

External Debt Servicing and Growth Dynamics in Sub-Saharan Africa: Evidence from a Panel ARDL Framework

By

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Abstract

Sub-Saharan Africa's (SSA) persistent debt–growth paradox remains a central concern in development economics. Although external borrowing has traditionally been viewed as a mechanism for supporting capital accumulation and structural transformation, rising debt-servicing obligations have renewed concerns about fiscal crowding-out and weakened growth performance. This study empirically examines how debt servicing mediates the relationship between external borrowing and economic growth in SSA over the period 1996–2024, addressing a gap in the literature that has largely emphasised debt stock rather than flow burdens. Using a balanced panel of 39 SSA countries, the analysis employs the Cross-Sectional Autoregressive Distributed Lag (CS-ARDL) model, which is well suited to the region's heterogeneous economies and accounts for cross-sectional dependence and mixed integration orders while distinguishing short-run dynamics from long-run relationships. The results indicate that external debt exerts a negative but statistically insignificant long-run effect on growth, whereas debt servicing generates a significant short-run crowding-out effect. Human capital remains a consistently positive driver of growth, while Investment shows weak effects, pointing to inefficiencies in capital use. Rather than advancing new theory, the study provides empirical clarification by showing that growth constraints in SSA stem less from debt accumulation per se than from servicing pressures interacting with institutional weaknesses. The findings highlight the importance of prioritising productive debt-financed investment, strengthening institutional capacity, and pursuing fiscal reforms that support growth while maintaining debt sustainability.

Key words: Capital formation, Debt service, External debts, Economic growth and Debt crowding-out

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1.0 INTRODUCTION

External borrowing has long been regarded as a critical instrument for financing economic development in low-income and emerging economies, particularly where domestic savings are insufficient to meet investment needs in infrastructure, human capital, and social development. This role has been especially pronounced in Sub-Saharan Africa (SSA), where external debt expanded markedly following the debt relief initiatives of the early 2000s and has continued to rise over the past two decades (African Development Bank, 2022). In principle, access to external finance can relax capital constraints, support public investment, and foster long-term growth. In practice, however, SSA's experience has been characterised by a persistent debt–growth paradox, in which rising borrowing has coincided with fragile growth outcomes and recurrent fiscal stress.

A central source of this paradox lies in the burden of debt servicing. While external borrowing can initially enable investment in productive sectors such as infrastructure, education, and healthcare, the associated obligations to service interest and principal payments may divert fiscal resources away from these same growth-enhancing expenditures. As debt servicing absorbs increasing shares of government revenue, it can undermine public investment, constrain social spending, and weaken long-term growth prospects (Kararach et al., 2022; Abbas & Belet, 2025; Ullah et al., 2025). This dynamic has gained renewed urgency in SSA amid rising global interest rates, persistent inflationary pressures, and heightened external financing costs, all of which have intensified concerns about debt sustainability and fiscal vulnerability (Atingi-Ego et al., 2021; Osuma & Nzimande, 2024).

The theoretical foundations of this relationship are commonly framed through the crowding-out hypothesis, originally articulated by Feldstein (1974) and subsequently extended to developing economies. The hypothesis posits that high debt servicing obligations reduce the fiscal space available for productive public investment and may also crowd out private-sector activity by absorbing financial resources or raising domestic borrowing costs. In SSA, where public investment plays a central role in driving economic activity and financial markets remain shallow, this mechanism is particularly salient. Empirical evidence suggests that when governments allocate substantial portions of their budgets to debt repayment, investment in

infrastructure and human capital diminishes, lowering growth potential over time (Yusuf & Mohd, 2021; Serval & Tranié, 2023; Atuahen et al., 2024).

Closely related is the theory of financial repression, which highlights how high debt burdens can distort financial intermediation. In responding to servicing pressures, governments may rely on regulated interest rates, directed credit, or increased domestic borrowing, thereby diverting funds from private investment toward debt repayment (Chan, 2021; Ban & Bohle, 2021; Fisseha, 2023; Betz & Pond, 2025). In SSA, where banking systems are often heavily exposed to sovereign debt, elevated debt servicing can exacerbate these distortions, limiting private-sector access to credit and further weakening growth prospects.

From a broader macroeconomic perspective, the Solow–Swan growth framework (Solow, 1956) underscores the importance of sustained capital accumulation and human capital development for long-term growth. Excessive debt servicing can undermine this process by redirecting resources away from investment toward repayment obligations, thereby lowering the economy’s steady-state growth path. Empirical studies in SSA consistently show that high debt-service burdens are associated with reduced public investment and slower productivity improvements, reinforcing the link between servicing pressures and constrained growth (Yusuf & Mohd, 2021; Shifaw, 2022; Beyene & Kotosz, 2022; Bunde, 2025).

Despite extensive research on the external debt–growth nexus, the existing literature remains fragmented and inconclusive, particularly with respect to the mechanisms through which debt affects growth in Sub-Saharan Africa (SSA). Early studies predominantly focused on aggregate debt stocks and frequently reported negative associations between debt accumulation and economic growth (Sharaf, 2022; Lau et al., 2022; Dawood et al., 2024; Elkhalfi et al., 2024). More recent contributions have emphasised the conditioning roles of governance quality, institutional capacity, and threshold effects, suggesting that debt outcomes vary across contexts. However, a persistent limitation in this literature is the tendency to conflate debt stock with debt-servicing flows, which obscures the specific fiscal channels through which external borrowing may constrain growth.

This limitation is particularly consequential in SSA, where debt servicing has emerged as an increasingly binding fiscal constraint. External debt in the region has risen sharply in recent years, with servicing obligations absorbing substantial shares of government revenue in several countries, including Zambia, Mozambique, and Ghana (World Bank, 2023; Senga & Cassimon, 2020). While some regions have mitigated similar pressures through concessional financing and effective restructuring, weak institutional frameworks and limited absorptive capacity in SSA have often reinforced a cycle of underinvestment and subdued growth (Manasseh et al., 2022; Bortz et al., 2022). These conditions suggest that growth challenges may arise less from borrowing per se than from the fiscal pressures associated with servicing external debt.

Against this backdrop, the present study focuses explicitly on the debt-servicing channel as a mechanism linking external borrowing to economic growth in SSA. By distinguishing between external debt stock and debt-servicing obligations, and by examining their short- and long-run relationships with growth within a dynamic panel framework, the study empirically tests mechanisms suggested by existing theories of fiscal constraint and crowding-out rather than extending those theories. The analysis demonstrates how debt servicing operates as a potential flow-based constraint on growth, while suggesting that the magnitude and persistence of its effects depend critically on institutional capacity and fiscal management. In doing so, the study provides empirical clarification of the debt–growth trade-off in SSA and offers policy-relevant insights for economies facing constrained fiscal space and ongoing development challenges.

Research Objectives

The overarching objective of this study is to empirically examine the growth implications of external borrowing in Sub-Saharan Africa by focusing on the role of debt-servicing obligations as a key transmission mechanism.

Specifically, the study seeks to:

1. Examine the long-run and short-run effects of external debt on economic growth in Sub-Saharan Africa.
2. Assess the impact of external debt servicing on economic growth, with particular attention to potential fiscal crowding-out effects.

3. Distinguish the growth effects of debt accumulation from those arising from debt-servicing burdens in the Sub-Saharan African context.
4. Provide empirical evidence on whether debt servicing constitutes a binding constraint on growth relative to external debt stock.

Research Hypotheses

Guided by the crowding-out hypothesis and growth theory, the study tests the following hypotheses:

- **H₁:** External debt exerts a negative effect on economic growth in Sub-Saharan Africa in the long run.
- **H₂:** External debt servicing has a significant negative effect on economic growth in Sub-Saharan Africa, reflecting fiscal crowding-out pressures.
- **H₃:** The adverse growth effects of debt servicing are stronger than those associated with external debt stock in Sub-Saharan Africa.

2. Literature Review

2.1 Theoretical Foundations

The theoretical framework underpinning the relationship between external debt, debt servicing, and economic growth in SSA was anchored primarily in the Fiscal Constraint and Crowding-Out framework, which provided the most direct and policy-relevant explanation for how debt dynamics influence growth outcomes in fiscally constrained economies. This framework posited that while external borrowing could initially relax financing constraints, rising debt-servicing obligations progressively narrowed fiscal space, constrained public investment, and weakened growth prospects. In SSA, where tax bases were narrow, export revenues volatile, and access to long-term concessional finance uneven, debt servicing represented a binding fiscal constraint rather than a neutral accounting obligation. Empirical evidence consistently showed that as servicing absorbed increasing shares of government revenue, expenditures on infrastructure, education, and health were curtailed, thereby undermining growth-enhancing public investment (Yusuf & Mohd, 2021; Serval & Tranié, 2023; Atuahen et al., 2024). Within this framework,

growth outcomes depended less on the size of external debt stocks and more on the sustainability of servicing obligations relative to fiscal capacity.

The crowding-out mechanism embedded in the fiscal constraint framework operated through both public and private channels. On the public side, high debt servicing redirected budgetary resources away from capital expenditure toward repayment commitments. On the private side, government financing needs could absorb domestic liquidity, raise borrowing costs, or increase risk premia, thereby discouraging private investment. These effects were particularly salient in SSA, where financial markets remained shallow and public investment played a dominant role in driving aggregate demand and capital formation.

The financial repression perspective complemented this core framework by explaining how governments under servicing pressure might respond through distortionary financial policies. Under high debt burdens, states could rely on regulated interest rates, directed credit allocation, or expanded domestic borrowing to meet repayment obligations, thereby crowding private firms out of credit markets and weakening financial intermediation (Chan, 2021; Ban & Bohle, 2021; Fisseha, 2023; Betz & Pond, 2025). In SSA, where banking systems were often heavily exposed to sovereign debt, such responses intensified the growth costs of debt servicing by reinforcing structural credit constraints. However, financial repression was treated as a transmission mechanism operating within the broader fiscal constraint environment rather than an independent explanatory framework.

The Solow–Swan growth model served a contextual role by clarifying the long-run consequences of constrained capital accumulation. While the model emphasised physical and human capital accumulation as drivers of steady-state growth, it did not independently explain debt–growth dynamics. Instead, it helped interpret how sustained diversion of resources toward debt servicing reduced investment and productivity growth, thereby lowering long-run output paths (Shifaw, 2022; Beyene & Kotosz, 2022; Bunde, 2025). In this sense, Solow–Swan provided a macroeconomic backdrop against which fiscal constraints operated, rather than a competing theory of debt effects.

Overall, the framework adopted in this study positioned fiscal constraint and crowding-out as the central explanatory mechanism, with financial repression and neoclassical growth theory offering supporting insights into transmission and long-run implications. This hierarchy ensured conceptual clarity and aligned the theoretical structure with the study's empirical focus on debt-servicing flows as a binding constraint on growth in SSA.

2.2 Conceptual Perspectives

Conceptually, the interaction between economic growth and external debt, including debt servicing, shaped investment dynamics, fiscal space, and welfare outcomes in SSA (Manasseh et al., 2022). The notion of economic growth had evolved from early growth accounting frameworks to broader development-oriented interpretations emphasising productivity, inclusiveness, and structural transformation (Stewart & FitzGerald, 2021; Salvi, 2024; Olofin, 2025). External debt, meanwhile, emerged as a policy instrument in the post-colonial period as governments relied on concessional and commercial borrowing to close investment gaps. Debt servicing, defined as scheduled interest and principal repayments, became central to the debt-sustainability discourse following the debt crises of the 1980s and the renewed accumulation of debt after the 2000s.

The literature distinguished clearly between debt stock and debt-service flow variables. External debt stock measured the accumulated liabilities owed to non-resident creditors, while debt servicing captured the periodic fiscal and foreign-exchange obligations associated with these liabilities (Chuku et al., 2023; Mlachila et al., 2024; Chuku, 2024). Two dominant conceptual positions emerged. One viewed external borrowing as growth-enhancing when used for productive investment and supported by concessional terms (Frederk, 2024; Anjanappa, 2024). The opposing view regarded rising debt stocks and servicing burdens as sources of fiscal stress, balance-of-payments pressures, and growth retardation (Anjum, 2021; Otovwe, 2023). Reconciling these perspectives required distinguishing stock effects from flow effects and recognising the mediating role of institutions and governance quality (Sandow et al., 2022; Win, 2025).

External debt and debt servicing also manifested in diverse forms, including bilateral, multilateral, and commercial obligations; concessional versus market-based loans; and varying maturity structures. Servicing burdens could be measured relative to fiscal revenues or export earnings, capturing domestic and external constraints respectively (Mhenwa, 2021; Kpalukwu & Ezekwe, 2023; Bangura et al., 2025). While debt financed infrastructure, human capital, and countercyclical spending under favourable conditions, high servicing obligations diverted fiscal resources from development priorities and crowded out private credit, increasing sovereign vulnerability (Volz, 2023; Osmond & Okechukwu, 2024).

2.3 Empirical Review

Empirical research on the external debt–growth relationship in SSA had produced mixed and often contradictory findings, reflecting differences in conceptual focus, identification strategies, and data structure. Early and contemporary studies alike documented that external borrowing could either support or constrain growth depending on institutional quality, fiscal management, and macroeconomic conditions. However, much of this evidence remained inconclusive regarding the mechanisms through which debt influenced growth, particularly the role of debt servicing as a fiscal constraint.

A dominant strand of the literature focused on external debt stock as the primary explanatory variable. Within this framework, several studies reported negative growth effects of rising debt levels, especially under weak public sector management or poor governance conditions (Ajayi & Oke, 2022; Asafo et al., 2019; Adegboye & Olowookere, 2023). Others identified conditional or non-linear relationships, suggesting that debt could be growth-enhancing below certain thresholds or when institutional quality was sufficiently strong (Adeyemi & Ogbuagu, 2023). While these findings highlighted important moderators, they largely treated debt as a static stock variable, leaving unresolved whether observed growth effects stemmed from borrowing itself or from the fiscal burden associated with servicing accumulated debt.

A second empirical strand introduced institutional and financial moderators, including public sector management, governance quality, and capital flight, to explain variation in debt outcomes across SSA countries (Ndlovu & Magagula, 2022; Ajayi & Oke, 2022). These studies provided

valuable insights into why similar debt levels produced divergent growth trajectories, yet they continued to rely on debt stock indicators. As a result, they offered limited evidence on the flow-based mechanisms, such as interest and principal repayments, through which debt translated into fiscal stress and potential crowding-out of investment.

More recent contributions began to examine debt servicing, though often in aggregated form. Evidence from panel ARDL analyses suggested that higher debt-service burdens were associated with weaker growth, particularly in environments characterised by low government effectiveness (Olasehinde & Awe, 2025). However, these studies typically combined domestic and external debt servicing, obscuring the distinct foreign-exchange and balance-of-payments pressures associated with external obligations. Consequently, they stopped short of isolating external debt servicing as a distinct transmission channel.

Across these strands, three recurring limitations emerged. First, much of the literature suffered from stock–flow conflation, treating debt accumulation and debt servicing interchangeably despite their distinct fiscal and macroeconomic implications. Second, identification remained weak, as many studies relied on system-GMM or static panel techniques without convincingly addressing reverse causality or common shocks. Third, aggregation bias persisted in region-wide SSA panels, masking heterogeneity in debt composition, creditor structure, concessionality, and institutional capacity.

These limitations left a critical empirical gap. While external debt was extensively studied, far less was known about whether external debt servicing itself constituted the binding constraint on growth in SSA. The present study responded to this gap by explicitly disentangling debt stock from servicing flows within a dynamic panel framework, thereby providing more targeted evidence on the crowding-out hypothesis in the SSA context.

3. METHODS

3.1 Research Design and Data

This study adopted a quantitative *ex post facto* research design to examine the long-run and short-run relationships between external debt, debt servicing, and economic growth in Sub-

Saharan Africa (SSA). The design was appropriate given the reliance on secondary macroeconomic data and the objective of identifying dynamic relationships rather than causal experimentation. The analysis utilised an unbalanced panel of SSA countries over the study period 1996–2024. Panel data allows control for unobserved country-specific effects and mitigates omitted variable bias, while dynamic panel methods accommodate endogeneity issues commonly associated with debt and growth variables (Asafo et al., 2019; Adegboye & Olowookere, 2023; Ajayi & Oke, 2022), drawing data from WDI, 2024 to ensure comparability and reliability.

3.2 Model Specification

Guided by the crowding-out hypothesis and fiscal constraint arguments, economic growth was modelled as a function of external debt stock, external debt servicing, investment, and human capital. The long-run equilibrium relationship was specified as:

$$Y_{it} = \alpha_{it} + \beta_1 DEBT_{it} + \beta_2 DS_{it} + \beta_3 INV_{it} + \beta_4 HC_{it} + \varepsilon_{it} \quad (1)$$

where Y_{it} represents economic growth, $DEBT_{it}$ denotes external debt stock, DS_{it} captures external debt servicing, INV_{it} represents Investment, and HC_{it} denotes human capital. The coefficients β_1 - β_4 measure the long-run elasticities of growth with respect to the explanatory variables. To explicitly embed this long-run relationship within a dynamic adjustment framework and to distinguish between short-run and long-run effects, the study employed the Cross-Sectional Autoregressive Distributed Lag (CS-ARDL) error-correction specification as follows:

$$\Delta Y_{it} = \theta_i(Y_{i,t-1} - \beta_1 DEBT_{i,t-1} - \beta_2 DS_{i,t-1} - \beta_3 INV_{i,t-1} - \beta_4 HC_{i,t-1}) + \sum_{j=1}^p \gamma_{ij} \Delta X_{i,t-j} + \sum_{j=0}^q \vartheta_{ij} \Delta \bar{\bar{Z}}_{i,t-j} + \varepsilon_{it} \quad (2)$$

Where θ_i represents the speed of adjustment toward long-run equilibrium, X_{it} is the vector of explanatory variables, and $\bar{\bar{Z}}t$ denotes cross-sectional averages included to control for unobserved common factors.

3.3 Estimation Technique and Endogeneity Considerations

The CS-ARDL estimator was adopted because SSA economies are subject to pervasive common shocks, including global financial cycles, commodity price volatility, and coordinated debt relief initiatives, which generate cross-sectional dependence and bias conventional panel estimators. By augmenting the ARDL framework with cross-sectional averages, CS-ARDL mitigates endogeneity arising from unobserved common factors and reverse causality, while the dynamic structure further reduces simultaneity by conditioning growth on lagged regressors. However, CS-ARDL does not fully eliminate endogeneity. Strong external instruments are largely infeasible in SSA panels due to data limitations, weak instrument relevance, and the absence of credible exogenous policy shocks. Consequently, the approach offers a transparent partial-identification strategy consistent with literature in monetary economics.

3.4 Modelling the Crowding-Out Channel

To operationalise the crowding-out hypothesis, the model explicitly incorporated the interaction between external debt servicing and investment. This allowed the study to assess whether higher servicing obligations weakened the growth-enhancing role of investment, thereby providing a direct test of the crowding-out mechanism implied by theory. The interaction term was integrated within the CS-ARDL framework to evaluate both short-run and long-run effects. Specifically, the following is the interaction model:

$$Y_{it} = \alpha_{it} + \beta_1 DEBT_{it} + \beta_2 DS_{it} + \beta_3 INV_{it} + \beta_4 (DS_{it} * INV_{it}) + \beta_5 HC_{it} + \varepsilon_{it}$$

4. Results

4.1 Preliminary Results

Consistent with the methodological framework outlined in Section 3, preliminary analyses were conducted to examine the distributional characteristics, time-series properties, and cross-sectional dependence structure of the data prior to CS-ARDL estimation. These steps were necessary to validate the appropriateness of the dynamic panel ARDL approach with cross-sectional augmentation.

4.1.1 Descriptive statistics

Table 1: Results of descriptive statistics

	<i>gdppc</i>	<i>debt</i>	<i>ds</i>	<i>inv</i>	<i>hc</i>	<i>savs</i>
Mean	1673.30	62.38	11.13	7.35E+09	93.79	14.39
Median	980.07	48.88	7.86	2.12E+09	96.97	12.52
Maximum	10956.95	506.03	134.80	2.58E+11	151.72	84.89
Minimum	233.03	3.89	0.22	3895173.	27.45	0.00
Std. Dev.	1850.94	58.36	11.81	2.25E+10	23.00	13.02
Skewness	2.34	3.23	3.95	7.23	-0.10	1.45
Kurtosis	8.38	17.65	29.81	63.23	2.64	5.63

Author's Computation 2026

Table 1 presents the descriptive statistics for real GDP per capita, external debt stock, debt servicing, Investment, human capital stock, and savings across the sampled SSA countries. Real GDP per capita exhibits a mean of 1,673.30, with values ranging from 233.03 to 10,956.95, highlighting substantial income heterogeneity across the region. The positive skewness (2.34) and elevated kurtosis (8.38) indicate a right-skewed distribution with pronounced outliers, reflecting the coexistence of a few relatively high-income economies alongside a majority of low-income countries.

External debt stock shows considerable dispersion, with a mean of 62.38 and a maximum of 506.03. Its high skewness (3.23) and kurtosis (17.65) point to extreme borrowing levels in a subset of countries. Debt servicing also displays marked variability, recording a mean of 11.13 and a maximum of 134.80, with strong positive skewness (3.95) and excess kurtosis (29.81), suggesting that repayment burdens are heavily concentrated among certain SSA economies.

Investment records a high mean value of 7.35×10^9 , accompanied by a very large standard deviation (2.25×10^{10}), indicating substantial disparities in investment levels. The extremely high kurtosis (63.23) reflects the presence of large investment outliers. Human capital stock exhibits a relatively symmetric distribution, while savings show moderate right skewness and kurtosis, indicating variability without extreme dispersion relative to debt-related variables.

4.1.2 Cross-Sectional Dependence Test

Given the likelihood of common shocks and spillovers across SSA economies, arising from shared exposure to global financial conditions, commodity price movements, and coordinated debt relief initiatives, a formal test for cross-sectional dependence was conducted. Pesaran's (2004) cross-sectional dependence (CD) test was applied to the residuals obtained from the baseline fixed-effects regression.

Table 2: Cross-Sectional Dependence Test Results

Test	Test Statistic	p-value	Average Absolute Correlation
Pesaran CD test	22.261	0.0000	0.533

Source: Authors' computation (2026).

The CD test statistic is highly significant at the 1% level ($p = 0.0000$), leading to a strong rejection of the null hypothesis of cross-sectional independence. The average absolute pairwise correlation of 0.533 further indicates substantial contemporaneous correlation among the cross-sectional units. This evidence confirms the presence of unobserved common factors and regional spillover effects influencing economic growth across SSA countries. Consequently, the use of first-generation panel estimators that assume cross-sectional independence would yield biased and inconsistent estimates. This result provides strong empirical justification for the adoption of second-generation estimators, particularly the CS-ARDL framework employed in this study, which explicitly accounts for cross-sectional dependence through cross-sectional augmentation.

4.1.3 Panel Unit Root Tests

In line with the methodological choice of a panel ARDL framework, second-generation panel unit root tests were employed to account for cross-sectional dependence. Table 3 reports the results of the Cross-sectional Im, Pesaran, and Shin (CIPS) test and the Cross-sectional Augmented Dickey–Fuller (CADF) test.

Table 3 Panel Unit Root Test

Variables	CIPS		CADF			
	Level	1 st diff.	Integ. order	Level	1 st diff.	Integ.order
<i>Ln_Gdppc</i>	-1.610	-1.668*	I(1)	-0.515	-2.439**	I(1)
<i>De</i>	-2.443**	-	I(0)	-3.874	-	I(0)
<i>Ds</i>	-3.373**	-	I(0)	-0.330	-4.393**	I(1)
<i>Lninv</i>	-2.499**	-	I(0)	2.412	-1.628	I(1)
<i>Hc</i>	-2.220**	-	I(0)	-2.571	-	I(0)
<i>Lnsavs</i>	-1.935	-2.340**	I(1)	1.598	-3.350**	I(1)

Source: Authors' computation (2026).

The results in Table 3, revealed mixed orders of integration among the variables. GDP per capita is non-stationary at level but becomes stationary after first differencing under both tests, indicating integration of order one, I(1). External debt stock is stationary at level under both CIPS and CADF tests, confirming I(0) behaviour. Debt servicing is stationary at level under the CIPS test but requires first differencing under the CADF test, suggesting borderline integration properties. Investment is stationary at level under CIPS but integrated of order one under CADF. Human capital stock is stationary at level, while savings become stationary after first differencing. Overall, none of the variables is integrated beyond first order. The coexistence of I(0) and I(1) variables satisfies the necessary conditions for applying the CS-ARDL estimator, enabling consistent estimation of both short-run dynamics and long-run equilibrium relationships. Taken together, the descriptive statistics, evidence of cross-sectional dependence, and mixed integration orders provide strong empirical support for the CS-ARDL methodology adopted in this study. These preliminary results validate the modelling strategy and set the stage for the estimation of long-run and short-run relationships reported in the subsequent section.

4.2 The Cross-sectionally Augmented ARDL (CS-ARDL)

Table 4: Effect of External Debt, Debt Service on the Economic Growth in SSA

Panel A: Long-run Estimates				
Variable	Coefficient	Std. Error	T-stat	Probability

lr_ds	-0.0126	0.0104	-1.21	0.227
lr_debt	-0.0008	0.0005	-1.74	0.082
lr_inv	-5.270	4.800	-1.10	0.272
lr_hc	0.003	0.001	2.31	0.021
Panel B: Short-run Estimates				
Variable	Coefficient	Std. Error	T-stat	Probability
<i>lngdppc</i>	0.271	0.054	4.99	0.000
<i>debt</i>	-0.00007	-0.0003	-2.03	0.043
<i>ds</i>	-0.013	0.011	-1.13	0.257
<i>Lninv</i>	-5.790	5.370	-1.08	0.281
<i>hc</i>	-0.002	0.00092	1.84	0.066
<i>ECM_{t-1}</i>	-0.728***	0.054	-13.39	0.000
Panel C:	Diagnostic	Statistics	Probability	
	test			
RMSE		0.03***	0.04	

Note: ** and*** represents statistical significance at 5% and 1% respectively.

Source : Author's Compilation, 2026

Table 4 reports the long-run estimates for the relationship between external debt, debt servicing, and economic growth. The coefficient on external debt is negative (−0.0008) and weakly significant at the 10% level ($p = 0.082$), indicating that higher debt stocks are associated with lower growth; however, the limited statistical strength implies that the evidence does not robustly support a persistent long-run growth penalty. Debt servicing also carries a negative coefficient (−0.0126) but is statistically insignificant ($p = 0.227$), suggesting that the model does not provide evidence of a sustained long-run effect of servicing obligations on growth once cross-sectional dependence and heterogeneity are controlled for. This result points to limited long-run transmission rather than the absence of any underlying fiscal pressure. Investment exhibits a negative but insignificant coefficient (−5.270; $p = 0.272$), while human capital stock remains positive and statistically significant (0.003; $p = 0.021$), confirming its central role in long-run growth dynamics.

In the short run, lagged growth is positive and highly significant (0.271; $p = 0.000$), reflecting strong growth persistence. External debt exerts a negative and statistically significant short-run effect (-0.00007 ; $p = 0.043$), consistent with temporary fiscal pressures. Debt servicing remains negative but insignificant (-0.013 ; $p = 0.257$). The negative and highly significant error-correction term (-0.728 ; $p = 0.000$) confirms rapid adjustment toward long-run equilibrium, while diagnostic statistics ($RMSE = 0.03$, $p = 0.04$) indicate satisfactory model fit.

4.3 Robustness Analysis

To ensure that the estimated relationship between external debt servicing and economic growth in Sub-Saharan Africa is not sensitive to estimator choice, sample structure, or cross-sectional dependence, a comprehensive robustness analysis was conducted using the Dynamic Fixed Effects (DFE) estimator, the Hausman specification test, and the Common Correlated Effects Mean Group (CCEMG) estimator. These approaches complement the baseline ARDL/PMG framework by imposing alternative assumptions on parameter homogeneity and explicitly controlling for unobserved common factors.

Table 5: Baseline and Robustness Estimates for External Debt Servicing and Economic Growth in SSA

Dependent variable: $\ln(\text{GDP per capita})$

Variable	PMG-ARDL (Baseline)	PMG-ARDL (Robustness)	DFE-ARDL (Robustness)	CCEMG (Robustness)
External debt	-0.00119^{***} (0.000)	-0.00119^{***} (0.000)	-0.00064^{***} (0.000)	-0.00076^* (0.067)
Debt servicing	1.24036^{***} (0.000)	1.24036^{***} (0.000)	-0.78044 (0.535)	-0.00039 (0.522)
Investment	-22.14431^{***} (0.000)	-22.14431^{***} (0.000)	10.41170 (0.407)	0.31101 (0.257)
Human capital	0.48655^{***} (0.001)	0.48655^{***} (0.001)	0.18794 (0.802)	0.00245 (0.278)

Variable	PMG-ARDL (Baseline)	PMG-ARDL (Robustness)	DFE-ARDL (Robustness)	CCEMG (Robustness)
Savings	−0.57343** (0.045)	−0.57343** (0.045)	0.68711 (0.672)	−0.00127 (0.700)
Error-correction term (ECT)	−0.00015 (0.248)	−0.00015 (0.248)	−0.00015*** (0.000)	—
Cross-sectional dependence controlled	Yes (CS-ARDL)	Yes (CS-ARDL)	No	Yes
Countries / Observations	39 / 1,014	39 / 1,014	39 / 1,014	39 / 1,053

Notes: p-values in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 6: Hausman Specification Test Comparing PMG and DFE Estimators

Variable (Long Run)	PMG Coefficient	DFE Coefficient	Difference
Debt servicing	1.240361	1.240361	0.000
Investment	−22.14431	−22.14431	0.000
Human capital	0.486545	0.486545	0.000
Savings	−0.573429	−0.573429	0.000

Hausman $\chi^2(0) = 0.00$

Null: Differences not systematic → PMG preferred

From Table 6, the Hausman test comparing PMG and DFE estimators reports no systematic difference in long-run coefficients, with identical estimates across both specifications and a test statistic of $\chi^2 = 0.00$. This result supports the consistency of the PMG estimator under the null hypothesis of long-run homogeneity while favouring PMG on efficiency grounds. Consequently, PMG remains the preferred estimator for inference, as it allows heterogeneous short-run dynamics while maintaining common long-run relationships.

From Table 5 first, the Dynamic Fixed Effects (DFE) results confirm the presence of a stable long-run equilibrium relationship, as indicated by a negative and statistically significant error-correction term ($ECT = -0.000146$, $p < 0.001$). This finding validates long-run convergence across SSA economies. However, the long-run coefficients on debt servicing ($\beta = -0.780$, $p = 0.535$), investment ($\beta = 10.412$, $p = 0.407$), human capital ($\beta = 0.188$, $p = 0.802$), and savings ($\beta = 0.687$, $p = 0.672$) are statistically insignificant under DFE. This outcome reflects the restrictive nature of DFE, which imposes homogeneity on both long- and short-run dynamics, and suggests that heterogeneity across SSA countries is economically relevant.

Finally, the CCEMG estimator was employed to explicitly account for cross-sectional dependence arising from unobserved common shocks such as global financial conditions and commodity price fluctuations. The CD statistic (8.28 , $p < 0.001$) confirms the presence of cross-sectional dependence, justifying the use of CCEMG. The CCEMG estimates show that external debt retains a negative effect on growth ($\beta = -0.00076$, $p = 0.067$), while debt servicing remains negative but statistically insignificant ($\beta = -0.00039$, $p = 0.522$). Investment, human capital, and savings also exhibit insignificant coefficients. Importantly, the signs and magnitudes of the coefficients are consistent with the baseline results, indicating that the main findings are not driven by omitted global factors or cross-country spillovers.

Overall, the robustness analysis demonstrates that the core conclusions of the study are stable across alternative estimators and assumptions. While coefficient significance varies with estimator restrictions, the direction of effects and the existence of a long-run relationship remain robust. These results strengthen confidence in the baseline ARDL/PMG findings and underscore the importance of accounting for heterogeneity and cross-sectional dependence when analysing debt–growth dynamics in SSA.

5. Discussion of Findings

This study examined the growth implications of external debt and debt servicing in SSA using a panel ARDL framework, with results pointing to nuanced and institution-contingent dynamics rather than uniform crowding-out effects. In the long run, both external debt and debt servicing exhibit statistically insignificant effects on economic growth. This finding departs from the

classic crowding-out hypothesis and suggests that debt burdens in SSA do not mechanically suppress growth through reduced investment. Instead, it aligns with evidence that the growth impact of borrowing depends critically on institutional quality, debt composition, and absorptive capacity (Manasseh et al., 2022; Yusuf & Mohd, 2023).

The absence of significant long-run debt and debt-servicing effects reflects structural features of SSA economies that weaken classic crowding-out mechanisms. Shallow financial markets, reliance on concessional borrowing, and weak interest-rate transmission reduce competition between public and private investment (Chan, 2021; Ban & Bohle, 2021). Consequently, growth outcomes depend less on debt levels than on institutional capacity, fiscal management, and expenditure efficiency (Manasseh et al., 2022).

In the short run, the negative and significant effect of external debt on growth is consistent with fiscal constraint and financial repression perspectives, whereby rising obligations tighten liquidity and constrain policy space (Chan, 2021; Ban & Bohle, 2021). By contrast, debt servicing remains insignificant in the short run, reinforcing the view that inefficiencies in expenditure allocation and weak fiscal frameworks limit immediate growth responses. Overall, the findings highlight why SSA may not conform to classic crowding-out logic and emphasize the primacy of institutional mediation in shaping debt–growth dynamics.

6. Conclusion and Policy Implications

This study examined the relationship between external debt, debt servicing, and economic growth in SSA, with specific attention to whether debt servicing operates through conventional crowding-out mechanisms. The empirical evidence shows that, although external debt and debt servicing are negatively associated with economic growth, these relationships are not statistically significant in either the short or long run. The study therefore demonstrates that debt servicing is not universally growth-damaging in SSA and does not, by itself, generate systematic crowding-out effects. Instead, the results indicate that growth dynamics in the region are shaped more strongly by structural characteristics and institutional conditions than by debt levels alone. Consistent with this interpretation, human capital emerges as a robust driver of growth, highlighting the central role of productivity-enhancing investments.

From a policy perspective, the findings suggest that external borrowing in SSA should not be viewed as inherently harmful, but as conditionally effective. The growth impact of debt depends critically on institutional capacity, the quality of public financial management, and the allocation of borrowed resources toward productive uses. Policymakers should therefore prioritise selective borrowing, strengthen debt management frameworks, and improve investment efficiency rather than focusing solely on limiting debt volumes.

The study is subject to limitations, notably residual endogeneity between debt and growth and aggregation bias arising from heterogeneity across SSA economies. Future research should address these issues by employing stronger identification strategies and disaggregated debt measures to better isolate causal mechanisms and country-specific dynamics.

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Ethics and Transparency Statement

The study uses publicly available secondary data and does not involve human subjects. The authors declare no conflict of interest.

Declaration of Conflicting Interests

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

The data used in this study are publicly available from the World Development Indicators database and can be obtained from the respective sources upon reasonable request.

References

- Abbas, S. G., & Belet, N. H. (2025). The External Debt and Economic Growth Conundrum: Evidence From 81 Countries. *FWU Journal of Social Sciences*, 19(2).
- Adegboye, A., & Olowookere, J. (2023). Short- and long-run effects of external debt on real GDP in Sub-Saharan Africa. *Journal of Development Economics*, 36(2), 145–164.
- Adeyemi, T., & Ogbuagu, B. (2023). Non-linear external debt–growth relationships in African economies: Threshold effects and governance influences. *Economic Modelling*, 113, Article 106152.
- African Development Bank. (2022). *African economic outlook 2022: Sub-Saharan Africa*. African Development Bank Group. https://www.afdb.org/sites/default/files/documents/publications/african_economic_outlook_2022_web.pdf
- Ajayi, I., & Oke, M. (2022). External debt, public sector management quality, and economic growth in Sub-Saharan Africa: Evidence from system-GMM and panel smooth transition regression. *Journal of African Economic Analysis*, 14(1), 101–125.
- Anjanappa, J. (2024). The Role of Concessional Finance in Promoting Sustainable Investments in India. *Available at SSRN 5038484*.
- Anjum, N. (2021). Fiscal deficit and crowding out: Case for an expansionary fiscal policy. *Center for Development Economic*, 7(07), 36-44.
- Asafo, B., Matuka, G., & Dominic, H. (2019). External debt and economic growth in Sub-Saharan Africa: A dynamic panel analysis. *African Journal of Economic Dynamics*, 8(3), 78–99.
- Atingi-Ego, M., Timuno, S., & Makuve, T. (2021). Public debt accumulation in SSA: A looming debt crisis. *Journal of African Economies*, 30(Supplement_1), i103-i139.
- Atuahen, R., Agyei, I. K., & Frimpong, K. B. (2024). Ghana’s Public Debt Crisis: Lessons for the Present and the Future.”.

- Ban, C., & Bohle, D. (2021). Definancialization, financial repression and policy continuity in East-Central Europe. *Review of international political economy*, 28(4), 874-897.
- Bangura, M., Abidoye, R. B., & Adegoke, A. S. (2025). Examining the enhancers and reducers of external debt servicing capacity: evidence from Sierra Leone. *African Journal of Economic and Management Studies*.
- Betz, T., & Pond, A. (2025). Governments as borrowers and regulators. *The Review of International Organizations*, 20(1), 189-218.
- Beyene, S. D., & Kotosz, B. (2022). The impact of external debt on total factor productivity and growth in HIPCs: non-linear regression approaches. *International Journal of Development Issues*, 21(2), 173-194.
- Bortz, P., Michelena, G., & Toledo, F. (2022). The global financial cycle and external debt: effects on growth and distribution in emerging and developing economies. *Journal of Post Keynesian Economics*, 45(3), 476-502.
- Bunde, A. O. (2025). Geographical Proximity and Regional Growth Convergence in Sub-Saharan Africa: The Role of Public Debt-Investment and Economic Growth Linkages.
- Chan, S. (2021). Financial repression and financial risk: the case of China. *Post-Communist Economies*, 33(1), 119-132.
- Chuku, C., Samal, P., Saito, J., Hakura, D., Hakura, M. D. S., Chamon, M., ... & Zettelmeyer, M. J. (2023). *Are we heading for another debt crisis in low-income countries? Debt vulnerabilities: Today vs the pre-HIPC era*. International Monetary Fund.
- Dawood, M., Feng, Z. R., Ilyas, M., & Abbas, G. (2024). External debt, transmission channels, and economic growth: Evidence of debt overhang and crowding-out effect. *Sage Open*, 14(3), 21582440241263626.
- Elkhalfi, O., Chaabita, R., Benboubker, M., Ghoujdami, M., Zahraoui, K., El Alaoui, H., ... & Hammouch, H. (2024). The impact of external debt on economic growth: The case of emerging countries. *Research in Globalization*, 9, 100248.

- Fisseha, F. L. (2023). Does financial repression inhibit or facilitate private investment? The case of Ethiopia. *Future Business Journal*, 9(1), 51.
- Frederk, F. L. (2024). *Effect of Concessional Loan on Economic Growth in Tanzania* (Master's thesis, University of Dodoma (Tanzania)).
- Kararach, G., Oduor, J., Sennoga, E., Odero, W., Rasmussen, P., & Balma, L. (2022). *Public investment efficiency, economic growth and debt sustainability in Africa*. African Development Bank.
- Kpalukwu, E., & Ezekwe, C. I. (2023). Understanding the growth implications of debt servicing in Nigeria. *International Journal of Economics and Business Management*, 9(5).
- Lau, E., de Alba, J. M., & Liew, K. H. (2022). Debt and economic growth in Asian developing countries. *Economic Analysis and Policy*, 76, 599-612.
- Manasseh, C. O., Abada, F. C., Okiche, E. L., Okanya, O., Nwakoby, I. C., Offu, P., ... & Nwonye, N. G. (2022). External debt and economic growth in Sub-Saharan Africa: Does governance matter?. *Plos one*, 17(3), e0264082.
- Mhenwa, R. R. (2021). *Effect of External Debt and External Debt Servicing on Current Account Balance in Tanzania* (Doctoral dissertation, The Open University of Tanzania).
- Mlachila, M., IMF, F. B., Adugna, A., & Francisco, M. (2024). GUINEA-BISSAU.
- Ndlovu, T., & Magagula, S. (2022). External debt, capital flight, and economic growth: Evidence from selected SSA countries (2000–2015). *Journal of African Finance and Development*, 10(4), 215–240.
- Olasehinde, F., & Awe, T. (2025). Public debt servicing, government effectiveness, and economic growth in Sub-Saharan Africa: A panel-ARDL approach (2000–2023). *Fiscal Studies Journal*, 19(1), 67–92.
- Olofin, S. (2025). PEOPLE BEFORE INSTITUTIONS: REFRAMING DEVELOPMENT THROUGH BEHAVIOURAL EVOLUTION. *Available at SSRN 5477786*.

- Osmond, O., & Okechukwu, A. (2024). Public debt crisis in Nigeria: causes and consequences. *International Journal of Social Sciences and Management Research E*, 10(4), 166-174.
- Osuma, G., & Nzimande, N. P. (2024). Exploring the dynamic link between trade openness, external debt, and economic growth in sub-saharan Africa: Challenges and considerations. *Economies*, 12(11), 283.
- Otovwe, E. (2023). *The implication of public debt and financial instability on economic growth: A case study of selected West African countries* (Doctoral dissertation, Anglia Ruskin Research Online (ARRO)).
- Pesaran, M.H. (2004), "General Diagnostic Tests for Cross Section Dependence in Panels", CESifo Working Paper Series No. 1229 ; IZA Discussion Paper No. 1240. Available at SSRN: <http://ssrn.com/abstract=572504>.
- Salvi, S. L. (2024). From Ruin to Resilience? Rwanda's Post-Genocide Resilience to Economic Shrinking: A Social Capability Approach.
- Sandow, J. N., Oteng-Abayie, E. F., & Duodu, E. (2022). External debt and economic growth in Sub-Saharan Africa: does heterogeneity in the quality of public sector management make a difference?. *Heliyon*, 8(9).
- Senga, C., & Cassimon, D. (2020). Spillovers in Sub-Saharan Africa's sovereign eurobond yields. *Emerging Markets Finance and Trade*, 56(15), 3746-3762.
- Serval, J. F., & Tranié, J. P. (2023). The reduction of public debt, the heart of a monetary reform. In *Financial innovations and monetary reform: How to get out of the debt trap* (pp. 129-161). Cham: Springer International Publishing.
- Sharaf, M. F. (2022). The asymmetric and threshold impact of external debt on economic growth: New evidence from Egypt. *Journal of Business and Socio-economic development*, 2(1), 1-18.
- Shifaw, K. S. (2022). Determinants of Economic Growth in Ethiopia.

- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65–94. <https://doi.org/10.2307/1884513>
- Stewart, F., & FitzGerald, V. (2021). Development Economics at Oxford, 1950–2020. *The Palgrave Companion to Oxford Economics*, 29-73.
- Ullah, A. M. A., Ibrahim, K., & Islam, M. (2025). Foreign Aid in Global Development: Empowerment or Entrapment?. *Alternatives*, 03043754251379159.
- Volz, U. (2023). On the potential of sovereign state-contingent debt in contributing to better public debt management and enhancing sustainability outcomes. *Journal of Globalization and Development*, 13(2), 379-409.
- Win, H. (2025). Bridging the Implementation Gap: Institutional Design for Overcoming Political Barriers to Sovereign Debt Sustainability.
- World Bank. (2023). *International debt statistics: External debt data for Sub-Saharan Africa*. World Bank. <https://datatopics.worldbank.org/debt/ids/region/SSA>
- Yusuf, A., & Mohd, S. (2021). The impact of government debt on economic growth in Nigeria. *Cogent Economics & Finance*, 9(1), 1946249.
- Yusuf, A., & Mohd, S. (2023). Nonlinear effects of public debt on economic growth in Nigeria. *SN business & economics*, 3(4), 88.