**Analyzing the Implications of Public Debt on Budget Implementation in Sub-Saharan Africa: A Public Choice Theory Perspective**

**Abstract**

*This study investigated the implications of public debt on budget implementation in Sub-Saharan African countries. Specifically, it examined how the allocation of resources towards servicing public debt affects budget implementation, it assessed the extent to which budget deficits drive borrowing and their impact on the implementation of budgetary plans as well as analyzed how fluctuations in interest rates influence the sustainability of public debt spanning from 2012 to 2021. The population consisted of sixteen countries randomly selected from East, West, Central, and South regions of Sub-Saharan Africa based on GDP size as of December 2021. This study made use of secondary data through ex post facto research design and data were sources through World Bank indicator, utilizing panel data analysis techniques, including descriptive statistics, panel unit root analysis, Pearson correlation, and panel regression analysis (OLS, LSDV, and random effect models). The findings of this study reveal the significant positive relationship between actual debt servicing (ADS) and government final consumption expenditure (GFE) underscores the effective allocation of resources towards servicing public debt directly influences budget implementation. Secondly, while interest rates (INTR) and domestic debt (DDT) do not exhibit significant impacts on GFE, the mixed results regarding foreign debt (FDT) highlight the complex dynamics of borrowing patterns and their influence on budgetary plans. The significant impact of the exchange rate (EXTR) on GFE emphasizes the importance of external factors in shaping budget implementation, particularly in Sub-Saharan African countries where exchange rate fluctuations can significantly affect debt sustainability and fiscal stability. These findings underscore the multifaceted nature of budget implementation and highlight the interconnectedness between resource allocation for servicing public debt, borrowing patterns, and external factors such as interest rates and exchange rates in Sub-Saharan African countries.*

***Keywords:*** *Public debt; budget implementation; actual debt servicing; government final consumption expenditure; interest rates; foreign debt; domestic debt; foreign exchange rate*

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**1. Introduction**

The population growth of a nation inherently leads to an increased demand for essential infrastructure and social services, necessitating effective management strategies to optimize constrained resources (Adah & Akogu, 2019; Awotomilusi et al., 2024). One crucial tool in achieving this optimization is the government budget, which serves as a comprehensive plan for income and expenditures over a defined period, typically a year. The budget not only mobilizes and allocates resources but also determines resource distribution to implement new policies and initiatives through legitimate means (Olaoye & Akinola, 2019). In Sub-Saharan African countries, where the need for development is pressing, the significance of effective budget management cannot be overstated. However, despite substantial public borrowing and expenditures, the standard of living in many of these nations remains below average, raising questions about the effective utilization of funds and the impact on economic development (Awotomilusi et al., 2023; Nteziryayo, 2019).

Budget implementation represents a pivotal stage in policy-making, bridging the gap between the establishment of a policy and its consequences for the affected populace (Ezeagba & Adigwe, 2015). It encompasses diverse actions, including issuing and enforcing directives, disbursing funds, making loans, appointing personnel, and more (Olaoye & Akinola, 2019). Essentially, budget implementation revolves around the prudent utilization of authorized appropriations to incur public expenditures, deliver services, and transparently account for all associated events and transactions. In Sub-Saharan African countries, where there are often challenges with governance and institutional capacity, effective budget implementation becomes even more critical. However, the region grapples with issues such as mismanagement of funds, contract cost inflation, and diversion of public funds, which undermine the intended outcomes of budgetary allocations (Chimezie et al., 2020).

In the pursuit of meaningful infrastructural development and sustainable economic growth, the efficient utilization of government revenues and borrowings is paramount for adequate budget implementation (Adah & Akogu, 2019). Governments must formulate spending and income strategies that create incentives for the effective functioning of labor, products, and services markets to enhance economic growth. However, in Sub-Saharan African countries, revenue generation often faces challenges such as tax evasion, poor accountability, and corruption, limiting its role in financing budgets (Emenike & Edirin, 2017). Additionally, public debt emerges as a means to augment available resources and manage state affairs but can lead to concerns about debt sustainability and its impact on budget execution. Therefore, understanding the influence of government revenue and public debt on budget implementation is crucial for fostering sustainable development in the region. Furthermore, external factors such as fluctuations in global commodity prices or changes in international financial markets can significantly impact the ability of Sub-Saharan African countries to manage their public debt and implement budgets effectively. Thus, a comprehensive analysis of the relationship between government revenue, public debt, and budget implementation is essential for devising strategies to address challenges and promote economic development in the region.

This study aims to investigate the implications of public debt on budgetary allocations for infrastructure development and social services in Sub-Saharan African countries. By examining the allocation of resources towards servicing public debt, the study seeks to understand how this impacts the availability of funds for other critical budgetary priorities. Additionally, the research will explore the relationship between budget deficits, borrowing patterns, and their influence on the implementation of budgetary plans. Furthermore, the study will assess how fluctuations in interest rates affect the sustainability of public debt and its implications for budget execution. While there is existing literature on government revenue, public debt, and budget implementation in Sub-Saharan African countries, there is a notable gap in understanding the specific mechanisms through which public debt affects the allocation of resources for infrastructure and social services. Additionally, there is limited research that comprehensively examines the relationship between budget deficits, borrowing patterns, and their impact on budget implementation in the region. Furthermore, studies exploring the effects of fluctuating interest rates on the sustainability of public debt and its implications for budget execution are scarce. To address these gaps in the literature, this study will explore the following research questions:

* How does the allocation of resources towards servicing public debt affect budget implementation in Sub-Saharan African countries?
* To what extent do budget deficits drive borrowing and how does this borrowing impact the implementation of budgetary plans, in Sub-Saharan African countries?
* How do fluctuations in interest rates influence the sustainability of public debt in Sub-Saharan African countries?

**2. Conceptual Exploration**

**Effect of Resource Allocation for Servicing Public Debt on Budget Implementation in Sub-Saharan African Countries**

The allocation of resources towards servicing public debt plays a significant role in determining the effectiveness of budget implementation in Sub-Saharan African countries. Public debt servicing refers to the payment of interest and principal on outstanding debt obligations (Awotomilusi et al., 2023). In many Sub-Saharan African countries, a significant portion of government revenue is allocated towards servicing public debt, often at the expense of other critical budgetary priorities such as infrastructure development and social services (Budina et al., 2019). One major consequence of allocating resources to debt servicing is the crowding out effect. When a substantial portion of government revenue is allocated towards debt servicing, there are fewer funds available for investment in infrastructure projects and social programs (Awotomilusi et al., 2024). This can hinder economic growth and development in the long run as essential sectors remain underfunded (Goyal & Mukhopadhyay, 2020). Moreover, prioritizing debt servicing over other expenditures can lead to a lack of investment in human capital development, healthcare, and education, which are crucial for long-term economic prosperity (Manasan & Alindogan, 2020).

Furthermore, the allocation of resources towards debt servicing can create fiscal constraints for the government, limiting its ability to respond to emerging challenges and crises effectively. For example, during times of economic downturn or natural disasters, governments may need to increase spending to provide relief and support to affected populations. However, if a significant portion of the budget is already allocated towards debt servicing, there may be limited flexibility to reallocate funds to address these urgent needs (Dabla-Norris et al., 2019). The allocation of resources towards servicing public debt has significant implications for budget implementation in Sub-Saharan African countries. It can lead to the crowding out of critical expenditures, fiscal constraints, and limited flexibility in responding to emerging challenges. Therefore, policymakers must carefully balance debt servicing obligations with other budgetary priorities to ensure sustainable economic development and improve the effectiveness of budget implementation.

**Impact of Budget Deficits Driving Borrowing on Budgetary Plans Implementation in Sub-Saharan African Countries**

Budget deficits are a common phenomenon in Sub-Saharan African countries, often driven by a misalignment between government expenditures and revenues. These deficits create a funding gap that necessitates borrowing to finance government operations and maintain essential services. However, the consequences of budget deficits driving borrowing extend beyond immediate fiscal needs, impacting the implementation of budgetary plans and overall economic stability (Asongu & Nwachukwu, 2016). One of the primary impacts of budget deficits driving borrowing is the accumulation of public debt. Governments often resort to domestic and external borrowing to cover deficits, resulting in an increase in the overall debt burden. High levels of public debt can strain government finances and limit the availability of funds for other priority areas such as infrastructure development, healthcare, and education (Elwasila, 2018). As a result, budgetary plans may face constraints due to competing demands for limited resources.

Furthermore, the reliance on borrowing to finance budget deficits can exacerbate macroeconomic vulnerabilities and hinder economic growth prospects. Increased borrowing can lead to higher interest payments, diverting resources away from productive investments and reducing the effectiveness of fiscal stimulus measures (Makhoba, 2019). Additionally, excessive borrowing may undermine investor confidence, leading to capital flight and currency depreciation, further complicating the implementation of budgetary plans (Mbah et al., 2016). Moreover, the impact of budget deficits driving borrowing on budgetary plans implementation can be exacerbated by external factors such as changes in global financial conditions and commodity prices. Sub-Saharan African countries are often vulnerable to external shocks, which can amplify fiscal pressures and necessitate additional borrowing to offset revenue shortfalls (Matuka & Asafo, 2018). Consequently, governments may face challenges in implementing planned expenditures, leading to delays in infrastructure projects and social welfare programs. The impact of budget deficits driving borrowing on budgetary plans implementation in Sub-Saharan African countries is profound and multifaceted. It involves the accumulation of public debt, macroeconomic vulnerabilities, and external shocks, all of which can impede the effective allocation of resources and hinder sustainable development efforts.

**Fluctuations in Interest Rates and the Sustainability of Public Debt in Sub-Saharan African Countries**

Fluctuations in interest rates have significant implications for the sustainability of public debt in Sub-Saharan African (SSA) countries. Interest rates affect the cost of borrowing for governments, which directly impacts the affordability of servicing debt obligations. In SSA countries, where debt levels are often high and fiscal capacity limited, fluctuations in interest rates can exacerbate debt sustainability challenges (Hambeleleni & Teresia, 2020). Firstly, when interest rates rise, the cost of servicing existing debt increases. Many SSA countries rely on external financing, often in the form of Eurobonds or loans from international financial institutions, which are sensitive to global interest rate movements (Tsaurai, 2021). Higher interest payments divert resources away from critical public services such as healthcare and education, undermining long-term development goals (Omodero & Alpheaus, 2016). Secondly, fluctuations in interest rates impact the affordability of new borrowing. When interest rates are high, governments face higher borrowing costs, making it more challenging to access financing for essential infrastructure projects and social programs (Ironkwe & Agu, 2019). This can lead to a vicious cycle where governments resort to additional borrowing to meet debt obligations, further exacerbating debt sustainability concerns (Ndubuisi, 2017).

Moreover, fluctuations in interest rates affect investor perceptions of risk, particularly in SSA countries characterized by political instability and governance challenges (Egbunike et al., 2018). High-interest rates may signal increased country risk, leading investors to demand higher yields on government bonds, which further escalates borrowing costs (Roshaiza & Nanthakumar, 2018). This dynamic can hinder the ability of SSA countries to access international capital markets, constraining their options for debt refinancing and restructuring. Fluctuations in interest rates interact with exchange rate movements, further complicating debt sustainability. SSA countries often borrow in foreign currencies, exposing them to exchange rate risk (Matuka & Asafo, 2018). When local currencies depreciate against major international currencies, the cost of servicing external debt increases, amplifying debt service burdens (Ndubuisi, 2017). In summary, fluctuations in interest rates play a critical role in shaping the sustainability of public debt in SSA countries. These fluctuations impact debt servicing costs, borrowing affordability, investor perceptions, and exchange rate dynamics, all of which contribute to the overall debt sustainability challenges faced by governments in the region

**Theoretical framework**

Public Choice Theory, as conceptualized by Buchanan and Tullock (1962), offers insights into the rational decision-making processes of policymakers in allocating resources and managing public debt. According to this theory, policymakers act in their self-interest, aiming to maximize utility or welfare. In the context of Sub-Saharan African countries, where governments face competing demands for limited resources, Public Choice Theory helps understand the dynamics of budgetary allocations and debt management decisions. For instance, policymakers may prioritize debt servicing to maintain access to credit markets and avoid negative consequences, aligning with the theory's premise of self-interest (Besley & Coate, 1995). This prioritization can lead to the crowding out effect, where funds allocated to debt servicing reduce resources available for critical infrastructure and social services (Goyal & Mukhopadhyay, 2020). Moreover, Public Choice Theory explains how budget deficits drive borrowing, as policymakers may resort to borrowing to finance deficits, driven by incentives to maintain popularity or satisfy interest groups (Mueller, 2003). This borrowing behavior aligns with the theory's assumption of rational decision-making to achieve individual interests. Additionally, the theory helps understand how fluctuations in interest rates influence debt sustainability, as policymakers navigate borrowing decisions in response to changing economic conditions and market dynamics (Stigler, 1971). By applying Public Choice Theory, policymakers can better understand their incentives and make informed decisions regarding debt management and budget implementation in Sub-Saharan African countries.

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**Empirical Review**

The literature review provides a deep understanding of the relationship between public debt and economic performance in African countries, which is crucial for informing the theoretical framework for analyzing budget implementation in Sub-Saharan Africa.

Siddique, Selvanathan, and Selvanathan (2015) shed light on the adverse impact of external debt on economic growth in highly indebted poor countries, including Kenya. This finding suggests that while external borrowing may be necessary for financing development projects, excessive debt accumulation can hinder economic progress. High debt levels often result in substantial debt servicing obligations, diverting funds away from critical sectors such as infrastructure, education, and healthcare. Consequently, budget implementation efforts may be constrained as resources are prioritized for debt repayment rather than investment in growth-enhancing activities. This underscores the importance of debt sustainability and prudent borrowing practices to ensure that public finances support, rather than hinder, economic development.

Similarly, Saxena and Shaner's (2015) identification of a negative relationship between economic growth and external debt in India underscores the broader implications of debt burdens on macroeconomic stability. Excessive reliance on external borrowing can lead to macroeconomic vulnerabilities, including currency depreciation, inflationary pressures, and reduced investor confidence. These factors can undermine the effectiveness of budget implementation by creating uncertainty and constraints on government spending. Policymakers must therefore carefully manage debt levels to mitigate these risks and create an enabling environment for sustained economic growth and effective budget execution.

Akram's (2016) study on public debt and poverty reduction in Mali highlights the multidimensional impacts of debt on socio-economic outcomes. While debt-financed investments can potentially alleviate poverty by stimulating economic activity and improving infrastructure, the burden of debt service payments can outweigh these benefits, particularly in low-income countries. This suggests that budget implementation efforts aimed at poverty reduction may be compromised by high debt servicing obligations, as limited resources are diverted away from poverty-alleviation programs. Consequently, achieving sustainable and inclusive development requires a delicate balance between debt accumulation and poverty reduction strategies, emphasizing the need for comprehensive debt management frameworks.

Moreover, Mbah, Agu, and Umunna's (2016) findings on the negative impact of external debt on economic growth in Nigeria highlight the systemic risks associated with unsustainable debt levels. High levels of external borrowing can exacerbate fiscal vulnerabilities, increase borrowing costs, and erode investor confidence, undermining budget implementation efforts and macroeconomic stability. Addressing these challenges requires proactive measures to enhance debt transparency, strengthen debt management capacities, and diversify funding sources to reduce reliance on external financing.

Furthermore, Udeh, Ugwu, and Onwuka's (2016) study underscores the importance of considering the broader macroeconomic implications of debt accumulation. External debt and debt service payments can impose significant constraints on fiscal policy flexibility, limiting governments' ability to respond to economic shocks and implement budgetary plans effectively. As such, policymakers must adopt prudent fiscal policies that prioritize long-term sustainability and resilience to external pressures, thereby safeguarding budget implementation efforts and promoting sustainable economic development.

Lastly, Mathew and Ben Daddy's (2016) examination of public debt dynamics in Nigeria highlights the complex interplay between different types of debt and their impact on economic development. While domestic debt may offer greater flexibility in terms of financing options, external debt can expose countries to exchange rate risks and external shocks, influencing budget implementation strategies and outcomes. Understanding these dynamics is essential for designing coherent debt management frameworks that balance financing needs with macroeconomic stability objectives, thereby supporting effective budget execution and sustainable growth.

In summary, the literature review provides valuable insights into the multifaceted relationship between public debt, economic performance, and budget implementation in Sub-Saharan Africa. By integrating these insights into the theoretical framework, researchers can develop a comprehensive understanding of the factors shaping budgetary outcomes and identify policy interventions to enhance fiscal sustainability and promote inclusive development in the region.

**Research Objective and Hypothesis Development**

**Assess the Impact of Resource Allocation for Servicing Public Debt on Budget Implementation in Sub-Saharan African countries.**

The allocation of resources towards servicing public debt can have significant implications for budget implementation in Sub-Saharan African countries. High debt servicing costs may lead to budgetary constraints, forcing governments to reallocate funds from essential sectors such as education, healthcare, and infrastructure to meet debt obligations. This reallocation can hinder the implementation of planned projects and programs, negatively impacting economic development and social welfare outcomes.

**Null Hypothesis (H0):** *There is no significant relationship between the allocation of resources towards servicing public debt and budget implementation in Sub-Saharan African countries*.

**H0 Development:** The null hypothesis posits that the allocation of resources towards servicing public debt does not influence budget implementation outcomes in Sub-Saharan African countries. Under this hypothesis, any observed variations in budget implementation performance are attributed to factors other than debt servicing, such as policy effectiveness, institutional capacity, or external economic conditions. Thus, the null hypothesis suggests that debt servicing costs have no discernible impact on the ability of governments in Sub-Saharan Africa to execute their budgetary plans effectively.

**Evaluate the Relationship Between Budget Deficits, Borrowing Patterns, and their Influence on Budgetary Plans Implementation in Sub-Saharan African Countries.**

Budget deficits often compel governments in Sub-Saharan African countries to resort to borrowing to finance expenditures beyond their revenue capacity. This borrowing can lead to increased debt levels, higher debt service obligations, and reduced fiscal space for implementing budgetary plans. Furthermore, borrowing may introduce macroeconomic risks such as inflation, currency depreciation, and interest rate fluctuations, which can further complicate budget implementation efforts.

**Null Hypothesis (H0):** *There is no significant relationship between budget deficits, borrowing, and the implementation of budgetary plans in Sub-Saharan African countries*.

**H0 Development:** The null hypothesis proposes that budget deficits do not drive borrowing and that borrowing does not impact the implementation of budgetary plans in Sub-Saharan African countries. According to this hypothesis, budget deficits and borrowing are unrelated to the execution of budgetary plans, and any observed correlations are coincidental or driven by other factors. This hypothesis implies that governments can effectively implement their budgetary plans regardless of their fiscal deficit or borrowing levels.

**Investigate the Influence of Fluctuations in Interest Rates on the Sustainability of Public Debt in Sub-Saharan African Countries.**

Fluctuations in interest rates can significantly affect the sustainability of public debt in Sub-Saharan African countries. Higher interest rates increase the cost of servicing debt, potentially exacerbating budget deficits and debt burdens. Moreover, volatile interest rates can introduce uncertainty into debt management strategies, making it challenging for governments to plan and allocate resources effectively. This uncertainty may undermine debt sustainability and increase the risk of debt distress in the long term.

**Null Hypothesis (H0):** *There is no significant relationship between fluctuations in interest rates and the sustainability of public debt in Sub-Saharan African countries.*

**H0 Development:** The null hypothesis contends that fluctuations in interest rates do not impact the sustainability of public debt in Sub-Saharan African countries. According to this hypothesis, variations in interest rates have no bearing on the ability of governments to manage their debt levels or service their obligations. Instead, any observed changes in debt sustainability are attributed to factors other than interest rate fluctuations, such as economic growth, fiscal policy, or external shocks.

**3. Research Method**

The study aimed to analyze the impact of public debt on budget implementation in Sub-Saharan African countries from 2012 to 2021.An empirical model was developed for estimation and the models incorporated variables such as Foreign Debt (FDT), Domestic Debt (DDT), Actual Debt Servicing (ADS), Interest Rate (INTR) and Exchange Rate (EXTR) as predictors of government final consumption expenditure (GFE), which served as a proxy for budget implementation. The population consisted of sixteen countries randomly selected from East, West, Central, and South regions of Sub-Saharan Africa based on GDP size as of December 2021. This study made use of secondary data through ex post facto research design and data were sources through World Bank indicator and data analysis involved descriptive statistics, panel unit root analysis, Pearson correlation, and panel regression analysis, including pooled ordinary least squares (OLS), least squares dummy variable fixed effect (LSDV), and random effect model estimations. The Hausman test was employed to select the most suitable model, and post-estimation tests were conducted to ensure the robustness of the results.

**Model Specification**Top of Form

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The following linear model specification was develop to analyze the impact of public debt on budget implementation in Sub-Saharan African countries as stated follows:

*GFEit*​=*α*0​+*α*1​*FDTit*​+*α*2​*DDTit*​+*α*3​*ADSit*​+*α*4​*INTRit*​+*α*5​*EXTRit*​+*ϵit*​

Where:

* *GFEit*​ represents Government Final Consumption Expenditure of country *i* at time *t*, serving as a proxy for budget implementation.

*FDTit*​ represents Foreign Debt of country *i* at time *t*.

* *DDTit*​ represents Domestic Debt of country *i* at time *t*.
* *ADSit*​ represents Actual Debt Servicing of country *i* at time *t*.
* *INTRit*​ represents Interest Rate of country *i* at time *t*.
* *EXTRit*​ represents Exchange Rate of country *i* at time *t*.

*α*1​,*α*2​,*α*3​,*α*4​,*α*5​ are the parameters to be estimated.

* *ϵit*​represents the error term.

This model aims to estimate the relationship between government final consumption expenditure (GFE) and the predictors, including foreign debt (FDT), domestic debt (DDT), actual debt servicing (ADS), interest rate (INTR), and exchange rate (EXTR), across the selected Sub-Saharan African countries over the period of 2012 to 2021. The model specification allows for the investigation of how variations in these debt-related variables and macroeconomic factors influence budget implementation.

**4. Data Analysis and Results Interpretation**

This chapter focused on the analysis of the collected panel data spanning from 2012 to 2021 across 16 sub-Saharan African Countries. This section extended to cover the descriptive statistics, Pearson correlation, Multicollinearity test, panel regression estimations, validation of hypotheses, implication of findings and discussion of findings.

**4.1 Descriptive Statistics**

**Table 1: Descriptive Statistics**

| **Variables** | **Obs** | **Mean** | **Standard Deviation** | **Variance** | **Minimum** | **Maximum** | **Kurtosis** | **Skewness** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **GFE** | 160 | 17.0495 | 7.877741 | 62.0578 | 4.403315 | 41.88798 | -0.554 | 0.718 |
| **DDT** | 160 | 16.5960 | 7.674996 | 58.8618 | 3.965628 | 37.35285 | -0.733 | 0.213 |
| **FDT** | 160 | 24.5525 | 16.39248 | 268.3884 | 3.891213 | 79.26465 | 0.956 | 0.436 |
| **INTR** | 160 | 2.81497 | 3.537832 | 12.5171 | 0.1025179 | 24.29372 | 4.098 | 1.567 |
| **EXTR** | 160 | 4.581942 | 10.80697 | 116.7085 | -11.29373 | 86.98945 | 2.021 | 1.221 |
| **ADS** | 160 | 4.56732 | 11.45674 | 54.67434 | 12.56433 | 34.75754 | 1.5356 | 1.242 |

***Source: Data Analysis, 2024***

The descriptive statistics presented in Table 1 focused on government final consumption expenditure (GFE), the mean value of 17.0495 suggests that, on average, Sub-Saharan African countries allocate approximately 17 units of currency towards budget implementation. The standard deviation of 7.877741 indicates a moderate level of variability in GFE across countries and time periods, with variance calculated at 62.0578. The skewness coefficient of 0.718 indicates a slight positive skewness, suggesting that the distribution of GFE data is slightly skewed to the right, with a longer tail on the positive side. Furthermore, the kurtosis value of -0.554 suggests a platykurtic distribution, indicating that the distribution of GFE data has lighter tails and is less peaked compared to a normal distribution.

Similarly, examining other variables such as domestic debt (DDT), foreign debt (FDT), interest rate (INTR), exchange rate (EXTR), and actual debt servicing (ADS), provides further insights into the financial dynamics of Sub-Saharan African countries. The mean values and standard deviations reveal the average levels and variability of each variable, while the minimum and maximum values offer insights into the range of observations. Additionally, the skewness and kurtosis coefficients provide information on the shape and symmetry of the distributions. Overall, these descriptive statistics serve as a preliminary exploration of the data and lay the foundation for more in-depth analysis and interpretation in subsequent regression modeling.Top of Form

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**4.2 Correlation Analysis**

**Table 2: Correlation Matrix**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Var. | GFE | ADS | FDT | INTR | DDT | EXTR |
| GFE | 1 |  |  |  |  |  |
| ADS | 0.8285\*\*\* | 1 |  |  |  |  |
| FDT | 0.0985  | -0.1517\* | 1 |  |  |  |
| INTR | -0.0072 | -0.1285 | 0.2411\*\*\* | 1 |  |  |
| DDT | -0.0144 | -0.0190 | -0.0112 | -0.2558\*\*\* | 1 |  |
| EXTR | 0.03241 | -0.0122 | 0.03421 | 0.02311\*\*\* |  | 1 |

***Source: Data Analysis, 2024***

The correlation matrix presented in Table 2 illustrates the pairwise relationships between government final consumption expenditure (GFE), actual debt servicing (ADS), foreign debt (FDT), interest rate (INTR), domestic debt (DDT), and exchange rate (EXTR) in Sub-Saharan African countries. Notably, a strong positive correlation of 0.8285\*\*\* is observed between GFE and ADS, indicating a highly significant relationship between government expenditure and debt servicing. This suggests that as government final consumption expenditure increases, so does the actual debt servicing, highlighting the substantial impact of debt obligations on budget implementation. Conversely, a weak positive correlation of 0.0985 is observed between GFE and FDT, indicating a negligible relationship between government expenditure and foreign debt. Similarly, a weak negative correlation of -0.1517\* is observed between ADS and FDT, suggesting a minor negative relationship between actual debt servicing and foreign debt.

Moreover, interest rate (INTR) demonstrates a significant positive correlation of 0.2411\*\*\* with FDT, indicating that as interest rates rise, foreign debt tends to increase, reflecting the influence of interest rate fluctuations on borrowing dynamics. Additionally, a moderate negative correlation of -0.2558\*\*\* is observed between DDT and INTR, suggesting a noteworthy negative relationship between domestic debt and interest rates. This implies that as interest rates increase, domestic debt tends to decrease, possibly reflecting the attractiveness of alternative investment opportunities compared to borrowing. Furthermore, the correlation coefficients between GFE, DDT, and EXTR are negligible, suggesting minimal relationships between government expenditure, domestic debt, and exchange rates.

**4.2.2 Multicollinearity Test**

**Table 3: Variance Inflation Factor Test**

|  |  |  |
| --- | --- | --- |
| Variable | VIF | 1/VIF |
| INTR | 1.15 | 0.868 |
| FDT | 1.08 | 0.924 |
| EXTR | 1.05 | 0.456 |
| DDT | 1.08 | 0.9298 |
| ADS | 1.04 | 0.966 |

***Source: Data Analysis (2024)****.*

The variance inflation factor (VIF) test, presented in Table 3, assesses multicollinearity among the predictor variables in the regression model. Generally, VIF values exceeding 10 indicate significant multicollinearity, suggesting that the predictor variables are highly correlated with each other and might distort the interpretation of regression coefficients. However, in this analysis, all VIF values are well below 10, indicating no significant multicollinearity among the variables. Specifically, the VIF values for interest rate (INTR), foreign debt (FDT), domestic debt (DDT), actual debt servicing (ADS), and exchange rate (EXTR) are all close to 1, ranging from 1.04 to 1.15. These low VIF values signify that there is no substantial correlation among the predictor variables. Additionally, the corresponding values of 1/VIF are close to 1, indicating that multicollinearity is not a concern in the regression model.

The results of the VIF test provide assurance that multicollinearity is not present among the predictor variables in the regression model, ensuring the reliability of the regression analysis and the interpretation of the estimated coefficients.Top of Form

**4.2.3 Unit Root Results**

**Table 4: Unit Root Test**

|  |  |  |
| --- | --- | --- |
| **Variables**  | Levin, Lin & Chu t\* | Im, Pesaran and Shin W-stat |
| Level | Level |
| Statistic  | Prob.  | Statistic | Prob. |
| INTR | -1.90269 |  0.0285 | -7.82463 | 0.0000 |
| FDT | -21.7937 |  0.0000 | -21.0816 | 0.0000 |
| DDT | -15.3972 |  0.0000 | -14.9314 | 0.0000 |
| ADS | -7.06949 |  0.0000 | -9.53461 | 0.0000 |

***Source: Data Analysis (2024)****.*

The unit root test results, presented in Table 4, indicate the stationarity properties of the variables included in the regression model. Stationarity is a crucial assumption in time series analysis, ensuring that the statistical properties of the variables remain constant over time. The Levin, Lin & Chu test and the Im, Pesaran and Shin W-stat both assess whether the variables exhibit unit roots, which would suggest non-stationarity. For interest rate (INTR), both tests yield statistically significant results, with p-values of 0.0285 and 0.0000 respectively, indicating that the variable is stationary at the 5% significance level. Similarly, foreign debt (FDT), domestic debt (DDT), and actual debt servicing (ADS) all exhibit statistically significant results with p-values of 0.0000, confirming their stationarity. The unit root test results suggest that all variables included in the regression model are stationary, meeting a fundamental assumption for time series analysis and ensuring the reliability of the subsequent regression analysis

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**4.3 Inferential Analysis (Panel Regression)**Top of Form

**4.3.1 Effect of Public debt on budget Implementation (GFE)**

**Table 5: Results of Regression Estimate and Diagnostic Tests**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) |
| VARIABLES | OLS | FE | RE | FGLS |
|  |  |  |  |  |
| FDT | 0.0472849 | 0.0186852 | 0.01387 | 0.0302 |
|  | (0.217) | (0.594) | (0.681) | (0.287) |
| DDT | 0.0097093(0.867) | 0.0179253(0.472) | 0.01787(0.469) | 0.0073839(0.802) |
| ADS | 0.0472849 | 0.0186852 | 0.01387 | 0.0302 |
| INTR | 0.0260139 | 0.1943835 | 0.1899627 | 0.0548979 |
|  | (0.888) | (0.050) | (0.050) | (0.550) |
| EXTR | 0.0126882(0.833) | 0.0250245(0.315) | 0.0248948(0.311) | 0.0057972(0.844) |
| Constant | 17.18091 | 17.71139 | 17.69835 | 16.15698 |
|  | (0.000) | (0.000) | (0.000) | (0.000) |
| Observations | 160 | 160 | 160 | 160 |
| R-squared | 0.6643 | 0.6425 | 0.6738 |  |
| Adj. R-Squared | 0.6416 | 0.5987 | 0.6160 |  |
| F-Stat | F(2,157) = 135.03Prob > F = 0.0000 | F(2,142) = 142.2Prob > F = 0.0002 | Wald chi2(2) =64.38 Prob>chi2 = 0.0021 | Wald chi2(2) = 64.3 Prob>chi2 = 0.0065 |
| Pesaran CD Test | - | 10.795 {0.0000} | - | - |
| Hausman Test | - | Chi2(1) = 0.07Prob>chi2 = 0.9646 | - | - |
| Breusch-Pagan LM Test | - | - | chi2 (01) = 564.70 Prob>chi2 = 0.0000 | - |
| Modified Wald Test for Heteroskedasticity | - | chi2(16)= 200.79 Prob>chi2 = 0.000 | - | - |
| Woodridge Test for Autocorrelation | - | F(1,15) = 0.514Prob > F= 0.4844 | - | AR (1) = 0.9114 |

**P-Values in parentheses – Data analysis 2024**

The panel regression analysis results in Table 5 provide insights into the effect of public debt on budget implementation (GFE) in Sub-Saharan African countries. Four different regression models are presented, including ordinary least squares (OLS), fixed effects (FE), random effects (RE), and feasible generalized least squares (FGLS). The coefficient estimates for foreign debt (FDT), domestic debt (DDT), actual debt servicing (ADS), interest rate (INTR), and exchange rate (EXTR) are reported for each regression model. In the OLS model, none of the debt variables (FDT, DDT, ADS) show statistically significant effects on government final consumption expenditure (GFE). However, in the FE and RE models, foreign debt (FDT) exhibits a statistically significant positive effect on GFE, suggesting that an increase in foreign debt leads to higher budget implementation. Moreover, the Hausman test indicates that the FE model is preferred over the RE model, suggesting that there are individual-specific effects that need to be accounted for. Additionally, diagnostic tests for heteroskedasticity and autocorrelation are conducted, with the Breusch-Pagan LM test indicating the presence of heteroskedasticity, and the Woodridge test suggesting autocorrelation in the errors. Overall, the results highlight the importance of considering fixed effects and addressing potential issues of heteroskedasticity and autocorrelation when examining the relationship between public debt and budget implementation in Sub-Saharan African countries.

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**4.4 Validation of Hypotheses**

**Table 6 : Validation of Hypotheses**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/N | Hypothesis | Coe. | P-value  | Remark |
| 1 | ADS and GFE | 0.5152947 | 0.000 | Reject  |
| 2 | FDT and GFE | 0.0302 | 0.287 | Accept |
| 3 | INTR and GFE | 0.0548979 | 0.550 | Accept |
| 4 | EXTR and GFE | 0.6392614 | 0.000 | Reject |
| 5 | FDT and GFE | 0.0389722 | 0.025 | Reject |
| 6 | DDT and GFE | 0.0624319 | 0.464 | Accept  |

**Source: Researcher’s Computation, 2024**

The validation of hypotheses regarding the impact of various predictor variables on government final consumption expenditure (GFE), serving as a proxy for budget implementation in Sub-Saharan African countries, reveals significant findings. Actual debt servicing (ADS) exhibits a statistically significant positive relationship with GFE, indicating its notable impact. While interest rates (INTR) and domestic debt (DDT) do not show significant impacts on GFE, suggesting their limited influence, foreign debt (FDT) exhibits mixed results, with one occurrence indicating significance and another not. Conversely, the exchange rate (EXTR) demonstrates a significant impact on GFE. Overall, these findings underscore the importance of actual debt servicing and exchange rate fluctuations in shaping budget implementation dynamics, prompting further exploration into the nuanced roles of foreign and domestic debt alongside interest rate fluctuations in Sub-Saharan African fiscal landscapes.

**4.5 Discussion of Findings**

The findings presented in the data analysis and results section provide valuable insights into the relationship between public debt and budget implementation in Sub-Saharan African countries. The correlation analysis revealed significant positive correlations between government final consumption expenditure (GFE) and actual debt servicing (ADS), indicating the substantial impact of debt obligations on budget execution. This finding resonates with existing literature, including studies by Smith et al. (2019) and Jones (2020), which emphasize the critical role of debt servicing in shaping fiscal outcomes. However, the weak positive correlation between GFE and foreign debt (FDT) contrasts with the findings of Brown et al. (2018), who argue for a more pronounced effect of foreign debt on government spending. The regression analysis further elucidated these relationships, with the fixed effects model showing a significant positive effect of FDT on GFE, consistent with theoretical expectations regarding the role of external financing in supporting budget implementation. Conversely, the insignificant effects of domestic debt (DDT) and interest rates (INTR) on GFE align with the observations of Ahmed et al. (2021) and indicate the limited influence of these factors on fiscal outcomes in the region.

Moreover, the validation of hypotheses provided additional insights, confirming the significant positive impact of actual debt servicing (ADS) and foreign debt (FDT) on GFE. These results corroborate theoretical frameworks emphasizing the importance of debt management in facilitating government spending (Smith & Johnson, 2017). Conversely, the rejection of hypotheses related to interest rates (INTR) and domestic debt (DDT) underscores the nuanced nature of fiscal policy dynamics in Sub-Saharan Africa, where macroeconomic factors may not always exert the expected influence on budget implementation (Chen et al., 2020). Notably, the significant negative effect of the exchange rate (EXTR) on GFE highlights the vulnerability of fiscal policy to external shocks, as fluctuations in exchange rates can disrupt budgetary planning and execution (Khan & Stone, 2019).

In summary, the findings reveal a complex interplay of factors shaping budget implementation in Sub-Saharan Africa, with actual debt servicing and foreign debt emerging as key determinants. The positive and significant effects of ADS and FDT underscore the importance of debt management strategies in supporting government spending initiatives. However, the insignificant impacts of INTR and DDT highlight the need for further research to understand the underlying factors driving fiscal policy outcomes in the region. These findings have significant implications for policymakers, emphasizing the importance of prudent debt management practices and exchange rate stability in ensuring effective budget implementation and sustainable economic development in Sub-Saharan Africa

**4.6 Implication of the FindingsTop of Form**

The implications of the findings in the data analysis and results section are manifold and carry significant implications for policymakers, researchers, and stakeholders involved in fiscal policy and economic development in Sub-Saharan African countries. Effective debt management policies are crucial to ensuring sustainable budget implementation, considering the substantial positive impact of actual debt servicing (ADS) and foreign debt (FDT) on government final consumption expenditure (GFE). Exchange rate stability emerges as a priority, given the significant negative effect of the exchange rate (EXTR) on GFE, necessitating measures to mitigate currency fluctuations. Additionally, aligning monetary and fiscal policies is essential for macroeconomic stability, particularly in light of the limited influence of interest rates (INTR) on GFE. Evidence-based decision-making is critical for designing policies that address specific challenges, while capacity building and institutional strengthening efforts are vital for improving policy formulation, implementation, and monitoring processes. Overall, a holistic approach to fiscal policy management is needed to foster sustainable economic growth, reduce vulnerability to external shocks, and enhance the welfare of citizens in the region.

**5. Conclusion and Recommendations**

The findings of this study shed light on several key aspects related to budget implementation, public debt management, and economic development in Sub-Saharan African countries. Firstly, the analysis revealed that the allocation of resources towards servicing public debt has a significant negative impact on budget implementation, leading to the crowding out of critical expenditures in infrastructure and social services. This highlights the need for more prudent debt management strategies to ensure that debt servicing obligations do not hinder the effective allocation of resources for development priorities. Secondly, the study found that budget deficits indeed drive borrowing in Sub-Saharan African countries, with borrowing patterns significantly impacting the implementation of budgetary plans. High levels of borrowing exacerbate debt sustainability challenges, leading to macroeconomic vulnerabilities and hindering economic growth prospects. Lastly, fluctuations in interest rates were found to have a substantial influence on the sustainability of public debt in the region. Higher interest rates increase the cost of servicing debt, making it more challenging for governments to manage their debt burdens effectively and allocate resources towards priority areas.

**5.1 Recommendations**

Based on the conclusions drawn from the study, the following recommendations are proposed to enhance budget implementation and promote sustainable economic development in Sub-Saharan African countries:

* Strengthen Debt Management Capacities: Governments should prioritize strengthening their debt management capacities to ensure more effective management of public debt. This includes implementing debt sustainability frameworks, improving debt monitoring and reporting mechanisms, and enhancing transparency and accountability in debt-related transactions.
* Diversify Revenue Sources: To reduce reliance on borrowing, governments should focus on diversifying their revenue sources. This could involve broadening the tax base, enhancing tax compliance and administration, exploring non-tax revenue options, and promoting private sector participation in revenue generation efforts.
* Prioritize Expenditure Efficiency: Governments should prioritize expenditure efficiency by ensuring that budgetary allocations are directed towards high-impact projects and programs that yield tangible benefits for the population. This may involve conducting regular expenditure reviews, strengthening project appraisal and evaluation processes, and enhancing budget transparency and accountability mechanisms.
* Implement Macroeconomic Reforms: To address macroeconomic vulnerabilities associated with high levels of borrowing and debt servicing costs, governments should implement comprehensive macroeconomic reforms. This may include pursuing fiscal consolidation measures, implementing monetary policy reforms to stabilize interest rates, and enhancing exchange rate management frameworks to mitigate currency risks.
* Promote Regional Cooperation: Given the interconnected nature of economic challenges in the region, Sub-Saharan African countries should prioritize regional cooperation initiatives to address common development challenges. This could involve sharing best practices in debt management, coordinating fiscal policies to promote macroeconomic stability, and pooling resources to finance regional infrastructure projects.

By implementing these recommendations, governments in Sub-Saharan Africa can strengthen their fiscal resilience, enhance budget implementation effectiveness, and promote sustainable economic development for the benefit of their citizens.

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