

# Public Debt Sustainability and Economic Stability in Nigeria: An Empirical Assessment

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## ABSTRACT

This research investigates the link between public debt sustainability and economic stability in Nigeria over the period from 1981 to 2023. Given the rising concerns about increasing public debt levels and their potential effects on the broader economy, the study employs an ex post facto research design. Data were sourced from the Debt Management Office (DMO), the Central Bank of Nigeria (CBN), and the World Bank Development Indicators. Time series econometric methods were utilized to assess how different components of public debt influence exchange rate stability, with initial analyses including unit root tests to confirm the stationarity of the data. Additionally, the study implemented the Error Correction Model (ECM) to capture both short-term adjustments and long-term equilibrium relationships among the variables. The findings indicate that domestic debt has a negative and statistically significant impact on exchange rate stability, suggesting that increases in domestic borrowing can destabilize the currency, likely due to liquidity constraints and the crowding out of private sector investment. Similarly, external debt negatively influences exchange rate stability, reflecting susceptibility to exchange rate fluctuations and global financial shocks. Conversely, debt servicing is found to positively and significantly contribute to exchange rate stability, emphasizing that timely servicing of debt can offset destabilizing pressures. Overall, total public debt exhibits a strong positive and highly significant effect, implying that strategic and well-managed borrowing can enhance macroeconomic stability. The study concludes that careful management of domestic and external debt, prompt debt servicing, and the targeted use of public debt for productive investments are essential for sustaining exchange rate stability and promoting economic growth. Recommendations include strengthening debt monitoring systems, prioritizing productive borrowing, and reinforcing fiscal policies to protect Nigeria's economic stability.

**Keywords:** public debt sustainability, economic stability, exchange rate, domestic debt, external debt, debt servicing, Nigeria, error correction model

## INTRODUCTION

Economic stability refers to a condition in which an economy experiences sustainable growth, low and predictable inflation, stable exchange rates, manageable unemployment levels, and sound fiscal and monetary management over time. It reflects the capacity of a nation to maintain macroeconomic balance while withstanding internal and external shocks without experiencing severe recessions, fiscal crises, or financial instability (Chigbo, and Okechukwu, 2023). Economic stability is fundamental for long-term development because it creates a predictable environment for investment, business expansion, employment generation, and poverty reduction. For developing economies such as Nigeria, economic stability is particularly crucial given structural vulnerabilities, heavy dependence on primary commodities, fiscal volatility, and exposure to global economic fluctuations. Achieving and sustaining economic stability requires prudent fiscal management, effective debt control, diversified revenue sources, credible monetary policy, and strong institutional governance frameworks. However, economic stability can be threatened by persistent fiscal deficits, excessive public borrowing, exchange rate pressures, inflationary shocks, and unsustainable debt accumulation. Consequently, understanding the relationship between public debt sustainability and economic stability is essential for formulating policies that promote resilient and inclusive economic development in Nigeria.

In recent years, Nigeria's public debt profile has risen significantly, raising critical concerns about its sustainability and broader implications for macroeconomic stability. By 2023, Nigeria's total public debt had exceeded ₦44 trillion, driven largely by continuous fiscal deficits, declining oil revenues, and increased domestic and external borrowing to finance budgetary gaps and development projects (Debt Management Office, 2023; Ojonye et al., 2024). While public borrowing is not inherently detrimental and can serve as a vital tool for financing infrastructure, education, healthcare, and industrial development, the effectiveness of debt depends largely on its productive use and sustainable management. Ideally, well-structured and strategically invested public debt should stimulate economic growth, enhance productivity, and strengthen long-term economic resilience. However, Nigeria's growing debt servicing burden has become a major fiscal constraint, with debt service-to-revenue ratios reportedly surpassing 90 percent in some fiscal periods, thereby crowding out critical public investment in growth-enhancing sectors (Akpan et al., 2023; International Monetary Fund, 2023). This situation raises serious concerns about debt overhang, where excessive debt discourages private investment due to expectations of higher future taxes, currency devaluation, or fiscal instability.

Moreover, the structure and composition of Nigeria's public debt present additional risks to economic stability. The increasing reliance on short-term domestic debt exposes the economy to refinancing risks and higher interest obligations, while external borrowing denominated in foreign currencies heightens vulnerability to exchange rate fluctuations and global financial tightening (World Bank, 2023; Yusuf & Mohd, 2023). Persistent depreciation of the naira has amplified the real cost of external debt servicing, further straining government finances and foreign reserves. At the same time, inflationary pressures and rising interest rates have increased domestic borrowing costs, complicating fiscal management and monetary stability. These challenges are compounded by weak revenue mobilization, limited tax base, oil revenue volatility, and inefficiencies in public financial management systems, which together undermine Nigeria's ability to sustain its debt without jeopardizing macroeconomic stability.

Despite Nigeria's longstanding reliance on public debt as a development financing strategy, empirical evidence on its sustainability and impact on economic stability remains mixed and inconclusive. Some studies suggest that moderate levels of public debt can support economic growth by financing productive investments, while others argue that excessive debt accumulation negatively affects macroeconomic stability through inflationary pressures, exchange rate instability, and fiscal rigidity (Ajayi & Edewusi, 2020; Nwamuo & Agu, 2021). Additionally, the relative impact of domestic versus external debt on economic stability continues to generate scholarly debate, as each carries distinct risks and policy implications. Domestic debt may increase interest rates and crowd out private investment, whereas external debt may expose the economy to currency risk and external shocks. Furthermore, high debt servicing costs reduce government capacity to invest in social infrastructure, thereby weakening long-term economic resilience and inclusive development.

Nigeria's economic stability is also influenced by broader structural and institutional factors, including governance quality, fiscal transparency, monetary policy credibility, and revenue diversification. The Petroleum Industry Act (PIA) and ongoing fiscal reforms aim to improve resource management and revenue generation, yet implementation gaps and global energy transition pressures continue to challenge fiscal sustainability. Additionally, recurring economic shocks such as global oil price volatility, post-pandemic recovery constraints, and geopolitical tensions have further complicated Nigeria's debt and stability dynamics (IMF, 2023). These realities underscore the need for a comprehensive empirical assessment of public debt sustainability and its relationship with key indicators of economic stability such as real GDP growth, inflation, exchange rate stability, fiscal balance, and interest rate dynamics.

Given these complexities, this study seeks to empirically examine the link between public debt sustainability and economic stability in Nigeria. By analyzing trends in domestic debt, external debt, total public debt, and debt servicing obligations in relation to macroeconomic stability indicators, the study aims to provide evidence-based insights for policymakers. Understanding whether Nigeria's current debt trajectory supports or undermines economic stability is crucial for designing sustainable fiscal strategies, strengthening debt management frameworks, and promoting long-term economic resilience. Ultimately, this research contributes to the ongoing policy discourse on how Nigeria can balance development financing needs with prudent debt management to achieve stable and inclusive economic growth.

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## Research Objectives

The primary aim of this study is to analyze the connection between public debt sustainability and economic stability in Nigeria through an empirical approach. The specific objectives include:

- i. To assess how domestic public debt influences economic stability, particularly exchange rate stability, in Nigeria.
- ii. To evaluate the effect of external public debt on major indicators of economic stability, with a focus on exchange rate stability.
- iii. To examine the relationship between public debt servicing and the stability of the Nigerian economy, especially in terms of exchange rates.
- iv. To determine the overall impact of total public debt on economic stability, emphasizing its influence on maintaining a stable exchange rate in Nigeria.

## LITERATURE REVIEW

This section gives a brief overview of relevant literature, emphasizing the conceptual framework, theoretical foundations, and empirical findings.

### Conceptual Clarification

#### Public Debt Sustainability

Public debt sustainability can be defined as a government's capacity to meet both current and future debt obligations without excessive reliance on additional borrowing, undergoing debt restructuring, or defaulting, all while maintaining economic growth and fiscal stability. The International Monetary Fund (IMF, 2023) notes that debt is deemed sustainable when a nation is able to fulfil its debt commitments without implementing unrealistic fiscal measures or endangering macroeconomic stability. This concept indicates that sustainability is influenced not just by the absolute level of debt, but also by factors such as economic growth rates, prevailing interest rates, and the performance of government revenues (World Bank, 2023).

In Nigeria, concerns about debt sustainability have intensified due to the rapid rise in both domestic and external debt, coupled with weak revenue mobilization and heavy reliance on oil earnings (Ojonye et al., 2024). Although Nigeria's debt-to-GDP ratio may appear moderate, high debt servicing costs have significantly constrained fiscal space, with a large share of government revenue being devoted to debt repayment rather than development spending (Akpan et al., 2023). This situation raises fears of a debt overhang, where excessive debt discourages private investment and slows economic growth.

Ultimately, public debt sustainability in Nigeria depends on improved tax collection, fiscal discipline, effective public financial management, and economic diversification (DMO, 2023). Without these reforms, rising debt may continue to threaten long-term fiscal stability and intergenerational equity.

#### Economic Stability

Economic stability describes a situation where an economy maintains consistent growth, moderate inflation, stable exchange rates, and sustainable fiscal and external balances over a period of time. The International Monetary Fund (IMF, 2023) highlights that macroeconomic stability is a fundamental requirement for attracting investment, creating employment opportunities, and achieving sustainable development, especially in developing economies such as Nigeria. A stable economic environment enables businesses and households to make long-term financial decisions with greater certainty while also lowering the economy's exposure to external and internal shocks.

In the Nigerian context, economic stability has faced several challenges, including persistent inflation, fluctuations in exchange rates, and recurring fiscal deficits largely linked to volatility in oil revenues (World Bank, 2023). Since crude oil remains a primary source of government income and foreign exchange earnings, declines in global oil prices often disrupt economic stability by increasing fiscal strain and exposing the country to balance of payments challenges (Ojonje et al., 2024).

Public debt is an important factor influencing economic stability. When properly managed, government borrowing can support infrastructure development and improve human capital, thereby contributing to economic growth and stability (Ajayi & Edewusi, 2020). On the other hand, excessive or poorly managed public debt may weaken economic stability by driving up interest rates, increasing inflationary pressures, and causing currency depreciation (Nwamuo & Agu, 2021). Furthermore, large debt servicing commitments can limit the government's ability to allocate sufficient resources to vital sectors such as healthcare, education, and infrastructure development (Akpan et al., 2023).

Achieving sustainable economic stability in Nigeria requires diversified revenue sources, prudent debt management, credible monetary policy, and strong governance institutions (DMO, 2023; World Bank, 2023). Reducing dependence on oil and strengthening public financial management systems are critical steps toward long-term stability.

### **Theoretical Framework**

This study is based on the debt overhang theory, which provides a useful framework for explaining the relationship between public debt sustainability and economic stability, particularly in developing countries (Krugman, 1988; Sachs, 1989; Reinhart & Rogoff, 2010). The theory argues that when a nation's public debt rises beyond a manageable or sustainable level, the expected benefits from economic activities begin to decline. This is because a substantial portion of the country's future income is anticipated to be used for servicing existing debt instead of being invested in productive sectors that promote growth. Under these conditions, both domestic and foreign investors may become hesitant to invest in the economy. Their reluctance often stems from expectations that the government may introduce higher taxes, allow inflation to rise, or permit currency depreciation in order to meet its debt repayment commitments. As a result, excessive debt levels can discourage investment and weaken overall economic performance.

According to this theoretical framework, excessive public debt can undermine economic stability by constraining fiscal space, distorting government expenditure priorities, and weakening macroeconomic management. In this context, public debt that is not aligned with the country's revenue-generating capacity can create a debt overhang situation where economic growth slows down, unemployment rises, and macroeconomic volatility increases (IMF, 2023; World Bank, 2023). The theory suggests that sustainable debt levels are critical for maintaining investor confidence, stable exchange rates, and predictable fiscal policy.

The relevance of the Debt Overhang Theory to Nigeria is evident given the country's rising debt profile, high debt servicing costs, and persistent fiscal deficits. Although Nigeria has continued to borrow for development financing, a large proportion of government revenue is consumed by debt repayment rather than investment in productive sectors such as infrastructure, education, and healthcare (Frank & Gloria, 2024). This situation supports the central argument of the theory that excessive debt can crowd out private investment, weaken economic growth, and threaten macroeconomic stability.

### **Empirical Literature**

Empirical studies on public debt sustainability and economic stability have grown considerably in recent years due to increasing concerns about rising debt levels and their potential macroeconomic consequences, particularly in developing countries such as Nigeria. Researchers have investigated how various components of public debt—including domestic debt, external debt, and debt servicing—interact with key indicators of economic stability such as gross domestic product (GDP) growth, inflation, exchange rate stability, and fiscal balance.

Oyedare, Akinrinola, and Ojomolade (2025) analyzed the influence of public debt on Nigeria's economic growth. The study specifically assessed the effects of treasury debt, external debt, and domestic debt on GDP at market prices in Nigeria for the period 1998 to 2023. An ex post facto research design was employed, while time series data were sourced from the Central Bank of Nigeria (CBN) and the Debt Management Office (DMO). The Augmented Dickey-Fuller (ADF) unit root test was used to determine the stationarity of the data, and the results were further validated using the Phillips-Perron unit root test. The Autoregressive Distributed Lag (ARDL) model was adopted for the analysis. The findings revealed that treasury debt had an insignificant effect on GDP with a p-value of 0.496. Similarly, domestic debt and external debt showed insignificant effects on GDP with p-values of 0.515 and 0.576 respectively. These results suggest that increased government borrowing, both internally and externally, for capital project financing may contribute to economic growth, holding other factors constant. Based on these findings, the study recommended that borrowed funds should be properly utilized in productive and profitable investments within the Nigerian economy.

Kenneth et al. (2025) investigated the impact of public debt on economic growth in Nigeria over the period from 1990 to 2023. The study focused on examining how domestic debt, external debt, and public debt servicing payments influence GDP in Nigeria. The Augmented Dickey-Fuller unit root test indicated that the variables were stationary at both level  $I(0)$  and first difference  $I(1)$ . Using secondary data obtained from the CBN Statistical Bulletin, National Bureau of Statistics (NBS), and Debt Management Office (DMO), the researchers applied the ARDL model for analysis. The ARDL bounds test confirmed the presence of a long-run relationship among the variables, allowing for the estimation of both short-run and long-run dynamics. The results showed that domestic and external debt exerted negative but insignificant effects on GDP, while public debt servicing payments had a positive and statistically significant impact on GDP in both the short and long run. The control variables—gross fixed capital formation, labour force participation rate, and inflation—produced mixed outcomes across the two periods. These findings imply that Nigeria's heavy dependence on public borrowing, whether domestic or external, has negatively affected economic performance due largely to inefficient management of borrowed resources. The study therefore recommended that borrowed funds should be allocated to productive sectors, debt management reforms should be implemented to ensure efficient utilization of funds, and reliance on external borrowing should be reduced in order to promote sustainable economic growth and development.

Oladele and Ojiekwe (2025) examined the influence of public debt on economic growth in Nigeria using a quantitative research approach. The study employed the Autoregressive Distributed Lag (ARDL) model and utilized secondary data obtained from the Central Bank of Nigeria, National Bureau of Statistics, and Debt Management Office for the period 2000 to 2023. Descriptive and inferential statistical techniques were applied, including unit root tests, ARDL bounds testing for cointegration, error correction model (ECM) estimation, and diagnostic tests for serial correlation, heteroskedasticity, and normality. The findings indicated that in the long run, domestic debt and debt maturity structure had positive and statistically significant effects on economic growth. Conversely, external debt and debt servicing costs demonstrated negative and significant relationships with real GDP. In the short run, domestic debt continued to exert a positive influence, whereas external debt maintained a negative impact. Diagnostic tests confirmed the robustness of the model, showing normally distributed residuals, absence of serial correlation and heteroskedasticity, and parameter stability. The study concluded that different components of public debt have varying effects on economic growth in Nigeria. Domestic debt and favorable maturity structures were found to promote growth, while external debt and high servicing costs constrained economic expansion. Consequently, the study recommended that Nigeria should prioritize domestic borrowing, extend debt maturity periods, reduce debt servicing costs, and strengthen institutional mechanisms for effective debt management.

Hassan, Salihu, and Osekweyi (2025) investigated the effect of public debt on Nigeria's economic growth between 1986 and 2024. The study examined variables including real GDP growth, domestic debt, external debt, domestic debt servicing, and external debt servicing using the ARDL estimation technique. Annual time series data were obtained from the Central Bank of Nigeria, International Monetary Fund, and World Bank. The results revealed that domestic and external debts exert positive and significant long-run effects on economic growth, indicating that borrowed funds may contribute to productive investments and infrastructure development. However, both domestic and external debt servicing were found to have significant negative effects on growth,

with external servicing posing a greater limitation on fiscal space and long-term development. In the short run, new borrowing supported economic growth while servicing obligations slightly reduced output. Granger causality analysis indicated bidirectional causality between domestic debt and economic growth, while external debt and debt servicing variables exhibited unidirectional causality toward growth. Diagnostic and stability tests confirmed the reliability of the model. The study concluded that well-managed borrowing directed toward high-return projects can enhance economic growth, although increasing servicing costs—particularly those related to external debt—can diminish these benefits. The authors recommended restructuring domestic debt portfolios, prioritizing concessional external loans, strengthening legislative oversight of borrowing limits, preventing domestic borrowing from crowding out private investment, and ensuring transparency and accountability in project implementation.

Godwin (2024) examined the stabilizing role of sustainable fiscal policy in public debt dynamics and its implications for fiscal sustainability in Nigeria during the period 1980 to 2022. The study utilized secondary data obtained from sources such as the Central Bank of Nigeria Statistical Bulletin (2023), World Development Indicators, Debt Management Office publications, Penn World Table, and World Economic Outlook reports. Various econometric techniques were applied, including Dynamic Ordinary Least Squares (DOLS), the Markov-switching model, and polynomial models. The findings revealed that automatic debt dynamics significantly influence overall debt dynamics. It was also observed that the strength or weakness of the primary fiscal balance determines changes in the total debt stock. The study further indicated that positive debt dynamics in the presence of declining revenue and rising government expenditure could lead to fiscal unsustainability. Consequently, the study recommended stabilizing inflation and interest rates to control automatic debt dynamics and emphasized the importance of maintaining a strong primary fiscal surplus to manage the growth of public debt and support economic expansion.

Gilbert and Raymond (2024) explored the relationship between government borrowing and sustainable economic growth in Nigeria for the period 1981 to 2022. The study disaggregated government borrowing while also incorporating sustainable development indicators. The Fully Modified Ordinary Least Squares (FMOLS) estimation technique was used to analyze the data. The results showed that domestic borrowing had a negative effect on sustainability due to high interest rates and its crowding-out effect on private sector investment. In contrast, external borrowing had a positive and significant influence on sustainability, partly because external loans often attract relatively lower interest rates and are frequently used for capital projects and infrastructure development. Additionally, macroeconomic variables such as interest rate and exchange rate were found to have negative and significant effects on sustainability. Based on these findings, the study recommended improved negotiation of loan terms to obtain better interest rates and more effective utilization of domestically borrowed funds. It also emphasized the need for government to strengthen domestic financial markets to access longer-term and lower-cost funding. Furthermore, government borrowing should be directed toward critical infrastructure such as electricity and transportation in order to enhance productivity in the real sector and expand capital stock for sustainable economic growth.

JO et al. (2024) investigated the relationship between public debt and economic growth in Nigeria from 1981 to 2021 using the Autoregressive Distributed Lag (ARDL) model. The study examined the effects of total domestic debt, total external debt, investment, and government expenditure on economic development in Nigeria. Gross Domestic Product (GDP) was used as a proxy for economic growth, while total domestic debt, total external debt, inflation rate, government expenditure, investment, and gross domestic savings served as explanatory variables. The results indicated that all the variables exhibited insignificant effects on economic growth in the long run, although government expenditure showed a significant influence. Domestic debt, government expenditure, and inflation rate displayed positive but insignificant relationships with economic growth, implying that increases in these variables could potentially enhance economic growth over time. Conversely, total external debt, investment, and gross domestic savings showed negative and insignificant relationships with economic growth, suggesting that increases in these variables may reduce growth in the long run. The study concluded that public debt indicators have insignificant long-run effects on Nigeria's economic growth. It therefore recommended that policymakers implement effective measures to ensure proper management of domestic debt and that government borrowing should be directed toward investments that promote national development.

Monitoring mechanisms should also be established to ensure that borrowed funds are used for the provision of essential infrastructure and services required for societal development.

Chinwe, Callistus, and Okaforocha (2023) examined public debt sustainability and economic growth in Nigeria using annual time series data from 1981 to 2021. The study employed the Generalized Method of Moments (GMM) estimation technique. Variables included real GDP, external debt, domestic debt, debt servicing, and government consumption. A debt relief dummy variable was incorporated to capture the period during which Nigeria received debt relief, while a recession dummy variable was used to account for periods of economic downturn. The results revealed the presence of a debt overhang characterized by an inverted U-shaped debt Laffer curve. The study estimated the optimal public debt threshold to range between 30% and 40%, with a benchmark of approximately 36% for total public debt and 33% for external debt stock. Based on these findings, the authors recommended that the Nigerian government should ensure efficient utilization of external debt to prevent investment crowding-out and mitigate the risks associated with debt overhang.

Ogboghro (2023) conducted a comparative study of domestic debt and economic growth in Nigeria and Ghana covering the period from 2000 to 2021 using multiple regression analysis. The study examined treasury bills, treasury certificates, treasury bonds, development stock, and promissory notes alongside interest rate as a control variable in relation to economic growth measured by real GDP. The findings indicated that treasury bills had a positive but insignificant effect on real GDP in Nigeria with no evidence of causality, whereas in Ghana treasury bills showed a significant positive effect with unidirectional causality from treasury bills to real GDP. Treasury certificates demonstrated insignificant effects in both countries with no evidence of causality. Treasury bonds had a significant positive impact on real GDP in Nigeria with evidence of causality, but no significant effect in Ghana. Development stock also showed a significant positive relationship with economic growth in Nigeria but not in Ghana. Conversely, promissory notes had a significant positive effect on economic growth in Ghana but were insignificant in Nigeria. Overall, the results indicated varying impacts of domestic debt instruments on economic growth in both countries. The study recommended that governments should prioritize borrowing through Federal Government of Nigeria (FGN) bonds, as these instruments demonstrated strong positive effects and bidirectional causality with economic growth in both Nigeria and Ghana.

## METHODOLOGY

This research employs an ex post facto research design, which is considered appropriate for investigating the relationship between public debt sustainability and economic stability in Nigeria. The choice of this design is justified because the study utilizes already existing historical data and does not involve the manipulation or control of variables by the researcher. Rather, the study examines and analyzes available data relating to public debt components and indicators of economic stability in order to establish possible causal and associative relationships.

### Model Specification

In line with the objectives of the study, the model is developed to empirically analyze how domestic debt, external debt, debt servicing, and total public debt influence economic stability in Nigeria. In this study, economic stability is represented by exchange rate stability as its proxy. The general functional relationship of the model is therefore expressed as follows:

$$EXR_t = f(DD_t, ED_t, DS_t, TPD_t) \tag{3.1}$$

The mathematical form of the model is given as

$$EXR_t = \beta_0 + \beta_1 DD_t + \beta_2 ED_t + \beta_3 DS_t + \beta_4 TPD_t \tag{3.2}$$

The econometric form of the model is given as:

$$EXR_t = \beta_0 + \beta_1 DD_t + \beta_2 ED_t + \beta_3 DS_t + \beta_4 TPD_t + \mu_t \tag{3.3}$$

Taking the log of both side in order to linearize the model

$$\log(EXR_t) = \beta_0 + \beta_1 \log(DD_t) + \beta_2 \log(ED_t) + \beta_3 \log(DS_t) + \beta_4 \log(TPD_t) + \log(\mu_t) \quad (3.4)$$

Where:

(EXR<sub>t</sub>) = Economic stability measured by exchange rate at time (t)

(DD<sub>t</sub>) = Domestic public debt at time (t)

(ED<sub>t</sub>) = External public debt at time (t)

(DS<sub>t</sub>) = Debt servicing at time (t)

(TPD<sub>t</sub>) = Total public debt at time (t)

$\beta_0$  = Constant

$\beta_1 - \beta_4$  = Parameters

### Method of Data Analysis

This study utilizes time series econometric methods to estimate the effect of different components of public debt on exchange rate stability. As part of the preliminary analysis, descriptive statistics and unit root tests are conducted to determine the stationarity properties of the data. Furthermore, the study employs the Error Correction Model (ECM) to analyze both the short-run adjustments and the long-run equilibrium relationships among the variables.

The use of the ECM is considered appropriate because it explains how short-term deviations from the long-run equilibrium relationship between public debt variables and economic stability are gradually corrected over time. This approach therefore provides a clearer understanding of both the immediate effects and the long-term impacts of the variables under study.

The general form of the ECM is presented as follows:

$$\Delta EXR_t = \alpha_0 + \alpha_1 \Delta DD_t + \alpha_2 \Delta ED_t + \alpha_3 DS_t + \alpha_4 TPD_t + \delta ECT_t + \mu_t \quad (3.5)$$

Where:

$\Delta$  denotes the first difference of the variables, capturing short-run changes,

(ECT is the lagged error correction term representing deviations from long-run equilibrium,

$\delta$  is the speed of adjustment coefficient indicating how quickly deviations are corrected,

$\mu_t$  is the stochastic error term.

## RESULTS AND DISCUSSION

### Test of Stationarity Using the ADF Unit Root Test

Prior to examining the relationship between public debt sustainability and economic stability in Nigeria, the Augmented Dickey-Fuller (ADF) unit root test was carried out to determine whether the variables used in the study are stationary. Ensuring stationarity is an important requirement in time series analysis because it helps prevent the occurrence of spurious regression results that may lead to misleading conclusions. The outcome of the ADF unit root test is presented in 4.1

Table 4.1: ADF Unit Root Test for All Variables

Variable	ADF @ level		ADF @ 1 <sup>st</sup> Diff		Order of Integration
	Level t-Statistic	Level Prob	1st Diff t-Statistic	1st Diff Prob	
LOG(EXR)	-1.650783	0.7551	-5.727349	0.0001	I (1)
LOG(DD)	-1.996289	0.5864	-3.684434	0.0348	I (1)
LOG(ED)	-1.858938	0.6573	-4.751713	0.0023	I (1)
LOG(DS)	-1.746545	0.7124	-6.394520	0.0000	I (1)
LOG(TPD)	-2.150797	0.5032	-4.237828	0.0090	I (1)

Source: Author’s computation using EViews 12

The results of the ADF unit root test presented in Table 4.1 show that all the variables are non-stationary at their level form but become stationary after being differenced once. This indicates that each variable is integrated of order one, I(1). These findings have important implications for the next stage of the analysis using the Error Correction Model (ECM). Because all variables are integrated at I(1), the ECM is suitable for analyzing both the short-run adjustments and the long-run equilibrium relationships between the public debt variables and exchange rate stability. This approach helps prevent the problem of spurious regression that may arise from non-stationary data. Therefore, the stationarity test confirms that the time series data are appropriate for further econometric analysis and justifies the use of the ECM to explore the dynamic relationship between public debt sustainability and economic stability in Nigeria. **Johansen Cointegration Test**

To examine whether a long-run relationship exists between public debt variables and economic stability in Nigeria, the Johansen cointegration test was performed. Both the trace statistic and maximum eigenvalue statistic were employed to determine the number of cointegrating relationships among the variables. The results of the analysis are displayed in Tables 4.2 and 4.3.

Table 4.2: Johansen Cointegration Test (Trace Statistic)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 C V	Prob.**
None *	0.682032	90.83798	69.81889	0.0004
At most 1	0.456467	43.86001	47.85613	0.1129
At most 2	0.255089	18.86372	29.79707	0.5027
At most 3	0.138749	6.78960	15.49471	0.6022
At most 4	0.016100	0.665482	3.841466	0.4146

Table 4.3: Johansen Cointegration Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 C V	Prob.**
None *	0.682032	46.97797	33.87687	0.0008
At most 1	0.456467	24.99628	27.58434	0.1035

At most 2	0.255089	12.07412	21.13162	0.5403
At most 3	0.138749	6.124118	14.26460	0.5973
At most 4	0.016100	0.665482	3.841466	0.4146

**Source:** Author’s computation using EViews 12

The results from the Johansen cointegration analysis reveal the existence of a long-run relationship between public debt indicators—namely domestic debt, external debt, debt servicing, and total public debt—and economic stability in Nigeria, represented by the exchange rate. Both the trace statistic and the maximum eigenvalue statistic reject the null hypothesis of no cointegration at the 5 percent significance level, indicating the presence of one cointegrating equation among the variables.

This outcome suggests that although short-term fluctuations may occur among the variables, they eventually adjust toward a long-run equilibrium relationship. In practical terms, this means that variations in domestic debt, external debt, debt servicing, and total public debt are systematically connected with movements in exchange rate stability within the Nigerian economy.

### Parsimonious Error Correction Model

The parsimonious Error Correction Model (ECM) was estimated to evaluate both the short-run dynamics and the long-run effects of public debt components on economic stability in Nigeria, using exchange rate stability as the proxy. The estimation results are presented in Table 4.3.

Table 4.3 Parsimonious Error Correction Model

Dependent Variable: DLOG(EXR)				
Method: Least Squares				
Date: 01/20/26 Time: 14:31				
Sample (adjusted): 1985 2023				
Included observations: 39 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.132768	0.066541	1.995286	0.0585
DLOG(EXR(-1))	0.698985	0.250854	2.786419	0.0108
DLOG(EXR(-2))	0.368384	0.238638	1.543695	0.1369
DLOG(DD)	-1.031000	0.334664	-3.080704	0.0055
DLOG(DD(-1))	0.382862	0.322268	1.188025	0.2475
DLOG(ED)	-0.679899	0.328836	-2.067592	0.0506
DLOG(ED(-1))	0.495838	0.327962	1.511876	0.1448
DLOG(ED(-2))	-0.576537	0.272158	-2.118395	0.0457

DLOG(ED(-3))	-0.137363	0.093367	-1.471221	0.1554
DLOG(DS)	0.176274	0.084540	2.085104	0.0489
DLOG(DS(-1))	0.096873	0.095979	1.009309	0.3238
DLOG(DS(-2))	0.027658	0.075328	0.367169	0.7170
DLOG(DS(-3))	-0.085503	0.061853	-1.382365	0.1807
DLOG(TPD)	2.279788	0.587119	3.883010	0.0008
DLOG(TPD(-1))	-1.760715	0.721790	-2.439374	0.0232
DLOG(TPD(-2))	0.389891	0.466998	0.834888	0.4128
ECM(-1)	-0.552644	0.238941	-2.312890	0.0305
R-squared	0.808802	Mean dependent var		0.172923
Adjusted R-squared	0.669749	S.D. dependent var		0.290516
S.E. of regression	0.166952	Akaike info criterion		-0.442946
Sum squared resid	0.613205	Schwarz criterion		0.282196
Log likelihood	25.63745	Hannan-Quinn criter.		-0.182771
F-statistic	5.816501	Durbin-Watson stat		1.630774
Prob(F-statistic)	0.000104			

**Source:** Author's computation using EViews 12

Domestic debt has a negative and statistically significant impact on exchange rate stability at the 5 percent significance level, with a coefficient of -1.031 and a p-value of 0.0055. This suggests that increases in domestic borrowing tend to destabilize the exchange rate, potentially because heavy borrowing from domestic sources can crowd out private sector investment and exert pressure on liquidity and inflation. The observed significant negative effect underscores the need for careful management of domestic debt to prevent adverse macroeconomic consequences.

External debt also exhibits a negative association with exchange rate stability, with a coefficient of -0.680 and a p-value of 0.0506. Although the significance is marginal, the result implies that rising external borrowing may contribute to exchange rate fluctuations, likely due to foreign currency repayment obligations and exposure to exchange rate risks. This highlights that overreliance on external debt can increase vulnerability to global financial shocks if not managed strategically.

In contrast, debt servicing shows a positive and statistically significant influence on exchange rate stability, with a coefficient of 0.176 and a p-value of 0.0489. This indicates that timely and efficient repayment of existing debt helps stabilize the exchange rate, as consistent interest and principal payments reduce investor uncertainty and maintain confidence in the government's fiscal management. Effective debt servicing therefore appears to counteract the destabilizing impact of accumulated debt.

Total public debt demonstrates a strong positive and highly significant effect on exchange rate stability, with a coefficient of 2.280 and a p-value of 0.0008. This finding suggests that, when considered collectively, public debt can support exchange rate stability if it is well-managed and directed toward productive investments that

enhance economic output. The positive effect reflects the potential benefits of strategic debt use outweighing risks in the short term.

The error correction term (ECM (-1)) is negative (-0.553) and statistically significant at the 5 percent level ( $p = 0.0305$ ), confirming the presence of a long-run equilibrium relationship between public debt variables and exchange rate stability. The coefficient indicates that roughly 55.3 percent of any short-run deviation from long-run equilibrium is adjusted in the subsequent period, signifying a relatively rapid movement toward stability.

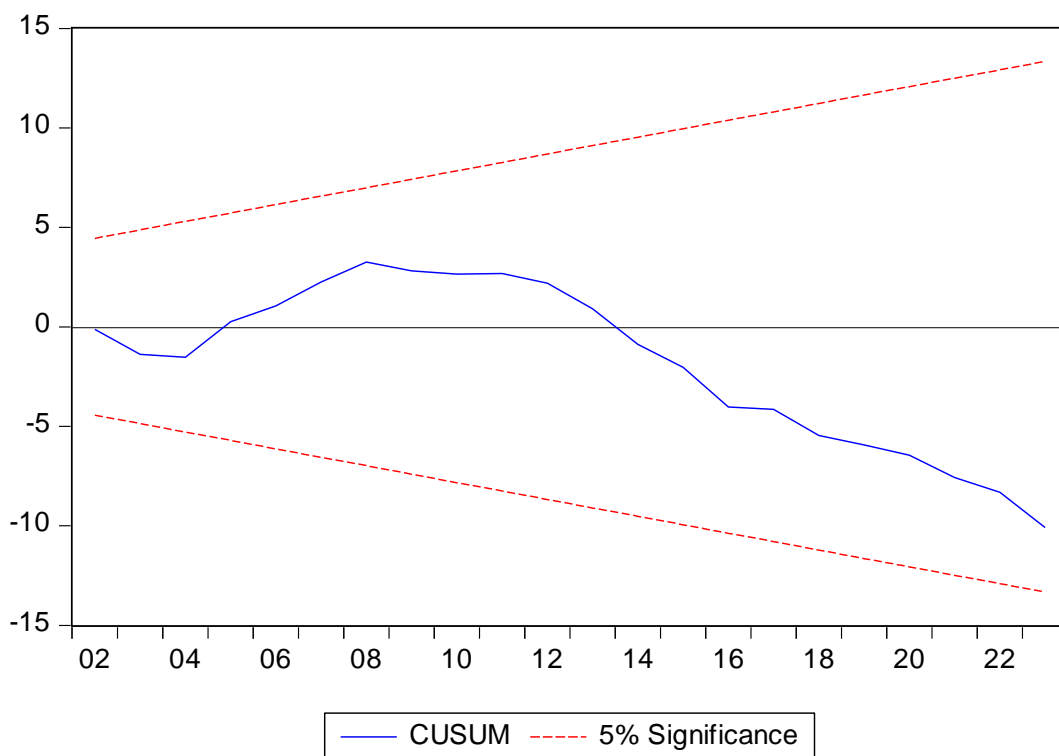
Overall, the model performs well. The R-squared value of 0.809 and the adjusted R-squared of 0.670 indicate that approximately 67 percent of the variation in exchange rate stability is explained by the debt variables included in the model. The F-statistic of 5.816 ( $p = 0.000104$ ) confirms the joint significance of the model, and the Durbin-Watson statistic of 1.631 suggests that residual autocorrelation is within acceptable limits.

In summary, the ECM results show that domestic debt has a destabilizing effect on exchange rate stability, while external debt has a marginal negative influence. Debt servicing and total public debt positively contribute to maintaining stability. The significant error correction term reinforces that deviations from long-run equilibrium are corrected efficiently, highlighting the importance of prudent management of public debt in sustaining economic stability in Nigeria.

### CUSUM Test for Stability

The CUSUM (Cumulative Sum) test is employed to evaluate the stability of regression coefficients over time.

**Figure 4.1 CUSUM test**



From the CUSUM graph, the blue line remains completely within the bounds of the red dashed lines across the entire sample period. This indicates that the regression coefficients in the model are stable over time, and there are no structural breaks in the relationship between the dependent variable (exchange rate) and the explanatory variables (components of public debt).

In practical terms, this suggests that the estimated Error Correction Model (ECM) is robust, and the relationships it captures remain consistent throughout the period under study. As a result, the conclusions drawn from the ECM regarding the influence of domestic debt, external debt, debt servicing, and total public debt on exchange rate stability can be regarded as reliable.

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## CONCLUSION AND RECOMMENDATIONS

This study investigated the empirical relationship between public debt sustainability and economic stability in Nigeria, with particular focus on how domestic debt, external debt, debt servicing, and total public debt affect exchange rate stability. The findings from the parsimonious Error Correction Model reveal differentiated effects of these debt components on economic stability. Domestic debt was found to exert a statistically significant negative impact on exchange rate stability, suggesting that high levels of domestic borrowing can destabilize the economy by crowding out private investment and creating liquidity pressures. External debt had a marginal negative influence, highlighting the risks associated with foreign currency repayment obligations and susceptibility to global financial shocks. Conversely, debt servicing and total public debt demonstrated positive and significant effects on exchange rate stability, implying that effective management and productive deployment of borrowed funds can enhance macroeconomic stability.

Based on these results, the study provides the following policy recommendations:

- i. government should prioritize productive domestic borrowing while limiting excessive short-term domestic debt that can destabilize the exchange rate. Borrowed funds should be channelled into infrastructure, healthcare, and other growth-enhancing sectors.
- ii. External borrowing should be strategically managed, focusing on concessional loans with low interest rates and favourable repayment terms to minimize exposure to exchange rate risk and global financial shocks.
- iii. Debt servicing should be maintained efficiently and timely to foster investor confidence and prevent destabilization of the currency. A clear debt servicing plan should be integrated into fiscal policy to enhance stability.
- iv. Total public debt should be monitored and managed through a comprehensive debt sustainability framework, ensuring that borrowing levels support long-term economic growth without jeopardizing fiscal space or crowding out productive investments.

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