

Impact of Fiscal Indiscipline on External Debt in Sub Saharan Africa

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Abstract

Purpose: This study examines the impact of fiscal indiscipline on external debt in SSA.

Methodology: A panel analysis using a Random Effect Model with data spanning September 2009 to December 2020 was employed.

Results: The Results from the Random Effects Model (REM) indicate that the primary fiscal balance has a negative impact on external debt. This implies that a primary fiscal deficit raises external debt, whereas a primary fiscal surplus reduces external debt.

Conclusions: In estimating the impact of fiscal indiscipline on external debt, this study observed that primary fiscal balances significantly and negatively affect external debt; that is, the lower the primary fiscal balance to a deficit, the larger the external debt accumulated. The study concludes that fiscal indiscipline affects external debt in SSA.

Limitations: The study's scope was limited to periods with available data, acknowledging the potential impact of data quality on these findings.

Contributions: This study guides policymakers and governments of SSA countries by providing possible ways to maintain a balance between government revenues and expenditures.

Novelty: This study offers actionable recommendations for policymakers in Sub-Saharan Africa, emphasizing the need for balanced government revenues and expenditures to promote economic stability. Focusing on sub-Saharan Africa addresses a significant gap in the literature and sets the foundation for future research on effective economic strategies in developing countries. Overall, the findings of this study are essential for enhancing fiscal policies and promoting economic resilience in the region.

Keywords: *External Debt, Fiscal Indiscipline, Sub Saharan Africa*

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1. Introduction

Fiscal policy is one of the tools that most countries implement to stimulate sustainable economic growth and drive the economy towards the attainment of basic economic objectives (Ozili, 2024). The three main tools that constitute fiscal policy are taxation, government spending, and transfer payments. Fiscal policies can either be expansionary, that is, increasing government expenditure, reducing taxes, or adopting both strategies simultaneously, and the reverse is true for a contractionary fiscal policy. In most cases, expansionary fiscal policy may result in a fiscal deficit, where government expenditures exceed government revenues. Governments facing fiscal deficits may be forced to borrow funds to finance their deficits, which may increase debt to higher levels that are unsustainable. Focus-Economics.com (N.D.) defines external debt as the part of a country's total debt that is owed to foreign lenders.

External debt is associated with vulnerabilities that may lead to debt crises because central banks cannot print hard currency to repay the debt. During the COVID-19 pandemic, borrowed funds were instrumental in cushioning its economic impact. This study focuses on external debt because, unlike domestic debt, it transfers resources out of the country and can generate a transfer problem ([Keynes, 1929](#)). The debt crisis in Sub-Saharan Africa (SSA) has recently been recognized as a global economic issue. [Anochiwa and Maduka \(2015\)](#) stated that the SSA debt crisis worsened during the 1980s as its debt to GNP ratio escalated from 51% in 1982 to 100% in 1992. To reduce the debt burden faced by poor countries to sustainable levels, the IMF, together with the World Bank (WB), designed the Highly Indebted Poor Countries Initiative (HIPC) in 1996.

The initiative was developed to help developing countries manage and service their external debt and ensure that low-income countries do not face too much external debt that they cannot manage. As of June 2021, 32 of the 38 countries identified as highly indebted and poor and considered eligible for debt relief funds are SSA countries. In 2005, the Multilateral Debt Relief Initiative (MDRI) was developed to supplement the HIPC initiative. The main objective of the MDRI was to deepen debt relief to HIPCs by providing total cancellation of eligible countries' debts owed to the African Development Fund (ADF), WB, and IMF. In addition, the MRDI was also to ensure that those additional resources from donors, which were meant for development, were allocated efficiently among low-income countries based on their policy performance ([Manasseh et al., 2022](#)). However, even though the two initiatives helped reduce most SSA countries' debt burdens, most of these countries experienced an increase in debt accumulation after the 2009 global economic crisis. [Ncube and Brixiová \(2015\)](#) suggest that Africa's debt accumulation increased because of the weakened fiscal and current account balances experienced by most countries soon after the global financial crisis.

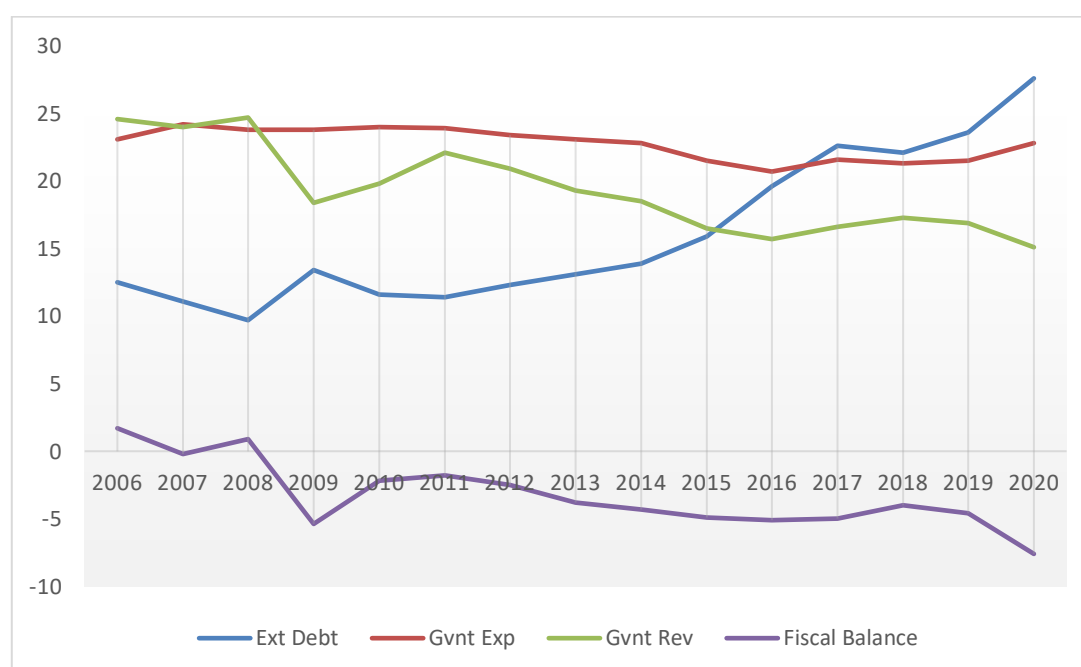


Figure 1. Trends of SSA external debt and primary fiscal balances (% of GDP)

Figure 1 shows the upward-trending external debt position for SSA from 2006 to 2020. During the year ended December 2009, the world was hit by a global financial crisis, which plummeted SSA's average government revenue from an annual average of 24.7% to 18.4%. However, government expenditure was not significantly affected, moving from 23.8% to 24% of GDP on average. Against this backdrop, the region experienced a slump in its fiscal balance from a surplus of 0.9% of its GDP to a deficit of -5.4% on average. However, during 2010 and 2011, government revenue firmed and closed the year 2011 at an annual average of 22.1%. The improvement in government revenue was underpinned by increases in tax rates as the economies implemented measures that were meant to curb the effects of the financial crisis.

The improvement in government revenue boosted the fiscal balance to a better level, even though it remained at a deficit of -1.8%. From 2011 to 2016, government revenue reversed gains, closing at 15.7% at the end of 2016. Similarly, government expenditure also eased during the same period to a closing average of 20.7% by 2016. In 2020, the fiscal balance, which was already registering deficits, was subdued from -4.6% at the end of 2019 to -7.6% on average. This was buoyed by a reduction in government revenue from 16.9% in 2019 to 15.1% in 2020, whereas the average government expenditure increased from 21.5% to 22.8%. The opposite movement direction of government expenditure and revenue was underpinned by the need to finance the effects of the Covid-19 pandemic.

SSA countries external debt has become alarmingly high, significantly affecting their economic stability and growth. The trends in the study background indicate that after the world was hit by a global financial crisis in 2009, SSA's fiscal balance deteriorated from a surplus to a deficit due to an increase in government expenditures that exceeded government revenue. [Mupunga and Ngundu \(2020\)](#) suggest that the increase in government debt was substantiated by waning GDP growth and increased borrowing on the international market, which deteriorated the primary fiscal balance from a surplus recorded from the early 2000s to 2008 to a deficit from 2009. During 2010 and 2011, the region's external debt slightly eased by 2% from an annual average of 13.4% at the end of 2009 to 11.4% at the end of 2011, as a result of an improvement in fiscal balances. Since then, the average external debt for SSA increased gradually to 22.6% by the end of 2017. According to [Mapuvire \(2023\)](#), external debt eased in 2018 to 21.1% and started increasing to a period maximum of 27.6% during the year ended December 31, 2020, probably due to the need for funds to curb the effects of the coronavirus.

SSA countries have borrowed more money under different governments, and the current administration is asking for more debt relief owing to the economic impact of COVID-19. This alarming trend has persisted in recent years and has raised concerns among analysts, prompting questions about whether the country is broke or heading toward insolvency. The landscape of SSA countries debt has shifted in recent years, with a significant move toward commercial financing routes. Although these sources are vital for plugging fiscal gaps, they are a double-edged sword because of their soaring interest rates and shorter windows for repayment, thus compounding the challenge of maintaining debt sustainability. [Hartanto, Radiman, and Adhani \(2020\)](#) argue that the increasing cost of debt servicing consumes a considerable portion of government revenues, leaving small portions for relevant sectors such as healthcare, education, and infrastructure. This situation limits public investment, hinders the government's ability to achieve development objectives, and deepens fiscal challenges.

As postulated by [Yuan, Rao, and Shi \(2019\)](#), the increased debt burden raises severe concerns about the crowding out effect, where essential economic activities such as investment in infrastructure development, education, health care, education and housing are sidelined due to high debt servicing costs, leading to reduced public investment and lower productivity. This situation could hinder domestic capital formation and limit the availability of essential services, thus hampering economic growth and possibly worsening social inequalities (Ijirshar et al, 2016). In line with this, more questions have been raised regarding the region's external debt sustainability. Unsustainable external debt levels are a significant threat to any economy, as they may hinder economic growth through the risk of capital flight. This study focuses on external debt because, unlike domestic debt, it transfers resources out of the country and can generate a transfer problem ([Keynes, 1929](#)).

To the best of the researcher's knowledge, no current study has investigated the impact of fiscal balances on external debt using a panel of SSA countries. Thus, this study aims to fill this research gap by conducting research using a panel of 20 selected SSA countries. This study also determines the contribution of fiscal indiscipline to external debt in SSA. The background indicates that rising government expenditures lead to an increase in external debt; therefore, this study hypothesizes that there is a negative relationship between fiscal indiscipline and external debt. The remainder of the paper is organized as follows: the following section reviews both empirical and theoretical literature relating to the study. Section 3 discusses the methodology used in the study, specifying the model used and the diagnostic tests that shall be carried out. Section 4 presents the interpretation of results obtained from regression analysis and diagnostic tests and offers conclusions and policy recommendations.

2. Literature Review

Despite the issues associated with foreign debt, its importance in government activities cannot be overemphasized. [Ogonegbu and Kagwaini \(2025\)](#) explained that how borrowed funds are used makes a huge difference; smart investments in infrastructure and human development can reduce these adverse effects on economic growth. The debt overhang theory provides a theoretical framework for understanding these challenges. It posits that when a country's debt exceeds its repayment capacity, it creates an environment of uncertainty and pessimism among investors ([Dawood, Feng, Ilyas, & Abbas, 2024](#)).

Anticipating that future revenues will primarily be used to repay existing debt rather than to finance productive investments, domestic and foreign investors may withhold investment, thereby stifling economic growth ([Krugman, 1987](#)). Many SSA countries are faced with huge budget deficits characterized by low sources of income and a persistent increase in government expenditures. Therefore, to meet the ever-increasing population's needs, the government has borrowed both locally and internationally. The adverse effect of using monetary and fiscal policies to eliminate economic problems leads to external borrowing to provide adequate funds without causing inflationary pressure or further deteriorating the economic situation through an increase in taxes. However, the use of foreign debt does not come without its resultant effects, as economic scholars continually link several variables to huge foreign debt.

2.1 Theoretical Review

2.1.1 Ricardian Equivalence Theory (RET)

The theory was developed by [Ricardo \(1955\)](#) and later elaborated on by [Barro \(1991\)](#). The theory is based on the notion that, as a way of stimulating their economies, governments adopt two main measures: increasing borrowing and implementing tax cuts, which are in turn financed through borrowing. The theory argues that if the government increases its expenditure by borrowing funds, it must increase its current or future taxes or enter into a deficit to raise funds to pay back the debt. In other words, the theory argues that deficits and taxes are equivalent methods of financing public debt.

2.1.2 The Debt Overhang Theory (DOT)

Debt Overhang Theory Debt overhang occurs when an entity, such as a corporation, government, or household, accrues an overwhelming amount of debt, making it challenging or unfeasible to secure further loans to finance new initiatives or growth ([Asogwa, Okechukwu, & Onyekwelu, 2018](#)). For countries, a debt overhang arises when their total debt exceeds their future ability to pay it off. According to [Swamy \(2015\)](#), the theory of debt overhang was first prominently discussed by [Myers \(1977\)](#) in the context of corporate finance in his seminal 1977 paper titled "Determinants of Corporate Borrowing." Myers introduced the concept to explain how excessive debt could affect a company's investment decisions, specifically, how it could deter new investments even if the projects were profitable. This framework has since been extended to analyze issues related to sovereign debt and other areas. The debt overhang theory posits that high levels of external debt can deter economic growth by discouraging domestic and foreign investment. This is because future revenues are anticipated to repay existing debts rather than to finance productive investments ([Krugman, 1987](#)). This theory is particularly relevant to SSA countries, where high debt levels could crowd out private investment.

[Manasseh et al. \(2022\)](#) noted that the Debt Overhang Theory emphasizes how excessive debt discourages investment due to fears that future revenues will be diverted toward debt servicing, thereby hindering economic growth and corporate investment decisions. However, critics argue that the Debt Overhang Theory oversimplifies the complex relationship between debt and economic growth. For instance, [Gómez-Puig, Sosvilla-Rivero, and Martínez-Zarzoso \(2022\)](#) observed that countries with strong governance and institutional frameworks can sustain higher debt levels without significantly damaging growth, while weaker systems remain highly vulnerable. [Turan and Yanikkaya \(2021\)](#) also emphasized that weak governance exacerbates the adverse effects of external debt, underscoring institutional quality as a key moderator of the impact of debt on growth.

Further complicating this dynamic, [Aladejare and Musa \(2024\)](#) found that governance quality influences whether public debt promotes or hinders growth, depending on a country's economic performance. Meanwhile, [Martín, Rojas, and Dabús \(2024\)](#) highlighted that moderate external debt can support growth, but excessive debt beyond critical levels is detrimental. This nuanced understanding suggests that while the Debt Overhang Theory rightly warns against excessive borrowing, it overlooks scenarios where debt, if carefully managed, can stimulate growth. The Debt Overhang Theory underscores the importance of prudent borrowing to avoid the pitfalls of excessive debt. It also highlights the need for improved governance and institutional quality to ensure that debt supports economic growth rather than hinders it in the long run. [Muhammad and Abdullahi \(2020\)](#) alluded that when debt repayments are too high, money is taken away from critical infrastructure, education, and healthcare, slowing economic progress.

From these theories, it is evident that countries rely on taxes or budget deficits to finance public and/or external debt. Raising taxes is seen as a sure way to raise the much-needed revenue to service debt. On the other hand, countries may, in place of taxes, run a budget deficit where expenditure exceeds revenues so as to generate revenues to finance the debt. However, all these measures have effects on the countries' growth and development prospects. On one end, increasing current or future taxes to finance debt might reduce investment and hence lower economic growth (indirect debt overhang). Alternatively, consumers might cut back on their current consumption in anticipation of higher future taxes, which negatively affects economic growth (direct debt overhang). However, some theorists believe that if borrowed funds are used productively, any increase in future taxes might be offset by positive returns on investment and economic growth. In such a case, countries that run a budget deficit to finance the development of infrastructure, for instance, are likely to be in a position to generate revenues in the long run that can be used to finance any debt accrued to finance that deficit. The following section reviews the existing literature on the impact of fiscal indiscipline on external debt.

2.2 Empirical Review

[Adekunle, Bekoe, Badmus, Anagun, and Alimi \(2021\)](#) examined the nexus between fiscal discipline and the budget process in Nigeria over the period from 1990 to 2020. The findings show that the level of fiscal discipline in Nigeria, as measured by two proxies of fiscal deficit and public debt gaps, is more enhanced under zero-based budgeting than under the current incremental budgeting system. The study established that civilian administrations are more prone to fiscal indiscipline than military dispensations. The paper also reveals the significant role of net foreign aid receipts in significantly narrowing fiscal deficit and public debt gaps in the short- and long-run, as well as the significant widening impact of an increasing government size on public debt in the long run. The study recommends, among others, the increasing need to restore fiscal discipline in public affairs through the reversion to a zero-based budgeting system.

[Evans \(2020\)](#) investigated the effects of fiscal discipline in the form of policy uncertainty, corruption, budgeting reforms, fiscal policy sustainability, and crowding-out on financial development and economic growth using the ARDL bounds testing approach for Nigeria for the period 1980-2017. The study shows that policy uncertainty, corruption, and fiscal deficits have a significant negative relationship with financial development and economic growth in the short and long runs. Higher levels of uncertainty, corruption, and fiscal deficits lead to reduced financial development and economic growth. In other words, fiscal policy crowds out financial development. In addition, debts have a significant negative relationship with financial development and economic growth in the long run, meaning that non-sustainable fiscal policy has damaging effects on financial development and economic growth in the long run. However, budget reforms have a significant positive relationship with financial development and economic growth in the long run. Furthermore, financial development has a significant positive relationship with economic growth in the short and long run, meaning that financial development is important for economic growth. These results support both the direct and indirect debt overhang hypotheses.

Furthermore, [Beyene \(2021\)](#) used the panel corrected standard error estimation technique to examine the relationship between external debt and its determinants for HIPC countries for the period 1990 to 2017. Their

results revealed that debt service, imports, and growth rates escalate external debt, while exports and foreign direct investment reduce it. In another study, Beyene used time-series data to investigate the drivers of external debt in Ethiopia from 1981 to 2016 using the autoregressive distributed lag model. Their findings indicate that the trade deficit, saving-investment gap, fiscal deficit, and debt servicing increase external debt, while the real GDP growth rate, trade openness, and inflation negatively affect external debt. These findings support the view of [Martín et al. \(2024\)](#), who argue that debt, if carefully managed, can stimulate growth, especially when used to finance development that attracts foreign direct investment and encourages future consumption.

[Muhammad and Abdullahi \(2020\)](#) examined the Impact of External Debt Serving and economic growth in Nigeria using the Autoregressive Distributed Lag (ARDL) model and data spanning from 1985 to 2018. Their findings revealed that external debt servicing negatively affects economic growth in the long run. This adverse effect was attributed to the depletion of government resources through debt repayment, which reduces the funding available for essential services and development projects. The results support the debt overhang hypothesis. Building on this perspective, [Ajayi and Edewusi \(2020\)](#) explored the heterogeneous effects of public debt on economic growth. Using advanced econometric techniques to analyze panel data across 115 countries from 1995 to 2016, they discovered contrasting effects: domestic debt positively influences economic growth, while external debt negatively impacts it in both the short and long terms.

This nuanced finding highlights the importance of debt composition and management in determining their developmental impact. Similarly, [Yusuf and Mohd \(2021\)](#) emphasize the need for strategic debt utilization, recommending that external debt be directed toward growth-enhancing sectors. A country can improve its repayment capacity by channeling borrowed funds to productive investments, such as infrastructure and industrial development, while fostering steady economic growth. These findings support the notion posited by [Aladejare and Musa \(2024\)](#) who found that governance quality influences whether public debt promotes or hinders growth, depending on a country's economic performance,

Although several studies have found a negative or positive relationship between public debt and economic growth, there has not been a strong conclusion on the subject, as countries in both developed and developing or emerging economies are distinctly peculiar in their own ways of managing debt and its application. In other words, the evidence points to the fact that the nature of governance and institutional quality determine the relationship between debt and budget deficits; thus, the relationship between these two variables is not cast in stone but has to be tested for different countries. Moreover, existing studies have focused more on the impact of external debt on economic growth than on the determinants of external debt or the effect of fiscal indiscipline on external debt. Therefore, this study focuses specifically on the impact of fiscal indiscipline on external debt, adding to the existing evidence in this area.

3. Methodology

The model used in this study was adapted from [Beyene \(2021\)](#) model. The correct model (REM, FEM, or pooled OLS) to be used in this study will be decided based on the diagnostic test results.

The following model was estimated:

$$\begin{aligned} \text{EXTD}_{i,t} = & \beta_0 + \beta_1 \text{PFB}_{i,t} + \beta_2 \text{RGDPG}_{i,t} + \beta_3 \text{EXTDLAG}_{i,t} + \beta_4 \text{DBTSERV}_{i,t} + \beta_5 \text{INFR}_{i,t} + \\ & \beta_6 \text{TB}_{i,t} + \beta_7 \text{FER}_{i,t} + \beta_8 \text{FDI}_{i,t} + \mu_{i,t} \end{aligned} \quad (1)$$

$$\begin{aligned} i &= 1, 2, 3, \dots, N \\ t &= 1, 2, 3, \dots, T \\ \mu_{i,t} &= \varepsilon_i + \gamma_t + \omega_{i,t} \end{aligned}$$

Where i represent the country and t represents time. External debt (EXTD) is defined as the part of a nation's total debt that is borrowed from foreign creditors. The external debt stock as a percentage of GDP is used to measure the level of external debt of a given country at a given time. PFB, RGDPG, EXTDLAG, DBTSERV, FER, TB, FDI and INF represents Primary Fiscal Balance, Real Gross

Domestic Product Growth, Lagged External Debt, Debt Servicing, Foreign Exchange Reserves, Terms of Trade and Inflation Rate respectively. $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ Represent model parameters where β_0 is the intercept and all other remaining parameters are coefficients. Last but not least, μ_{it} is the stochastic random error term.

3.1 Data Type and Sources

This study uses annual macro panel data covering the period from 2009 to 2020. The data were obtained from the following data sources: the World Bank, International Monetary Fund, Global Economy, Trading Economics, and the central banks of the countries under review.

3.2 Diagnostic Tests

Diagnostic tests verified the model assumptions, enhanced the accuracy of the estimates, and ensured the reliability of the conclusions drawn from the data. By addressing potential issues early in the analysis, researchers can provide more robust and credible findings that can inform decision-making in various fields ([Kondo, Mutsvangwa, & Mandishekwa, 2025](#)). To obtain relevant and suitable findings, tests such as unit root tests and cointegration are used.

3.3 Panel Unit Root Test

The main importance of unit root testing is that it solves the problem of spurious regression ([Gujarati, 2009](#)). Due to the large cross-sectional dimension, the researcher assumes that the disturbances in the model are cross-sectional independent. The following tests will be used to test for panel unit root; Augmented Dickey Fuller Chi Square statistic, Philips Peron Chi Square, Levin, Lin and Chu statistic and Pesaran and Shin W statistic. The hypotheses of the tests are specified below:

H_0 : Panel unit root exists

H_1 : No panel unit root

Decision: The null hypothesis will be rejected if the p-value obtained from the test is less than 0.05, and the conclusion will be that the series is stationary.

3.4 Panel Co-integration test

According to [Maddala and Kim \(1998\)](#), a co-integration test is used to determine whether a long-run relationship exists between variables in a model. Non-stationary variables are co-integrated if their linear combination is stationary. In this study, the Pedroni Residual approach is used to test for co-integration, and the hypothesis of the test is specified below:

H_0 : Variables are not co-integrated

H_1 : The variables are co-integrated

Decision: The null hypothesis will be rejected if the p-value obtained from the test is less than 0.05 and conclude that the variables are co-integrated.

3.5 Hausman Test for Random Effects (1978)

The rationale behind the Random Effects Model (REM) is that it assumes no correlation between the random effects and the independent variables included in the model. It is important to determine whether such a correlation exists before deciding on the estimation technique to be used. Thus, if such a correlation exists, the REM is inappropriate, as it will result in inconsistent estimation of the regression coefficients; rather, the Fixed Effects Model (FEM) will be preferred. The Hausman test was used to test whether the research should use the REM or FEM, and the hypothesis is as follows:

H_0 : The random effects and the independent variables are not correlated

H_1 : The random effects and the independent variables are correlated

The Null hypothesis will be rejected if the p-value obtained from the test is less than 0.05 and conclude that the REM is not appropriate.

3.6 Breusch and Pagan Lagrange Multiplier test (1980)

Cross-sectional dependence is the most common problem in macro panels that cover long periods of over 20 to 30 years ([Baltagi & Baltagi, 2008](#)). The Breusch and Pagan LM tests are used to test for the

presence of both cross-sectional and time-series effects on the data. The results of the test will be used to decide between the Random Effects model and the pooled Ordinary Least Squares (OLS) regression model. Suppose that the error term in the model is represented by the following function:

$$\mu_{it} = \varepsilon_i + \gamma_t + \omega_{it} \quad (2)$$

Where $i = 1, 2, 3, \dots, N$, $t = 1, 2, 3, \dots, T$. ε_i represents the unobserved cross-sectional effects, γ_t represents the unobserved time series effects and ω_{it} is the random disturbance term. Therefore, the following hypothesis is tested:

$$\begin{aligned} H_0^\varepsilon : \sigma_\varepsilon^2 &= 0 \\ H_0^\gamma : \sigma_\gamma^2 &= 0 \\ H_0^{\varepsilon\gamma} : \sigma_\varepsilon^2 = \sigma_\gamma^2 &= 0 \end{aligned} \quad (3)$$

If any of the above null hypotheses are rejected, the Random Effect model will be preferred, and the pooled OLS model will be inappropriate.

4. Results and Discussions

All the diagnostic tests explained above will be carried out to satisfy the assumptions of the causal model, as emphasized by [Kondo and Mutsvangwa \(2025\)](#); [Diebold \(2017\)](#); [Gujarati \(2009\)](#). Diagnostic tests are presented, followed by the regression test results.

4.1 Descriptive Statistics

The summary statistics presented in Table 1 offer a critical foundation for understanding the underlying dynamics of the dataset, revealing the distinct characteristics and behaviors of each variable through a range of descriptive metrics.

Table 1. Summary statistics results

	DBTSRV	EXTD	EXTDLAG	FER	INF	PFB	RGDPG	TB	FDI
Mean	9.98	41.54	39.09	65.03	11.94	-5.59	3.75	-8.37	3.85
Median	6.18	32.47	31.30	37.44	5.55	-4.90	3.80	-10.60	2.51
Max	47.24	170.70	133.28	436.38	558.56	8.60	19.70	42.10	39.46
Min	0.49	4.95	4.95	0.26	-16.76	-17.30	-15.80	-49.10	-6.37
Std.dev	9.40	30.79	26.95	82.16	46.26	4.02	4.40	15.86	5.56

FER, with a mean of 65.03, demonstrated a remarkably high standard deviation of 82.16. This suggests that the FER experiences considerable fluctuations around its mean, implying a high degree of volatility. This volatility could stem from various factors, such as fluctuating market prices, unpredictable environmental conditions affecting agricultural production, and inconsistent policy implementation. Conversely, PFB, with a mean of -5.59 and a standard deviation of only 4.02, exhibits a much lower level of volatility, indicating a more stable behavior. This stability can be attributed to consistent policy frameworks, well-established market mechanisms, and relatively predictable environmental conditions.

The disparity between the mean and median values of certain variables provides further insight into their distribution. DBTSRV, with a mean of 9.98 and median of 6.18, displayed a positively skewed distribution. This skewness suggests that the data are influenced by a few high outliers, pulling the mean upwards. This could be due to occasional large debt service payments or unexpected financial shocks to the economy. A similar pattern is observed in INF, where the mean (11.94) is significantly higher than the median (5.55), indicating a distribution skewed towards higher inflation rates. This skewness may be attributed to periods of hyperinflation or significant economic instability.

The extreme value ranges and high standard deviations observed in the FER and EXTD point towards leptokurtic distributions. Leptokurtosis, characterized by heavier tails and a higher peak, suggests a

greater likelihood of extreme results. In the context of the FER, this implies that agricultural production is prone to significant shocks, such as severe droughts or floods, leading to dramatic fluctuations in output. For EXTD, this reflects the impact of external factors such as global economic crises, policy shifts, and global wars, leading to substantial variations in external debt.

Examining the monotonicity of the variables provides further insights into their temporal behavior. EXTD, with a wide range from 4.95 to 170.70, exhibited a lack of consistent trend, suggesting that its behavior is influenced by a variety of external and internal factors that change over time. This lack of a consistent trend could be due to fluctuating global economic conditions, changes in government borrowing policies, or variations in debt repayment capacities. In contrast, PFB, with a range from -17.30 to 8.60, demonstrated more stable behavior over time, indicating a more predictable pattern. This stability could be due to consistent policy frameworks and relatively stable economic conditions.

4.2 Panel Unit Root Test

In panel analysis, running a Panel Unit Root Test is essential to determine whether the variables in the dataset are stationary. Stationarity means that the statistical properties of a time series, such as the mean and variance, are constant over time. If the variables are non-stationary, meaning they contain unit roots, the regression results can be spurious, leading to misleading conclusions. This will also ensure that the data gathered are appropriately transformed, if necessary, before proceeding with further econometric analysis, thereby producing reliable and valid results, as shown in Table 2.

Table 2. Panel unit root test results

Variables	Levin, Lin & Chu Statistic	Im, Pesaran & Shin W-Statistic	ADF Fisher Chi-square Statistic	PP Fisher Chi-Square Statistic	Order of Integration
EXTD	0.0000***	0.0000***	0.0000***	0.0000***	I(1)
EXTDLAG	0.0000***	0.0000***	0.0000***	0.0000***	I(1)
PFB	0.0000***	0.0000***	0.0000***	0.0000***	I(1)
INF	0.0000***	0.0000***	0.0000***	0.0000***	I(0)
RGDPG	0.0000***		0.0005***	0.0005***	I(0)
FER	0.0000***	0.0038***	0.0016***	0.0008***	I(0)
DBTSRV	0.0000***	0.0000***	0.0000***	0.0000***	I(1)
TB	0.0000***	0.0015***	0.0013***	0.0273**	I(0)
FDI	0.0000***	0.0000***	0.0000***	0.0000***	I(0)

Notes (**) and (***) indicate that the variables are stationary at the 5% and 1% significance levels, respectively.

Table 2 shows that, except for EXTD, EXTDLAG, PFB, and DBTSRV, which are stationary after the first difference, the remaining variables are stationary at the level. Since some of the variables in the model are not stationary at the level, there is a need to test for cointegration to avoid the problem of nonsensical regression.

4.3 Panel Cointegration Test

The Pedroni Residual Panel Cointegration Test determines whether a long-run equilibrium relationship exists among the variables within a panel. Essentially, it checks whether the variables move together over time, even with short-term fluctuations. If the test indicates cointegration, it confirms that a stable, long-term relationship exists, meaning that despite individual variations, the variables will eventually revert to a common equilibrium. In essence, the Pedroni test establishes the foundation for understanding the enduring connections within panel data, allowing for more accurate and reliable economic analysis.

Table 3. Pedroni residual panel cointegration test results

	Statistic	Prob	Weighted Statistic	Prob
Panel v-Statistic	1.621567	0.0524	0.942768	0.1729
Panel rho-Statistic	0.880280	0.8106	1.001436	0.8417
Panel PP-Statistic	-4.606671	0.0000	-6.453536	0.0000
Panel ADF-Statistic	-4.699695	0.0000	-5.522168	0.0000

Table 3 shows that the p-values from the PP-Statistic are 0.0000 and 0.0000, which are less than 0.05. The p-values from the ADF Statistic are 0.0000 and 0.0000, which are also less than 0.05. The decision is to reject the null hypothesis, leading to the conclusion that the non-stationary variables in the model are cointegrated and there is a long-term relationship between the tested independent variables and the dependent variable.

4.4 Hausman Test for Random Effects

The Hausman test is a crucial diagnostic tool in panel data analysis used to decide between fixed- and random-effects models. It essentially helps determine whether the unobserved individual effects (differences between entities) are correlated with the independent variables in the model.

Table 4. Hausman test for random effects results

Test Summary	Chi Square Statistic	Chi Square d.f	Probability
Cross Section Random	15.302930	8	0.0535

Table 4 shows that the probability is 0.0535, which is greater than 0.05. Therefore, the conclusion is not to reject the null hypothesis, implying that the random effects are uncorrelated with the explanatory variables; thus, the REM is preferred.

4.5 Breusch and Pagan Lagrange Multiplier Test

The Breusch and Pagan Lagrange Multiplier (LM) test is a vital diagnostic tool in panel data analysis, specifically designed to detect the presence of heteroskedasticity in linear regression models. Heteroskedasticity means that the variance of the errors in a regression model is not constant across all observations. In the context of panel data, this test is used to determine whether there are significant differences in the variances of the errors across individual entities or cross-sectional units in the panel. When heteroskedasticity is present, the OLS estimators remain unbiased and consistent, but they are no longer the best linear unbiased estimators (BLUE). This implies that the standard errors of the coefficients are biased, leading to inaccurate hypothesis testing and potentially misleading conclusions.

Table 5. Breusch and pagan LaGrange multiplier test results

Test	Statistic	Probability
Breusch-Pagan LM	283.7176	0.0000
Pesaran scaled LM	4.807609	0.0000
Pesaran CD	-0.045040	0.9641

The results of the Breusch-Pagan LM in Table 5 show that the probability is 0.0000, which is less than 0.05. Therefore, the null hypothesis is rejected, and the conclusion is that there are neither cross-sectional effects nor time series effects in the data. Therefore, the REM is preferred as the best-estimation model.

4.6 Regression Results

Table 6. Random effects model regression results

Variables	Coefficient	Std. Error	t- Statistic	Prob
C	2.010762	1.887377	1.065374	0.2878
PFB	-0.250911*	0.149413	-1.679314	0.0944
EXTDLAG	1.009715***	0.027787	36.33802	0.0000

RGDPG	-0.749533***	0.136801	-5.479024	0.0000
INF	-0.027940**	0.012047	-2.319185	0.0213
FER	-0.007440	0.008254	-0.901376	0.3683
DBTSERV	0.212467***	0.074095	2.867498	0.0045
TB	0.072367*	0.039989	1.809673	0.0716
FDI	0.197336*	0.114151	1.728728	0.0852
R²	0.917801			
Adjusted R²	0.914954			
Probability (F-statistic)	0.000000			
Durbin-Watson statistic	1.751197			
F-Statistic	322.4045			

Note: (*), (**) and (***) indicate 10%, 5%, and 1% significance levels, respectively.

Table 6 indicates a strong model fit, with an Adjusted R² of 0.915 and a highly significant F-statistic of 322.40, suggesting that the model effectively explains the variation in external debt in Sub-Saharan Africa. Past external debt (EXTDLAG) has a strong positive and highly significant effect, highlighting the persistence of debt accumulation. The Primary Fiscal Balance (PFB) negatively affects external debt at the 10% significance level, indicating that fiscal deficits increase debt levels, while real GDP growth (RGDPG) and inflation (INF) negatively and significantly influence debt, showing that stronger economic performance and moderate inflation help reduce external debt. Debt servicing (DBTSERV) positively impacts debt accumulation, whereas variables such as Foreign Exchange Reserves (FER) are not significant. Overall, these results underscore the importance of fiscal discipline, economic growth, and debt management in controlling external debt.

Model:

$$\text{EXTD}_{i,t} = 2.010762 - 0.250911\text{PFB}_{i,t} + 1.009715\text{EXTDLAG}_{i,t} - 0.749533\text{RGDPG}_{i,t} - 0.027940\text{INF}_{i,t} - 0.007440\text{FER}_{i,t} + 0.212467\text{DBTSERV}_{i,t} + 0.072367\text{TB}_{i,t} + 0.197336\text{FDI}_{i,t} \quad (4)$$

4.7 Results Interpretation

The results of the analysis indicate a well-fitting model, reflected by an adjusted R² of 0.914954, suggesting that the model effectively explains the variation in external debt. The F-statistic of 322.4045, with a significance level of 1%, reinforces the model's feasibility. Additionally, a Durbin-Watson statistic of 1.751197 suggests minimal serial autocorrelation, further validating the model specification. Notably, a 1% improvement in the primary fiscal balance correlates with a 0.250911% reduction in external debt, with a p-value of 0.0944, indicating significance at the 10% level. The rising costs of debt servicing significantly strain fiscal resources, corroborate the Ricardian Equivalence and debt overhang theories, and could potentially impede long-term economic growth by consuming a substantial portion of the national budget and limiting public investment. As the primary fiscal balance becomes less negative, external debt decreases, echoing the findings of [Dey and Tareque \(2020\)](#).

The analysis also highlights a strong persistence effect in external debt accumulation, where a 1% increase in past external debt results in a 1.009715% increase in the current external debt. This near one-to-one relationship suggests a compounding cycle influenced by debt-servicing obligations. Concurrently, a significant negative correlation between real GDP (RGDP) and external debt is observed; a 1% increase in RGDP leads to a 0.749533% decrease in external debt, supported by a p-value of 0.0000. Economic growth enhances fiscal capacity, enabling better debt management and reducing reliance on external borrowing, consistent with the findings of [Chiminya, Dunne, and Nikolaidou \(2018\)](#); [Azolibe \(2021\)](#). Interestingly, inflation shows an unexpected negative relationship with external debt, where a 1% increase in inflation correlates with a 0.027940% decrease in external debt. This significant result, with a p-value of 0.0213, suggests that currency devaluation can lower the real value of foreign-denominated debt, facilitating debt reduction. Furthermore, the analysis reveals that a 1% increase in debt servicing contributes to a 0.212467% rise in external debt, significant at the 1% level, which aligns with [Beyene \(2021\)](#).

The findings also indicate a statistically significant positive relationship between trade balance and external debt, contrary to expectations; a 1% improvement in the trade balance is linked to a 0.072367% increase in external debt, likely due to the initial investments needed to support export growth. Similarly, foreign direct investment (FDI) is positively correlated with external debt, where a 1% increase in FDI corresponds to a 0.197336% increase in external debt. This relationship, suggested by a p-value of 0.0852, points to the need for infrastructure development and potential government guarantees on loans, consistent with [Waheed \(2017\)](#); [Chiminya et al. \(2018\)](#). The analysis finds that Foreign Exchange Reserves (FER) have an insignificant impact on external debt, with a p-value of 0.3683, indicating that fluctuations in reserves do not predict changes in external debt. This could stem from the government's prioritization of reserves for purposes such as import financing rather than direct debt management, which aligns with the findings of [Qian and Steiner \(2017\)](#). Overall, these results provide a comprehensive view of the intricate relationships that influence external debt in SSA.

5. Conclusions

5.1 Conclusion

This study concludes that fiscal indiscipline significantly affects external debt accumulation in sub-Saharan Africa (SSA). Lower primary fiscal balances, particularly deficits, lead to higher external debt. To break the recurring cycle of insolvency, SSA governments must prioritize disciplined fiscal behavior, reduce their reliance on external borrowing, and shift from expansionary consumption-based policies to targeted, high-multiplier investments. Strengthening institutions, enforcing legally binding fiscal targets, adopting debt ceilings linked to domestic revenues, and leveraging innovative financing mechanisms, such as PPPs and blended finance, can promote sustainable economic growth and debt management. Structural reforms and industrialization strategies are crucial for maintaining debt sustainability and achieving long-term macroeconomic stability.

5.2 Research Limitations

This study is limited by its focus on current fiscal indicators and cross-sectional debt data in the SSA. Other potential factors, such as political instability, global economic shocks, and sector-specific fiscal policies were not fully incorporated. Additionally, the analysis is constrained by the availability and reliability of secondary data from SSA countries, which may affect the generalizability of the results of this study.

5.3 Suggestions and Directions for Future Research

Future studies could expand the time horizon and apply advanced econometric techniques, such as the Generalized Method of Moments (GMM) or logit models, to capture the dynamic effects of fiscal policies on external debt sustainability. Incorporating additional variables, including political, environmental, and institutional factors, can provide a more comprehensive understanding of debt accumulation and its determinants in different SSA contexts.

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Author Contributions

TK conceptualized the study, designed the research framework, conducted the data analysis, and prepared the initial manuscript draft. VM contributed to data collection, processing, and literature review, and participated in revising the manuscript. PM provided critical supervision, validated the research findings, and performed a comprehensive review of the manuscript. All authors have read and

approved the final version of the manuscript and take full responsibility for the accuracy and integrity of the research reported in this paper.

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