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Debt Burden and Economic Growth in Nigeria: Evidence from ARDL Approach

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Abstract **Original Research Article**

This study re-examines the debt-growth nexus in Nigeria by embedding external debt dynamics within an endogenous growth framework that explicitly incorporates investment as a transmission channel and institutional quality as a moderating factor. Using annual data from 1996-2023 and the Autoregressive Distributed Lag (ARDL) approach, the analysis captures both short-run adjustments and long-run equilibrium relationships. Unit root tests confirm mixed orders of integration, while the bounds test establishes a stable cointegrating relationship among the variables. Empirical results show that debt servicing exerts a robust negative and statistically significant effect on economic growth in both the short and long run, strongly supporting the debt overhang hypothesis. In contrast, external debt stock is negative but statistically insignificant, indicating that the scale of borrowing alone does not guarantee growth. Gross domestic investment significantly enhances long-run growth, consistent with endogenous growth theory, although its short-run effects remain weak. Institutional quality and its interaction with external debt are statistically insignificant, with the long-run coefficient on institutional quality negative, suggesting that governance improvements in isolation may not translate into growth gains due to structural rigidities, measurement limitations, or transitional adjustments. The error correction term is negative and highly significant (−1.1449), indicating rapid adjustment with overshooting, consistent with small-sample ARDL dynamics and Nigeria's episodic macroeconomic adjustments. Overall, the study contributes by offering a unified dynamic framework that jointly models debt, investment, and institutional quality, demonstrating that the growth impact of external borrowing in Nigeria is conditional rather than automatic, and depends critically on investment efficiency, manageable debt servicing, and complementary structural reforms.

Keywords: Debt burden, Economic growth, ARDL, Nigeria, Debt servicing, Institutional quality.

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1. INTRODUCTION

Sustainable economic growth remains a central objective of macroeconomic policy, particularly in developing economies where domestic savings are insufficient to finance the level of investment required for structural transformation. In such economies, public borrowing serves as an important mechanism for bridging the savings-investment gap and supporting development expenditure. The dual-gap framework suggests that when domestic savings and foreign exchange earnings are

inadequate, external borrowing can supplement capital needs and stimulate growth (Chenery & Strout, 1966). However, when borrowing expands beyond productive absorptive capacity, rising debt obligations may constrain fiscal sustainability and weaken economic performance. This concern has become increasingly pronounced in Sub-Saharan Africa, where public debt accumulation has accelerated in recent years amid rising debt servicing pressures and fiscal vulnerabilities (IMF, 2023).

Nigeria presents a particularly important case in this regard. Following the Paris Club debt relief in 2005, the country experienced a temporary decline in debt obligations and moderate macroeconomic stability. However, from 2015 onward, public debt rose sharply as a result of declining oil revenues, widening fiscal deficits, exchange rate pressures, and increasing infrastructure financing needs (DMO, 2024; AfDB, 2023). Despite this renewed borrowing, economic growth has remained fragile, with recessions recorded in 2016 and 2020 and only modest post-recession recovery. This trend raises important questions about whether debt accumulation has translated into productive growth outcomes or whether increasing repayment obligations are undermining macroeconomic performance.

Theoretically, the relationship between debt and growth remains ambiguous. Endogenous growth theory argues that borrowed resources can promote long-term growth when channelled into productive investment, infrastructure, and human capital formation. In contrast, the debt overhang hypothesis suggests that excessive debt discourages investment and reduces growth because anticipated repayment burdens create uncertainty and crowd out productive expenditure (Krugman, 1988). The empirical evidence for Nigeria reflects this ambiguity. While some studies find that external debt can support growth under prudent management, others report that debt servicing obligations significantly constrain growth by reducing fiscal space (Adamu & Lawal, 2022; Adebayo, 2021). More recently, scholars have emphasized that the growth effects of debt depend on transmission mechanisms such as investment efficiency and institutional quality, as weak institutions may hinder the productive utilization of borrowed funds (Kaufmann et al., 2023; Eze & Bello, 2024).

Despite these insights, important empirical and methodological gaps remain in the Nigerian literature. First, most existing studies focus on the direct impact of external debt on growth while paying limited attention to the role of investment as the channel through which debt influences economic performance. Second, although some recent studies employ the ARDL methodology, they generally omit the moderating role of institutional quality in the debt-growth nexus, thereby ignoring how governance conditions shape the effectiveness of debt-financed expenditure. Third, existing evidence rarely integrates debt stock, debt servicing, investment, and institutional quality within a unified dynamic framework capable of capturing both short-run adjustments and long-run equilibrium effects. These limitations reduce the ability of prior studies to explain why rising public debt has not consistently translated into sustained growth in Nigeria.

This study addresses these gaps by examining the relationship between debt burden and economic growth in Nigeria using an ARDL framework that incorporates investment as a transmission mechanism and institutional quality as a moderating factor through an interaction term between external debt stock and institutional quality. This specification enables the study to evaluate not only whether debt affects growth, but also how the effect operates through investment and under what institutional conditions borrowing contributes to economic expansion. The analysis covers the period 1996-2023, chosen deliberately because the World Governance Indicators, from which institutional quality measures are obtained, begin in 1996, thereby providing a consistent basis for incorporating governance dynamics into the model. Based on this framework, the study tests the propositions that external debt and debt servicing significantly affect economic growth, that investment enhances growth performance, and that institutional quality moderates the debt-growth relationship.

Accordingly, this paper contributes to the literature in four important ways. First, it extends

the Nigerian debt-growth literature by integrating investment and institutional quality into the analysis of debt burden and economic growth. Second, it introduces an interaction effect between external debt and institutional quality within the ARDL framework, offering a more nuanced assessment of whether governance conditions influence the productivity of debt. Third, it provides updated empirical evidence using 1996-2023 data, capturing recent debt accumulation trends and macroeconomic shocks in Nigeria. Fourth, by estimating both short-run and long-run effects simultaneously, the study generates policy-relevant insights on how prudent debt management, institutional reforms, and efficient investment allocation can jointly support sustainable growth. The remainder of the study is structured as follows. Section Two reviews the relevant theoretical and empirical literature. Section Three presents the data and methodology. Section Four discusses the empirical findings, while Section Five concludes with policy recommendations.

2. LITERATURE REVIEW

2.1 Theoretical Review

The nexus between public debt and economic growth is grounded in diverse theoretical traditions, each offering distinct transmission channels through which external debt stock (EDS), debt servicing (DSP), investment (INV), and institutional quality (IQ) influence economic performance. These frameworks provide the conceptual basis for specifying the empirical model and interpreting the dynamic relationships tested in this study.

2.1.1 Debt Overhang Theory

The Debt Overhang Theory, advanced by Paul Krugman (1988), posits that when a country's debt exceeds its repayment capacity, expectations of future taxation and macroeconomic instability discourage private investment and slow economic growth. Extensions by Jeffrey Sachs (1989) and Daniel Cohen (1993) emphasize that high debt burdens create a disincentive for both domestic and foreign investors, leading to a persistent low-investment equilibrium. This theory is particularly relevant for Nigeria, where rising debt servicing obligations may crowd out productive public expenditure and constrain growth.

2.1.2 Endogenous Growth Theory

Endogenous growth models, pioneered by Paul Romer (1986), Robert Lucas (1988), and Philippe Aghion and Peter Howitt (1992), argue that long-run growth is driven by internal factors such as capital accumulation, innovation, and human capital development. Within this framework, external borrowing can promote growth when channelled into productive investment. However, inefficiencies in resource allocation or weak institutions may weaken this transmission mechanism, implying that the growth impact of debt is conditional rather than automatic.

2.1.3 Keynesian Theory of Public Debt

Rooted in John Maynard Keynes (1936), the Keynesian perspective highlights the short-run expansionary effects of deficit-financed spending. Government borrowing can stimulate aggregate demand, particularly during economic downturns. Subsequent contributions by Franco Modigliani (1961) and N. Gregory Mankiw (1999) emphasize the macroeconomic trade-offs associated with public debt. While debt may boost short-run output, its long-run impact depends on sustainability and the productivity of expenditure.

2.1.4 Dual-Gap Theory

The Dual-Gap Theory, developed by Hollis Chenery and Alan Strout (1966), explains external borrowing as a mechanism for bridging savings and foreign exchange constraints in developing economies. By supplementing domestic resources, foreign capital supports investment and growth. However, the theory assumes efficient utilization of funds and sound macroeconomic management; conditions that may not hold in weak institutional environments.

2.1.5 Institutional Theory

Institutional theory underscores the role of governance structures in shaping economic outcomes. Douglass North (1990) and Daron Acemoglu et al. (2005) argue that strong institutions enhance resource allocation efficiency and support sustained growth. Empirical contributions by Daniel Kaufmann et al. (2010) and Dani Rodrik et al. (2004) further demonstrate that institutional quality conditions the effectiveness of public policy, including debt-financed investment.

2.2 Empirical Review

Empirical evidence on the debt-growth nexus remains deeply contested, with divergent findings driven not only by country-specific conditions but, more importantly, by differences in model specification, data structure, estimation techniques, and variable selection. To move beyond descriptive reporting, this section critically evaluates the literature across four thematic strands, highlighting why results differ and how these methodological choices shape conclusions.

2.2.1 Debt and Economic Growth

The cross-country literature provides an important starting point but also illustrates how sensitive results are to methodology. For example, Carmen Reinhart and Kenneth Rogoff (2010) report that high public debt is associated with lower growth, suggesting the existence of a debt threshold. However, Thomas Herndon et al. (2014) demonstrate that this conclusion is highly sensitive to data exclusion, weighting schemes, and coding errors, thereby questioning the robustness of universal debt thresholds. Similarly, Catherine Pattillo et al. (2002, 2004) introduce non-linearity, showing that debt may initially promote growth but becomes harmful beyond a certain level; an insight largely absent in many Nigeria-specific studies. Within Nigeria, the divergence in findings can be traced to data frequency and model specification. For instance, Ogonegbu E. A. and Kagwaini D. M. (2025) report positive short-run effects of external debt using quarterly ARDL data. However, such high-frequency data may capture temporary fiscal stimulus effects rather than structural growth dynamics, potentially overstating short-run benefits. In contrast, studies using annual data such as Yusuf A. and Mohd S. (2021), tend to find weaker or insignificant short-run effects, reflecting the lagged nature of investment returns. Moreover, both studies largely rely on reduced-form specifications, omitting key transmission channels and institutional interactions, which limits their ability to explain why debt does not consistently translate into growth. These inconsistencies suggest that differences in time aggregation, omitted variables, and model structure are central to the conflicting evidence.

2.2.2 Debt Servicing and Fiscal Constraints

Unlike the broader debt-growth relationship, there is relatively stronger consensus regarding the adverse effects of debt servicing; however, even here, methodological limitations persist. Adamu I. and Lawal A. (2022) find that debt servicing significantly reduces economic growth in Nigeria. While informative, their analysis relies on static or single-equation models, which do not capture feedback loops between growth, revenue generation, and debt accumulation. This raises concerns about potential endogeneity bias, as slower growth may itself increase debt servicing burdens. Similarly, Khan M. and Tariq R. (2020) identify strong crowding-out effects in Pakistan, but their framework does not explicitly model long-run equilibrium relationships. In contrast, ARDL-based studies that incorporate an error correction mechanism tend to show that while debt servicing constrains growth in both the short and long run, the speed of adjustment to equilibrium is equally important. Thus, differences in findings across studies can often be attributed to whether the model accounts for dynamic adjustment processes, rather than purely contemporaneous effects.

2.2.3 Investment as a Transmission Mechanism

The role of investment as a transmission channel has gained increasing attention, yet empirical

treatment remains fragmented. Duyile I. E. et al. (2024) find that external debt promotes investment in the long run but does not significantly enhance growth, suggesting inefficiencies in capital allocation. However, their approach estimates separate relationships rather than embedding investment within a unified system, making it difficult to establish causality within the debt-growth nexus. Similarly, Ogunjimi J. (2019) reports mixed effects of debt on investment, but the analysis does not distinguish between short-run and long-run dynamics, nor does it account for institutional factors. Cross-country evidence, such as Lau S. Y. et al. (2019), highlights asymmetric and non-linear effects using NARDL, further suggesting that linear specifications may obscure important dynamics. The inconsistency in findings across studies therefore reflects differences in whether investment is treated as an endogenous transmission variable or as an isolated outcome, as well as whether dynamic interactions are properly modelled.

2.2.4 Institutional Quality and Methodological Approaches

The growing emphasis on institutional quality reflects a shift toward understanding the conditional nature of the debt-growth relationship, yet empirical implementation remains limited. Van Bon N. (2022) demonstrates that strong institutions enhance investment outcomes, but even in this case, the interaction between debt and institutional quality is not explicitly modelled. Similarly, Olamide F. O. and Maredza A. (2023) incorporate corruption as a proxy for governance, finding negative growth effects, but their framework does not test moderation effects. In Nigeria-focused studies, institutional variables are often included as additive regressors rather than interactive terms, which implicitly assumes that governance affects growth independently of debt. This is a restrictive assumption, as it ignores the possibility that the effectiveness of borrowing depends on institutional conditions. Furthermore, methodological choices such as the preference for ARDL due to mixed integration orders, often prioritize estimation convenience over structural interpretation, leading to models that capture correlation rather than conditional causality.

Overall, the divergence in empirical findings across studies is not merely a reflection of economic reality but is largely driven by methodological heterogeneity; including differences in data frequency (quarterly vs annual), model specification (static vs dynamic), variable inclusion (omitted transmission and moderation variables), and estimation techniques (linear vs non-linear frameworks). These limitations collectively explain why some studies report short-run positive effects of debt while others find insignificant or negative outcomes. Consequently, a more robust understanding of the debt-growth nexus requires an integrated modelling approach that simultaneously captures transmission mechanisms, conditional effects, and dynamic adjustments; an approach adopted in the present study.

2.2.5 Identified Gaps

Despite extensive empirical work, key gaps remain in the Nigerian debt-growth literature. First, existing studies (e.g., Adebayo, 2021; Yusuf & Mohd, 2021) largely focus on direct debt-growth relationships, neglecting transmission channels; this study addresses this by incorporating investment (INV) within an ARDL framework. Second, moderation effects are rarely examined, with institutional quality typically treated as an additive factor (e.g., Olamide & Maredza, 2023; Van Bon, 2022); thus, an interaction term (EDS×IQ) is introduced to capture its conditional role. Third, prior analyses are fragmented, treating debt, investment, and institutions separately (e.g., Ogunjimi, 2019; Duyile et al., 2024); this study integrates them within a unified dynamic ARDL model. Fourth, many studies (e.g., Yusuf & Mohd, 2021) rely on limited or outdated datasets ; this study uses updated data (1996–2023) to reflect recent debt dynamics. Finally, limited attention is given to non-linear and conditional effects (e.g., Reinhart & Rogoff, 2010; Pattillo et al., 2002, 2004); this study accounts for these

through interaction modelling and dynamic specification.

3. METHODOLOGY

3.1 Theoretical Framework

This study is anchored in the endogenous growth theory, which posits that long-run economic growth is driven by internal factors such as capital accumulation, investment efficiency, and institutional quality (Romer, 1986; Lucas, 1988). Unlike the neoclassical paradigm where technological progress is exogenous, the endogenous framework treats total factor productivity (TFP) as a function of policy and governance. The augmented production function is expressed as:

$$Y_t = A_t F\,(K_t, L_t) \text{ ……………………… (3.1)}$$

where Yt denotes real output, Kt represents physical capital, Lt is labour, and At captures TFP. Institutional quality enhances productivity such that:

$$A_t = f(IQ_t) \text{ …………………………… (3.2)}$$

To incorporate debt dynamics, the production structure is extended to include external debt stock (EDSt) and debt servicing (DSPt):

$$Y_t = f(IQ_t F(K_t, L_t, EDS_t, DSP_t) \text{ ………(3.3)}$$

Capital accumulation follows:

$$\Delta K_t = I_t - \delta K_{t-1} \text{ ………………………(3.4)}$$

where I_t is gross investment and δ is the depreciation rate. External borrowing relaxes domestic savings constraints and finances investment:

$$I_t = sY_t + \theta EDS_t - \emptyset DSP_t \text{ ………………………………….. (3.5)}$$

with ϕ>0 capturing the crowding-out effect of debt servicing, consistent with the debt overhang hypothesis. Given data limitations, labour is subsumed into the stochastic component, while macroeconomic controls: inflation (INF_t) and trade openness (TOP_t) are incorporated. To capture the conditional role of governance, an interaction term $(EDS\times IQ)_t$ is introduced, allowing the growth impact of external debt to vary with institutional quality. The framework therefore highlights two transmission channels: the investment channel and the institutional channel.

3.2 Model Specification

Flowing from the theoretical framework, economic growth is modelled as a function of debt dynamics, investment, institutional quality, and macroeconomic controls:

$$GDP_t = \beta_0 + \beta_1 EDS_t + \beta_2 DSP_t + \beta_3 INV_t + \beta_4 IQ_t + \beta_5\, INF_t + \beta_6\, TOP_t + \beta_7\,(EDS * IQ)_t + \varepsilon_t \text{ ……………………………………………………………..(3.6)}$$

Where GDP_t is Real GDP growth rate (proxy for economic growth); EDS_t is External debt stock (% of GDP); EDP_t is External debt service (% of GNI); INVt represents Gross domestic investment (% of GDP); IQ_t denotes Institutional quality index (composite of governance indicators); INF_t is the Inflation rate; TOP_t measures trade openness (exports + imports as % of GDP); $(EDS*IQ)_t$ is the Interaction term between debt stock and institutional quality; and ε_t is a white-noise error term. A priori expectations are:

$EDS\ (\pm), DSP\ (-), INV\ (+), IQ\ (+), INF\ (-), TOP\ (\pm), (EDS\ \times IQ)\ (\pm).$

3.3 ARDL Model Specification

To capture dynamic relationships, the study employs the Autoregressive Distributed Lag (ARDL) model of order (p,q1,…,q7):

$$GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i GDP_{t-i} + \sum_{j=0}^{q1} \beta_j EDS_{t-j} + \sum_{k=0}^{q2} \theta_k DSP_{t-k} + \sum_{l=0}^{q3} \gamma_l INV_{t-l} + \sum_{m=0}^{q4} \delta_m IQ_{t-m} + \sum_{n=0}^{q5} \phi_n INF_{t-n} + \sum_{o-0}^{q6} \psi_0 TOP_{t-o} + \sum_{r=0}^{q7} \omega_r (EDS * IQ)_{t-r} + \varepsilon_t \quad \text{.....(3.7)}$$

The ARDL model accommodates variables integrated of order I(0) and I(1) and is efficient in small samples.

3.4 Error Correction Representation and Cointegration

The ARDL model is re-parameterized into an Error Correction Model (ECM) to distinguish between short-run dynamics and long-run equilibrium:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{P-1} \alpha_i^* \Delta GDP_{t-i} + \sum_{j=0}^{q1_{-1}} \beta_j^* \Delta EDS_{t-j} + \sum_{k=0}^{q^2-1} \theta_k^* \Delta DSP_{t-k} + \sum_{l=0}^{q^3-1} \gamma_l^* \Delta INV_{t-l} + \sum_{m=0}^{q^4-1} \delta_m^* \Delta IQ_{t-m} + \sum_{n=0}^{q^5-1} \phi_n^* \Delta INF_{t-n} + \sum_{o=0}^{q^6-1} \psi_o^* \Delta TOP_{t-o} + \sum_{r=0}^{q^7-1} \omega_r^* \Delta (EDS * IQ)_{t-r} + \lambda EC_{t-1} + \mu_t \quad \text{.....(3.8)}$$

The error correction term is defined as:

$$EC_{t-1} = GDP_{t-1} - (\beta_0 + \beta_1 EDS_{t-1} + \beta_2 DSP_{t-1} + \beta_3 INV_{t-1} + \beta_4 IQ_{t-1} + \beta_5 INF_{t-1} + \beta_6 TOP_{t-1} + \beta_7 (EDS * IQ)_{t-1}) \quad \text{.....(3.9)}$$

A negative and significant λ confirms cointegration and measures the speed of adjustment toward long-run equilibrium. Cointegration is formally tested using the Pesaran, Shin, and Smith (2001) bounds testing approach.

3.5 Data Sources

The study utilizes annual time-series data for Nigeria spanning 1996-2023. Data on external debt stock, debt servicing, inflation, trade openness, and investment are sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Bank's World Development Indicators (WDI). Institutional quality is constructed as a composite index derived from the Worldwide Governance Indicators (WGI). These sources ensure data reliability, consistency, and international comparability.

Construction of Institutional Quality Index

Institutional quality (IQ) is constructed as a composite index from the six dimensions of the

World Governance Indicators (WGI): voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Each dimension is measured using percentile rank scores (0–100), adjusted by the World Bank to ensure temporal consistency and cross-country comparability. The index is computed as a simple average:

$$IQ_t = \frac{1}{6}\sum_{i=1}^{6} WGI_{it} \quad (3.10)$$

where WGIitWGI_{it}WGIit denotes the percentile rank of the ithi^{th}ith governance dimension at time ttt. This approach ensures transparency, avoids subjective weighting (e.g., PCA), treats all dimensions equally, and enhances comparability across indicators.

3.7 Estimation Technique

The Autoregressive Distributed Lag (ARDL) bounds testing approach is adopted due to its suitability for variables with mixed orders of integration I(0) and I(1), robustness in small samples, and ability to simultaneously estimate short-run and long-run dynamics. Optimal lag lengths are selected using the Akaike Information Criterion (AIC), given its superior performance in small samples. The maximum lag length is restricted to between 2 and 4 to avoid over-parameterisation, while alternative lag structures are systematically evaluated to ensure model stability and consistency.

Long-run coefficients are derived from the cointegrating equation, while short-run dynamics are obtained from the Error Correction Model (ECM) representation. This framework mitigates potential endogeneity through appropriate lag structures and ensures efficient estimation.

Degrees-of-Freedom Consideration and Model Parsimony

Given the small sample size (T = 28), degrees of freedom are carefully managed to avoid overfitting. In the ARDL framework, effective observations are reduced by lag selection, such that:

$$DF = T - k \quad (3.11)$$

where T is the sample size and k the number of estimated parameters. To mitigate parameter proliferation, the study restricts lag length to 2–4, applies the Akaike Information Criterion (AIC) for optimal lag selection, and retains only statistically and economically meaningful specifications. These measures ensure model parsimony, adequate degrees of freedom, and reliable inference in line with small-sample econometric best practices.

3.7 Diagnostic and Stability Tests

To ensure the robustness and reliability of the estimated model, several post-estimation diagnostic tests are conducted. Serial correlation is examined using the Breusch-Godfrey LM test, while heteroskedasticity is assessed through the Breusch-Pagan-Godfrey test. The Jarque-Bera test evaluates the normality of residuals, and the Ramsey RESET test checks for functional form misspecification. Parameter stability is further investigated using the CUSUM and CUSUM of Squares (CUSUMSQ) tests, which verify the constancy of coefficients over the sample period.

3.8 Methodological Contribution

This study contributes to the empirical literature in several ways. First, it embeds external debt dynamics within an endogenous growth framework, providing a strong theoretical foundation for analyzing the debt-growth nexus. Second, it captures dual transmission channels: investment and institutional quality, through which debt influences economic performance. Third, the inclusion of an interaction term (EDS × IQ) allows for the assessment of the conditional effectiveness of external debt, thereby enriching policy insights. Finally, the application of a robust ARDL-ECM framework enables a comprehensive analysis of both short-run adjustments and long-run equilibrium

relationships, offering a nuanced understanding of the complex and dynamic relationship between debt burden and economic growth in Nigeria.

4. RESULTS AND DISCUSSION

4.1 Preliminary Analysis and Stationarity Properties

Prior to estimation, the study examines the correlation structure among the variables. The results indicate generally moderate pairwise correlations; however, a notably high correlation exists between external debt stock (EDS) and the interaction term (EDS×IQ) (r = 0.979). This is expected, given the constructed nature of interaction terms, and does not by itself indicate harmful multicollinearity. Aside from this mechanically induced relationship, all other correlations remain below the conventional threshold of 0.80, suggesting no serious multicollinearity concerns.

Table 4.1: Stationarity tests results for study variables

	ADF Test			PP Test		
Variables	Level	1st Diff.	Remark	Level	1st Diff.	Remark
GDP	-2.794*	-7.229***	1(0)	-2.811*	-7.370***	1(0)
EDS	-1.480^{n}	-3.679**	1(1)	-1.434^{n}	-3.679**	1(1)
DSP	-2.328^{n}	-6.096***	1(1)	-2.320^{n}	-6.752***	1(1)
INV	-1.537^{n}	-3.111**	1(1)	-1.595^{n}	-3.0456**	1(1)
IQ	-1.481^{n}	-6.636***	1(1)	-2.282^{n}	-6.644***	1(1)
EDS*IQ	-1.272^{n}	-3.425**	1(1)	-1.272^{n}	-3.437**	1(1)
INF	-4.597***	-7.375***	1(0)	-4.621***	-9.659***	1(0)
TOP	-2.890*	-5.332***	1(0)	-2.864*	-5.332***	1(0)

Source: Authors' compulation from E-views 9

Notes: ***, ** and * correspond to 1%, 5% and 10% significance level, respectively, while "n" denotes Not Significant.

The time-series properties of the variables are assessed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, with results presented in Table 4.1. The findings reveal a mixed order of integration. Specifically, real GDP (GDP), inflation (INF), and trade openness (TOP) are stationary at levels, implying integration of order zero, I(0), while external debt stock (EDS), debt servicing (DSP), investment (INV), institutional quality (IQ), and the interaction term (EDS×IQ) become stationary after first differencing, indicating integration of order one, I(1).

The consistency between ADF and PP results strengthens the robustness of these findings, and importantly, no variable is integrated of order two, I(2), thereby satisfying the key requirement for the application of the ARDL bounds testing approach.

Although both EDS and IQ are individually integrated of order one, the integration properties of their interaction term (EDS×IQ) are not theoretically predetermined. Accordingly, the

interaction term is empirically tested and found to be I(1), justifying its inclusion within the ARDL framework without violating underlying assumptions. Overall, the combination of a well-behaved correlation structure and mixed integration order provides strong econometric justification for the use of the ARDL approach in this study.

4.2 ARDL Bounds Test for Cointegration

The existence of a long-run equilibrium relationship among the variables was examined using the ARDL bounds testing approach. As reported in Table 4.2, the computed F-statistic (5.767) exceeds the upper critical bound at the 1% significance level. This leads to a rejection of the null hypothesis of no cointegration.

Table 4.2: ARDL Bounds Test for Cointegration (PSS, 2001)

	Model	F-Statistics	K	Critical Values			Decision
GDP = f(EDS, DSP, INV, IQ, INF, TOP, (EDS*IQ))				%	Lower Bound1(0)	Upper Bound1(1)	Reject H0 and accept H1. Co-integration exists
		5.77	7	1.0%	2.96	4.26	
				2.5%	2.60	3.84	
				5.0%	2.32	3.50	
				10.0%	2.00	3.13	

Source: Authors' compulation from E-views 9

This result provides strong empirical evidence that economic growth, external debt, debt servicing, investment, institutional quality, and macroeconomic controls are jointly determined in the long run. In other words, deviations from equilibrium are temporary and corrected over time, validating the theoretical proposition of a stable long-run relationship within the endogenous growth framework.

4.3 Long-Run Estimates and Structural Relationships

The long-run estimates from the ARDL model reported in Table 4.3 reveal important structural dynamics underlying economic growth in Nigeria. External debt stock (EDS) exhibits a negative but statistically insignificant effect (coefficient = −0.2799; p = 0.6174), suggesting that the volume of borrowing alone does not drive long-run growth outcomes. This finding aligns with Yusuf and Mohd (2021) and Olamide and Maredza (2023), who report weak or adverse long-run effects of external debt, but contrasts with Ogonegbu and Kagwaini (2025) and Seyram et al. (2019), who find growth-enhancing effects under efficient debt management.

Table 4.3: ARDL long-run estimated results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDS	-0.2799	0.5386	-0.5197	0.6174
DSP	-0.4695	0.1773	-2.6475	0.0294

INV	0.2572	0.0978	2.6305	0.0302
IQ	-0.4532	0.8951	-0.5063	0.6263
INF	0.1543	0.1714	0.9001	0.3944
TOP	0.0281	0.0718	0.3918	0.7055

Source: Authors' compulation from E-views 9

Debt servicing (DSP) is negative and statistically significant (coefficient = −0.4695; p = 0.0294), providing strong support for the debt overhang hypothesis. This implies that rising repayment obligations constrain fiscal space and crowd out productive investment. The result is consistent with Duyile, Esther, and Oladeji (2024), Khan and Tariq (2020), and Yusuf and Mohd (2021), all of whom document the adverse growth implications of debt servicing.

Gross domestic investment (INV) emerges as a positive and significant determinant of growth (coefficient = 0.2572; p = 0.0302), confirming the central role of capital accumulation within the endogenous growth framework. This supports the findings of Olamide and Maredza (2023) and Van Bon (2022), although the moderate magnitude suggests that inefficiencies in investment allocation may dampen its full impact.

A striking result is the negative but insignificant coefficient of institutional quality (IQ) (−0.4532; p = 0.6263), which contradicts theoretical expectations. This counterintuitive sign may reflect several underlying factors. First, improvements in formal governance structures may constrain previously growth-supporting informal or rent-driven economic activities, leading to transitional growth slowdowns. Second, measurement limitations associated with the Worldwide Governance Indicators (WGI), particularly perception-based percentile rankings may not fully capture effective institutional performance in Nigeria. Third, the high correlation between EDS and the interaction term (EDS×IQ) suggests potential multicollinearity effects, which may distort coefficient signs without necessarily affecting overall model validity. This result contrasts with Van Bon (2022), who finds a positive governance effect, but is consistent with Agbo and Nwadialor (2020), who emphasize persistent institutional inefficiencies in Nigeria.

Inflation (INF) exhibits a positive but statistically insignificant coefficient (0.1543; p = 0.3944), contrary to the a priori expectation of a negative relationship. This sign reversal may reflect moderate inflation levels that are growth-accommodating rather than harmful, particularly in developing economies where inflation can coexist with expansionary macroeconomic conditions. It may also capture demand-driven growth episodes or monetary expansion associated with fiscal financing. While this finding deviates from conventional theory, it aligns with strands of empirical literature that document non-linear or threshold effects of inflation on growth.

Trade openness (TOP) is positive but insignificant (coefficient = 0.0281; p = 0.7055), suggesting that external integration does not exert a strong independent influence on long-run growth, possibly due to Nigeria's structural import dependence. Similarly, the interaction term (EDS×IQ) remains statistically insignificant, indicating that institutional quality does not significantly moderate the long-run impact of external debt.

Overall, the long-run results highlight a clear structural pattern: while investment drives sustainable growth, debt servicing constrains it, and the effectiveness of external debt is limited by institutional and structural inefficiencies. These findings reinforce the mixed evidence in the empirical literature and provide nuanced

insights into the complex debt–growth relationship in Nigeria.

4.4 Short-Run Dynamics and Error Correction Mechanism

The short-run dynamics are estimated using the error correction representation of the selected ARDL model, with results presented in Table 4.4. The findings reveal that contemporaneous changes in external debt stock (ΔEDS) exert a negative but statistically insignificant effect on economic growth (coefficient = −0.5318; p = 0.4479), indicating that external borrowing does not translate into immediate output gains. This outcome supports the findings of Duyile, Esther, and Oladeji (2024), who reported the absence of significant short-run effects of external debt on economic development in Nigeria. However, it contrasts with the evidence of Yusuf and Mohd (2021) and Olamide and Maredza (2023), who documented short-run growth-enhancing effects of external debt, suggesting that such benefits may be context-specific and dependent on efficient resource utilization.

Table 4.4: Short-run estimated ARDL results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EDS)	-0.5318	0.6664	-0.7980	0.4479
D(DSP)	-0.453	0.1949	-2.3255	0.0485
D(DSP(-1))	-0.1495	0.1397	-1.0701	0.3158
D(INV)	0.1121	0.1734	0.6467	0.5359
D(INV(-1))	-0.2218	0.1823	-1.2162	0.2586
D(IQ)	-0.5189	1.0058	-0.5159	0.6199
D(INF)	-0.1233	0.1469	-0.8392	0.4257
D(INF)(-1))	0.1871	0.1553	1.2045	0.2628
D(TOP)	-0.1000	0.0651	-1.5348	0.1634
D(TOP(-1))	-0.1842	0.0702	-2.6249	0.0304
D(EDS_IQ)	0.0273	0.0404	0.6756	0.5183
CointEq(-1)	-1.1449	0.2165	-5.2877	0.0007

Source: Authors' compulation from E-views 9

In contrast, debt servicing (ΔDSP) exerts a negative and statistically significant impact on growth (coefficient = −0.4532; p = 0.0485), confirming the presence of short-run fiscal constraints arising from repayment obligations. This finding strongly aligns with the debt overhang hypothesis and is consistent with Yusuf and Mohd (2021), as well as Khan and Tariq (2020), both of whom reported significant crowding-out effects of debt servicing on investment and growth. Similarly, Seyram et al. (2019) highlight that debt servicing pressures often negate the growth-enhancing benefits of external borrowing.

Other explanatory variables, including investment (ΔINV), institutional quality (ΔIQ), inflation (ΔINF), and the interaction term (ΔEDS×IQ) are statistically insignificant in the short run. The insignificance of investment contradicts the findings of Olamide and Maredza

(2023), who identified investment as a key driver of growth, but supports the argument that investment effects are typically realized with lags. Likewise, the insignificance of institutional quality in the short run is consistent with Van Bon (2022), who posits that governance improvements exert stronger long-term rather than immediate effects. The interaction term remains insignificant, suggesting that institutional quality does not significantly moderate the debt-growth relationship in the short run; an outcome that contrasts with studies emphasizing strong governance effects but aligns with those highlighting their long-run relevance.

Among the control variables, inflation remains statistically insignificant, while trade openness (ΔTOP) exhibits a negative and significant lagged effect (coefficient = −0.1842; p = 0.0304), reflecting Nigeria's vulnerability to external shocks and import dependence. This finding is broadly consistent with the mixed evidence in the empirical literature regarding the growth effects of openness in developing economies.

A central result is the error correction term (ECT_{t-1}), which is negative and highly significant (−1.1449; p = 0.0007), confirming the existence of a stable long-run cointegrating relationship among the variables. The magnitude, exceeding unity in absolute value implies an overshooting adjustment mechanism, where approximately 114% of short-run disequilibrium is corrected within one period. While this may initially suggest instability, a deeper interpretation indicates otherwise.

First, the relatively small sample size (T = 28) reduces degrees of freedom and can inflate adjustment coefficients in ARDL-ECM estimations. Second, the inclusion of multiple regressors and lag structures introduces the possibility of mild over-parameterisation, which may affect dynamic responses. Third, and more importantly, the Nigerian macroeconomic environment is characterized by episodic structural shifts including debt relief initiatives, fiscal consolidation, and subsequent debt accumulation cycles, which generate rapid but non-linear adjustment dynamics. In this context, the observed overshooting reflects an aggressive correction process rather than true instability.

Overall, the short-run results reinforce the dominance of debt servicing as an immediate constraint on economic performance, consistent with a large body of empirical evidence. At the same time, the insignificant short-run effects of external debt, investment, and institutional quality suggest that their growth impacts are primarily transmitted through long-run channels. This pattern broadly corroborates the mixed empirical findings documented in Section 2.3, while also contributing new evidence on the conditional and dynamic nature of the debt-growth relationship in Nigeria.

4.5 Diagnostic and Stability Tests

Post-estimation diagnostic tests confirm the adequacy and robustness of the ARDL model. The Jarque-Bera statistic indicates that the residuals are normally distributed (p = 0.8475), while the Breusch-Godfrey LM test shows no evidence of serial correlation (p = 0.1025). Similarly, the Breusch-Pagan-Godfrey test confirms homoskedastic residuals (p = 0.9306), and the Ramsey RESET test suggests correct functional specification with no omitted variable bias (p = 0.3526). Collectively, these results indicate that the model satisfies key classical assumptions and supports reliable statistical inference.

Table 4.5: Short-run diagnostics tests results

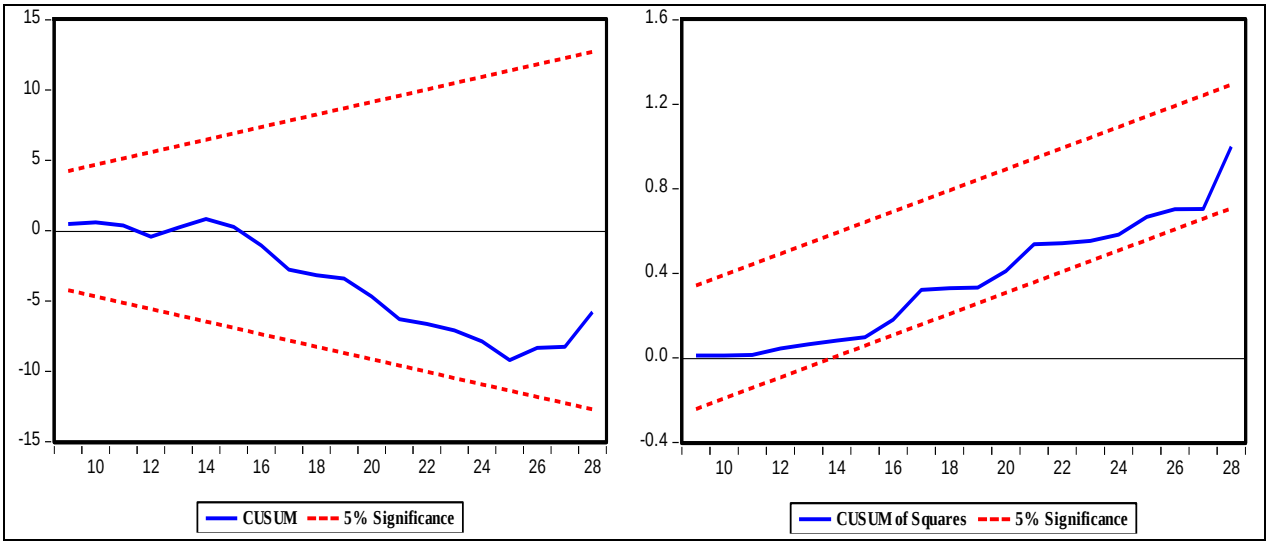
Test	Null Hypothesis	F-Statistic	Prob. Value
Jarque-Bera	There is Normal Distribution	0.3309	0.8475
Breusch Godfrey	No Serial AutoCorrelation	3.4108	0.1025

Breusch-Pagan-Godfrey	No Heteroscedasticity	0.4321	0.9306
Ramsey RESET	No misspecification	1.2464	0.3526

Source: Authors' compulation from E-views 9

Parameter stability is further validated using the CUSUM and CUSUM of Squares (CUSUMSQ) tests. As presented in Figure 4.1, both plots remain within the 5% critical bounds over the entire sample period, confirming the stability of the estimated coefficients and absence of structural instability.

Figure 4.1: CUSUM and CUSUMSQ Stability Tests (5% Significance Bounds)



Source: Authors' compulation from E-views 9

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Conclusion

This study examined the dynamic relationship between debt burden and economic growth in Nigeria within an endogenous growth framework using the ARDL approach, and the results confirm the existence of a stable long-run cointegrating relationship among the variables. Empirically, debt servicing emerges as the most binding constraint to growth in both the short and long run, thereby validating the debt overhang hypothesis, while external debt stock, though negative, remains statistically insignificant, implying that borrowing alone does not guarantee growth without efficient utilization. Gross domestic investment significantly drives long-run growth, whereas its weak short-run effect reflects implementation and transmission lags. Notably, institutional quality exhibits a negative and insignificant long-run coefficient, suggesting that governance improvements in isolation may not translate into higher growth, possibly due to structural rigidities, measurement limitations, or transitional adjustments that constrain informal economic activity. Inflation and trade openness are likewise insignificant, indicating limited

independent long-run influence on growth. Overall, the findings underscore that Nigeria's growth trajectory is shaped less by the scale of borrowing and more by the efficiency of debt utilization, the burden of servicing obligations, and prevailing structural conditions within the economy.

5.2 Policy Implications and Recommendations

(i) Reduce Debt Servicing Pressures
Given its strong negative impact, priority should be placed on debt sustainability through restructuring, concessional borrowing, and improved debt management to expand fiscal space.

(ii) Enhance Investment Efficiency
Strengthening project selection, monitoring, and execution is essential to ensure that both domestic and debt-financed investments yield tangible growth outcomes.

(iii) Reframe Institutional Reforms within Structural Transformation
The negative coefficient on institutional quality suggests that governance reforms alone are insufficient. Institutional strengthening must be complemented by structural transformation; particularly industrialization, formal sector expansion, and productivity-enhancing policies to translate governance improvements into growth.

(iv) Rebalance Fiscal Policy
Shifting expenditure from recurrent to capital investment, alongside improved domestic revenue mobilization, will reduce debt dependence and support sustainable growth.

(v) Promote Economic Diversification
Reducing import dependence and expanding non-oil exports will enhance resilience and improve the effectiveness of debt-financed development strategies.

5.3 Study Limitations

Despite its contributions, the study has notable limitations. First, the relatively small sample size (T = 28) constrains degrees of freedom and may affect parameter stability. Second, the analysis focuses exclusively on external debt, excluding domestic debt dynamics. Third, potential endogeneity, particularly between investment and growth, may not be fully eliminated despite the ARDL framework. Fourth, the institutional quality index, constructed from composite governance indicators, may be subject to measurement and perception biases. These limitations suggest caution in interpretation and provide avenues for future research.

5.4 Concluding Insight

The central insight of this study is that external debt is not inherently detrimental nor beneficial; its growth impact is conditional. While excessive debt servicing undermines growth, productive investment can enhance it. However, institutional reforms must be embedded within broader structural transformation to be effective. A coherent policy mix: anchored on sustainable debt management, efficient investment, and structural economic reform, is therefore essential for achieving sustained economic growth in Nigeria.

References

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of economic growth* (Vol. 1A, pp. 385–472). Elsevier. https://doi.org/10.1016/S1574-0684(05)01006-3

Adamu, I., & Lawal, A. (2022). Debt servicing and economic growth in Nigeria. *African Development Review, 34*(2), 215–229. https://doi.org/10.1111/1467-8268.12620

Adebayo, T. S. (2021). External debt and economic growth in Nigeria. *Journal of Economic Studies, 48*(3), 645–660. https://doi.org/10.1108/JES-11-2019-0516

African Development Bank. (2023). *African economic outlook 2023*. https://www.afdb.org

Agbo, J. U., & Nwadialor, J. E. (2020). External debt crisis in Nigeria: Lessons from

exchange rate mismanagement. *Journal of African Economic History, 48*(1), 88–106.

Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica, 60*(2), 323–351. https://doi.org/10.2307/2951599

Aghion, P., Howitt, P., & Brant-Collett, M. (2021). *Endogenous growth theory*. MIT Press.

Bacha, E. L. (1990). A three-gap model of foreign transfers and the GDP growth rate in developing countries. *Journal of Development Economics, 32*(2), 279–296. https://doi.org/10.1016/0304-3878(90)90039-E

Barro, R. J., & Sala-i-Martin, X. (2004). *Economic growth* (2nd ed.). MIT Press.

Chenery, H. B., & Strout, A. M. (1966). Foreign assistance and economic development. *American Economic Review, 56*(4), 679–733.

Cohen, D. (1993). Low investment and large LDC debt in the 1980s. *American Economic Review, 83*(3), 437–449.

Debt Management Office. (2024). *Nigeria public debt profile report*. https://www.dmo.gov.ng

Duyile, I. E., Esther, I. O., & Oladeji, O. E. (2024). Debt management and economic development of Nigeria: ARDL approach. *International Journal of Accounting Research, 9*(2), 41–47. https://doi.org/10.65453/ijar.v9i2.1225

Elmendorf, D. W., & Mankiw, N. G. (1999). Government debt. In J. B. Taylor & M. Woodford (Eds.), *Handbook of macroeconomics* (Vol. 1C, pp. 1615–1669). Elsevier.

Eze, C., & Bello, A. (2024). Institutional quality and economic performance in Nigeria. *Nigerian Journal of Economic Policy, 16*(1), 55–78.

Herndon, T., Ash, M., & Pollin, R. (2014). Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff. *Cambridge Journal of Economics, 38*(2), 257–279. https://doi.org/10.1093/cje/bet075

International Monetary Fund. (2023). *Global debt monitor 2023*. https://www.imf.org

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). The worldwide governance indicators: Methodology and analytical issues (World Bank Policy Research Working Paper No. 5430). World Bank. https://doi.org/10.1596/1813-9450-5430

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2023). *Worldwide governance indicators*. World Bank. https://info.worldbank.org/governance/wgi/

Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.

Khan, M., & Tariq, R. (2020). External debt, debt servicing, and public investment: Evidence from Pakistan. *Journal of Asian Economics, 67*, 101125. https://doi.org/10.1016/j.asieco.2020.101125

Krugman, P. (1988). Financing vs. forgiving a debt overhang. *Journal of Development Economics, 29*(3), 253–268. https://doi.org/10.1016/0304-3878(88)90044-2

Lau, S. Y., Tan, A. L., & Liew, C. Y. (2019). The asymmetric link between public debt and private investment in Malaysia. *Malaysian Journal of Economic Studies, 56*(2), 327–342.

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3–42. https://doi.org/10.1016/0304-3932(88)90168-7

Modigliani, F. (1961). Long-run implications of alternative fiscal policies and the burden of the national debt. *The Economic Journal, 71*(284), 730–755. https://doi.org/10.2307/2228249

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

Ogonegbu, E. A., & Kagwaini, D. M. (2025). The impact of external debt on economic performance in Nigeria: An ARDL approach. *International Academic Journal of Economics and Finance, 4*(4), 39–64.

Ogunjimi, J. (2019). The impact of public debt on investment in Nigeria. *DBN Journal of Economics and Sustainable Growth, 2*(1), 45–62.

Olamide, F. O., & Maredza, A. (2023). External debt, corruption, and economic growth in South Africa: A pre-COVID-19 ARDL assessment. *South African Journal of Economics, 91*(1), 55–77. https://doi.org/10.1111/saje.12309

Olawumi, O. (2023). Investment efficiency and economic growth in Nigeria. *African Journal of Economic Research, 11*(2), 120–139.

Pattillo, C., Poirson, H., & Ricci, L. (2002). External debt and growth. *IMF Working Paper No. 02/69*. International Monetary Fund.

Pattillo, C., Poirson, H., & Ricci, L. (2004). What are the channels through which external debt affects growth? *IMF Working Paper No. 04/15*. International Monetary Fund.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289–326. https://doi.org/10.1002/jae.616

Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a time of debt. *American Economic Review, 100*(2), 573–578. https://doi.org/10.1257/aer.100.2.573

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: The primacy of institutions over geography and integration in economic development. *Journal of Economic Growth, 9*(2), 131–165.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy, 94*(5), 1002–1037. https://doi.org/10.1086/261420

Sachs, J. D. (1989). The debt overhang of developing countries. In G. Calvo et al. (Eds.), *Debt, stabilization and development* (pp. 80–102). Basil Blackwell.

Seyram, A. M., Matuka, A., & Dominic, B. (2019). External debt and economic growth in Sub-Saharan Africa: Evidence from system GMM estimation. *Journal of Economics and Sustainable Development, 10*(5), 145–161.

Taylor, L. (1994). *Reconstructing macroeconomics: Structuralist proposals and critiques of the mainstream*. Harvard University Press.

Van Bon, N. (2022). Government debt, institutional quality, and private investment in advanced economies. *Economic Modelling, 107*, 105706. https://doi.org/10.1016/j.econmod.2021.105706

World Bank. (2024). *World Development Indicators*. Retrieved from https://databank.worldbank.org/source/world-development-indicators

Yusuf, A., & Mohd, S. (2021). The impact of government debt on economic growth in Nigeria. *Cogent Economics & Finance, 9*(1), 1946249. https://doi.org/10.1080/23322039.2021.1946249