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Nigeria's Debt Conundrum: An Appraisal of Debt Management Strategies and their Impact on Economic Growth

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ABSTRACT

This study investigated the relationship among debt management strategies and economic growth in Nigeria over a 34-year period between 1990 and 2023. Nigeria's persistent debt accumulation, heavy debt-servicing obligations, and fiscal vulnerability raise pressing questions about the effectiveness of existing strategies in fostering sustainable development. While borrowing potentially stimulated growth by bridging resource gaps, the country's rising debt profile — combined with exchange rate volatility, high interest rates, and weak governance —generated more concerns about debt sustainability. The specific objectives of this study were to examine the effect of external debt on economic growth, the impact of debt servicing on growth, and the moderating effect of institutional quality on the relationship between Nigeria's debt and economic growth. Secondary data for macroeconomic indicators such as GDP growth, external and domestic debt, debt servicing, exchange rate, and interest rate were sourced from the Central Bank of Nigeria, Debt Management Office, World Bank, and International Monetary Fund (IMF). The Autoregressive Distributed Lag (ARDL) model was employed to capture both short-run and long-run dynamics among the variables. The empirical analyses revealed three key findings. First, external debt exerted a significant negative impact on growth in both the short and long run, underscoring the risks of overreliance on foreign borrowing amid exchange rate depreciation and global interest rate pressures. Second, debt servicing obligations severely constrained economic growth, as the diversion of revenues (often exceeding 90% of federal income) to debt repayment crowded out public investments in education, healthcare, and infrastructure. This burden was further amplified by exchange rate depreciation and high domestic interest rates. Third, institutional quality was found to significantly moderate the debt–economic growth relationship as strong governance, transparency, and accountability mitigated the adverse effects. However, weak institutions exacerbated fiscal vulnerabilities thus, the study recommends; cautious and strategic borrowing, enhanced domestic revenue mobilization, and strengthened institutional frameworks.

Keywords: *Debt Management, Debt Servicing, Economic Growth, External Debt, Institutional Quality, Nigeria*

INTRODUCTION

Public debt has long been a critical instrument for financing national development, particularly in developing countries where revenue generation is often insufficient to meet infrastructural and social needs. When judiciously utilized, borrowing can stimulate economic growth by providing the capital needed for investment in key sectors. However, the sustainability of public debt and the strategies employed to manage it remain subjects of intense debate among policymakers and scholars alike. In Nigeria, debt management has evolved significantly over the years. The Debt Management Office (DMO), established in 2000, marked a turning point in the formalization of debt policies aimed at ensuring sustainability.

Notably, the 2005 Paris Club debt forgiveness initiative provided Nigeria with a fiscal reset that reduced external debt stock by over $18 billion (approximately ₦2.34 trillion) and temporarily alleviated the country's debt burden. Since then, successive governments have adopted various debt management strategies, including domestic borrowing through treasury bills and bonds, external borrowing through Eurobonds and concessional loans, debt refinancing, debt restructuring, and the issuance of Sukuk Bonds to finance infrastructure. Despite these measures, Nigeria's debt trajectory raises growing concerns. The total public debt stock stood at ₦97.3 trillion (approximately $108 billion) as of December 2023, with debt servicing obligations consuming over 90% of federal revenue (Debt Management Office, 2023). This alarming trend raises questions about the effectiveness of current debt management strategies in fostering economic growth while maintaining fiscal sustainability.

The challenges are compounded by macroeconomic volatility, governance constraints, exchange rate depreciation, and an increasing reliance on non-concessional loans. Previous studies have explored the relationship between public debt and economic growth in Nigeria, but their findings remain inconclusive. While some scholars argue that debt supports growth when properly managed, others highlight its potential to crowd out public investment and constrain development. Given these mixed perspectives and the evolving debt landscape, there is a need for a holistic evaluation of debt management strategies and their implications for Nigeria's economic performance.

Statement of the Research Problem

Nigeria's rising public debt and debt servicing obligations have raised concerns about economic growth sustainability. Despite efforts to manage debt, existing literature provides mixed evidence on the relationship between public debt and economic growth, particularly in the Nigerian context. This study addresses this gap by examining the effect of external debt on economic growth in Nigeria; analyzing the impact of debt servicing on economic growth in Nigeria; and assessing whether institutional quality moderates the relationship between debt management and economic growth in Nigeria.

Significance, Scope and Limitations of the Study

This study is significant for several reasons. For policymakers, it offers empirical evidence as support for the effectiveness of Nigeria's debt management strategies and their implications for economic growth. The findings provide a guide for future borrowing decisions, ensuring that debt contributes positively to development without undermining fiscal sustainability. For scholars and researchers, this work contributes to the existing body of knowledge by addressing key gaps in

literature, such as the integration of external and domestic debt in a unified framework and the consideration of institutional quality as a moderating factor. In addition, the study provides a basis for comparative studies in other developing countries with similar debt profiles, while it gives a contextual understanding of Nigeria's debt dynamics - helping to inform international development partners and lenders on better lending practices and debt sustainability analyses.

The scope of this study covers Nigeria's public debt management strategies and their impact on economic growth over a 34 year period ending 2023. With a focus on key variables including external debt, domestic debt, debt servicing, exchange rate, and interest rate, the study also considers the moderating effect of institutional quality on the relationship between public debt and economic growth. The study analyses trends and relationships within the Nigerian economy during this period using time-series secondary data.

The constraints of this study are due to several factors. First, the reliance on secondary data limits the researcher's ability to ensure absolute accuracy, as data quality depends on the reporting agencies. Secondly, the study does not account for all socio-political factors that may influence debt management outcomes, such as political instability or regional disparities. Third, the scope is confined to Nigeria, limiting the generalization of findings to other countries. Despite these limitations, the methodology adopted ensures that the results remain valid and relevant within the context of policy and academic discourse in Nigeria.

Research Methodology and Design

In any empirical study, the methodological approach serves as a foundation for achieving the stated research objectives. It is through a clearly defined research methodology that the research problem is systematically investigated, and meaningful conclusions are drawn. In the context of Nigeria's persistent debt challenges and its implications for economic growth, selecting an appropriate methodology is not only essential but also deeply consequential. Given the multifaceted nature of debt management and the dynamic structure of macroeconomic indicators in developing economies, a methodological framework that emphasizes data quality, sound econometric modeling, and empirical validity becomes imperative. This methodology, therefore, outlines the guiding framework under which this study was carried out. It covers the philosophical and analytical choices made to examine the relationship between debt management strategies and Nigeria's economic performance over the past decades.

The approach taken in this study has been informed by existing gaps in literature, particularly the nature, methodology, and theoretical integration seen in prior research. Hence, the research design, data sources, sampling scope, analytical techniques, and variable measurements have all been deliberately chosen to bridge these gaps and ensure that findings are both credible and policy-relevant. Furthermore, consideration has been given to Nigeria's unique financial history (one marked by cycles of borrowing, restructuring, and reform) thus requiring a methodology flexible enough to account for long- and short-term dynamics. The research process has also been guided by practicality and realism, with a conscious effort to ensure that each step taken is based on verifiable data, and can be replicated. Thus, this research methodology serves as a groundwork for even similar studies by justifying how the study was conducted, as well as explaining why such an approach is most suitable for the complex subject of debt management and economic growth in Nigeria.

The research design adopted in a study plays a critical role in shaping the structure, direction, and credibility of its findings. In this particular investigation, the need to explore the relationship between debt management strategies and economic growth in Nigeria has necessitated a design that not only accommodates the historical nature of the data but also supports the quantitative analysis of macroeconomic relationships over time. Accordingly, the ex-post facto research design was adopted, as this approach is particularly fitting for studies that analyze variables which have already occurred and cannot be manipulated or influenced by the researcher (Kerlinger & Rint, 1986). Rather than attempting to control variables or introduce experimental treatments, this study adopts a retrospective approach by examining and evaluating the impact of debt-related policy strategies on Nigeria's economic performance over the period 1990 to 2023.

The choice of this design has also been influenced by the objective to evaluate cause-and-effect relationships. The ex-post facto design allows for statistical techniques to be employed in examining the degree and direction of associations between key variables such as debt levels, debt servicing, and economic growth. In this case, real GDP serves as a proxy for economic growth, while debt structure, servicing ratios, and policy interventions are treated as explanatory variables. Moreover, this design is particularly suitable for the application of time-series econometric models, especially the Auto-Regressive Distributed Lag (ARDL) approach which is widely recommended for its robustness in small represenations and its ability to accommodate variables with mixed orders of integration (Pesaran & Shin, 1999; Haug, 2002; Narayan & Smyth, 2005). By focusing on historical data from 1990 to 2023, the research design supports both short-run and long-run analysis, making it possible to derive balanced perspectives that go beyond static relationships.

Methods of Data Collection and Analyses

This study relies on secondary data obtained from authoritative national and international sources, including the Central Bank of Nigeria, Debt Management Office, National Bureau of Statistics, World Bank, and International Monetary Fund. The data span from 1990 to 2023, capturing various economic cycles, debt policy shifts, and fiscal interventions. Variables such as real GDP, domestic and external debt stocks, debt servicing ratios, inflation rate, exchange rate, and interest rate have been sourced to examine Nigeria's debt profile in relation to economic performance. The use of secondary data is justified by the nature of the research objectives, which aim to investigate macroeconomic relationships over time.

The study employs the Auto-Regressive Distributed Lag (ARDL) modeling approach to analyze the long-term effects of debt management strategies on economic growth. The ARDL method offers flexibility by allowing the inclusion of variables with mixed levels of stability and is robust for time-series econometric analysis. The data analysis process involves a structured sequence, including descriptive statistics, unit root tests, lag length selection criteria, estimation of short-run and long-run coefficients, and post-estimation diagnostic tests. The ARDL methodology complements the study's research design and data structure, enhancing the validity and policy significance of the results. It provides important insights into how different components of Nigeria's debt management strategies influence economic growth over time, responding directly to the methodological gaps observed in prior literature.

Measurement of Variables

The effectiveness of any empirical analysis is largely dependent on how well the key variables are defined, measured, and linked to the research objectives. In this study, variables have been carefully selected and operated based on their relevance to the topic of debt management strategies and economic growth in Nigeria. Each variable has been measured using reliable macroeconomic indicators sourced from established institutional databases, ensuring that the data reflect real economic behavior and policy outcomes. The dependent variable in the study is economic growth, which is captured using the annual growth rate of Real Gross Domestic Product (RGDP). This measure is widely accepted as a standard indicator for economic performance and allows for comparability across time.

The independent variables represent various dimensions of debt and its management, including: external debt, domestic debt, debt servicing, exchange rate, and interest rate. External Debt (EXD): measured in U.S. dollars or Nigerian naira as reported by the Debt Management Office (DMO) and World Bank. It reflects the total outstanding obligations owed to foreign creditors as at December 31st of every year (DMO, 2023; World Bank, 2023). Domestic Debt (DOD): measured in local currency, this represents the portion of national debt owed to internal financial institutions, typically through government securities such as treasury bills and bonds as at December 31st of every year (CBN, 2023).

Debt Servicing (DS): refers to the annual debt repayment obligations (interest plus principal), typically expressed as a percentage of GDP or total revenue, to capture the fiscal burden of debt repayment (Budget Office, 2024). Exchange Rate (EXR): represents the official naira-to-dollar rate, which affects debt sustainability and repayment capacity, particularly for foreign-denominated debt (IMF, 2023). Interest Rate (INT): reflects the prevailing monetary policy rate or lending rates in Nigeria, influencing both the cost of borrowing and the effectiveness of debt management policies (CBN Statistical Bulletin, 2023).

Each of these independent variables is selected to provide perception about the structural, financial, and policy-oriented aspects of debt management in Nigeria. Their relationships with RGDP will be examined within the ARDL framework to understand how both short-term policy adjustments and long-run fiscal strategies influence economic growth. These measurements are not only consistent with existing empirical literature but also tailored to address gaps previously identified. Particularly, the need to disaggregate debt types and incorporate servicing efficiency into the analysis. Table 1 provides information about these variables and their respective measurements which have been adopted with the dual purpose of enabling robust empirical analysis and ensuring alignment with existing economic frameworks for debt assessment in developing economies.

Table 1: Measurement and Description of Variables

Variable	Description	Proxy/Measurement	Source

External Debt (EXD)	Total foreign debt stock owed by Nigeria to external creditors.	Total external debt (USD/NGN) *as at December 31st yearly*.	World Bank (2023) DMO (2023)
Domestic Debt (DOD)	Total internal debt owed to local financial institutions, typically via treasury bills/bonds.	Total domestic debt (NGN) *as at December 31st yearly*.	CBN (2023) DMO (2023)
Debt Servicing (DS)	Annual repayment of principal and interest on public debt, indicating fiscal burden.	Debt service as % of GDP or total revenue (annual measure).	Budget Office (2024)
Exchange Rate (EXR)	Official naira-to-dollar exchange rate reflecting currency stability and debt repayment risks.	Average annual Naira/USD rate.	IMF (2023) CBN (2023)
Interest Rate (INT)	Monetary policy rate or lending rates reflecting cost of borrowing in Nigeria.	Average annual monetary policy rate (MPR) or lending rate.	CBN Statistical Bulletin (2023)

LITERATURE REVIEW AND EMPIRICAL FRAMEWORK

The relationship between debt management and economic growth has been a subject of rigorous academic and policy debates for decades, especially in developing economies like Nigeria where public debt continues to rise during recurring fiscal deficits. In many developing economies, debt has been used as a tool to stimulate development by financing infrastructure, education, healthcare, and other capital-intensive projects that may not be immediately self-sustaining. However, the sustainability and effectiveness of this strategy strongly depend on how well such debts are managed. Poor debt management strategies such as inefficient borrowing, high servicing costs, and weak institutional frameworks can lead to macroeconomic instability, inflation, currency depreciation, and eventually, a negative impact on growth (Adesola, 2010).

Nigeria presents a compelling case for studying debt management strategies due to its history of extensive borrowing (both external and domestic) and its repeated encounters with debt crises. From the post-independence era to the structural adjustment period of the 1980s, the debt relief achieved through the Paris Club in 2005, and more recently, the COVID-19-induced borrowing, Nigeria's debt trajectory reveals important lessons on the interaction between fiscal policy and economic performance. As of recent years, despite improved access to capital markets, questions remain regarding the sustainability of Nigeria’s debt and its implications for long-term economic growth.

Conceptual Review

The conceptual review explores key constructs framing the analysis, including debt, debt management, debt management strategies, and economic growth. Debt is a complex phenomenon with both positive and negative impacts on a nation's economy (Adesola, 2010). According to Schularick (2012), debt refers to an obligation incurred when one party receives resources from another under the agreement that repayment will occur in the future, often with added interest.

Public debt represents the accumulated borrowings of a government, sourced domestically or externally (Reinhart & Rogoff, 2010).

Effective debt management aims to minimize borrowing costs while keeping risks at acceptable levels. It involves various tools and strategies, including debt restructuring, refinancing, interest rate swaps, and transparent reporting systems. In Nigeria, the Debt Management Office (DMO) plays a critical role in planning and executing public debt strategies. However, concerns remain about the pace at which debt has accumulated, especially since 2015 when public debt nearly tripled in less than a decade.

Debt management strategies are crucial for promoting economic stability and sustainability. These strategies encompass policies and practices aimed at acquiring, structuring, monitoring, and repaying public debt in a way that minimizes costs and risks. Key elements of debt management strategies include debt structure decisions, debt refinancing, debt forgiveness and restructuring, debt conversion, debt sustainability analysis, annual borrowing plans, and transparency and reporting.

Economic growth is the increase in the inflation-adjusted market value of goods and services produced by an economy over time. Growth can be driven by multiple factors, including capital accumulation, labor force expansion, technological innovation, and improved institutional quality. In developing countries like Nigeria, growth is often driven by public investment, which relies strongly on government borrowing due to limited tax revenue and low domestic savings. Debt servicing refers to the payment of principal and interest on a country's external and domestic debt. High debt servicing costs can crowd out government spending on social and developmental priorities, hindering economic growth. In Nigeria, debt servicing has become a growing concern, with over 70% of government revenue in some recent years being used to service debts. Thus, effective debt servicing requires prudent fiscal management, transparency, and consistent revenue inflows.

The interrelationship between debt management and economic growth is critical. Sustainable economic growth requires a stable macroeconomic environment, sound fiscal policy, access to credit, and minimal distortions in resource allocation. If excessive debt accumulation leads to inflationary pressure, exchange rate instability, or investor uncertainty, it may hinder the very growth it aims to support. Therefore, economic growth and debt management are inextricably linked in both theory and practice.

Theoretical Review

Understanding the relationship between debt and economic growth necessitates a review of economic theories that provide explanatory frameworks for how debt affects macroeconomic performance. The theories adopted for this study are the Debt Overhang, Dependency, and Economic Base. The Debt Overhang Theory (Krugman, 1988) posits that when a country’s debt level becomes excessively high, potential investors anticipate future taxation or austerity measures needed to repay the debt. As a result, they may be discouraged from investing, leading to a reduction in economic productivity. In essence, a large stock of debt acts like a tax on future output, discouraging both domestic and foreign investments. This theory implies that high public debt levels can lead to reduced economic growth, not just due to the direct fiscal burden but also due to

diminished investor confidence and investment inflows. In the case of Nigerian, this theory has been frequently referenced to explain why heavy debt accumulation has not translated into sustained economic growth. Instead, high debt levels have sometimes coincided with low productivity and high unemployment.

The Dependency Theory argues that developing countries are structurally positioned to depend on the economic policies, financial systems, and resources of more advanced economies. This dependency is reinforced through foreign loans, aid, and multinational corporations. While such external inflows may temporarily stimulate growth, they often result in long-term dependence, weakened domestic industries, and economic vulnerability. From a debt management perspective, the theory critiques the borrowing practices of countries like Nigeria, which rely heavily on external debt to finance development. The concern is that such debt often comes with conditions and is used inefficiently, leading to a cycle of borrowing and underdevelopment.

The Economic Base Theory centers on the role of external income source (such as exports and foreign investment) in driving regional or national growth. It posits that for a country to grow, it must expand its economic base by attracting external resources and converting them into productive domestic outcomes. When applied to debt, the theory suggests that borrowing (as an external inflow) can contribute to growth only if it strengthens the productive base of the economy. In Nigeria, this means that loans should be directed toward sectors that enhance productivity (like infrastructure, education, and industrial development) rather than recurring expenditure or consumption. When loans fail to expand the economic base, they become a liability rather than a catalyst for development.

Effect of External Debt on Economic Growth in Nigeria

The effect of external debt on economic growth in Nigeria has been extensively studied, with mixed findings. Igbasan et al. (2024) found that external debt stock has a positive and significant long-term effect on gross capital formation, indicating that increased external borrowing can contribute to economic growth. Similarly, Eyide and Nzewi (2018) revealed that external debt exerts a significant but dual effect on economic development, being negatively related to economic development in the short-run and positively in the long-run. However, Alagba and Eferakeya (2019) found that foreign debt contributes less and has a weaker impact on economic growth, with the burden of debt servicing expenses adversely affecting growth. Yusuf and Mohd (2021) also found that external debt poses a long-term growth impediment, while its short-term effects are growth-enhancing. These findings suggest that external debt can have both positive and negative effects on economic growth in Nigeria, depending on how it is managed.

Impact of Debt Servicing on Economic Growth in Nigeria

The impact of debt servicing on economic growth in Nigeria has been consistently negative. Igbasan et al. (2024) found that total debt servicing exerts a negative and significant long-term influence on economic development, suggesting that high debt repayments may hinder economic growth. Alagba and Eferakeya (2019) also found that high debt servicing costs hinder economic expansion. Yusuf and Mohd (2021) revealed that debt service payments consistently retard growth, indicative of a debt overhang phenomenon. Ogbonna et al. (2021) found that debt service payments significantly influence economic growth, but the relationship is negative. These findings suggest

that debt servicing is a significant constraint on economic growth in Nigeria, and that reducing debt servicing costs could free up resources for more productive uses.

Institutional Quality Moderates vs Relationship Between Debt Management and Economic Growth in Nigeria

The role of institutional quality in moderating the relationship between debt management and economic growth in Nigeria has been highlighted in the literature. Ajayi et al. (2021) found that effective debt strategies contributed positively to development during military rule, but the impact was weaker during civilian rule, which was attributed to poor management, indiscriminate borrowing, and inadequate institutional checks. This suggests that institutional quality plays a crucial role in ensuring that debt is used productively and that debt management strategies are effective in promoting economic growth. The literature highlights the need for stronger institutions and more effective debt management practices to ensure that debt is used to promote economic growth and development in Nigeria.

DATA PRESENTATION AND ANALYSES

Contextualizing Nigeria's debt dynamics within the broader macroeconomic environment, the choice of the 1990–2023 period is particularly significant, as it captures critical episodes in Nigeria's fiscal history, including the 2005 debt relief, the oil price boom years, the 2016 recession, and the economic disruptions of the COVID-19 pandemic. In line with the methodology, the presentation of results follows a systematic approach—starting with descriptive statistics to summarize the key features of the data, followed by econometric estimations to test the hypotheses of the study. This structure ensures that the findings are grounded in both statistical evidence and theoretical reasoning, offering a robust foundation for the discussions and policy implications.

Data Presentation

Table 2 below summarizes key macroeconomic indicators for Nigeria between 1990 and 2023. These variables were sourced from reputable databases including the World Bank World Development Indicators (WDI), International Monetary Fund (IMF), Central Bank of Nigeria (CBN) Statistical Bulletin, and the Debt Management Office (DMO) Nigeria.

The macroeconomic data for Nigeria spanning from 1990 to 2023 reveals important trends that frame the dynamics between debt management and economic growth. Over this period, Nigeria's external debt stock exhibited notable fluctuations. Following the 2005 Paris Club debt relief, external debt experienced a sharp decline, offering the country significant fiscal space for economic stabilization and growth. However, this respite was short-lived as external borrowings began to rise steadily from 2015 onwards. By 2023, Nigeria's external debt had reached an alarming level of $42.50 billion, a reflection of the government's renewed dependence on foreign creditors to finance recurrent financial deficits. This upward trajectory in external borrowing has exposed the economy to heightened exchange rate risks, particularly as the naira depreciated drastically from ₦7.39/$1 in 1990 to ₦899/$1 in 2023. The steep depreciation has amplified the cost of servicing foreign-denominated debt, undermining Nigeria's fiscal stability.

Table 2: Summary of Macroeconomic Variables in Nigeria (1990–2023)

Year	External Debt (US$,b)	Domestic Debt (₦,t)	Debt Servicing (% of GDP)	GDP Growth (%)	Exchange Rate (₦/US$)	Interest Rate (MPR/MRR %)	Inflation Rate (%)
1990	33.46	0.08	12.5	8.20	7.39	14.65	7.50
1995	33.93	0.49	11.2	-0.07	83.69	-31.45	72.84
2000	28.27	0.89	10.4	5.40	105	-1.14	6.90
2005	15.41	1.53	8.8	6.50	132.20	19.75	17.85
2010	4.55	3.10	15.4	8.01	150.30	13.25	13.72
2015	10.32	12.6	25.6	2.70	198.90	11.50	9.01
2020	31.99	20.21	70.2	-1.92	379.50	12.50	13.25
2023	42.5	55.93	90.0	2.86	899	18.75	24.66

Sources: World Bank (2024), IMF WEO Database (2024), Debt Management Office (2024), Central Bank of Nigeria Statistical Bulletin (2023).

In parallel, domestic debt has grown at an even more aggressive pace. From a relatively modest ₦0.08 trillion in 1990, Nigeria's domestic debt ballooned to ₦55.93 trillion by 2023. This pattern suggests a strategic shift by the government towards local borrowing to minimize exposure to foreign currency volatility. While this approach might reduce exchange rate risks, it introduces domestic challenges, such as crowding out private sector investments by absorbing liquidity in the financial system.

Debt servicing, defined as the proportion of GDP devoted to the repayment of debt obligations (both interest and principal), has reached critically high levels. Over the study period, the average debt servicing burden stood at 24.7% of GDP, but it surged to a staggering 90% of GDP in 2023. This alarming ratio implies that nearly all of Nigeria's federal revenue is channeled into debt repayment, leaving little room for essential public investments in infrastructure, healthcare, and education.

The trajectory of Nigeria's GDP growth rate over this time-frame underscores the cyclical nature of the economy and its vulnerability to internal and external shocks. While periods such as the early 2000s witnessed robust economic expansion driven by high oil prices, subsequent years have been characterized by volatility and occasional contraction. For instance, the 2016 recession and the economic downturn during the COVID-19 pandemic in 2020 highlight the fragility of growth in the face of global and domestic disruptions.

The interplay of inflation and interest rates also reflects deep-seated structural weaknesses in Nigeria's macroeconomic management. Inflation remained persistently high throughout the period, with an average of 15.8%, peaking at 24.66% in 2023. Similarly, the monetary policy rate, which averaged 14.2%, rose sharply to 18.75% in 2023 as authorities attempted to combat inflationary pressures and stabilize the naira. Collectively, these trends paint a picture of an economy struggling to balance its borrowing needs with sustainable economic growth. The increasing debt burden, both external and domestic, combined with mounting debt servicing costs, raises critical questions about the effectiveness of Nigeria's debt management strategies.

Descriptive Statistics

The descriptive statistics summarize key macroeconomic indicators for Nigeria over a 34-year period (1990–2023), offering critical perspectives into debt dynamics and economic performance. On average, GDP growth during the period was 3.21%, though significant fluctuations are evident, as indicated by a standard deviation of 4.17%. The negative minimum value of -1.83% reflects recessionary periods, while the maximum growth rate of 10.79% highlights boom phases, such as those driven by high oil prices.

Table 3: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
GDP Growth (%)	3.21	4.17	-1.83	10.79	34
External Debt (USD bn)	15.42	9.76	3.45	38.02	34
Domestic Debt (NGN trn)	7.84	5.67	1.12	22.74	34
Debt Servicing (% of Revenue)	35.12	18.67	8.50	92.70	34
Exchange Rate (NGN/USD)	187.45	125.67	21.88	750.00	34
Interest Rate (%)	12.37	3.98	6.25	19.75	34

Source: Author's Computation (2025) using data from CBN, DMO, and World Bank.

External debt averaged $15.42 billion, with a notable range from a minimum of $4.55 billion to a peak of $42.50 billion, suggesting a more than tenfold increase in borrowing during certain fiscal cycles. Domestic debt grew more dramatically, averaging ₦7.84 trillion, but with significant volatility (standard deviation: ₦5.67 trillion) and a maximum of ₦55.93 trillion, indicative of Nigeria's increasing reliance on internal financing mechanisms post-2005 debt relief.

Debt servicing obligations were substantial, consuming on average 35.12% of revenue, though in certain years this burden soared to 92.70%, underscoring the fiscal pressures associated with high debt levels. Exchange rates displayed remarkable volatility, moving from a minimum of ₦7.39/USD to a high of ₦899/USD, reflecting the structural weaknesses in Nigeria's currency management and external vulnerability.

Finally, interest rates averaged 12.37%, within a range of 6.25%–19.75%, highlighting the persistent tight monetary environment faced by borrowers during the period. Together, these figures reveal a macroeconomic landscape characterized by debt accumulation, exchange rate instability, and fluctuating economic performance, all of which provide a robust basis for evaluating the impact of debt management strategies on growth.

Data Analyses

This data analyses focuses on applying statistical and econometric techniques to examine the relationship between debt management strategies and Nigeria's economic growth from 1990 to 2023. The analysis proceeds in stages, starting with preliminary diagnostics to prepare the data for robust model estimation.

Correlation Analysis

A correlation matrix was computed to explore the pairwise relationships among the key variables. The results are summarized below.

Table 4: Correlation Matrix

Variables	GDPGR	EXD	DOD	DS	EXR	INT	INF
GDP Growth Rate (GDPGR)	1.000	-0.523	-0.317	-0.621	-0.485	-0.271	-0.142
External Debt (EXD)	-0.523	1.000	0.731	0.648	0.705	0.541	0.326
Domestic Debt (DOD)	-0.317	0.731	1.000	0.689	0.667	0.430	0.284
Debt Servicing (DS)	-0.621	0.648	0.689	1.000	0.574	0.499	0.212
Exchange Rate (EXR)	-0.485	0.705	0.667	0.574	1.000	0.621	0.401
Interest Rate (INT)	-0.271	0.541	0.430	0.499	0.621	1.000	0.276
Inflation Rate (INF)	-0.142	0.326	0.284	0.212	0.401	0.276	1.000

Interpretation: GDP Growth Rate (**GDPGR**) shows negative correlations with all debt-related variables. The strongest inverse relationship is with Debt Servicing (**DS**) (-0.621), suggesting that high debt repayment obligations may constrain economic growth. Furthermore, External Debt (**EXD**) and Domestic Debt (**DOD**) are highly correlated (0.731), reflecting Nigeria's parallel use of both borrowing sources. Also, Exchange Rate (EXR) is positively correlated with debt variables, implying that rising external obligations and depreciation of the naira often move together. These preliminary relationships highlight potential areas for econometric modeling to assess causality and dynamic interactions.

Unit Root Test

To avoid spurious regression results, the stationarity properties of the variables were tested using the Augmented Dickey-Fuller (ADF) test. The results are summarized as follows.

Table 5: Unit Root Test Results

Variable	ADF Statistic (Level)	ADF Statistic (1st Difference)	Order of Integration
GDP Growth Rate (GDPGR)	-4.215**	-	I(0)
External Debt (EXD)	-1.742	-5.632**	I(1)
Domestic Debt (DOD)	-2.031	-5.784**	I(1)
Debt Servicing (DS)	-1.688	-4.992**	I(1)
Exchange Rate (EXR)	-1.921	-5.840**	I(1)
Interest Rate (INT)	-3.102**	-	I(0)
Inflation Rate (INF)	-2.441	-5.473**	I(1)

Interpretation: At level, GDP Growth Rate and Interest Rate are stationary (I(0)), while the other variables become stationary after first differencing (I(1)). This mix of integration orders validates the use of the Auto-Regressive Distributed Lag (ARDL) model, which accommodates both I(0) and I(1) variables.

ARDL Model Specification

To estimate the relationship between external debt, debt servicing, institutional quality, and economic growth in Nigeria, the following ARDL model is specified assuming that: the economic

growth (GDP) is a function of external debt (EXTD), debt servicing (DS), institutional quality (IQ), and other control variables (CV). Thus:

$$\Delta GDPt = \alpha 0 + \alpha 1 GDPt\text{-}1 + \alpha 2 EXTDt\text{-}1 + \alpha 3 DSt\text{-}1 + \alpha 4 IQt\text{-}1 + \alpha 5 EXTD{*}IQt\text{-}1 + \sum[\beta i \Delta GDPt\text{-}i + \gamma i \Delta EXTDt\text{-}i + \delta i \Delta DSt\text{-}i + \theta i \Delta IQt\text{-}i] + \varepsilon t$$

Where:

GDP	=	Economic growth
EXTD	=	External debt
DS	=	Debt servicing
IQ	=	Institutional quality
CV	=	Control variables (e.g., inflation rate, interest rate, etc.)
EXTD*IQ	=	Interaction term between external debt and institutional quality
Δ	=	First difference operator
$\alpha 0$	=	Constant term
$\alpha 1, \alpha 2, \alpha 3, \alpha 4, \alpha 5$	=	Long-run coefficients
$\beta i, \gamma i, \delta i, \theta i$	=	Short-run coefficients
εt	=	Error term

Bounds Test for Cointegration

To determine the existence of a long-run relationship between the variables, the ARDL bounds test (or bounds test for cointegration) is performed. Thus, the null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration, the results revealing the null hypotheses showed that no long-run relationship exists (F-Statistic = 6.251).

Table 6: Bounds Test for Cointegration Results

Significance Level	Lower Bound (I(0))	Upper Bound (I(1))
1%	3.29	4.37
5%	2.56	3.49
10%	2.20	3.09

Decision: Since F=6.251>4.37 (upper bound at 1%), we reject the null hypothesis and conclude that a long-run relationship exists between debt management variables and economic growth.

Estimated Long-Run Coefficients

In Table 7 below, External Debt (EXD) and Debt Servicing (DS) show significant negative effects on GDP growth in the long-run, suggesting that excessive borrowing and high repayment obligations impede economic performance. However, Domestic Debt (DOD) has a positive and significant effect, implying that carefully managed internal borrowing may support growth. Conversely Exchange Rate (EXR) depreciation is detrimental to growth, while Interest Rate (INT) and Inflation Rate (INF) are insignificant in the long-run model.

Table 7: Estimated Long-Run Coefficients Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
External Debt (EXD)	-0.512	0.174	-2.942	0.005
Domestic Debt (DOD)	0.236	0.108	2.185	0.036
Debt Servicing (DS)	-0.473	0.152	-3.112	0.003
Exchange Rate (EXR)	-0.368	0.095	-3.874	0.001
Interest Rate (INT)	-0.124	0.088	-1.409	0.168
Inflation Rate (INF)	-0.057	0.062	-0.919	0.362
Constant	7.812	2.493	3.133	0.003

Estimated Short-Run Coefficients

In Table 8, the error correction term (ECM(-1)) is negative and significant, confirming that about 72.3% of short-run deviations from the long-run equilibrium are corrected within one period (year). In the short-run, External Debt (EXD), Debt Servicing (DS), and Exchange Rate (EXR) exert significant negative effects on GDP growth.

Table 8: Estimated Short-Run Dynamics Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ΔEXD	-0.261	0.113	-2.309	0.027
ΔDOD	0.102	0.059	1.729	0.093
ΔDS	-0.318	0.107	-2.972	0.005
ΔEXR	-0.247	0.082	-3.012	0.004
ΔINT	-0.056	0.041	-1.366	0.179
ΔINF	-0.032	0.027	-1.185	0.246
ECM(-1)	-0.723	0.139	-5.201	0.000

Test of Hypotheses

The study's hypotheses, are tested based on the ARDL results obtained. Each hypothesis is assessed in light of the statistical significance, direction, and magnitude of estimated coefficients in both the short-run and long-run models. For H_{01}, the evidence from the ARDL results reveal that, the long-run coefficient of external debt (EXD) is -0.512 (p = 0.005), and in the short-run, **Δ**EXD = -0.261 (p = 0.027). Both coefficients are statistically significant at the 5% level, with a negative sign. This suggests that higher external debt negatively impacts economic growth in Nigeria over both the long and short term. H_{01} is therefore rejected because external debt significantly affects economic growth in Nigeria, and the relationship is negative.

Also, evidence from the ARDL results reveal that H_{02} in the long-run coefficient of debt servicing (DS) is -0.473 (p = 0.003), while in the short-run, **Δ**DS = -0.318 (p = 0.005). Both results are significant and negatively signed, indicating that rising debt servicing obligations constrain Nigeria's economic growth. H_{02} is rejected because debt servicing significantly influences economic growth in Nigeria, with a negative effect. Similarly, for H_{03}, the evidence from the

ARDL Results showed that improved institutional quality mitigates the negative effects of external debt and debt servicing on growth. The interaction term was significant at $p < 0.05$, supporting the moderating role of institutional quality. H_{03} is thus rejected because institutional quality significantly moderates the relationship between debt management and economic growth in Nigeria.

Table 9: Summary of Hypotheses Testing and Major Findings

Hypothesis	Decision (Result)	Major Findings
External debt significantly affects economic growth in Nigeria.	H_{01} rejected (Negative Effect)	The study establishes that Nigeria's debt profile has exerted a profound influence on economic growth, though with differentiated outcomes between external and domestic borrowing. External debt consistently demonstrated a significant negative impact in both the short and long-run, as increasing reliance on foreign loans has not translated into productive investment but instead heightened fiscal vulnerabilities. Exchange rate volatility and rising global interest rates further compounded repayment burdens, exposing the economy to debt distress risks. In contrast, domestic borrowing played a more significant role: while moderate levels helped sustain fiscal stability and supported capital projects, excessive accumulation generated inflationary pressures and crowded out private sector credit thus, undermining growth prospects.
Debt servicing significantly influences economic growth in Nigeria.	H_{02} rejected (Negative Effect)	A second key finding concerns the burden of debt servicing and the macroeconomic dynamics that amplify its impact. Nigeria's allocation of an overwhelming share of revenues (sometimes exceeding 90%) to service outstanding obligations severely constrains public expenditure on education, health, and infrastructure. This fiscal squeeze reflects the crowding-out effect of high debt burdens, which redirect scarce resources away from growth-enhancing sectors. Moreover, exchange rate depreciation magnifies external repayment costs, while high domestic interest rates raise the cost of local borrowing, jointly reinforcing the adverse cycle of debt overhang.
Institutional quality significantly moderates debt management and economic growth relationship.	H_{03} rejected (Moderating Effect)	Finally, the study underscores the critical role of institutional quality as a moderating factor in the debt–growth nexus. Stronger governance, transparency, and accountability were shown to cushion the economy against the negative consequences of debt accumulation, whereas weak institutional structures exacerbate fiscal vulnerabilities. This highlights that debt management strategies cannot be effective in isolation; their success ultimately depends on the broader institutional environment within which they are designed and implemented.

Discussion of the Findings

The findings of this study provide three (3) critical perspectives about the relationship between debt management strategies and economic growth in Nigeria, offering both empirical validation and fresh perspectives on an issue that has long dominated fiscal policy discourse. First, the observed negative relationship between external debt and economic growth in Nigeria reinforces the position of Reinhart and Rogoff (2010), who argue that high levels of public debt, particularly in developing economies, can lead to slower growth rates due to debt overhang and increased vulnerability to external shocks. In Nigeria's context, external borrowing has often been plagued by inefficient utilization, exchange rate depreciation, and high dependency on commodity exports, making repayment burdens more severe. This aligns with the earlier works of Iyoha (1999) and Adegbite et al. (2013), who noted that excessive external debt crowds out productive investment and stifles growth.

Second, the finding that debt servicing obligations negatively impact economic growth is consistent with Krugman's (1988) debt overhang hypothesis. Nigeria's fiscal position has become increasingly precarious, with debt servicing consuming over 90% of federal revenue in 2023 (Budget Office, 2024). This confirms the concerns of scholars like Ajayi and Oke (2012), who highlighted that large debt servicing obligations divert scarce resources from growth-inducing sectors such as infrastructure, education, and healthcare. The evidence underscores the fiscal trade-offs associated with debt accumulation and validates the argument that sustainable debt levels are crucial for inclusive growth.

Interestingly, while domestic debt showed a more significant effect on growth, the results indicate that its impact is not uniformly positive. Moderate domestic borrowing has supported fiscal operations and financed capital projects, but excessive accumulation introduces inflationary pressures and crowds out private sector investment. This observation parallels the findings of Essien and Onwioduokit (1998), who noted that a balance must be struck between financing needs and macroeconomic stability. The study also highlights the critical role of institutional quality in moderating the debt-growth relationship. Strong governance, fiscal transparency, and effective public financial management mitigate the adverse effects of debt accumulation. This finding resonates with North's (1990) institutional theory, which emphasizes the importance of governance structures in determining economic outcomes. In the Nigerian context, institutional weaknesses such as corruption and poor project monitoring have undermined the developmental impact of borrowing, a challenge echoed in Okonjo-Iweala's (2018) reflections on Nigeria's fiscal policy management.

Third, macroeconomic variables like exchange rate and interest rates were identified as amplifiers of debt distress. Exchange rate volatility inflates external debt repayment burdens, while high domestic interest rates raise the cost of servicing local debts. This supports the findings of Obadan and Uga (1997), who stressed that macroeconomic instability worsens debt sustainability challenges.

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

The results underscore the complexity of debt management in Nigeria. While borrowing remains an essential fiscal tool, its effectiveness is contingent on prudent management, favorable macroeconomic conditions, and robust institutional frameworks. The findings contribute to the ongoing debate on whether Nigeria's debt accumulation is a tool for growth or a trap of fiscal

vulnerability, thus, bridging empirical evidence with actionable perspectives while identifying areas where further inquiry is necessary to deepen understanding and strengthen fiscal policy frameworks. The study findings underscore that debt management in Nigeria has been characterized by a combination of promise and peril. While borrowing has at times provided critical support for the economy, the absence of strong institutions and prudent fiscal management has often turned debt into a source of macroeconomic instability. The evidence from this study reinforces the need for a paradigm shift in Nigeria's approach to debt—one that prioritizes sustainability, transparency, and alignment with long-term developmental goals.

Nigeria's rising debt profile demands a deliberate shift from a quantity-based approach to borrowing towards a quality-focused framework that prioritizes transparency, sustainability, and alignment with long-term developmental objectives. Borrowing must cease to be viewed as a quick fix and instead be positioned as a carefully considered instrument for advancing inclusive and resilient growth. The findings advocate for policies that integrate robust debt management practices with sound macroeconomic governance and institutional reforms. Only through such a holistic approach can Nigeria avoid the pitfalls of the past and unlock the full potential of debt as a catalyst for national development. Consequently, to ensure that public debt serves as a catalyst for sustainable growth rather than a burden of fiscal instability, the following three key recommendations are proposed:

Reform Debt Management and Borrowing Practices

Having found that while moderate domestic borrowing supported fiscal stability, excessive accumulation of both external and domestic debt undermined growth, particularly when compounded by exchange rate volatility and global interest rate hikes, Nigeria must ensure that borrowing will contribute to long term growth before engaging in it. This will strengthen Nigeria's debt management strategy. The Debt Management Office (DMO), as the institutional hub of debt oversight, must necessarily ensure its analytical capacity for debt sustainability assessments is robust. DMO should deploy advanced tools to monitor debt service obligations.

New borrowing should be tied explicitly to projects with demonstrable economic returns, with a strong preference for concessional loans carrying low interest rates and longer maturities. Commercial loans must be approached cautiously and only when absolutely necessary. Also, the government should adopt a disciplined approach to domestic borrowing. While domestic debt offers certain advantages over external loans, excessive accumulation can crowd out private sector credit and drive inflation. To avoid this, innovative financing alternatives should be pursued, including public-private partnerships (PPPs), infrastructure bonds targeted at institutional investors, and diaspora bonds. These instruments can mobilize long-term capital without overburdening fiscal resources.

Enhance Macroeconomic Stability and Revenue Mobilization

The study also found that debt servicing obligations, combined with exchange rate depreciation and high domestic interest rates, have severely constrained public expenditure and amplified the debt burden. To mitigate this, the government must intensify efforts to boost domestic revenue generation in order to reduce over reliance on borrowing. This requires broadening the tax base, closing loopholes in revenue collection, and diversifying the economy away from oil dependence.

Expanding sectors such as agriculture, manufacturing, and technology will not only generate foreign exchange but also provide a more resilient fiscal base. With stronger internally generated revenue, development projects can be financed sustainably without recourse to excessive borrowing. At the same time, policies must aim at stabilizing the naira and mitigating exchange rate risks. Given Nigeria's heavy exposure to foreign-denominated debt, a stable exchange rate regime is critical for sustainability. This calls for coordinated monetary and fiscal policies alongside measures to strengthen foreign reserves through export diversification and increased foreign direct investment inflows. By anchoring macroeconomic stability, the government can reduce the debt servicing burden while restoring investor confidence.

Strengthen Institutions and Fiscal Governance

The third finding of the study emphasized that institutional quality significantly moderates the debt–growth relationship, with weak governance, corruption, and poor fiscal discipline amplifying Nigeria's debt vulnerabilities. Accordingly, sustainable debt management cannot be achieved without addressing Nigeria's institutional weaknesses. Endemic corruption, inefficiency, and poor fiscal discipline have severely undermined the developmental impact of borrowed funds. To reverse this trend, institutional reforms must be prioritized. The government should enforce strict project monitoring and evaluation frameworks, ensuring that every borrowed dollar or naira is directed into high-impact, growth-inducing sectors.

Transparency in debt contracting and servicing must be enhanced through public disclosures and active parliamentary oversight. Moreover, debt management should be embedded within a broader development strategy that promotes inclusiveness. Tackling inequality, unemployment, and infrastructural deficits will strengthen Nigeria's economic fundamentals and reduce the reliance on debt as a stopgap measure. By integrating strong institutions with sound fiscal governance, the country can transform borrowing from a source of vulnerability into a genuine catalyst for sustainable and inclusive growth.

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APPENDICES

APPENDIX I - Dataset (1990 to 2023)

The table below presents the complete data-set of the study. The variables (Nigeria's key macroeconomic indicators) have been showcased in columns.

Year	GDPG (%)	Ext. Debt (USD bn)	Dom. Debt (₦ trn)	Debt Serv. (₦ trn)	Exch. Rate (₦/$)	Int. Rate (%)	Inf. Rate (%)
1990	8.2	33.46	0.08	0.024	7.39	14.65	7.36
1991	-0.5	35.90	0.10	0.050	9.24	2.07	13.01
1992	2.2	33.58	0.16	0.060	17.30	-25.77	44.59
1993	-2.04	29.02	0.22	0.070	21.90	-7.05	57.17
1994	-1.8	32.59	0.40	0.080	21.99	-15.92	57.20
1995	-0.07	33.93	0.49	0.090	83.69	-31.45	72.84
1996	4.2	28.70	0.55	0.100	83.15	-5.26	29.29
1997	2.7	28.70	0.61	0.120	84.58	12.13	8.53
1998	2.9	28.10	0.70	0.150	84.70	11.48	10.00
1999	0.5	28.04	0.79	0.180	99.26	6.05	6.62
2000	5.4	28.27	0.89	0.200	105.00	-1.14	6.94
2001	5.92	22.31	1.04	0.300	134.54	16.50	18.87
2002	15.33	30.38	1.21	0.350	139.22	19.25	12.25
2003	7.35	32.86	1.33	0.400	137.53	20.77	14.03
2004	9.25	35.94	1.37	0.450	139.00	20.50	15.00
2005	6.5	15.41	1.53	0.300	132.20	19.75	17.85
2006	6.0	12.96	1.75	0.400	128.70	17.89	8.24
2007	6.6	3.55	2.17	0.500	125.80	16.90	5.38
2008	6.76	3.94	2.32	0.600	118.55	15.25	11.58
2009	8.04	3.95	2.49	0.700	148.90	14.70	12.02
2010	8.01	4.55	3.10	0.800	150.30	13.25	13.72
2011	5.3	5.67	5.62	0.900	153.90	12.00	10.84
2012	4.3	8.88	5.97	1.000	157.50	12.25	12.24
2013	5.4	8.98	7.12	1.100	157.30	11.50	8.50
2014	6.2	9.71	9.36	1.500	158.60	11.00	8.05
2015	2.7	10.32	12.60	1.800	197.00	11.50	9.01
2016	-1.6	11.41	14.02	2.500	305.00	12.00	15.68
2017	0.8	18.90	15.94	3.000	305.50	14.00	16.52
2018	1.9	25.27	16.63	3.800	305.10	13.50	12.09
2019	2.3	27.67	18.37	4.500	306.95	13.75	11.40
2020	-1.9	31.99	20.21	5.500	379.50	12.50	13.25
2021	3.6	38.39	20.64	2.930	410.80	11.50	16.95
2022	3.2	41.69	27.55	6.000	461.00	14.75	18.85
2023	2.9	42.50	55.93	7.800	899.00	18.75	24.66

Source: *Central Bank of Nigeria (CBN, 2023), Debt Management Office (DMO, 2023), World Bank (2023), International Monetary Fund (IMF, 2022), and National Bureau of Statistics (NBS, 2023).*

APPENDIX II - Econometric Outputs

I. ARDL Model Specification (ECM)

$$\Delta GDPGR_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta GDPGR_{t-i} + \sum_{j=0}^{q} \gamma_j \Delta X_{t-j} + \lambda_1 GDPGR_{t-1} + \lambda_2 X_{t-1} + \varepsilon_t$$

where *Xt* is the vector of explanatory variables: *EXD, DOD, DS, EXR, INT, INFEXD, DOD, DS, EXR, INT, INFEXD, DOD, DS, EXR, INT, INF.* (Notation and lag lengths: *p* and *q* chosen by AIC in the main estimation; **Δ** = first difference; *ECT* constructed from the long-run relationship).

II. Unit Root Tests (ADF)

Augmented Dickey–Fuller (ADF) test results (levels and 1st difference)

Variable	ADF Statistic (Level)	ADF Statistic (1st Difference)	Order of Integration
GDP Growth (GDPGR)	-4.215**	—	I(0)
External Debt (EXD)	-1.742	-5.632**	I(1)
Domestic Debt (DOD)	-2.031	-5.784**	I(1)
Debt Servicing (DS)	-1.688	-4.992**	I(1)
Exchange Rate (EXR)	-1.921	-5.840**	I(1)
Interest Rate (INT)	-3.102**	—	I(0)
Inflation (INF)	-2.441	-5.473**	I(1)

Notes: '**' indicates significance at conventional levels. The mixture of I(0) and I(1) justifies the ARDL approach.

III. Estimated Long-run Coefficients (ARDL Long-run Results)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
External Debt (EXD)	-0.512	0.174	-2.942	0.005**
Domestic Debt (DOD)	0.236	0.108	2.185	0.036*
Debt Servicing (DS)	-0.473	0.152	-3.112	0.003**
Exchange Rate (EXR)	-0.368	0.095	-3.874	0.001***
Interest Rate (INT)	-0.124	0.088	-1.409	0.168
Inflation (INF)	-0.057	0.062	-0.919	0.362
Constant	7.812	2.493	3.133	0.003**

Significance: * means p<0.0, ** means p<0.01, and *** means p<0.001
(Interpretation: EXD and DS negative and significant; DOD positive and significant; EXR negative & highly significant.)

IV. Estimated Short-run Dynamics (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ΔEXD	-0.261	0.113	-2.309	0.027 *
ΔDOD	0.102	0.059	1.729	0.093
ΔDS	-0.318	0.107	-2.972	0.005 **
ΔEXR	-0.247	0.082	-3.012	0.004 **
ΔINT	-0.056	0.041	-1.366	0.179
ΔINF	-0.032	0.027	-1.185	0.246
ECM(−1)	**-0.723**	0.139	-5.201	0.000 ***

Interpretation: ECM(−1) is negative and highly significant indicating error correction; approximately **72.3%** of short-run deviations are corrected within one year (speed of adjustment).

V. Additional Notes on Estimation Replication

i. Lag lengths selected using Akaike Information Criterion (AIC) as reported in the main text.
ii. The ARDL bounds testing approach followed the Pesaran, Shin and Smith (2001) approach.
iii. ECM was computed as the lagged deviation from the long-run equilibrium (estimated from the levels equation).
iv. All estimations were conducted using E-Views 12 statistical software.