Innovations

Sovereign Debt, Economic Growth and Financial System Stability in Sub-Saharan Africa (1990 to 2023)

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Abstract: *This study investigates the impact of sovereign debt, economic growth and financial system stability in Sub-Saharan Africa, focusing on the impact of external and domestic debt. Using a panel Autoregressive Distributed Lag (ARDL) model, the study analyses data from 1990 to 2023 to analyse short- and long-run impacts of sovereign debt on economic growth and financial system stability. The study indicates that domestic debt has a mixed impact on growth, it recorded no significant impact on economic growth on the short run but 1% increase in domestic debt translates to a 0.107% increase in economic growth in the longer run. External debt, however, has a negative significant impact in that an extra 1% rise in external debt translates to a 0.004% marginal fall in economic growth due to debt servicing charges. In the same manner, domestic debt proves to destabilize the financial markets, lowering financial system stability by 0.172% for each additional 1% increase. In contrast, external debt stabilizes financial system stability, causing a 0.003% marginal increase in financial system, reducing the crowding out effect of excessive dependency on domestic credit. The study further finds that smart debt management practices and sound institutional quality measures can nullify these threats and enable to enhance the economic stability contributions made by sovereign debt. Robustness tests confirm the estimates' robustness in favour of supporting the need for a balanced debt accumulation policy. The findings suggest significant policy lessons for Sub-Saharan African countries that long-term financial system stability and economic resilience can only be achieved by adopting sustainable debt policies and structural economic reforms.*

Keywords: *Sovereign Debt, Debt Service, Economic Growth, Financial System stability, Autoregressive Distributed Lag*

Introduction

Sovereign debt has become an inevitable funding vehicle for countries wishing to bridge the deficit between expenditure and revenue at the government level (Duru et al., 2023; Ngcobo et al., 2025). Ngcobo et al. (2025) claim that global GEXP increase, particularly in African countries, due to expansionary policies, raises fiscal imbalance and public indebtedness, raising concerns about long-term economic prospects. Sub-Saharan Africa (SSA) experienced a faster accumulation of sovereign debt over the past three decades mainly to finance infrastructure, health, education, and social development programs. With traditional sources of income short and aid flows becoming volatile, the majority of SSA nations have increasingly turned to domestic and external capital markets, multilateral organizations, and bilateral donors to fund their fiscal needs (IMF, 2021; World Bank, 2022).

While sovereign borrowing can stimulate economic development by financing productive investments, its macroeconomic stability implications in the long term are controversial. The 1980s and 1990s saw external debt crises for Nigeria, Ghana, and Zambia that led to structural adjustment programs in the framework of the IMF and World Bank (Ndikumana & Boyce, 2011). The experience demonstrates the risks of debt accumulation that was not sustainable and stresses the need for prudent debt management.

In the wake of the Highly Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI) of the early 2000s, external debt burdens of several SSA countries decreased. The relief was short-lived. Debt in SSA has increased consistently since 2010. For example, according to the African Development Bank (AfDB, 2022), the regional average public debt-to-GDP rose from approximately 35% in 2010 to over 60% in 2022. These among other factors have contributed to this trend; commodity price volatility, increasing fiscal deficits, currency depreciation, and the fiscal impact of the COVID-19 pandemic.

The commodity price collapse after 2014 hit hard oil and mineral-exporting nations such as Angola, Nigeria, and Zambia. Governments had to borrow to cover budget gaps. The COVID-19 pandemic further strained fiscal buffers, requiring emergency expenditure at the same time that it curbed revenue mobilization (Mitsi, 2025). SSA nations accumulated about $400 billion of additional financing requirements between 2020 and 2023 (IMF, 2021). Chowdhury et al. (2024) affirm that over the past two decades, developed countries have accumulated significant debt due to stimulus spending and financial system stabilization following global financial crises, sovereign debt crises, and COVID-19 pandemic.

Figure 1.1: Economic Growth, Financial System Stability, Domestic Debt, and External Debt Trend (1990 – 2023)
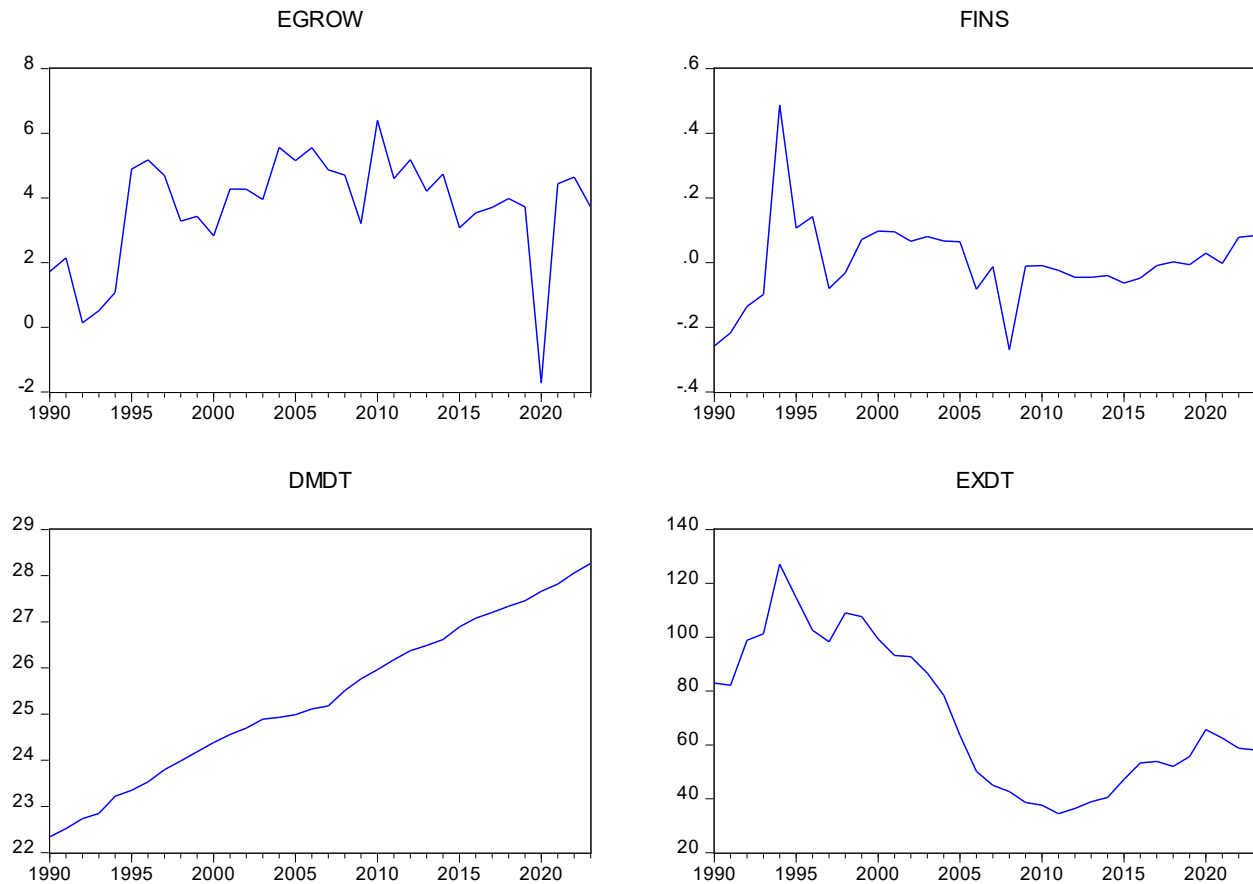
A review of Figure 1.1 shows that between 1990 and the early 2000s, SSA's economic growth was modest, fluctuating between 2% and 4%, constrained by political instability, commodity price shocks, and structural adjustment programs. Growth surged in the mid-2000s, peaking at about 6% due to rising commodity prices, debt relief under the HIPC Initiative, and higher foreign investment. After 2010, growth weakened amid global uncertainties, the 2014–2016 oil slump, and domestic challenges such as poor infrastructure, insecurity, and public sector inefficiencies. The COVID-19 pandemic further deepened the decline, with sharp contractions in 2020 before recovery began.

Financial stability in the 1990s remained fragile, with underdeveloped markets, weak regulation, and poorly managed state-owned banks keeping the stability index near zero or negative. From the 2000s, reforms such as banking liberalization, prudential regulation, and capital market development drove gradual improvement. By 2023, enhanced supervision, financial inclusion, and fintech innovations especially in Kenya and Nigeriahad strengthened stability and broadened access to

financial services. Domestic debt was low in the 1990s as governments relied on concessional financing. From 2000, however, countries shifted toward domestic borrowing to reduce external vulnerability and develop capital markets. By 2023, domestic debt reached about 29% of GDP. While useful for financing projects, it raised concerns over private sector crowding out, rising interest costs, and rollover risks (Lawal et al., 2024).

External debt followed a sharper upward trend. Despite HIPC and MDRI relief, new debt accumulation largely Eurobonds and commercial loans rose from about 40% of GDP in 2000 to over 120% by 2023. This reflected expanding fiscal needs, reduced concessional financing, and growing debt service burdens. Countries such as Zambia, Ghana, and Ethiopia have since faced distress or restructuring from unsustainable borrowing and weak revenue mobilization. As domestic borrowing grew, supported by deepening financial markets and demand for sovereign bonds, it remained locally denominated and concentrated in banks, pension funds, and insurers. Though safer than external debt, domestic borrowing can still crowd out private investment, pressure interest rates, and expose banks to sovereign risk (Panizza, 2008; Reinhart & Rogoff, 2010).

Figure 1.2: Economic Growth, Domestic Debt, and External Debt Trend (1990 – 2023)
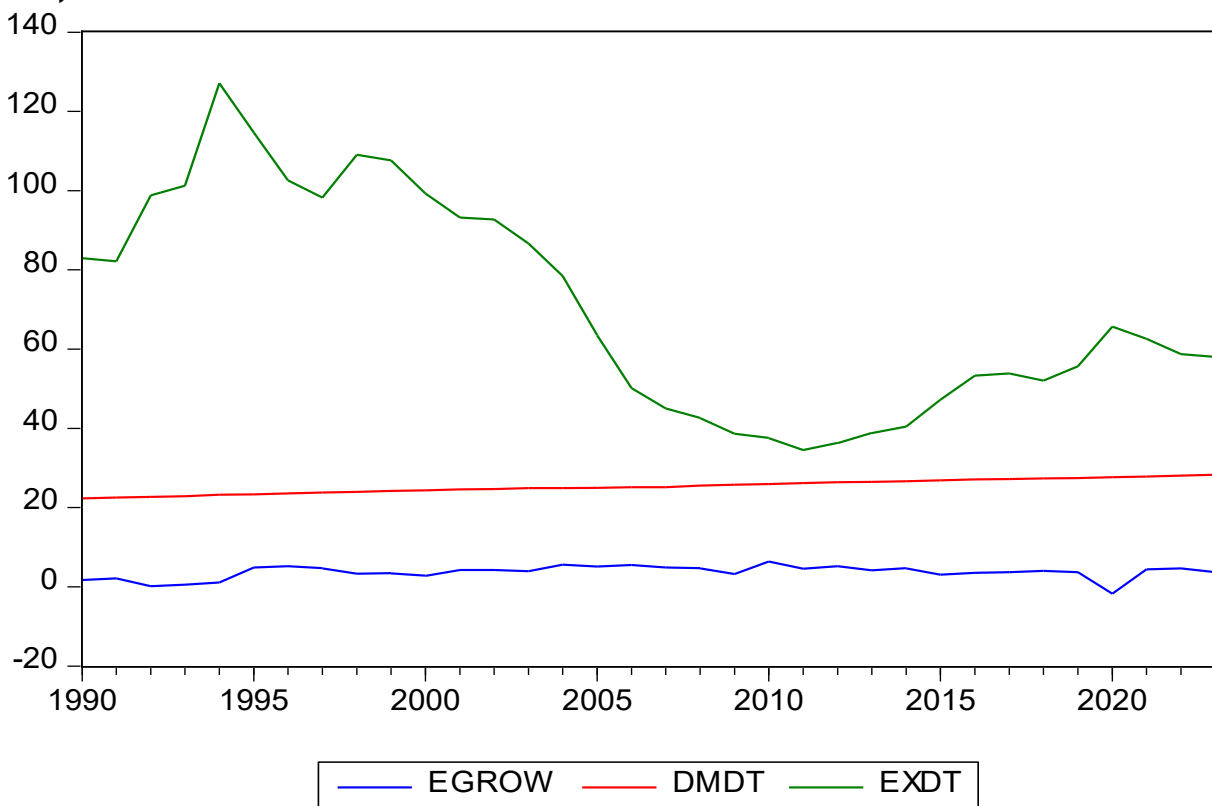
Figure 1.2 illustrates the evolution of domestic debt, external debt, and economic growth in Sub-Saharan Africa (SSA) from 1990 to 2023, reflecting structural weaknesses, debt strategies, and global financial shifts. The relationship is complex and varies across countries, shaped by institutional and macroeconomic contexts.

Domestic debt rose sharply after the early 2000s with financial liberalization and the introduction of treasury instruments. Countries such as Kenya, Nigeria, and Ghana increasingly relied on local borrowing as concessional financing declined. Empirical evidence confirms a long-run positive effect of domestic debt on GDP growth (Mencinger et al., 2014; Checherita-Westphal & Rother, 2012), consistent with Keynesian and Endogenous Growth theories, as borrowing for infrastructure and capital projects boosts productive capacity. Yet, rising domestic debt undermines financial stability by crowding out private credit, raising interest rates, and locking bank liquidity into sovereign securities. This "sovereign-bank nexus" increases exposure to fiscal shocks, as seen in Ghana's domestic bond crisis and banking distress. External debt has also trended upward since HIPC/MDRI relief, driven by Eurobond issuance and bilateral loans, notably from China. Debt burdens have intensified in Zambia, Ethiopia, and Angola, with ratios exceeding 70–100% of GDP. Studies show a negative and significant effect of external debt on growth in both the short and long run, aligning with the Debt Overhang Theory, which argues that excessive obligations deter investment due to future taxation and instability concerns (Manasseh et al., 2022).

The growth-debt nexus remains contested. While Keynesian theory suggests public borrowing stimulates demand and growth (Petlele et al., 2025), excessive debt raises instability, default risk, and deters private investment (Presbitero, 2012). Evidence points to a non-linear effect: debt spurs growth up to a threshold, beyond which it becomes detrimental (Ando et al., 2025; Ma et al., 2025). High servicing costs, misallocation, and poor utilization weaken returns, restrict private investment, and heighten vulnerability to shocks (Salameh et al., 2020; Melo-Becerra et al., 2015). SSA's fragile financial systems, limited fiscal buffers, and reliance on external finance intensify these risks. Zambia's Eurobond default during COVID-19 highlighted these vulnerabilities (Reuters, 2020).

Structural constraints such as narrow export bases, import dependence, and exposure to external shocks worsen the debt burden. Ghana and Kenya, for example, faced fiscal crises and IMF bailouts due to debt servicing pressures (World Bank, 2023). Nattabi (2025) argues that the debt cycle has slowed long-term development, as repayment priorities often displace citizen welfare and growth investments.
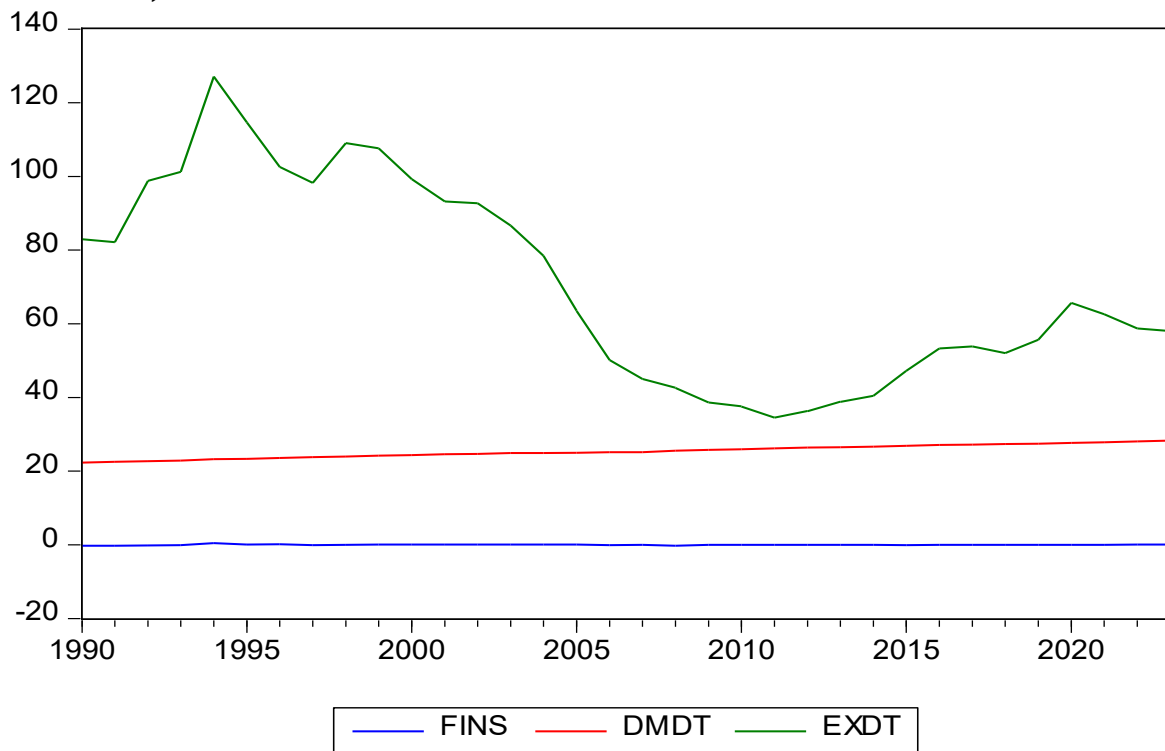
Figure 1.3: Financial System Stability, Domestic Debt, and External Debt Trend (1990 – 2023)

Figure 1.3 compares the trajectories of financial system stability, domestic debt, and external debt in Sub-Saharan Africa (SSA) between 1990 and 2023. While domestic and external debts have risen steadily, financial system stability has followed a volatile and declining path, particularly since the mid-2000s, reflecting mounting fiscal pressures and systemic vulnerabilities. This study investigates the impact of sovereign debt, disaggregated into domestic and external components, on economic growth and financial stability in SSA over the period 1990–2023. Covering 39 countries selected for data availability and economic relevance, the analysis spans 34 years to capture both short- and long-term effects. It emphasizes the differentiated impacts of domestic and external debt, given their distinct cost structures, risks, and transmission mechanisms. Methodologically, the study applies Panel ARDL and FMOLS models to capture dynamic relationships across time and countries, while controlling relevant macroeconomic variables.

The analysis does not extend to country-specific case studies, monetary policy dynamics, political economy influences, or micro-level financial sector indicators. Although institutional quality is used as a control, the political economy of debt accumulation and governance structures are not examined in detail. Similarly, exogenous shocks such as financial crises, commodity swings, or pandemics are acknowledged but not explicitly modeled. The study is both timely and relevant, given rising concerns over sovereign debt sustainability and macro-financial

stability in SSA. Recent global disruptions have strained public balance sheets, exposed structural weaknesses, and revived fears of a regional debt crisis. Its findings therefore hold significant academic value while offering practical insights into economic management, development planning, and regional integration.

Theoretical and Academic Relevance: The study will contribute to development economics, public finance, and financial stability by decomposing sovereign debt, introducing financial stability into the debt story, and using a Dynamic Panel ARDL Framework. It differentiates between domestic and foreign debt in line with their different risk profiles and macroeconomic transmission channels. The study will also employ a panel autoregressive distributed lag (ARDL) model that enables a distinction between short-run shocks and long-run equilibrium relations, making the results more affluent. With its focus on Sub-Saharan Africa, the study will fill a significant empirical gap in literature.

Policy Significance: The study will provide a foundation for sustainable debt policy in Sub-Saharan Africa to promote economic growth and stability. It will aid risk monitoring and early warning, enhancing national debt sustainability models, and public finance management systems. The study will provide development partners like the IMF and the World Bank with information on program design, making interventions sensitive to country circumstances and development aspirations.

Practical Implications for Financial Sector Resilience: The study will offer practical implications for financial sector resilience like increasing banking sector prudence, driving investor confidence and risk pricing, and enhancing strategic public-private partnerships in health, education, and infrastructural development. It will also highlight the importance of understanding debt dynamics and fiscal fundamentals for deepening and resilience of finance.

Regional Integration and Development Planning: The study will promote regional integration, debt relief, and joint action in sovereign debt management. It will promote consistent debt policies and helps SSA countries harmonize their fiscal policy with the Sustainable Development Goals and Africa's Agenda 2063 in order to attain economic transformation, inclusive growth, and macroeconomic stability.

Review of Related Literature
This study adopts a hybrid framework combining the Debt Overhang Theory and the Financial Instability Hypothesis, as both capture the dynamics of debt accumulation and its spillover effects on macroeconomic stability. In SSA, debt discourages investment by creating expectations of future taxation (Krugman, 1988; Sachs, 1989)

while also heightening systemic risks through pressures on exchange rates, inflation, and financial markets (Minsky, 1977; Reinhart, Rogoff, & Savastano, 2003). The debt overhang perspective emphasizes that once repayment obligations exceed repayment capacity, new investment declines because profits are directed toward debt service rather than reinvestment. Sovereign debt crises thus erode political, economic, and social stability (Rasheed & Tahir, 2024). The Financial Instability Hypothesis highlights how rising dependence on debt, especially under speculative or Ponzi conditions, can crowd out private credit, destabilize banks, and amplify systemic risk (Minsky, 1982). Fiscal mismanagement and external shocks further deepen these vulnerabilities (Izumi, 2020; Elom-Obed et al., 2017).

Empirical studies reveal mixed evidence. Reinhart and Rogoff (2010) argue that debt-to-GDP ratios above 90% hinder growth, though Herndon, Ash, and Pollin (2014) criticize their findings for selection bias. Other studies, including Calderón and Fuentes (2013), show that debt reduces growth unless supported by strong institutions and sound policies. Panizza and Presbitero (2013) contend there is no universal causal link, with impacts depending on country-specific conditions. Afonso and Alves (2014) note that debt service has a stronger negative effect on growth than debt itself, while Checherita-Westphal and Rother (2010) link rising debt ratios to declining per-capita GDP through reduced savings, investment, and productivity. Non-linear studies, such as Albu and Albu (2021) and Ngcobo et al. (2025), identify thresholds where debt transitions from growth-enhancing to growth-detrimental.

Findings also extend to financial stability. Agyapong et al. (2022) argue that moderate domestic debt can strengthen markets, but excessive borrowing raises interest costs and crowds out credit. Suhaibu et al. (2024) emphasize the role of macroeconomic conditions, while Melo-Becerra et al. (2015) link debt shocks to banking risks through inflation and interest rates. Ndikumana and Boyce (2011) highlight capital flight as a major drawback of Africa's foreign borrowing, offsetting potential benefits. More recently, Xu et al. (2022) show that external debt also affects environmental quality, while Hlongwane (2023) confirms its negative long-run effect on South African growth. Collectively, these findings underscore the dual role of sovereign debt: it can stimulate development under prudent management but undermines growth and stability once it surpasses sustainable thresholds.

Despite vast global studies, there are vast gaps in the Sub-Saharan Africa context. The majority of the studies emphasizes only economic growth and overlooks the financial stability aspect, which is particularly important against the backdrop of recent banking and currency crises in the region. The role of debt management policy, including fiscal responsibility laws and institutional reform, is not sufficiently incorporated in existing empirical frameworks. The impacts of recent debt restructurings events, such as Ghana's Domestic Debt Exchange and Zambia's

default, have not been thoroughly studied in peer-reviewed literature. Few employ dynamic models like the panel ARDL that identify both the short- and long-run impacts over time and countries, which makes this study particularly methodological. Moreover, less emphasis has been placed on the quest for mediating variables like debt management strategy, institutional quality, and policy reforms moderating debt's impact on growth and stability in Sub-Saharan Africa. This study, therefore, attempts to fill these silences through a robust, empirical, and contextual analysis which traces the complexities of debt in economic and financial channels in SSA.

Data and Methods

This study relies on secondary data drawn from reputable international sources and previous research on sovereign debt, economic growth, and financial stability. These materials provide the foundation for addressing the knowledge gap identified. As a country-level investigation, the study employs panel data cross-sectional time-series data capturing both spatial and temporal dimensions.

The data are sourced from credible institutions. The World Bank's World Development Indicators provide GDP growth, inflation, and other macroeconomic indicators. The International Monetary Fund supplies data on sovereign debt and financial stability, while the African Development Bank offers regional economic reports, and UNCTAD contributes information on debt sustainability and external sector dynamics. These databases are selected for their reliability, comprehensiveness, and relevance (Baltagi, 2008).

Variable selection is guided by established literature, ensuring consistency with existing studies while considering data availability. Past studies on sovereign debt and growth show that methodological choices particularly model specification strongly influence results (Bardsen et al., 2005). Balancing theoretical rigor with empirical applicability, this study aligns its theoretical framework with previous contributions (Getinet & Ersumo, 2020; Akram, 2017; Chirwa & Odhiambo, 2020; Yoong et al., 2020; Hlongwane, 2023).The central aim is to assess the impact of sovereign debt on economic growth and financial stability in Sub-Saharan Africa. It hypothesizes that rising debt alters the trajectory of both outcomes. To test this, the study applies a dynamic panel model, which incorporates lagged effects and captures the evolving interplay between debt, growth, and stability over time.

$$Y_{it} = \alpha + \beta_1 Y_{it} + \beta_2 SD_{it} + \beta_3 CV_3 + \mu_i + \varepsilon_{it} \quad \text{……………………………………………………….. 1}$$

Where:

Y_{it} is the dependent variable (economic growth or financial stability), for the cross sections over time.

SD_{it} is sovereign debt for the cross sections over time.

CV_{it} are control variables for the cross sections over time.

μ_i accounts for country-specific effects.

ε_{it} is the error term for the cross sections over time.

Panel Autoregressive Distributed Lag (ARDL) approach is a statistical technique for examining both short-term and long-term dynamical relationships between variables in panel data, involving several entities observed over time. It is flexible and reliable for empirical study since it can handle variables of various ordering and record temporal effects. In econometrics, this method is frequently employed to examine intricate dynamic correlations in data related to economic and financial development. The dynamic relationship between the independent and dependent variables can be thoroughly analysed using ARDL, and the moderating effect of the control variables on the dynamic relationship will be examined.

The panel ARDL model used in the analysis of the analysis has the following baseline form:

$$y_{it} = \alpha + b_1\tau_{t-1} + b_2\tau_{t-2} + \cdots + b_p\tau_{t-p} + \gamma\omega_{it} + \delta\theta_{it} + \varepsilon_{it} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots .2$$

Where:

y_{it} represents the dependent variable for the cross sections over time

τ_t is the independent variable

ω_{it} and θ_{it} are the control variables for the cross sections over time

α represent the intercept for the cross sections over time

ε_{it} is the error term for the cross sections over time

b_1, b_2, ..., b_p is the coefficients capturing the short-term impact on the dependent variable

γ and δ is the coefficients capturing the influence of the control variables on the dependent variable economic growth in Sub-Saharan Africa.

The panel ARDL model has been modified to incorporate the indicators for this objective, resulting in the presentation of dynamic models:

$$\Delta EGROW_{it} = \sum_{j=1}^{p-1} \lambda_j \Delta DMDT_{t-j} + \sum_{j=0}^{q-1} \delta_j \Delta DTSE_{t-j}$$

$$+ \sum_{j=0}^{q-1} \delta_j \Delta TROP_{t-j}$$

$$+ \sum_{j=0}^{q-1} \delta_j \Delta GOEX_{t-j} + \sum_{j=0}^{q-1} \delta_j \Delta FDI_{t-j} + \sum_{j=0}^{q-1} \delta_j \Delta INSQ_{t-j} + \varphi_i'[EGROW_{t-i}$$

$$- \{\beta_0 + \beta_1 DMDT_{t-1} + \beta_2 DTSE_{t-1} + \beta_3 TROP_{t-1} + \beta_3 GOEX_{t-1} + \beta_3 FDI_{t-1}$$

$$+ \beta_3 INSQ_{t-1}\}] + \varepsilon_{it} \dots \dots \dots \dots \dots \dots \dots \dots .3$$

Where:

'I' and 't' is the cross sections and time period respectively

EGROW is the economic growth rate of SSA countries

DMDT is the domestic debt of SSA countries

DTSE is the debt service of SSA countries

TROP is the trade openness of SSA countries

GOEX is the government expenditure of SSA countries

FDI is the foreign direct investment of SSA countries

INSQ is the institutional quality of SSA countries

ε is the error term

λ_j and δ_j is the short-run coefficients of the lagged dependent and explanatory variables respectively

Δ is the differencing operator

β_1–β_3, is the long-run parameters

β_0 is the constant term

φ is the speed of adjustment towards long-run equilibrium.

The first type of analysis will be descriptive statistical analysis, which is essentially to examine different variables that are thought to be important for the analysis of the objectives of the study. Additionally, the goal was to record the variables' fleeting behavioural patterns during the sample time. The analysis that will come next is the pre-estimation diagnostics tests, which take into account the panel unit root and panel cointegration tests to check for the series' stationarity and the long-term relationship, respectively. Furthermore, the Granger causality test of the Dumitrescu-Hurlin (DH) panel will be used to assess the causation impact in heterogeneous panel data sets. The analysis uses advanced panel data econometrics to gain robust and meaningful outcomes. Descriptive statistics and correlation matrices to explore first relationships. Panel unit root and co integration tests to establish whether long-run inferences are valid. Dynamic panel estimation through

the Autoregressive Distributed Lag (ARDL) model and Generalized Method of Moments (GMM) for robust testing. A diagnostic test must be performed on the data used in the study that includes a time-series element before any more statistical estimations are made. The power of unit root tests based on a single time series can be increased by employing panel data unit root tests, as traditional unit root tests like Dickey-Fuller (DF), augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) lack the ability to distinguish the unit root null from stationary alternatives (Maddala & Wu, 1999). Asymptotic features of panel regression analysis have been derived under the assumption that the time-series data for each member in the panel is weak, according to Levin & Lin (1992). Ideally, we should find that these time-series data are steady before proceeding with the estimation; otherwise, the findings may be erroneous (Kao, 1999).

According to these claims, the multiple panel unit root test must be used to determine the stationarity of the variables used in the study, taking into account the heterogeneity across individual specific effects and distinct patterns of residual serial correlations (Im, Pesaran & Shin, 2003). Various methods for the test of stationarity in panel analysis have been proposed in the literature to determine whether or not estimated variables have a unit root. These methods include ADF-Fisher (Maddala & Wu, 1999; MacKinnon, 1995), PP-Fisher (Barbieri, 2006), Levin, Lin & Chu (2002), and Im, Pesaran & Shin (2003).

In traditional time-series data, cointegration indicates a group of variables that are independently integrated of order one, and a linear combination of these variables can be considered stationary (Pedroni, 1999). Panel cointegration techniques are becoming more and more popular as a means of determining whether long-term relationships exist between these integrated variables when time-series and cross-sectional (panel data) dimensions are used in the study (Pedroni, 1995, 1997 & 2001; Persyn & Westerlund, 2008).

The Pedroni and Kao panel cointegration tests are the methods that will be taken into consideration for the panel cointegration test during the investigation. In particular, Pedroni (1995, 1997) put out several criteria for null or no cointegration in the analysis of heterogeneous panel data, which permits a significant amount of heterogeneity. Koa (1999) proposed an augmented Dickey-Fuller (ADF) test to test for the null hypothesis of no cointegration and residual-based tests for cointegration regression in panel data. Based on his earlier research, Pedroni (1999) claims that tests for the null hypothesis of no cointegration in heterogeneous panels have only been applied to straightforward bivariate cases. As a result, there is significant room for variation across panel members in the tests for the null of no cointegration for the situation with numerous regressors.

Presentation and Analyses of Data

First, the basic descriptive statistics of the estimated variables are presented in the table 1 below:

Table 1: Descriptive Statistics of the panel Data

Variable	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
EGRW	3.694	35.224	-50.248	5.237	-1.573	18.518	13851.62
FINS	-0.0007	22.571	-10.006	1.021	9.461	200.390	2172476.
DMDT	25.351	32.299	1.7356	3.476	-1.238	6.269	929.419
EXDT	70.872	581.119	3.895	65.946	2.734	13.442	7676.423
DTSE	18.811	24.091	13.287	1.872	0.055	2.928	0.945
FDI	2.942	46.275	-17.292	4.980	3.595	23.305	25635.50
GOEX	102.085	200.971	1.590	27.133	-1.913	8.471	2463.085
INSQ	28.815	86.058	0.980	17.965	0.761	3.085	128.425
TROP	59.531	165.049	0.659	30.552	0.981	3.968	264.312

Source: Researcher's Estimation using E-View

EGROW is annual percentage growth in real GDP;FINS is composite index comprising inflation, exchange rate volatility, and interest rate spreads measuring financial system stability; DMDT is domestic public sector debt as a percentage of GDP;EXDT is external public sector debt as a percentage of GDP;DTSE is debt servicing costs relative to total debt; TROP is trade openness measured as the sum of exports and imports as a percentage of GDP;GOEX is public spending as a share of GDP;FDI is the net inflows of foreign direct investment as a percentage of GDP;INSQ is institutional quality measured by regulatory quality.

The result in table1 provides descriptive statistics for the employed variables across Sub-Saharan African (SSA) countries. A detailed analysis offers insights into the distributional characteristics and central tendency of the research variables. The economic growth, with a mean of 3.69%, reflects modest average performance. However, the extreme range (–50.25% to 35.22%) and negative skewness (–1.57) indicate volatility, likely due to domestic and external debt crises, political instability, commodity price shocks in most countries in Sub-Saharan African (SSA).

The high kurtosis (18.52) suggests that abnormal growth contractions are not rare but recurrent, which undermines policy predictability and investor confidence. The financial system stability presents the most extreme non-normality (Skewness = 9.46; Kurtosis = 200.39). The index, which blends inflation, exchange rate volatility, and interest rate spreads, has a near-zero mean (–0.0007), underscoring chronic instability in the region's financial architecture. This is consistent with the frequent currency depreciations and inflation spikes observed in countries like Nigeria, Ghana, and Zambia. The volatility also reflects the structural underdevelopment of financial markets, limited capital buffers, and poor regulatory oversight.

The domestic public debthas a mean of 25.35% of GDP with moderate dispersion. The negative Skewness (–1.24) implies more frequent high debt episodes, such as observed in most Sub-Saharan African (SSA) countries, where domestic borrowing has been used to fund recurrent deficits. While not extreme, the high kurtosis (6.27) warns of debt sustainability risks, especially when interest costs rise. The external public debt stands out with a mean of 70.87% and very wide dispersion (Std. Dev = 65.95). With values as high as 581%, this suggests unsustainable borrowing by some countries, reflecting the debt distress status recently declared by Zambia and Ethiopia. The positive skewness and kurtosis reinforce this interpretation, indicating that debt levels far exceed prudent thresholds in several outliers. Debt servicing costs are relatively stable (Mean = 18.81%) and exhibit a near-normal distribution. This suggests that while debt volumes vary widely, the cost of debt servicing remains moderately predictable across most SSA nations though for some countries, external shocks are already distorting their capital budget and developmental plans.

However, foreign direct investment, with a mean of 2.94%, displays high volatility (Std. Dev = 4.98) and substantial asymmetry (Skewness = 3.59). While FDI remains critical for bridging capital gaps, its negative minimum (–17.29%) implies reversals, likely during conflict periods or when capital controls are imposed. This trend is visible in fragile states or resource-exporting countries suffering from boom-bust cycles. Government expenditure is high (Mean = 102.09%), reflecting large-scale fiscal operations relative to GDP. This could be due to high dependency on public sector spending in health, education, or infrastructure. However, the distribution is skewed left and leptokurtic, implying that a few countries maintain unusually low spending, possibly due to fiscal austerity or external conditionalities. Institutional quality and trade openness reflect broader structural variables. While institutional quality varies widely (Mean = 28.82%), the skewness and kurtosis imply that many countries still face weak regulatory environments. Trade openness (Mean = 59.53%) varies greatly as well, highlighting differing levels of global economic integration across SSA.

The correlation matrix in Table 2 provides essential insights into the linear relationships among key macroeconomic and institutional variables affecting Sub-Saharan African (SSA) economies.

Table 2: Correlation analysis of the panel Data

	EGROW	FINS	DMDT	EXDT	DTSE	FDI	GOEX	INSQ	TROP
EGRW	1								
FINS	0.038	1							
DMDT	0.094	-0.147	1						
EXDT	-0.173	0.067	-0.368	1					
DTSE	0.040	0.013	0.423	-0.101	1				
FDI	0.124	0.128	-0.035	0.123	0.006	1			
GOEX	0.015	-0.097	0.007	-0.069	-0.142	0.013	1		
INSQ	0.119	-0.061	0.066	-0.166	0.268	-0.022	0.087	1	
TROP	0.040	0.039	-0.173	0.106	0.134	0.221	0.365	0.268	1

Source: Researcher's Estimation using E-View

EGROW is annual percentage growth in real GDP; FINS is composite index comprising inflation, exchange rate volatility, and interest rate spreads measuring financial system stability; DMDT is domestic public sector debt as a percentage of GDP; EXDT is external public sector debt as a percentage of GDP; DTSE is debt servicing costs relative to total debt; TROP is trade openness measured as the sum of exports and imports as a percentage of GDP; GOEX is public spending as a share of GDP; FDI is the net inflows of foreign direct investment as a percentage of GDP; INSQ is institutional quality measured by regulatory quality.

The correlations are generally weak to moderate, reflecting the heterogeneity of policy environments, economic structures, and external vulnerabilities across the region. Economic growth is weakly and positively correlated with FDI (0.124) and institutional quality (INSQ = 0.119). This suggests that while foreign capital and better governance contribute to growth, their impact is often moderated by structural bottlenecks and absorptive capacity constraints. For instance, countries like Rwanda and Mauritius, which have improved institutional frameworks and actively attracted FDI, have seen steady economic expansion. Conversely, the negative correlation between economic growth and external debt with the value of –0.173indicates that excessive foreign borrowing, particularly in unsustainable forms, may suppress growth, and this is a concern relevant to heavily indebted countries like Zambia and Ethiopia, where debt servicing crowds out growth-enhancing investment.

The financial system stability index exhibits weak positive correlations with FDI (0.128) and EXDT (0.067), implying that external resources may support financial

deepening. However, a negative correlation with domestic debt (DMDT = −0.147) suggests that excessive domestic borrowing can undermine stability, likely through inflationary pressures or rising interest rates. Financial system instability has been a recurring issue in SSA, notably in Ghana and Nigeria, where high domestic borrowing has led to interest rate spikes, exchange rate volatility, and banking sector stress. Domestic public debt shows a moderate positive correlation with debt servicing costs (DTSE = 0.423), an intuitive relationship where higher debt levels increase the fiscal burden of servicing. This is a critical issue across SSA, where limited fiscal space is being squeezed further by rising debt costs. For example, Nigeria and Kenya's debt service-to-revenue ratio has risen sharply in recent years, constraining public investment. Interestingly, domestic and external public debt are negatively correlated (−0.368), suggesting a degree of substitution between domestic and external borrowing. Countries often switch financing strategies based on access, cost, and IMF conditionalities. For instance, Nigeria has pivoted between domestic and Eurobond markets depending on market conditions and currency pressures.

Trade openness is positively correlated with FDI (0.221) and government expenditure (GOEX = 0.365). This reflects the fact that more open economies tend to attract investment and spend more on trade-related infrastructure and services. Coastal economies like Kenya and Ghana, with established ports and logistics networks, illustrate this pattern. Institutional quality correlates positively with debt servicing costs (0.268) and trade openness (0.268), implying that stronger institutions are associated with better debt reporting, transparency, and integration into the global economy. However, the weak correlation with economic growth suggests that institutional reforms in SSA may still take time to translate into tangible growth benefits, particularly in low-capacity countries. On this note, these correlation patterns underscore the interdependence of fiscal policy, institutional strength, and global integration in shaping SSA's economic outcomes. However, the relatively low correlation coefficients also signal that non-linear dynamics, country-specific shocks, and unobserved structural factors play a substantial role, necessitating more advanced econometric modeling to capture causal relationships. **Next,** the results of the panel root test are presented in table 3below and the test is based on five test criteria. These variants tests attempt to determine the stationarity of the panel dataset and the order of integration at which these employed variables attained stationarity (does not have unit root) are indicated for the five outcomes. Conventionally, the null hypothesis assumes that variables have a unit root and the outcomes for the panel unit root test are based on the assumption of common and individual unit root process, which are attained at 5% level of significance. However, the decision rule for the position to accept null hypothesis that variable has a unit root or does not is supported by the outcomes of greater majority of the five criteria

such as Levin, Lin & Chu t, Breitung t-stat, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, and PP - Fisher Chi-square as highlighted in table 3 below.

Table 3. Panel Unit Root Test: Summary - Individual Intercept and Trend

Methods and Statistic						
Variable	[a]Levin, Lin & Chu t	[a]Breitung t-stat	[b]Im, Pesaran and Shin W-stat	[b]ADF - Fisher Chi-square	[b]PP - Fisher Chi-square	Order of Integration
EGRW	-8.798***	-8.629***	-11.465***	283.608***	1064.77***	1(0)
FINS	-4.330***	-2.195**	-4.443***	165.382***	182.988***	1(0)
DMDT	-11.290***	-10.102***	-12.918***	309.957***	802.829***	1(1)
EXDT	-15.006***	-12.126***	-14.575***	386.164***	1070.99***	1(1)
DTSE	-12.900***	-12.606***	-20.412***	492.632***	3393.28***	1(1)
FDI	-3.217***	-1.317*	-3.711***	143.777***	270.532***	1(0)
GOEX	-2.829***	-2.725***	-2.265**	103.049**	149.713***	1(0)
INSQ	-13.131***	-13.143***	-15.517***	373.627***	1465.21***	1(1)
TROP	-2.538***	-2.728***	-3.031***	116.599***	167.802***	1(0)

Source: Researcher's Estimation using E-View

EGROW is annual percentage growth in real GDP; FINS is composite index comprising inflation, exchange rate volatility, and interest rate spreads measuring financial system stability; DMDT is domestic public sector debt as a percentage of GDP; EXDT is external public sector debt as a percentage of GDP; DTSE is debt servicing costs relative to total debt; TROP is trade openness measured as the sum of exports and imports as a percentage of GDP; GOEX is public spending as a share of GDP; FDI is the net inflows of foreign direct investment as a percentage of GDP; INSQ is institutional quality measured by regulatory quality.
[a]Null: Unit root (assumes common unit root process),
[b]Null: Unit root (assumes individual unit root process)
*Significant at 10%, **Significant at 5%, and ***Significant at 1%.

The stationarity properties of macroeconomic time series play a critical role in determining the appropriate modeling approach for empirical analysis. Table 3 presents the results of five panel unit root tests such as Levin, Lin & Chu (LLC), Breitung, Im-Pesaran-Shin (IPS), ADF-Fisher, and PP-Fisher applied to a panel of Sub-Saharan African countries. These tests assess whether the variables are stationary in level [I(0)] or require differencing to achieve stationarity [I(1)], which has direct implications for regression analysis, causality tests, and long-run modeling.

The results indicate that economic growth, financial system stability, foreign direct investment, government expenditure, and trade openness are stationary at level, i.e., I(0). These variables exhibit short-run fluctuations that revert to a mean over time. For instance, economic growth in SSA despite being exposed to shocks from commodity prices, weather variability, and political instability displays mean-reverting behavior due to underlying structural adjustments and monetary stabilization programs adopted by many countries since the early 2000s. FDI and trade openness, both responsive to external factors such as global capital flows, exchange rate regimes, and trade agreements, are also found to be stationary. This suggests that while SSA economies remain vulnerable to external volatility, their FDI and trade positions do not display persistent trending behavior. This may reflect the impact of relatively stable regulatory regimes, regional integration under frameworks like the AfCFTA, and donor-supported reforms in investment climate and trade facilitation.

Conversely, domestic debt, external debt, debt servicing costs, and institutional quality are non-stationary in level but stationary after first differencing, that isI(1). These variables exhibit long-run trends, which is consistent with the developmental trajectory of many SSA countries. The accumulation of both domestic and external public debt reflects persistent fiscal deficits, increasing public investment needs, and weak revenue mobilization. For example, Ghana and Kenya have experienced a rising trend in domestic debt issuance to cover recurrent expenditures and infrastructure investment, a pattern mirrored in several other middle-income SSA economies. Institutional quality, being inherently structural and path-dependent, is understandably non-stationary. Institutional reforms such as judicial independence, regulatory enforcement, and anti-corruption frameworks evolve slowly over decades and are shaped by historical legacies, political will, and donor conditionalities. The slow-moving nature of institutional change in countries like Nigeria, South Sudan, or the Democratic Republic of Congo helps explain why this variable lacks short-run mean reversion.

The mixed order of integration where some variables being I(0) and others I(1) justifies the application of panel ARDL models and cointegration techniques like the

Pedroni test. These methods accommodate different integration orders and allow for the modeling of both short-run dynamics and long-run equilibrium relationships. This is particularly important in SSA, where economic policy must address both transitory volatility (inflation spikes) and structural problems (debt sustainability and weak institutions).On that note, the stationarity analysis reveals the dual nature of macroeconomic dynamics in SSA as certain policy-sensitive variables adjust quickly, while others display persistent trends. Understanding these properties is essential for reliable econometric modeling and for designing time-consistent economic policies tailored to the region's unique developmental challenges.

In addition, the outcomes of the Pedroni panel cointegration test are presented in table 4. Our Pedroni panel cointegration test was subject to satisfying the precondition for running panel cointegration model which states that variables must be non-stationary at level but when the variables are converted into first differenced then they become stationary. This position was highlighted in the previous section, where majority of the variables including DMDT and EXDT attained stationarity at first differenced. A cursory look at table 4 revealed that the results of the Pedroni panel cointegration test are significant at 1% and 5% level. The outcomes depicted strong evidence of panel cointegration among the variables for both panel and group.

Table 4: Pedroni Panel Cointegration Test Result

Model	Properties	Panel (within-dimension)				Group (between-dimension)		
		v-Statistic	rho-Statistic	PP-Statistic	ADF-Statistic	rho-Statistic	PP-Statistic	ADF-Statistic
EGRW & DMDT	Statistic	-1.500	-3.357***	-17.825***	-8.932**	-2.273**	-26.596***	-9.975**
	Weighted Statistic	-3.510	-2.834***	-19.817***	-9.999**			
FINS & DMDT	Statistic	-1.196	-1.955**	-16.856***	-5.619**	5.150	-6.578***	-1.395*
	Weighted Statis	-4.408	3.175	-6.184***	-3.538**			

	tic							
EGRW & EXDT	**Statistic**	-0.267	-2.966***	-16.608***	-16.378**	-1.889**	-20.959***	-19.886**
	Weighted Statistic	-0.341	-3.264***	-17.569***	-17.247**			
FINS & EXDT	**Statistic**	-5.215	-0.808	-10.074***	-0.539	5.753	-3.444***	-0.243
	Weighted Statistic	-4.562	3.227	-4.853***	-2.240**			

Source: Researcher's Estimation using E-View

EGROW is annual percentage growth in real GDP; FINS is composite index comprising inflation, exchange rate volatility, and interest rate spreads measuring financial system stability; DMDT is domestic public sector debt as a percentage of GDP; EXDT is external public sector debt as a percentage of GDP; DTSE is debt servicing costs relative to total debt; TROP is trade openness measured as the sum of exports and imports as a percentage of GDP; GOEX is public spending as a share of GDP; FDI is the net inflows of foreign direct investment as a percentage of GDP; INSQ is institutional quality measured by regulatory quality.
*Significant at 10%, **Significant at 5%, and ***Significant at 1%.

Panel cointegration analysis is a crucial step in econometric modeling when dealing with non-stationary time series data, particularly within a regional context like Sub-Saharan Africa (SSA), where economic variables often exhibit persistent trends and structural breaks. The Pedroni panel cointegration test, used in Table 4 of the dataset, is applied to test for long-run equilibrium relationships between selected macroeconomic indicators. This is particularly relevant for SSA, where issues such as debt sustainability, financial instability, and fluctuating growth trajectories remain central to development policy discourse. The Pedroni test provides seven statistics, grouped into two dimensions such as with in-dimension (panel statistics) and between-dimension (group statistics). Statistically significant results (particularly from the ADF and PP statistics) are used to infer the presence of cointegration.

For the economic growth and domestic public debtpair, both the panel and group ADF-statistics and PP-statistics are statistically significant at the 1% level. This strongly suggests that economic growth and domestic debt are cointegrated across SSA countries. Despite the short-run volatility in output, there exists a stable long-term relationship between domestic debt accumulation and real GDP growth. This finding is particularly relevant in the SSA context. Over the past two decades, many SSA countries have increasingly relied on domestic bond markets to finance public expenditure. For example, Kenya and Ghana have developed relatively active domestic debt markets, using treasury bills and bonds to raise capital. While this can support infrastructure development and service delivery, excessive reliance on domestic borrowing has also led to rising interest costs, crowding out private sector credit, and exacerbating inflationary pressures. The cointegration result suggests that these dynamics do not operate in isolation over time but have a systematic and enduring influence on the trajectory of economic growth. Moreover, this long-run association calls for prudent fiscal planning and sustainable debt management frameworks. Countries must balance short-term borrowing needs with long-term growth objectives, ensuring that debt-financed investments yield adequate returns to justify their costs.

The financial system stability and domestic public debtpair also shows strong evidence of cointegration. Both within-dimension and group-dimension ADF-statistics are significant at the 1% level. This indicates a long-run relationship between domestic debt levels and financial system stability in SSA. This relationship is intuitive as governments borrow domestically, the increased demand for funds can drive up interest rates, reduce credit availability for the private sector, and strain the liquidity of financial institutions. In SSA, where financial markets are shallow and often concentrated in a few commercial banks, government borrowing can quickly dominate the market. For instance, in countries like Nigeria and Zambia, high levels of domestic borrowing have been linked to rising interest spreads, exchange rate volatility, and weakened investor confidence. The long-run cointegration implies that financial system instability is not merely a product of short-term shocks but also structurally linked to public sector borrowing behavior. Therefore, effective regulation, improved debt transparency, and macroprudential frameworks are essential for mitigating these risks.

The economic growth and external public debt cointegration test also produces statistically significant results across all relevant statistics, particularly the ADF and PP-statistics in both dimensions. This confirms a long-term relationship between economic growth and external debt in SSA. This finding is historically grounded. Many SSA countries, particularly low-income economies, rely on external borrowing from bilateral, multilateral, and commercial sources to finance their budgets. While

such borrowing has the potential to support development through infrastructure financing, it has also led to recurrent debt crises when not matched with adequate economic growth. For instance, Zambia's 2020 default on its Eurobond repayments and Ethiopia's recent debt distress reflect how external borrowing, if mismanaged or subject to adverse external shocks (global interest rate hikes or commodity price crashes), can derail economic growth. The cointegration result underscores the structural dependency of growth on external financing, highlighting the importance of aligning debt accumulation with export performance, revenue generation, and productivity-enhancing investment. Moreover, the debt-growth relationship is shaped by the terms and conditions of borrowing. Concessional loans from multilateral lenders (for example, the World Bank) often have less destabilizing effects than commercial loans. The long-run cointegration thus also reflects the composition and maturity profile of external debt in SSA.

The financial stability and external public debtpair shows mixed evidence of cointegration. While some statistics (notably the PP-statistic) are significant, others are not. This suggests a weaker or less consistent long-run relationship between financial stability and external debt, compared to domestic debt. This weaker relationship may be due to the indirect nature of external debt's transmission mechanism. Unlike domestic debt, which directly affects domestic interest rates and banking liquidity, external debt influences financial stability more subtly through exchange rate pressures, foreign reserve adequacy, and credit ratings. Moreover, many SSA countries benefit from debt relief or concessional terms that temporarily shield them from the full burden of external debt. Nevertheless, episodes of external debt distress in some SSA countries such as in Mozambique, where undisclosed loans triggered a financial crisis demonstrate that the risks are real, even if not universally experienced. The partial cointegration results may reflect the heterogeneity in SSA countries' external debt profiles and their exposure to global financial cycles.

On this note, the Pedroni cointegration results demonstrate robust long-run relationships between debt variables (both domestic and external) and macroeconomic outcomes, specifically economic growth and financial stability in Sub-Saharan Africa. These findings carry significant policy implications. The outcomes justify the use of long-run econometric modeling techniques, such as panel ARDL and fully modified OLS, to capture these relationships. From a policy perspective, SSA countries must prioritize sustainable debt strategies, enhance institutional frameworks, and improve macroeconomic resilience. Sound public financial management, active debt monitoring, and transparent fiscal reporting are not just short-term necessities but long-term imperatives for inclusive growth and financial system stability.

The Panel ARDL results are shown in table 5 below.

Table 5: Panel ARDL Results

Variable	Coef.	Std. Err.	t-Statistic	Prob.
Long-run estimate				
DMDT	0.107	0.041	2.629	0.009
DTSE	-0.565	0.069	-8.129	0.000
FDI	0.105	0.021	4.916	0.000
GOEX	-0.021	0.009	-2.283	0.023
TROP	0.009	0.007	1.285	0.200
INSQ	0.104	0.011	9.416	0.000
Short-run estimate				
ECT	-0.810	0.121	-6.669	0.000
D(EGROW(-1))	-0.035	0.092	-0.377	0.707
D(EGROW(-2))	0.017	0.070	0.250	0.803
D(EGROW(-3))	0.043	0.071	0.610	0.542
D(DMDT)	1.319	2.594	0.508	0.611
D(DMDT(-1))	2.170	2.286	0.950	0.343
D(DMDT(-2))	-3.624	4.114	-0.881	0.379
D(DTSE)	1.606	0.632	2.540	0.011
D(DTSE(-1))	1.037	0.568	1.827	0.069
D(DTSE(-2))	0.633	0.744	0.850	0.396
D(FDI)	0.040	0.223	0.181	0.856
D(FDI(-1))	0.066	0.246	0.270	0.788
D(FDI(-2))	0.534	0.269	1.983	0.048
D(GOEX)	-0.118	0.083	-1.425	0.155
D(GOEX(-1))	0.085	0.065	1.311	0.191
D(GOEX(-2))	-0.069	0.106	-0.653	0.514
D(TROP)	0.056	0.033	1.684	0.093
D(TROP(-1))	-0.072	0.067	-1.076	0.283
D(TROP(-2))	-0.030	0.047	-0.646	0.518
D(INSQ)	0.123	0.109	1.130	0.259
D(INSQ(-1))	-0.003	0.108	-0.023	0.981
D(INSQ(-2))	0.196	0.101	1.947	0.052
Intercept	8.170	1.247	6.554	0.000

The estimation outcomes in table5 presents Panel Autoregressive Distributed Lag (ARDL) model results exploring the impact of domestic public debtonreal economic growth in SSA countries. The ARDL model is particularly appropriate in this context due to the mixed order of integration of the variables (both I(0) and I(1)), as established in table 5 via panel unit root tests.

The ARDL framework permits simultaneous estimation of short-run dynamics and long-run equilibrium relationships, which is ideal for analyzing how immediate policy shifts (e.g., increased borrowing) differ in impact from longer-term structural trends (for example, institutional quality or trade openness). This is particularly valuable in SSA, where policy effects often materialize with lags due to administrative constraints, implementation inefficiencies, and structural bottlenecks. The long-run coefficients reported in table5 reflect the steady-state impact of key explanatory variables on economic growth such as domestic public debts and the employed control variables. The coefficient on DMDT is positive and statistically significant, indicating that in the long run, a 1 percentage point increase in domestic public debt is associated with a 0.107 percentage point rise in real GDP growth. This supports the hypothesis that domestic borrowing can finance productive public investment in SSA, especially when external debt access is limited or risky due to foreign exchange constraints. This finding is consistent with experiences in SSA countries like Kenya, Ghana, and Nigeria, where governments have increasingly relied on domestic financial markets to raise funds for infrastructure and social investment. For example, Kenya's use of infrastructure bonds has helped finance key road and energy projects. When efficiently allocated, such spending can enhance productivity, create jobs, and stimulate growth. However, this relationship is conditional. The positive impact depends on the nature of expenditures financed through debt. Investment in human capital or productive infrastructure contributes to long-term economic growth, whereas excessive borrowing for recurrent spending (public wages or subsidies) can undermine fiscal sustainability and fail to produce growth dividends.

The coefficient on DTSE is negative and highly significant (−0.565), confirming that rising debt servicing costs reduce economic growth. This reflects a crowding-out effect, where scarce fiscal resources are diverted from investment to debt repayment. In many SSA countries, domestic debt carries higher interest rates than concessional external loans, making debt service burdensome. For instance, in Ghana, domestic debt interest payments account for a substantial portion of the budget, limiting resources for health, education, and infrastructure. This finding underscores the importance of not just the volume, but the cost and structure of debt in determining its macroeconomic consequences.FDI (0.105) and institutional quality (INSQ = 0.104)both exhibit strong positive effects on growth. These variables are

critical complements to domestic borrowing given that better institutions and stable investment climates enhance the efficiency of public spending and the private sector's response to fiscal policy. Government expenditure has a negative long-run coefficient (–0.021), suggesting that aggregate government expenditure, when poorly targeted or dominated by consumption, may not support growth. This is a cautionary signal for SSA policymakers to reallocate spending toward productive capital investment. Trade Openness (TROP) has an insignificant impact in the long run. This could be due to SSA's limited value-added exports and heavy reliance on commodity markets, which are vulnerable to global shocks and do not consistently support long-term structural transformation.

The short-run estimates capture immediate impacts and help assess the speed of adjustment to the long-run equilibrium. The coefficient of the error correction term (–0.810)is negative, large, and statistically significant, indicating that over 81% of any short-run deviation from the long-run equilibrium is corrected within one period. This implies a high speed of adjustment, suggesting that SSA economies tend to converge quickly to the long-term relationship between domestic debt and growth. Such rapid adjustment is encouraging, especially in countries pursuing fiscal reforms and structural adjustments under IMF-supported programs. Despite its strong long-run impact, domestic public debts do not exert a statistically significant effect on growth in the short run. This implies that fiscal expansions financed by domestic borrowing may not produce immediate growth dividends, possibly due to implementation delays, procurement inefficiencies, or political economy constraints. This finding reinforces the idea that the benefits of domestic debt materialize over time, contingent on governance and institutional capacity. The results of panel ARDL model showed that the parameter estimations for the employed variables have p-value less than 0.05 level of significant. This implies that domestic debt does have positive and significant impact on short- and long-term economic growth in Sub-Saharan Africa.

The coefficient on DMDT is –0.1721 and statistically significant at the 1% level. This suggests that a 1 percentage point increase in domestic debt reduces financial system stability by approximately 0.17 points on the financial stability index. The result underscores a long-run destabilizing effect of domestic debt accumulation in SSA. This aligns with real-world experiences in SSA countries like Zambia, Ghana, and Nigeria, where domestic borrowing has been associated with higher interest rate spreads, increased government absorption of private credit space, and rising inflation expectations. These dynamics erode banking sector confidence, distort lending behavior, and weaken monetary transmission.

The coefficient of 0.2930 for debt servicing cost is positive and significant, indicating that higher service is associated with stronger financial stability in the long run. This may reflect fiscal consolidation under IMF programs that tighten macroeconomic frameworks and boost investor confidence, or pro-cyclicality, where fiscally stronger governments can both service debt and maintain financial discipline. FDI also exerts a positive influence (0.0223), reinforcing financial stability by providing long-term capital and buffering domestic shocks, as seen in Rwanda and Mauritius, where sustained inflows enhanced banking innovation and currency stability. Trade openness shows a marginally negative effect (–0.0023), consistent with SSA's vulnerability to commodity price volatility, while government expenditure strengthens stability (0.0127) when directed toward financial infrastructure, credit schemes, and social safety nets. Institutional quality (0.0297) further reinforces systemic resilience through stronger regulation, anti-corruption measures, and sound governance.

The error correction term (–0.1999) is negative and significant, confirming long-run equilibrium and showing that about 20% of disequilibrium is corrected annually. This slow adjustment highlights rigidities in SSA's financial systems, often delayed by political or bureaucratic constraints. Short-run coefficients for domestic debt are insignificant, suggesting that its destabilizing effects are structural and cumulative rather than immediate, muted initially by temporary policy accommodations. The ARDL model addresses endogeneity and mixed integration, while its error correction structure provides a robust link between short- and long-run dynamics. Results confirm that domestic debt has a significant long-run influence on financial stability in SSA.

For external debt, the coefficient (–0.0044) is negative and significant, showing that higher levels reduce economic growth, supporting the debt overhang hypothesis. Rising debt service costs (–0.1916) further constrain productive spending, as in Zambia and Ghana, where servicing exceeds 30% of revenues. In contrast, FDI strongly boosts growth (0.37%), underscoring the value of non-debt financing, while institutional quality enhances long-term investment productivity. Trade openness and government expenditure remain growth-reducing when poorly managed, reflecting commodity dependence and consumption-heavy budgets. The large error correction term (–0.9062) indicates rapid adjustment, with 91% of disequilibrium corrected annually, while the short-run effect of external debt (–0.1110) shows immediate contractions through exchange rate depreciation and higher risk premiums. External debt also influences financial stability. A small but significant positive effect (0.003) suggests that well-managed borrowing can bolster reserves and strengthen markets, while debt servicing supports stability by signaling fiscal credibility, though unsustainably high costs risk long-term fragility. FDI and

institutional quality enhance resilience, while trade openness and government spending have mixed effects depending on structure and policy targeting. The adjustment term (–0.237) reflects moderate convergence, slowed by institutional and market inefficiencies. Short-run coefficients for domestic debt remain insignificant, showing that vulnerabilities accumulate gradually. Robustness checks using FMOLS confirm these dynamics, validating the consistency of ARDL estimates and underscoring the importance of debt composition, governance, and fiscal management in shaping growth and stability outcomes in SSA.

Impact of domestic debt on short- and long-term economic growth in Sub Saharan Africa

Table 6: Panel FM-OLS

Variable	Coef.	Std. Err.	t-Statistic	Prob.
DMDT	0.274	0.089	3.062	0.002
DTSE	-0.742	0.211	-3.521	0.000
FDI	0.135	0.037	3.628	0.000
TROP	0.029	0.013	2.216	0.027
GOEX	-0.041	0.018	-2.235	0.026
INSQ	0.057	0.022	2.623	0.009
R^2 0.105				
Adjusted R^2		0.073		

The FMOLS results confirm a positive and significant long-run relationship between domestic public debt and economic growth. A 1% increase in domestic debt raises GDP growth by about 0.27%, consistent with the Panel ARDL model. This suggests that domestic borrowing can support growth when directed toward capital investment, though recurrent spending and deficit monetization undermine stability by crowding out private credit, raising interest rates, and burdening fiscal space with high servicing costs. In countries like Ghana and Nigeria, reliance on treasury instruments has strained liquidity, limited private lending, and heightened sovereign exposure in banks. Foreign direct investment also shows a strong positive effect on growth, reflecting its role as a sustainable financing alternative that brings capital, technology, and managerial expertise. Rwanda and Mauritius illustrate this linkage through reforms that attract investment. Trade openness is positive and significant but reflects dependence on primary exports with limited value addition. Government expenditure, though marginally negative, points to inefficiencies when resources are absorbed by wages or subsidies rather than infrastructure. Institutional quality strongly enhances growth, amplifying the benefits of FDI and reducing the adverse effects of debt mismanagement.

The FMOLS findings further confirm that domestic public debt, while growth-enhancing, weakens financial system stability in the long run. A 1% increase in domestic debt reduces the financial stability index by 0.14 units, indicating that excessive borrowing undermines banking resilience by crowding out private credit and exposing banks to fiscal shocks. Debt servicing appears positive but requires caution, as long-term burdens often erode fiscal space and threaten stability. FDI supports stability, while institutional quality remains a stabilizing factor, though its effect is sometimes statistically weak. Trade openness is insignificant, underscoring the limited role of trade in financial resilience within SSA's commodity-dependent economies. External debt presents a more severe challenge. FMOLS results show that a 1% rise in external debt reduces long-run growth by 0.087%, consistent with debt overhang theory. Countries like Zambia and Ethiopia illustrate this burden, where high debt service erodes fiscal capacity, drives inflation, and worsens exchange rate volatility. Debt servicing is similarly negative, as many SSA governments spend over one-third of revenues on repayment, limiting social and capital investment. In contrast, FDI again proves growth-friendly, while institutional quality strengthens debt productivity and cushions its negative effects. Trade openness remains significant, but its benefits are weakened by export dependence on commodities.

On financial stability, external debt shows a small but significant positive impact, suggesting that carefully managed borrowing can bolster reserves and deepen markets. However, servicing costs erode this effect by exposing countries to exchange rate shocks, particularly when debt is foreign currency denominated. FDI enhances stability by diversifying capital sources and improving bank resilience, while government spending remains negatively associated with stability, reflecting inefficiencies and weak financial infrastructure investment. Institutional quality, though positive, is not consistently significant, highlighting governance gaps. Trade openness remains negligible, underscoring the shallow integration of SSA financial systems into global markets.

Overall, the FMOLS results reinforce earlier dynamic panel estimates: while domestic debt can support long-term growth, it destabilizes financial systems, and external debt largely hinders growth while posing mixed effects on stability. Policymakers must therefore prioritize prudent debt management, institutional strengthening, FDI promotion, and fiscal efficiency to balance growth financing with financial resilience.

Conclusion and Recommendation
This study critically examined the effects of sovereign debt, both domestic and external, on economic growth and financial system stability in Sub-Saharan Africa

(SSA). Using panel econometric techniques such as Panel ARDL and FMOLS, it provided short- and long-term insights into the debt-growth-stability nexus. The results show that domestic debt supports long-run growth but undermines financial stability, largely due to the crowding out of private credit, rising interest rates, and the heightened exposure of banks to sovereign risk. These dynamics have weakened capital formation and reinforced fiscal–financial fragility.

External debt was found to exert a negative long-term effect on growth, particularly in countries like Zambia and Ethiopia where non-concessional borrowing created heavy debt service burdens and foreign exchange pressures. FMOLS estimates reveal that each percentage increase in external debt reduces real GDP growth, especially when debts are foreign currency denominated without matching export growth. Yet external debt, when complemented by institutional quality and FDI, can strengthen financial stability and support development if strategically managed. Institutional quality emerges as a critical enabler by enhancing transparency, reducing corruption, and improving debt efficiency. Short-run effects are weak, confirming that debt outcomes unfold gradually and require consistent policy coordination.

The study underscores that unsustainable debt remains a constraint to SSA's macro-financial stability. While borrowing is necessary for development, it must be grounded in strong institutions, linked to productive investment, and governed by transparent fiscal practices. Many SSA countries still channel debt into recurrent expenditure, weakening growth impact. Effective debt management requires medium-term debt strategies, sustainability frameworks, and transparent reporting through regular debt bulletins. Borrowing should prioritize infrastructure, technology, energy, and human capital, guided by robust public investment management systems that ensure value-for-money and reduce inefficiencies.

Rising short-term domestic debt, particularly treasury bills, continues to crowd out private investment and destabilize banks. Governments should lengthen maturities, issue benchmark bonds, align debt issuance with fiscal flows, and attract non-bank investors to reduce concentration risks. The negative effects of non-concessional external borrowing call for a shift toward concessional financing, stronger negotiation capacity, and avoidance of resource-backed loans that deepen fiscal vulnerability. At the same time, domestic revenue mobilization must be expanded through broader tax bases, digitalized tax systems, and progressive taxation, as SSA's tax-to-GDP ratio remains far below global averages.

This study contributes significantly to the literature by integrating analysis of debt's effects on both growth and financial stability, areas often examined separately. It highlights how sovereign borrowing reshapes output performance while

simultaneously influencing the resilience of financial systems in a region where underdeveloped markets are increasingly exposed to sovereign risk. Building on these findings, further research should explore country-specific debt dynamics, the role of monetary policy in shaping debt outcomes, and deeper linkages between sovereign borrowing and financial sector indicators such as non-performing loans, credit growth, and capital adequacy.

References

1. Afonso, A., & Alves, J. (2014). The role of government debt in economic growth. ISEG-UTL Economics Department Working Paper, (16).
2. Albu, A. C., & Albu, L. L. (2021). Public debt and economic growth in Euro area countries. A wavelet approach. Technological and Economic Development of Economy, 27(3), 602-625.
3. Ando, S., Mishra, P., Patel, N., Peralta-Alva, A., & Presbitero, A. F. (2025). Fiscal consolidation and public debt. Journal of Economic Dynamics and Control, 170, 104998.
4. Akram, N. (2017). Role of public debt in economic growth of Sri Lanka: an ARDL approach. Pakistan Journal of Applied Economics, 27(2), 189-212.
5. Bardsen, G., Eitrheim, O., Jansen, E. S., & Nymoen, R. (2005). The Econometrics of Macroeconomic Modelling: Advanved Texts in Econometrics.
6. Baum, A., Checherita-Westphal, C., & Rother, P. (2013). Debt and growth: New evidence for the euro area. Journal of international money and finance, 32, 809-821.
7. Calderón, C., & Fuentes, J. R. (2013). Government debt and economic growth (No. IDB-WP-424). IDB working paper series.
8. Checherita-Westphal, C., & Rother, P. (2010). The impact of high and growing government debt on economic growth: an empirical investigation for the euro area (No. 1237).
9. Checherita-Westphal, C., & Rother, P. (2012). The impact of high government debt on economic growth and its channels: An empirical investigation for the euro area. European economic review, 56(7), 1392-1405.
10. Chirwa, T. G., & Odhiambo, N. M. (2020). Public debt and economic growth nexus in the Euro area: A dynamic panel ARDL approach. Scientific Annals of Economics and Business, 67(3), 291-310.
11. Chowdhury, M. A. F., Prince, E. R., Shoyeb, M., & Abdullah, M. (2024). The threshold effect of institutional quality on sovereign debt and economic stability. Journal of Policy Modeling, 46(1), 39-59.
12. Duru, I. U., Okorontah, C. F., Danjuma, I., Nwamuo, C., Promise, U. K., &Favour, O. T. (2023). Does public debt disrupt economic growth in Nigeria? A two-stage least squares approach. Economy, 10(1), 39-49.

13. Elom-Obed, F. O., Odo, S. I., Elom-Obed, O., & Anoke, C. I. (2017). Public debt and economic growth in Nigeria. Asian Research Journal of Arts & Social Sciences, 4(3), 1-16.

14. Getinet, B., & Ersumo, F. (2020). The impact of public external debt on economic growth in Ethiopia: The ARDL approach to co-integration. Journal of Economics and Sustainable Development, 11(11), 25-39.

15. Hlongwane, T. M. (2023). The consequential effects of public debt on economic growth in South Africa: An ARDL cointegration approach. Journal of Public Administration, Finance and Law, (27), 141-153.

16. Im, K., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. Journal of Econometrics, 115, 53–74.

17. International Monetary Fund. (2023). Regional economic outlook: Sub-Saharan Africa.

18. Lawal, F. C., Onwumere, J. U. J., Kalu, E. U., Onyejiaku, C., & Ukpere, W. I. (2024). Responsiveness of the stability of the financial system to fiscal shocks: A Sub-Saharan Africa (SSA) perspective. Innovations, (78), September 2024. www.journal-innovations.com.

19. Izumi, R. (2020). Financial stability with sovereign debt. Journal of Financial Stability, 51, 100795.

20. Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. Journal of Econometrics, 90, 1–44.

21. Krugman, P. (1988). Financing vs. forgiving a debt overhang. Journal of Development Economics, 29(3), 253–268.

22. Levin, A., & Lin, C. (1992). Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties. University of California Discussion Paper 92-23, (May).

23. Levin, A., Lin, C., & Chu, C. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. Journal of Econometrics, 108, 1–24.

24. Mackinnon, J. G. (1995). Numerical Distribution Functions for Unit Root and Cointegration Tests. Queen's Economics Department Working Paper, (918).

25. Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. Oxford Bulletin of Economics and Statistics, Special Issue, 0305-9049, 631–652.

26. 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.

27. Martella, R. C., Nelson, R, & Marchand-Martella, N. E. (1999), Research Methods: Learning to Become a Critical Research Consumer. Boston: Allyn and Bacon.

28. Melo-Becerra, L. A., Ramos-Forero, J. E., & Zárate-Solano, H. (2015). Sovereign bond markets and financial stability in an emerging economy: an application of

directed acyclic graphs and SVAR models. *Macroeconomics and Finance in Emerging Market Economies, 8(3)*, 306-319.

29. Mencinger, J., Aristovnik, A., & Verbic, M. (2014). The impact of growing public debt on economic growth in the European Union. *Amfiteatru Economic Journal, 16(35)*, 403-414.

30. Mitsi, D. (2025). Public Debt and Economic Growth after Covid-19 in Europe: Challenges and Policy Implications. *Review of European Studies, 15(4)*, 1-31.

31. Nattabi, P. K. (2025). Sustainable Development and Sovereign Debt: A Legal Perspective on Debt Sustainability for Africa. *East African Journal of Law and Ethics, 8(1)*, 41-62.

32. Ngcobo, T. S., Zungu, L. T., & Nkomo, N. Y. (2025). The dynamic effect of public debt on economic growth in the era of Macroprudential policy regime: A Bayesian approach. *International Journal of Development Issues, 24(1)*, 16-37.

33. Onwumere, J. U. J. (2005), *Business and Economic Research Methods*, Lagos: Don-Vinton Limited.

34. Pedroni, P. (1995). Panel cointegration; asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Revised Version of the Draft That Was Presented at the North American and European Econometric Society Meetings in Quebec and Maastricht Respectively during the Summer of 1994, (June)*, 1–41.

35. Pedroni, P. (1997). Panel cointegration - asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis: new results., 1-42.

36. Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics, Special Issue, (0305-9049)*, 653–670.

37. Petlele, O., & Buthelezi, E. M. (2025). Shocks of government bonds and yield impact economic growth in South Africa. *Cogent Economics & Finance, 13(1)*, 2448219.

38. Rasheed, M., & Tahir, M. (2024). Sovereign Debt Crises: Impact on Domestic Governance, Political and Economic Stability. *Journal of Development and Social Sciences, 5(2)*, 490-497.

39. Reuters. (2020, November 13). Zambia becomes Africa's first pandemic-era sovereign default.

40. Salameh, H., Alodadi, A., & Alzubi, K. (2020). The effect of sovereign debt on economic growth: The case of oil-rich countries. *International Journal of Economics and Financial Issues, 10(2)*, 262-267.

41. Suhaibu, I., Bonye, F., & Abdullai, T. (2024). Financial Repression, Wellbeing and Financial Stability: The African perspective. *Forman Journal of Economic Studies, 20(02)*, 17-32.

42. Xu, W., Jahanger, A., Inuwa, N., Samour, A., & Ibrahim, S. S. (2022). Testing the impact of external sovereign debt on Turkey's ecological footprint: New evidence from the bootstrap ARDL approach. Frontiers in Environmental Science, 1010534.
43. Yoong, F. T., Latip, A. R. A., Sanusi, N. A., & Kusairi, S. (2020). Public debt and economic growth nexus in Malaysia: An ARDL approach. The Journal of Asian Finance, Economics and Business, 7(11), 137-145.