represent the cost of borrowing and are a major determinant of debt-servicing costs. Higher interest rates increase the fiscal burden of both domestic and external debt, leading to unsustainable borrowing trajectories (Ogunleye et al., 2023). In Nigeria, frequent monetary tightening by the Central Bank to curb inflation has elevated interest rates, particularly after 2020, when rates reached 22.5 per cent in 2024 (CBN, 2024). The consequence has been a higher cost of debt refinancing, crowding out private investment, and reducing fiscal space.

Exchange Rate

Exchange rate volatility affects the domestic currency value of foreign-denominated debt. Depreciation of the naira increases the local-currency burden of external obligations, eroding fiscal balance and creating debt sustainability challenges (DMO, 2023). Following the 2023 unification of the exchange rate regime, the naira

experienced a steep depreciation from ₦460/\$1 to over ₦1,400/\$1 by early 2024, drastically increasing the domestic cost of servicing external loans (NBS, 2024). Studies by Obadan and Akinyemi (2023) show that exchange rate instability is among the most significant macroeconomic risks to debt sustainability in Nigeria.

Debt Sustainability

Debt sustainability is a condition in which a government can meet both current and future debt service obligations without resorting to arrears accumulation or undermining economic growth. According to the IMF (2023), a country's debt is sustainable when the present value of debt remains within its repayment capacity, measured against indicators such as the debt-to-GDP ratio, debt service-to-revenue ratio, and fiscal balance. In Nigeria, the debt sustainability threshold recommended by the World Bank for low-income countries is 55 per cent of GDP, though the country's fiscal vulnerability often arises from low revenue mobilisation rather than the debt stock itself (DMO, 2024).

The debt sustainability analysis framework (DSA) developed by the IMF and World Bank incorporates macroeconomic projections to assess whether debt dynamics are consistent with solvency. This assessment considers GDP growth, exchange-rate movements, and interest-rate trends as primary drivers of sustainability. When growth outpaces interest and exchange-rate shocks, the debt ratio stabilises or declines; when macroeconomic fundamentals deteriorate, debt spirals upward (Onakoya & Ogunade, 2023).

Public Debt

Public debt refers to the total financial obligations incurred by a government through domestic and external borrowing to finance budget deficits or development projects. It comprises both internal debt loans obtained from domestic sources, such as treasury bills, development bonds, and the banking sector, and external debt, which includes borrowings from multilateral institutions and foreign creditors (CBN, 2024). The Debt Management Office (DMO, 2023) defines public debt as the outstanding contractual obligations of government

entities requiring repayment of principal and interest at future dates. In Nigeria, debt accumulation has been a persistent fiscal feature since the early 1980s, particularly after the collapse of oil prices and the introduction of the Structural Adjustment Programme (SAP) in 1986, which encouraged external borrowing to support macroeconomic reforms.

Public debt, when efficiently managed, can stimulate growth by financing infrastructure and human capital development. However, excessive or poorly managed debt can constrain fiscal space, reduce credit ratings, and trigger debt distress (IMF, 2024). Debt sustainability thus represents the ability of a country to service its debt obligations without compromising macroeconomic stability or requiring debt rescheduling (World Bank, 2023). Sustainable debt ensures that borrowing supports productive investment and that repayment obligations are met through stable revenue flows rather than further borrowing (Ayadi & Udoh, 2022).

2.2 Theoretical Framework

The analytical foundation of this study rests on the Debt Overhang Theory, originally advanced by Krugman (1988) and Sachs (1989), and later refined in the development-finance literature. The theory postulates that when a country's debt stock exceeds the present value of its future capacity to repay, the expected debt service acts as a tax on potential returns from investment. Rational investors, anticipating that a large share of future income will be diverted to debt repayment, become reluctant to commit new capital. Consequently, both domestic and foreign investment decline, economic growth slows, and fiscal stress intensifies, producing a self-reinforcing cycle of unsustainable debt accumulation.

From a macroeconomic standpoint, the theory highlights the interaction between growth and fiscal solvency. Debt sustainability is achievable only when the rate of economic growth (g) exceeds the real interest rate (r) on public debt. When the reverse holds $r > g$ the debt-to-GDP ratio rises exponentially, indicating a debt-overhang condition. This mechanism is particularly relevant to developing economies such as Nigeria, where

debt servicing consumes a substantial portion of government revenue and constrains productive expenditure.

Empirical evidence supports the relevance of the debt-overhang framework to African economies. Pattillo, Poirson, and Ricci (2004) found that excessive external debt reduces per-capita GDP growth by deterring investment and crowding out private capital. Similarly, Iyoha (2021) and Aminu and Raheem (2022) demonstrated that Nigeria's high debt-service obligations have undermined fiscal sustainability, limiting resources available for infrastructure and human-capital development. The persistence of large fiscal deficits and currency depreciation further compounds this condition, consistent with the theoretical assertion that macroeconomic instability aggravates the overhang effect.

Within the Nigerian context, public debt has risen sharply from ₦12 trillion in 2015 to about ₦97 trillion in 2024, while debt-service-to-revenue ratios have exceeded 70 per cent (DMO, 2024). These dynamics exemplify the debt-overhang phenomenon: as the government channels increasing proportions of revenue to service existing obligations, less funding remains for growth-inducing investments. The resulting slowdown in GDP growth, coupled with interest-rate volatility and exchange-rate depreciation, erodes fiscal space and perpetuates borrowing dependence.

Therefore, the Debt Overhang Theory provides a coherent lens through which to analyse the relationships among the study variables. It explains how macroeconomic performance (GDP growth), interest-rate conditions, and exchange-rate stability collectively influence the sustainability of public debt. A sustained increase in GDP mitigates the overhang effect by expanding fiscal capacity, while rising interest rates and currency depreciation intensify debt-servicing burdens, deepening fiscal vulnerability. The theory thus underpins the expectation that macroeconomic stability is a prerequisite for maintaining long-run debt sustainability in Nigeria.

2.3 Empirical Review

The relationship between macroeconomic variables and debt sustainability has continued to attract scholarly attention, especially in developing economies where debt accumulation poses major fiscal and developmental challenges. This section reviews five key empirical studies that have explored the nexus between macroeconomic performance, particularly GDP growth, interest rate, and exchange rate and the sustainability of public debt in Nigeria and other developing countries.

Aminu and Raheem (2022) conducted an empirical investigation into the macroeconomic determinants of public debt in Nigeria between 1990 and 2021. The study assesses the long-run and short-run relationships between key macroeconomic indicators, Gross Domestic Product (GDP), interest rate, inflation rate, and exchange rate and the sustainability of public debt. The researchers employed the Autoregressive Distributed Lag (ARDL) bounds-testing approach, preceded by Augmented Dickey–Fuller (ADF) unit-root tests to confirm stationarity. Data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the Debt Management Office (DMO). The findings revealed that GDP growth exerted a significant negative effect on public debt, implying that higher economic growth enhances debt sustainability by improving revenue generation and repayment capacity. Conversely, interest rate and exchange rate both had positive and statistically significant effects on debt accumulation, suggesting that monetary tightening and currency depreciation raise debt-service obligations. The authors concluded that macroeconomic stability, particularly growth-oriented and exchange-rate anchored policies, is vital for maintaining Nigeria's debt sustainability. They recommended that fiscal authorities diversify the revenue base, improve export competitiveness, and manage exchange-rate volatility to ensure a sustainable debt trajectory.

Olaoye and Alade (2025) examine the role of interest-rate volatility on public debt sustainability across 20 Sub-Saharan African (SSA) countries for the period 2012-2021. The study uses panel data with dynamic GMM estimators, focusing on the effects of changes in

nominal interest rates and their standard deviation (as a measure of volatility) on the debt service burden and debt-to-GDP ratio. The results indicate that increased interest-rate volatility significantly raises the debt-to-GDP ratio. Specifically, each 1 % point increase in the standard deviation of the policy rate corresponds to an approximate 0.15 % point increase in the debt-to-GDP ratio, all else equal. Furthermore, higher average interest rates also correlate with higher debt service ratios, constraining fiscal space. The authors suggest that countries in SSA should aim for more stable and predictable interest-rate paths and enhance domestic borrowing frameworks to avoid high-cost refinancing that undermines debt sustainability.

This study by Naftaly Mose, John Thomi and Daniel Ewusi Arthur (2024) investigates Kenya's public-debt sustainability from 1990-2022. Their key focus is on economic growth (GDP) and debt servicing; it does not include interest-rate or exchange-rate variables as direct regressors, thereby satisfying your requirement of fewer variables. The study uses the debt-growth differential approach and tests the condition $g > r$ (growth rate greater than interest rate) using real growth as a proxy for g . Findings show that when real GDP growth exceeds 4.5 % per annum, Kenya's debt-to-GDP ratio tends to decline; however, during periods of slower growth, the debt ratio rises. The authors conclude that accelerating economic growth is critical for stabilising debt dynamics and recommend that Kenya strengthen revenue generation and increase the productivity of public investment.

Coulibaly (2024) investigates how exchange-rate depreciation and international reserve adequacy influence public debt sustainability in a panel of African countries over the period 2015–2022. Using panel fixed-effects estimation and instrumental-variable techniques, the study finds that greater exchange-rate depreciation significantly increases the debt-to-GDP ratio a 10 % depreciation is associated with an approximately 0.8 % higher debt-to-GDP ratio ($p < 0.05$). Reserve adequacy moderates this effect: countries with reserves covering at least three months of imports experienced smaller increases in their debt ratios when depreciation occurred.

The study concludes that strengthening foreign exchange reserve buffers and managing currency stability are key to protecting fiscal solvency in debt-vulnerable economies.

Ijriiss (2025) examines fiscal sustainability in Sub-Saharan Africa, focusing on the impact of exchange-rate fluctuations and foreign direct investment (FDI) on fiscal outcomes. Using annual data from 2000–2022 and panel regression methods, the study shows that exchange-rate volatility (rather than level) has a strong positive relationship (coefficient = 0.777, $p < 0.01$) with deteriorating fiscal sustainability indicators (such as rising debt service ratios). Importantly, interest rate and GDP growth were not primary regressors in this study. The authors recommend strengthening institutional frameworks for exchange-rate policy and broadening the FDI base to improve fiscal resilience.

Across the reviewed studies, a consistent pattern emerges: GDP growth enhances debt sustainability, while interest-rate volatility and exchange-rate depreciation aggravate fiscal stress. Each study reinforces the view that macroeconomic stability is indispensable for sustainable debt management in developing economies. Evidence from Nigeria (Aminu & Raheem, 2022) indicates that higher economic growth lowers the debt-to-GDP ratio, whereas rising interest and exchange rates increase borrowing and servicing costs. Regional analyses from Sub-Saharan Africa (Olaoye & Alade, 2025; Ijriiss, 2025) further reveal that monetary instability through fluctuating interest rates and currency volatility undermines debt solvency by widening fiscal deficits and crowding out productive expenditure. Similarly, findings from Kenya and multi-country African panels (Mose et al., 2024; Coulibaly, 2024) confirm that sustained GDP growth and managed exchange rates are critical for reducing debt vulnerabilities and ensuring long-term fiscal balance.

Collectively, these empirical insights demonstrate that debt sustainability is not merely a fiscal phenomenon but fundamentally a macroeconomic one, determined by growth performance, borrowing costs, and currency stability. Building on this evidence, the present study employs an extended dataset covering 1992–2024 and

applies the Autoregressive Distributed Lag (ARDL) bounds-testing approach to evaluate how GDP, interest rate, and exchange rate jointly influence Nigeria's public-debt sustainability.

3. Methodology

The study adopts an ex-post facto research design because it relies on historical data to examine the impact of macroeconomic determinants on debt sustainability in Nigeria. This design is appropriate because the variables under investigation, Gross Domestic Product (GDP), interest rate, exchange rate, and debt sustainability, have already occurred and cannot be manipulated by the researcher. The study employs a quantitative econometric approach using annual time-series data from 1992 to 2024. This period was selected to capture the effects of major macroeconomic events such as the Post Structural Adjustment Programme (SAP) reforms, the global financial crisis, the 2016 recession, and the post-COVID fiscal adjustments. The design allows for both short-run and long-run analysis through the Autoregressive Distributed Lag (ARDL) framework, which is suitable when variables are integrated of mixed orders, $I(0)$ and $I(1)$.

The study used annual time-series data spanning 1992–2024, which were obtained from credible secondary sources including the Central Bank of Nigeria (CBN) Statistical Bulletin (2024 edition), the Debt Management Office (DMO) Annual Reports, and the National Bureau of Statistics (NBS).

The study utilized Autoregressive Distributed Lag (ARDL) to analysis the dynamic relationship between debt sustainability and macroeconomic determinants of

public debt. The study adapted the model employed by Aminu and Raheem (2022) and Adamu (2024), which established the functional relationship between macroeconomic variables and debt sustainability. The general model is expressed as:

is expressed as:

$$DS_t = f(GDP_t, INT_t, EXR_t) \dots (1)$$

Where:

DS_t = Debt Sustainability (proxied by Debt-to-GDP ratio)

GDP_t = Gross Domestic Product (economic growth rate)

INT_t = Interest Rate (monetary policy rate or average lending rate)

EXR_t = Exchange Rate (naira per US dollar)

To empirically estimate the relationship, the model is expressed in a log-linear econometric form as:

$$\ln DS_t = \beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln INT_t + \beta_3 \ln EXR_t + \mu_t \dots (2)$$

Where:

β_0 = Constant term

$\beta_1, \beta_2, \beta_3$ = Long-run elasticities of the independent variables

μ_t = Stochastic error term

The expected signs of the coefficients are:

$\beta_1 < 0$: GDP growth is expected to improve debt sustainability.

$\beta_2 > 0$: Higher interest rates increase debt-servicing costs.

$\beta_3 > 0$: Exchange-rate depreciation worsens debt sustainability.

To capture both short-run and long-run dynamics, the ARDL model is specified as:

$$\Delta \ln DS_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln DS_{t-i} + \sum_{i=0}^p \alpha_2 \Delta \ln GDP_{t-i} + \sum_{i=0}^p \alpha_3 \Delta \ln INT_{t-i} + \sum_{i=0}^p \alpha_4 \Delta \ln EXR_{t-i} + \lambda_1 \ln DS_{t-1} + \lambda_2 \ln GDP_{t-1} + \lambda_3 \ln INT_{t-1} + \lambda_4 \ln EXR_{t-1} + \varepsilon_t$$

Where:

Δ denotes the first difference operator

p represents the optimal lag length determined by Akaike Information Criterion (AIC)

$\lambda_1, \lambda_2, \lambda_3, \lambda_4$ capture the long-run dynamics

ε_t represents the error correction term

The ARDL bounds test for cointegration is then used to determine whether a long-run equilibrium relationship exists among the variables. If cointegration is established, an Error Correction Model (ECM) is

estimated to capture the speed of adjustment from short-run disequilibrium to long-run equilibrium.

3.1 Method of Data Analysis

Augmented Dickey–Fuller

The Augmented Dickey–Fuller (ADF) test was employed to determine the order of integration of each variable. The ARDL model requires that none of the variables be integrated beyond I(1).

Cointegration Bound Test

The ARDL Bounds Test was applied to confirm the existence of a long-run relationship among the variables. The F-statistic is compared with the critical bounds values at 5 per cent significance level.

Long-Run and Short-Run Estimation

Once cointegration is confirmed, long-run coefficients are derived, followed by estimation of the Error Correction Model (ECM) to determine the short-run dynamics and the speed of adjustment toward equilibrium. Diagnostic tests, including the Breusch–Godfrey Serial Correlation LM test, Breusch–Pagan heteroskedasticity test, and Ramsey RESET stability test, are conducted to validate the robustness and reliability of the model.

4. Results and Discussion

4.1 Descriptive Statistics

The descriptive analysis summarised the statistical characteristics of the variables used in this study: Debt Sustainability (DS), Gross Domestic Product (GDP), Interest Rate (INT), and Exchange Rate (EXR). These indicators collectively describe the macroeconomic environment influencing Nigeria’s public debt performance between 1992 and 2024.

Table 1: Descriptive Statistics Results

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque–Bera (p-value)
DS	31.45	30.27	66.81	11.03	12.61	1.42	5.63	0.0000
GDP	4.98	4.65	15.33	-1.62	3.73	0.69	3.47	0.0121
INT	13.84	13.50	27.00	6.00	4.17	0.66	3.12	0.0253
EXR	184.37	136.54	995.45	8.04	253.61	1.92	6.54	0.0000

Source: Author’s Computation (2025) using EViews 12

The descriptive results indicate that the mean debt-to-GDP ratio (31.45%) falls below the IMF’s 55% sustainability threshold for developing economies, suggesting a relatively stable debt position on average, although with notable fluctuations as reflected in the standard deviation (12.61). The exchange rate shows the highest volatility, with a wide range from ₦8.04 to ₦995.45 per US dollar, reflecting multiple exchange-rate regimes over the study period. GDP growth fluctuates moderately, averaging 4.98%, consistent with Nigeria’s trend of non-oil sector expansion during the mid-2000s and sharp contractions during recessionary years.

Interest rate variability (mean 13.84%) reflects alternating periods of monetary tightening and relaxation. Overall, the data depict a macroeconomy characterised by moderate growth, volatile exchange-rate movements, and a debt profile influenced by fiscal and monetary policy swings.

4.2 Augmented Dickey–Fuller Test

The Augmented Dickey–Fuller (ADF) test was conducted to determine the stationarity properties of the series and prevent spurious regression outcomes. The results are presented below.

Table 2: ADF Unit Root Test Results

Variable	ADF Statistic	5% Critical Value	Probability	Order of Integration	Decision
DS	-4.96	-3.55	0.0013	I(1)	Stationary
GDP	-5.01	-3.55	0.0009	I(1)	Stationary
INT	-4.42	-3.54	0.0064	I(0)	Stationary
EXR	-6.21	-3.55	0.0000	I(1)	Stationary

Source: Author's Computation (2025) using EViews 12

The test results indicate that all variables are integrated of order one, I(1). The null hypothesis of non-stationarity is rejected for each variable at the 5% significance level. This implies that the ARDL model is appropriate for estimation, as it accommodates a mix of I(0) and I(1) series.

4.3 Bounds Test for Cointegration

The ARDL bounds test was performed to determine whether a long-run equilibrium relationship exists among the variables.

Table 3: ARDL Bounds Cointegration Test Results

Test Statistic	Value	Lower Bound I(0)	Upper Bound I(1)	Decision
F-statistic	7.12	3.23	4.35	Cointegration confirmed

Source: Author's Computation (2025) using EViews 12

The computed F-statistic (7.12) exceeds the upper bound critical value (4.35) at the 5% level, confirming the presence of a long-run cointegrating relationship among debt sustainability, GDP, interest rate, and exchange rate in Nigeria. This implies that these macroeconomic

variables move together over time, supporting the existence of a stable long-term relationship.

4.4 Short-Run ARDL (Error Correction) Results

Table 4: Short-Run ARDL Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
Δ GDP	-0.1987	0.0943	-2.11	0.041
Δ INT	0.1215	0.0612	1.98	0.042
Δ EXR	0.2094	0.0791	2.65	0.014
ECT(-1)	-0.6472	0.1278	-5.06	0.000

Source: Author's Computation (2025) using EViews 12

The short-run results show that GDP growth remains negatively associated with debt accumulation, confirming that output expansion mitigates fiscal pressure even in the short term. Both interest rate and exchange rate exert positive effects on debt stock, reflecting the immediate transmission of monetary and currency shocks into public debt obligations. The error

correction term (ECT = -0.6472) is negative and statistically significant at 1%, indicating that about 64.7% of short-run disequilibrium is corrected annually towards long-run equilibrium. This validates the stability of the model.

4.5 Long-Run ARDL Results

Table 5: long-Run ARDL Results

Variable	Coefficient	Std. Error	t-Statistic	Probability	Remark
GDP	-0.6213	0.2438	-2.55	0.017	Significant
INT	0.3724	0.1526	2.44	0.021	Significant
EXR	0.4112	0.1917	2.14	0.039	Significant
C	12.4185	3.6127	3.44	0.002	—

Source: Author's Computation (2025) using EViews 12

The long-run estimates reveal that GDP growth has a negative and statistically significant impact on public debt sustainability. Specifically, a 1% increase in GDP growth reduces the debt-to-GDP ratio by approximately 0.62%, indicating that economic expansion strengthens the country's debt capacity. In contrast, interest rate and exchange rate both have positive and significant effects

on debt sustainability, suggesting that higher borrowing costs and currency depreciation worsen fiscal balance and debt solvency. These findings align with the debt-overhang hypothesis and confirm that macroeconomic instability heightens debt vulnerability in Nigeria.

4.6 Diagnostic and Stability Tests

Table 6: Diagnostic Results

Test	Statistic	p-value	Decision
Breusch–Godfrey Serial Correlation LM	1.82	0.162	No serial correlation
Breusch–Pagan Heteroskedasticity	0.93	0.347	Homoskedastic
Ramsey RESET	1.46	0.243	Correct model specification
CUSUM / CUSUMSQ	Stable	—	Model stability confirmed

Source: Author's Computation (2025) using EViews 12

The diagnostic tests confirm the reliability of the ARDL estimates. There is no evidence of serial correlation or

heteroskedasticity, and the Ramsey RESET test validates the functional specification of the model. The CUSUM and CUSUMSQ plots indicate that the residuals remain within the 5% critical bounds, affirming the structural stability of the model throughout the sample period.

The empirical findings reveal a robust and statistically significant long-run relationship between Nigeria's debt sustainability and its key macroeconomic indicators. The negative relationship between GDP growth and public debt accumulation implies that sustained economic expansion enhances fiscal solvency and strengthens the government's capacity to meet debt obligations. This result aligns with Aminu and Raheem (2022) and Mose, Thomi, and Arthur (2024), who found that higher economic growth reduces the debt-to-GDP ratio by boosting revenue generation and improving debt-servicing ability. Their findings collectively affirm that growth-oriented policies, particularly those promoting productivity and structural diversification, are fundamental for maintaining a sustainable debt trajectory in developing economies.

In contrast, both interest rate and exchange rate exert positive effects on Nigeria's debt accumulation, highlighting their destabilising role in fiscal sustainability. The positive coefficient of interest rate indicates that increases in borrowing costs amplify debt-servicing obligations, especially on domestic debt

instruments. This finding is consistent with the results of Olaoye and Alade (2025), whose panel analysis of Sub-Saharan African economies demonstrated that interest-rate volatility significantly worsens debt sustainability by raising refinancing costs and constraining fiscal space. Similarly, exchange-rate depreciation was found to intensify Nigeria's debt burden by inflating the local-currency value of external obligations, in line with Coulibaly (2024) and Ijriss (2025), who established that exchange-rate instability and depreciation increase debt-to-GDP ratios and weaken fiscal balances across African economies.

Taken together, these findings confirm that macroeconomic instability manifested through weak growth, high borrowing costs, and volatile exchange rates undermines debt sustainability in Nigeria. They also provide empirical support for the Debt Overhang Theory, which posits that excessive indebtedness and macroeconomic uncertainty discourage productive investment and reduce long-term growth potential. The study's results, therefore, underscore the importance of coordinated macroeconomic management. Specifically, monetary policy should aim to stabilise interest rates, while fiscal and exchange-rate policies must focus on promoting growth, maintaining price stability, and mitigating external vulnerabilities. Strengthening institutional capacity for debt management and

improving the efficiency of public investment will further enhance Nigeria's ability to maintain a sustainable debt position.

Policy Implications

The findings of this study carry significant policy implications for fiscal and monetary authorities in Nigeria. The negative relationship between Gross Domestic Product (GDP) growth and public debt accumulation underscores the central role of real economic expansion in sustaining fiscal solvency. This result implies that without strong and consistent economic growth, Nigeria's debt burden will continue to rise irrespective of revenue mobilisation efforts. Hence, macroeconomic policies should prioritise productivity-enhancing investments that strengthen non-oil sectors such as manufacturing, agriculture, and technology. Expanding these sectors will generate higher fiscal revenues, enhance foreign-exchange earnings, and reduce the pressure to borrow.

The positive and statistically significant effect of interest rates on debt sustainability highlights the cost burden associated with domestic borrowing. Nigeria's reliance on high-yield government securities, driven by monetary tightening to curb inflation, has increased the interest component of debt servicing. This finding implies that overly restrictive monetary policy can inadvertently worsen fiscal imbalances. Therefore, a more coordinated monetary-fiscal policy framework is required to balance the goals of price stability and debt sustainability. Monetary policy instruments such as open-market operations should be calibrated to stimulate private investment and moderate the cost of public borrowing.

Similarly, the positive long-run relationship between exchange-rate depreciation and debt accumulation indicates that external sector volatility remains a major driver of Nigeria's debt vulnerability. The depreciation of the naira raises the domestic cost of servicing foreign-denominated debt and expands fiscal deficits. This calls for a robust exchange-rate management strategy anchored on increased export competitiveness, improved foreign-exchange liquidity, and diversification of foreign earnings. The Central Bank of Nigeria must pursue

credible foreign-exchange policies that promote naira stability and restore investor confidence.

At the institutional level, the results highlight the importance of strengthening the Debt Management Office (DMO) and enhancing fiscal transparency. The DMO should regularly publish comprehensive debt-sustainability analyses, improve coordination with monetary authorities, and ensure that new borrowing aligns with long-term economic objectives. The integration of growth-focused fiscal discipline with prudent debt management will be crucial in preventing a return to unsustainable debt levels.

5. Conclusion and Recommendations

This study examined the impact of macroeconomic determinants, GDP growth, interest rate, and exchange rate on debt sustainability in Nigeria from 1992 to 2024 using the ARDL bounds-testing approach. The empirical findings confirm a long-run equilibrium relationship among the variables, indicating that macroeconomic fundamentals jointly shape Nigeria's debt position. Specifically, GDP growth exerts a significant negative influence on the debt-to-GDP ratio, while interest rate and exchange rate both have significant positive effects. The results imply that sustained economic growth enhances Nigeria's ability to service its debt and reduce fiscal vulnerability, whereas high interest rates and currency depreciation aggravate debt servicing costs. In the short run, the speed of adjustment coefficient (-0.6472) indicates that deviations from long-run equilibrium are corrected by about 65% each year, signifying a strong tendency toward fiscal stability when appropriate macroeconomic policies are implemented.

Overall, the study concludes that Nigeria's debt sustainability is a function of macroeconomic stability. The persistence of high interest rates and exchange-rate volatility, coupled with weak economic diversification, poses risks to fiscal solvency. Therefore, policy frameworks that stimulate growth, stabilise the currency, and reduce borrowing costs are indispensable for maintaining a sustainable debt path. These findings align with the Debt Overhang Theory, which argues that

excessive debt undermines growth and fiscal stability when macroeconomic fundamentals are weak.

The findings of this study provide clear and empirically grounded directions for fiscal and monetary policy in Nigeria. Specifically, the relationships identified among GDP growth, interest rate, exchange rate, and debt sustainability point to three principal areas requiring intervention.

1. The study established that GDP growth exerts a statistically significant negative effect on the debt-to-GDP ratio. This implies that higher economic growth improves Nigeria's fiscal capacity to manage its debt obligations. Consequently, government policy should focus on consolidating growth through productivity-enhancing sectors, particularly agriculture, manufacturing, and information technology, which have proven multiplier effects on revenue generation. Strengthened GDP performance will increase fiscal receipts, reduce dependence on borrowing, and improve the sustainability of existing debt.
2. The positive and significant relationship between interest rate and public debt

sustainability indicates that high lending and monetary policy rates contribute to increased debt servicing costs. Therefore, the Central Bank of Nigeria should adopt a more flexible and accommodative interest rate policy that balances the goals of inflation control and fiscal affordability. A gradual reduction in the monetary policy rate would help to lower domestic debt-servicing expenses and ease fiscal strain on government budgets.

3. The results also show that exchange rate depreciation significantly worsens debt sustainability. This occurs because a weaker naira increases the domestic cost of servicing foreign-denominated debts. The implication is that maintaining exchange-rate stability is essential for protecting Nigeria's fiscal position. Policymakers should prioritise measures that support the naira—such as improving export diversification, ensuring consistent foreign exchange supply, and curbing speculative demand—to mitigate the impact of exchange-rate volatility on external debt servicing.

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