

## Effect of capital account liberalization on external debt in Sub-Saharan Africa

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### Abstract

Financial sector reforms in Sub-Saharan Africa (SSA) over the past few decades, including the liberalization of the capital account, have had a positive impact on capital inflows to the region. This paper examines the effect of capital account liberalization on external debt in SSA. We use the Chinn-Ito Index as a measure of capital account liberalization utilizing a robust panel data set from the World Bank and International Monetary Fund databases for the period 2007 to 2021 on 42 SSA countries. The study employs the Dynamic System Generalized Method of Moments (SGMM) estimation technique. We find a positive and significant effect of capital account liberalization on external debt, suggesting that greater capital openness is associated with higher levels of external debt. We also find that the stock of external debt increases the likelihood of further debt buildup, which is indicated by the significant and positive coefficient of the lagged external debt variable. Further results show that economic growth and trade openness reduce external debt, while investment increases it. These findings highlight the dual nature of capital account liberalization: it expands financing opportunities but also raises debt vulnerabilities, underscoring the need for cautious liberalization and stronger debt management in SSA. The study therefore recommends that SSA countries adopt a cautious, sequenced approach to the management of capital accounts, given the existing liberalized regime, strengthen debt management frameworks, and ensure that external borrowing is channelled into productive, growth-enhancing investments. Additionally, promoting sustainable economic growth and trade competitiveness will be essential to reducing the increased reliance on external borrowing and safeguarding long-term debt sustainability.

**Article History:** Received 20 March 2025

Accepted 27 January 2026

**Keywords:** Capital account liberalization, capital inflows, external debt, SSA.

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## Introduction

Sub-Saharan Africa (SSA) is a region that is undoubtedly characterized by immense diversity in culture, language, and economic structure, encompassing countries at various income levels: low-, middle-, and high-income. Despite its abundance of natural resources, its position as home to the world's largest free trade area, and a market of approximately 1.2 billion people, SSA continues to grapple with significant development challenges. As of 2023, about 462 million people in the region were living in extreme poverty, with 21 countries either at high risk of, or already experiencing external debt distress (World Bank, 2023; International Monetary Fund [IMF], 2023). Notably, countries such as Ghana, Zambia, and Chad have initiated debt restructuring programmes to restore fiscal sustainability and rebuild macroeconomic stability.

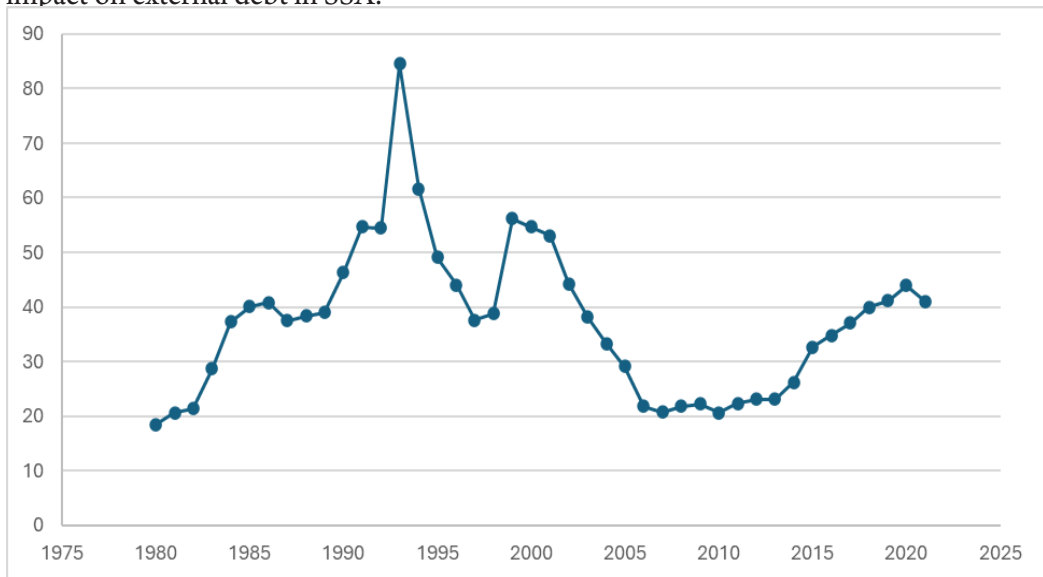
In an increasingly globalized world, capital account liberalization (CAL), that is, the removal of restrictions on the movement of capital across borders has become a key feature of economic reform in many developing and emerging economies. Following the collapse of the Bretton Woods system in the 1970s, advanced economies spearheaded financial openness, with SSA countries adopting CAL from the late 1980s under IMF and World Bank-led Structural Adjustment Programs (SAPs) aimed at attracting foreign investment and integrating domestic economies into global markets (Mughogho & Alagidede, 2019; Alter et al., 2025; Asongu et al., 2020). However, CAL remains contentious. While proponents emphasize improved access to finance and investment efficiency, critics warn of heightened macroeconomic instability, capital flight, and crowding out of domestic investment (Eklou & Foster, 2023; Bondzie Afful et al., 2024). The East Asian financial crisis of 1997-1998 underscored these risks, demonstrating how rapid capital reversals can destabilize even well-managed economies.

In SSA, the pace and sequencing of CAL have differed widely, with countries such as Kenya, Nigeria, Uganda, and Mauritius adopting approaches ranging from gradual reforms to rapid liberalization (Bicaba et al., 2014; Leykun, 2022). Evidence suggests that institutional quality and macroprudential strength play a critical role in shaping liberalization outcomes, with stronger governance associated with more stable capital flows (Bondzie Afful et al., 2024; Ohonba & Akinola, 2023). Regional initiatives like the West African Economic and Monetary Union (WAEMU), the Southern African Development Community (SADC), and the Communauté Financière d'Afrique (CFA) have further promoted sub-regional financial integration, although their impact has been uneven (Asongu et al., 2020; SADC, 2023). These efforts toward liberalizing trade and the capital account have coincided with growing levels of external debt. Moreover, because many SSA countries have low levels of domestic savings and thus limited capacity for domestic resource mobilization, external borrowing has become a crucial means of financing development. This reliance on external financing options has culminated in rising external debt. In recent years, debt levels have risen sharply from \$664.97 billion in 2019 to \$701.95 billion in 2020 (World Bank, 2020). Subsequent increases in external

debt raised serious questions about debt sustainability and its ramifications on the economies in the region.

The urgency of this study is further underscored by recent developments. The COVID-19 pandemic exacerbated fiscal pressures in SSA, with debt-to-GDP ratios rising sharply as governments borrowed heavily to finance health interventions and economic recovery measures (United Nations Development Programme [UNDP], 2020). This was compounded by the global surge in interest rates from 2022 thus heightening debt servicing costs, particularly for countries reliant on Eurobond financing and other non-concessional sources (UNDP, 2020; UNCTAD, 2023). At the same time, China, once a leading bilateral creditor in the region, has scaled back its infrastructure lending, leaving many SSA economies with reduced access to alternative financing options (Selassie et al., 2025). These dynamics make an analysis of the CAL-external debt nexus not only relevant but also urgent for policymakers seeking sustainable financing pathways.

What further distinguishes the SSA context from other regions is the intersection of capital account liberalization with institutional fragility and heavy reliance on commodity exports. Weak governance structures and underdeveloped financial markets often amplify the risks associated with capital account liberalization, making countries more vulnerable to volatile capital flows (Mlachila et al., 2016). Additionally, the dependence of many SSA economies on primary commodities means that fluctuations in global commodity prices interact with liberalized capital account regimes to affect external borrowing needs in unique ways not typically observed in more diversified economies (Baffes & Nagle, 2022). This context provides a distinct backdrop for examining CAL's impact on external debt in SSA.



**Figure 1:** External debt to GDP for Sub-Saharan African countries: 1980-2022.

Historical data on external debt (% of GDP), presented in Figure 1 above, illustrates the long-term debt trajectory of Sub-Saharan African countries. In 1980, the external debt stood at 18.5% of GDP, and by 1986, had more than doubled to 40.8%, reflecting the combination of the global debt crisis, unfavourable terms of trade, and the growing reliance on external lending resulting from the SAP. External debt levels peaked in 1993, reaching 84.5% after nearly a decade of many countries in the region implementing SAPs. While debt relief efforts in the late 1990s and early 2000s, such as the HIPC Initiative, resulted in a decline, reaching 20.6% in 2010, the subsequent years saw a gradual increase in debt levels. By 2020, debt had climbed again to 43.9%, partly due to pandemic-induced fiscal pressures. Evidently, this trend in external debt-to-GDP underscores the need for a better appreciation of the factors influencing growth in the external debt. It also highlights the challenges of achieving sustainable debt levels in an age of a liberalized capital account as well as reforms in the economic environment.

Despite growing interest in the macroeconomic consequences of CAL, limited empirical research has focused specifically on its relationship with external debt accumulation in the SSA context. Existing literature often centers on the effects of liberalization on economic growth, capital flows, or financial development, without adequately addressing whether liberalized capital account regimes exacerbate or mitigate external debt burdens. Counterarguments suggest that CAL may reduce external debt burdens by attracting foreign direct investment (FDI) and other non-debt-creating capital inflows. Empirical studies indicate that well-sequenced liberalization can channel private capital into productive sectors, reducing reliance on debt-financed development (Asongu et al., 2020). However, whether such outcomes materialize in SSA depends heavily on institutional quality, absorptive capacity, and the credibility of macroeconomic policies; factors that remain uneven across the region.

This paper fills this gap by examining the link between capital account liberalization and external debt in Sub-Saharan Africa, thus contributing to the broader discourse on the developmental implications of financial openness in emerging economies. Our work is guided by the following key objective: to investigate the effect of capital account liberalization on external debt in Sub-Saharan Africa. In doing so, it aims to inform policy on the trade-offs between financial openness and debt sustainability in a region striving to balance growth ambitions with fiscal prudence. The rest of the paper is structured as follows. The next section provides a review of the literature, followed by a discussion of the methodology and data in section 3. The results are presented and discussed in section 4, while section 5 concludes.

## Literature review

The literature on the theoretical links between capital account liberalization and external debt is scant. Early work on capital account liberalization and its economic ramifications can be traced to Eichengreen et al. (1998). More recently, Azzimonti et al. (2014)

present a theoretical model that illustrates how financial globalization can drive up public debt, with reference to OECD countries. Their framework distinguishes between two types of agents; entrepreneurs, who face high income risk and workers, who have relatively stable incomes, both of whom prefer holding public debt for consumption smoothing. In a financially closed economy, the high demand for safe assets like public debt drives interest rates below the intertemporal discount rate, benefiting both groups. However, as public debt accumulates, interest rates eventually rise, reducing the welfare gains for workers and limiting their support for further debt increases. Under financial globalization, interest rates become less sensitive to individual countries' debt levels due to the integration of global markets. This reduced interest rate elasticity weakens the natural constraint on borrowing, making it easier for governments to accumulate more debt, especially when politically influential groups like workers continue to support public debt issuance. Thus, financial integration can amplify public debt accumulation by diminishing the disciplining effect of rising interest rates.

Specifically, we anchor our study in the intertemporal consumption smoothing model, which posits that countries borrow externally to smooth consumption and investment over time in response to income fluctuations and development needs (Garg & Prabheesh, 2018; Obstfeld & Taylor, 2022). Within the context of capital account liberalization, external borrowing provides governments and households with greater access to international financial markets, enabling them to maintain consumption and investment in the face of shocks. However, the model also implies that excessive borrowing under liberalized regimes can create vulnerabilities, particularly when debt accumulation outpaces repayment capacity (Obstfeld & Taylor, 2022). Therefore, the intertemporal consumption smoothing model provides a robust theoretical framework linking capital account liberalization with external debt, complementing the insights of Azzimonti et al. (2014) thus grounding the study in a widely recognized economic theory.

To make the theoretical framework more explicit and testable, the following hypothesis is formulated based on the intertemporal consumption smoothing model and the financial globalization mechanism (Azzimonti et al., 2014): capital account liberalization is positively associated with external debt accumulation in Sub-Saharan African economies.

The empirical literature on capital account liberalization (CAL) and its interaction with external debt dynamics spans across developed, developing, and Sub-Saharan African (SSA) economies. These studies offer diverse methodological approaches, indices of capital account openness, and contextual interpretations of results. Broadly, the literature can be grouped into three thematic areas: (i) CAL, capital flows, and external debt, (ii) CAL, external debt, and economic growth, and (iii) CAL and external debt specifically.

### ***Capital account liberalization, capital flows, and external debt***

The effectiveness of capital account liberalization in promoting external capital flows is contingent on institutional strength. These flows may take the form of foreign direct investment (FDI), portfolio flows, or external debt. Some studies have found that liberalization yields substantial benefits only when countries meet threshold levels of institutional quality, such as rule of law, creditor rights, and financial development (Eichengreen et al., 2011; Okada, 2013; Gammoundi & Cherif, 2016). Evidence from SSA and MENA regions (Mughogho & Alagidede, 2019; Saidi, 2020) reinforces this view, suggesting that liberalization without robust governance may be ineffective or counterproductive.

A consensus emerges that CAL is generally associated with increased capital inflows, both debt and non-debt especially, when implemented alongside sound financial reforms. Studies such as Sedik & Sun (2012), Brafu-Insaidoo & Biekpe (2014), and Mughogho & Alagidede (2019) demonstrate a positive association between liberalization and the volume of capital inflows, confirming that financial openness acts as a catalyst for external resource mobilization. However, the nature of these inflows and their economic implications vary. While liberalization increases both external debt and FDI in SSA (Brafu-Insaidoo & Biekpe, 2014), Azolibe (2022) shows that rising debt may deter FDI unless borrowing is directed toward productive investments such as infrastructure, highlighting the importance of debt quality rather than volume.

A persistent concern in the literature relates to the linkage between external debt and capital flight. Several studies, including Ampah et al. (2018) and Otieno et al. (2022) underscore the risk that mismanaged external debt could exacerbate capital flight. This is often facilitated by rent-seeking behaviour and weak institutional oversight. These findings suggest that instead of serving its intended development-financing role, external debt may be diverted into illicit financial flows, particularly in environments with fragile governance. This further reinforces the critical role of institutional frameworks not only in maximizing the benefits of capital inflows but also in mitigating leakages and distortions.

### ***Capital account liberalization, economic growth, and external debt***

A growing body of literature explores the impact of CAL and external debt on economic growth, with mixed findings. Egbuna et al. (2013), Adeola (2017) and Joshua et al. (2021) observed that CAL and external borrowing can enhance growth when supported by effective management and productive capital inflows such as FDI and remittances. Conversely, many studies find that the burden of external debt negatively affects growth in Sub-Saharan Africa, particularly in the presence of capital flight and weak institutions (Siddique et al., 2016; Senadza et al., 2018; Ayenew, 2022; Agyeman et al., 2022). Shittu et al. (2018) and Orimolade & Olusola (2018) support this view, noting bidirectional causality between external debt and growth and a long-term negative association between capital flight variables and GDP in Nigeria.

Importantly, some studies propose that the negative impacts of debt are not necessarily a call for reduced borrowing but for improved debt management and investment efficiency (Senadza et al., 2018; Duodu & Baidoo, 2022). This insight stresses the importance of channeling borrowed funds into productive sectors capable of generating returns that exceed the cost of borrowing. The studies by Joshua et al. (2021) and Shittu et al. (2018) highlight that the relationship between external debt and economic growth is not uniform, with Shittu et al. (2018) identifying bidirectional causality and Joshua et al. (2021) stressing the importance of productive investment of borrowed funds. Additionally, Khan et al. (2021) show that the positive impact of capital flows like remittances, exports, and FDI varies by country, emphasizing that the effectiveness of capital account liberalization depends on strong macroeconomic and institutional frameworks, particularly in developing countries.

### *Capital account liberalization and external debt dynamics*

A substantial body of evidence indicates that capital account liberalization is associated with an increase in public or external debt levels. Studies across developed and developing countries such as Claessens et al. (2007), Azzimonti et al. (2014), Agnello & Sousa (2015), and Bataka (2021) find a positive and significant relationship between financial openness and public debt accumulation. These studies suggest that financial liberalization often creates incentives for governments to borrow more either to meet investor expectations, finance broader fiscal policies, or due to reduced borrowing constraints in international markets. This tendency is especially pronounced in emerging and Sub-Saharan African economies, where Bataka (2021) shows that financial liberalization consistently drives public debt in both the short and long run. A comparative analysis highlights the role of economic development in mediating the CAL-debt relationship. Liu & Sun (2016) show that financial openness boosts subnational debt in developing countries but may reduce debt in developed economies. Similarly, Dong (2021) find that domestic financial liberalization may restrain debt levels, whereas openness in other countries tends to elevate external debt burdens in developing nations. These findings emphasize the asymmetric effects of CAL, suggesting that institutional strength and financial maturity play crucial roles in determining outcomes.

Several studies also underscore the importance of contextual factors, particularly macroeconomic stability and institutional quality. Zehri (2017) finds a negative correlation between CAL and external debt in South Mediterranean countries, attributing deviations from the general trend to macroeconomic instability. De Soyres et al. (2019) further corroborate the importance of institutional context, reporting no significant link between CAL and debt over a broad period, but identifying a positive relationship during a more recent sub-period (2012-2016) when institutional reforms and financial conditions may have shifted. The choice of globalization indicators and CAL measures also influences empirical results. While most studies utilize the Chinn-Ito index or the

index of financial reform by Abiad et al. (2008), others, such as Kim et al. (2018) and Bataka (2021), use the KOF globalization index or its subcomponents. These variations highlight the multifaceted nature of globalization and the need to carefully interpret findings based on the specific dimensions of liberalization being measured whether de jure policy reforms or de facto financial flows.

While some studies (e.g., Bataka, 2021; Claessens et al., 2007) consistently show that financial openness fuels debt accumulation, others (e.g., Zehri, 2017; De Soyres et al., 2019) highlight contexts where this link is weaker, absent, or even negative. This apparent contradiction can be understood through a synthesis: the CAL-debt relationship is not uniform but mediated by institutional capacity, macroeconomic stability, and the specific dimension of openness being measured (de jure vs. de facto). Thus, evidence suggests that in fragile or developing economies, liberalization tends to expand external borrowing opportunities, while in more stable or institutionally mature contexts, it may either discipline debt accumulation or have neutral effects.

## Methods and data

### *Data*

This paper utilizes a panel dataset comprising 42 Sub-Saharan African (SSA) countries over the period 2007-2021 sourced from International Monetary Fund (IMF), World Development Indicators (WDI), Chinn-Ito (2008) dataset. The study period is informed by the fact that during the last two decades, the process of international financial integration has reached peak levels and has coincided with several waves of external debt crises across many countries; developing and developed. Furthermore, the choice of countries and time frame is informed by data availability and the period for which the Chinn-Ito Index is consistently available. The analysis covers both the full sample and a restricted sample that excludes Nigeria and South Africa, given their disproportionate influence on SSA's economic dynamics. These two countries collectively account for nearly half of the region's GDP, and their exclusion in a robustness check helps to mitigate potential bias stemming from their distinct economic structures and financial markets.

### *Empirical model*

We employ a panel data framework covering 42 Sub-Saharan African (SSA) countries over the period 2007-2021. Panel data models are particularly suited for this analysis due to their capacity to control unobserved heterogeneity, which is often present in macroeconomic cross-country studies. The use of both the fixed and random effects models can capture this heterogeneity; however these estimators can be biased when the time dimension ( $T$ ) is small and the cross-sectional dimension ( $N$ ) is large (Rolfé & Weidner, 2018; Klosin, 2024). The theoretical basis for the empirical specification is drawn from the standard debt accumulation framework, where external borrowing is influenced by macroeconomic fundamentals such as growth, trade openness,

investment, and exchange rate movements (Koekpe, 2019). In this context, capital account liberalization, proxied by the Chinn-Ito index (KAOPEN), is expected to affect a country's reliance on external debt through changes in access to global financial markets.

A critical concern in estimating this relationship is endogeneity, which arises when explanatory variables are correlated with the error term. Endogeneity typically emerges due to three main sources: omitted variable bias, measurement error, and simultaneity or reverse causality (Ullah, Akhtar, & Zaefarian, 2018). For instance, while capital account liberalization may influence external debt, higher debt levels may also influence the pace of liberalization reforms, creating a reverse causality problem. Similarly, macroeconomic shocks (e.g., global commodity price swings) may drive both debt accumulation and capital account policies, leading to omitted variable bias.

To address these challenges, the study adopts the System Generalized Method of Moments (SGMM) estimator developed by Arellano & Bover (1995) and Blundell & Bond (1998). Unlike difference GMM, which may suffer from weak instrument problems when variables are highly persistent, the System GMM combines equations in first differences with equations in levels, using lagged differences as instruments for the level equations (Baltagi, 2021). This combination strengthens the instrument set, improves efficiency, and reduces finite-sample bias. By doing so, SGMM effectively tackles endogeneity stemming from simultaneity and omitted variable bias, while also accommodating the dynamic structure introduced by the lagged dependent variable. The study employs both one-step and two-step SGMM estimators for robustness. While the two-step estimator is asymptotically more efficient, its finite-sample properties may be less reliable (Hwang & Sun, 2018), hence the inclusion of both estimators enhances the reliability of the results.

The general form of the model is specified as:

$$Y_{it} = \phi Y_{it-1} + \alpha Z_{it} + \beta' X_{it} + \theta_i + \varepsilon_{it} \quad [1]$$

Where  $i$  refers to the countries,  $t$  refers to the time,  $\phi$  is the lagged dependent variable's coefficient,  $Y_{it}$  is the dependent variable in this case external debt (% of GDP),  $\alpha$  is the independent variable's coefficient,  $Z_{it}$  is the independent variable which is capital account liberalization index (KAOPEN),  $Y_{it-1}$  is the lagged dependent variable,  $\beta'$  is the coefficient of the control variables,  $X_{it}$  is the control variables (inflation, real effective exchange rate, GDP growth, total investment, current account balance and trade openness),  $\varepsilon_{it}$  is the error term and  $\theta_i$  is the country specific effect.

This model is rewritten explicitly as:

$$\begin{aligned} Ext\_Debt_{it} = & \phi Ext\_Debt_{1it-1} + \alpha KAOPEN_{it} + \beta_1 RGDP_{it} + \beta_2 Inflation_{it} + \beta_3 Exch\_rate_{it} \\ & + \beta_4 Investment_{it} + \beta_5 CAB_{it} + \beta_6 TOPEN_{it} + \theta_i \\ & + \varepsilon_{it} \end{aligned} \quad [2]$$

Where  $Ext\_Debt$  is external debt as a percentage of GDP,  $Ext\_Debt_1$  is the lagged external debt, KAOPEN is the Chinn-Ito Index for capital account liberalization,  $RGDP$  is the growth rate of real GDP,  $Inflation$  is inflation rate,  $Exch\_rate$  is the real effective exchange rate,  $Investment$  is the total investment as a percentage of GDP,  $CAB$  is the

current account balance as a percentage of GDP, and TOPEN is trade openness as a percentage of GDP.

Because of the inclusion of the lagged dependent variable and the potential endogeneity among explanatory variables, traditional OLS, fixed effects, or random effects estimators may yield biased and inconsistent estimates. As such, the Generalized Method of Moments (GMM) developed by Arellano & Bond (1991) is employed. The GMM approach transforms the model into first differences to eliminate unobserved individual effects:

$$\begin{aligned} \Delta Ext\_Debt_{it} = & \varnothing \Delta Ext\_Debt_{it-1} + \alpha \Delta KAOPEN_{it} + \beta_1 \Delta RGDP_{it} + \beta_2 \Delta Inflation_{it} + \beta_3 \Delta Exch\_rate_{it} \\ & + \beta_4 \Delta Investment_{it} + \beta_5 \Delta CAB_{it} + \beta_6 \Delta TOPEN_{it} \\ & + \Delta \varepsilon_{it} \end{aligned} \quad [3]$$

Even after differencing, the issue of endogeneity between  $Ext\_Debt_{it-1}$  and  $\Delta \varepsilon_{it}$  persists due to the correlation between the lagged dependent variable and the error term. To address this, the difference GMM uses lagged levels of the endogenous variables as instruments, assuming:

$$E[A_{i,t-s} \cdot \Delta \varepsilon_{it}] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad [4]$$

Despite its strengths, the difference GMM estimator may produce weak instruments when the variables are persistent over time. To overcome this, the System GMM estimator introduced by Arellano & Bover (1995) and further developed by Blundell & Bond (1998) is utilized. This method combines the difference equation with the original equation in levels, using lagged differences of the explanatory variables as instruments for the level equation. The system GMM thus improves efficiency and addresses the potential weak instrument problem. The validity of instruments for the level equation rests on the assumption:

$$E[A_{i,t+p}, \theta_i] = E[A_{i,t+q}, \theta_i] \text{ for all } p \text{ and } q \quad [5]$$

With this assumption, additional moment conditions for the level equation are:

$$E[\Delta A_{i,t-s} \cdot (\varepsilon_{it} + \theta_i)] = 0 \text{ for } s = 1; t = 3, \dots, T \quad [6]$$

Accordingly, the System GMM estimation employed in this study consists of two equations: one in differences and one in levels, corresponding to moment conditions [4] and [6] respectively. The two-step system GMM estimator is preferred due to its greater efficiency and more reliable inference. The lagged dependent variable is instrumented using its own past values, and all other potentially endogenous regressors are also instrumented appropriately. In line with the system GMM framework, the instruments employed in this study are internal. Specifically, lagged levels of the variables are used as instruments for the differenced equation, while lagged differences are used as instruments for the level equation. No external instruments are introduced, since the internal instrumentation strategy sufficiently addresses endogeneity by exploiting the panel structure of the data.

Arellano and Bond (1991) validated the reliability of the GMM estimator by two specification tests: the Arellano-Bond test (AR(2)) for autocorrelation in the disturbances and the Hansen J-statistic for over-identifying restriction. These tests strengthen the methodological integrity of the study. The exogenous instrumented variables exhibit no correlation with the error term, according to the Hansen J statistic null hypothesis, which should not be rejected. Conversely, the assumption of the GMM estimator is violated if the AR(2) null hypothesis which claims that the model is free from second-order serial correlation is rejected (Arellano & Bond, 1991).

The dependent variable is external debt, expressed as a percentage of GDP. This ratio serves as a direct measure of a country's external debt burden relative to its economic output. It captures the sustainability and macroeconomic implications of debt accumulation and is widely used in empirical literature for cross-country debt analysis. Our key independent variable is capital account liberalization, measured using the Chinn-Ito Index (KAOPEN). This *de jure* measure captures the extent to which countries have liberalized their capital accounts by quantifying restrictions on cross-border financial transactions. The index is constructed from IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) and incorporates information on multiple exchange rates, current account restrictions, capital account controls, and surrender requirements for export proceeds. The Chinn-Ito index is chosen for its broad country coverage and temporal span (1970-2021), making it suitable for long-term cross-country analysis.

Based on theoretical expectations (Azzimonti et al., 2014), capital account liberalization is hypothesized to exert a positive influence on external debt accumulation. More open capital accounts can facilitate access to international credit markets, thereby increasing external borrowing. Control variables include, real GDP growth rate, a proxy for a country's economic performance and capacity to service debt. Higher growth is expected to reduce the reliance on external borrowing hence the anticipated sign is negative (Alter et al., 2025); inflation, is a proxy for macroeconomic stability, thus higher inflation may increase external borrowing needs due to eroded purchasing power and revenue volatility, implying a positive expected sign (Oligbi, 2024); real effective exchange rate (REER), a measure of international competitiveness is obtained by adjusting nominal exchange rates for inflation differentials. Appreciation may increase trade deficits and external borrowing, while depreciation may have the opposite effect. The expected sign is ambiguous (Kumar et al., 2019); investment (% of GDP), reflects capital formation levels in the economy. While higher investment may stimulate growth and reduce debt, it may also necessitate borrowing if domestic savings are insufficient. The expected sign is ambiguous (Osuma & Nzimande, 2024); current account balance (% of GDP), an indicator to capture the gap between a nation's savings and investment. A surplus reduces external borrowing needs, while a deficit increases them. The expected sign is negative (Alter et al., 2025); trade openness (exports plus imports as % of GDP), a measure of the extent of a country's integration with the global economy. Greater openness may

lead to improved access to finance and reduce the need for borrowing. However, it can also expose economies to external shocks. The expected sign is ambiguous but generally considered negative (Osuma & Nzimande, 2024). Table 1 below shows the description of the variables used in the study.

**Table 1:** Description of variables in the study

Variable	Definition	Source	Expected sign
<b>Dependent variable</b>			
Ext_Debt	External debt as a percentage of GDP	IMF	
<b>Independent variable</b>			
KAOPEN	Chinn-Ito measure of capital account liberalization	Chinn-Ito (2008)	+
<b>Controls</b>			
RGDP	Real gross domestic product growth rate	IMF	-
Inflation	Inflation rate measured by consumer price index	IMF	+
Exch_rate	Real effective exchange rate (2010= base year)	IMF	+/-
Investment	Total Investment as a percentage of GDP	IMF	+/-
CAB	Current account balance as a percentage of GDP	IMF	-
TOPEN	Trade openness as a percentage of GDP	WDI/Trading Economics	-

**Table 2:** Descriptive statistics of the variables in the study

Variable	Obs	Mean	Std. Dev.	Min	Max
Ext_Debt	630	26.96	22.98	0.50	315.60
KAOPEN	625	-0.60	1.36	-1.93	2.30
RGDP	630	3.93	4.71	-36.40	20.70
Inflation	630	7.85	26.08	-72.70	557.20
Exch_rate	615	101.04	14.15	65.30	173.20
Investment	600	23.56	9.77	4.60	79.40
CAB	630	-6.03	8.84	-65.00	24.00
TOPEN	622	72.42	36.53	16.352	311.4

## Results and discussion

Table 2 reports on the summary statistics of the study variables. On average, external debt accounts for about 27% of GDP, though with substantial variation across countries. The capital account liberalization index shows both closed and relatively open regimes, reflecting heterogeneous policy environments in Sub-Saharan Africa. Macroeconomic indicators such as GDP growth, inflation, and exchange rate display wide dispersions, suggesting diverse economic conditions across countries and time. Similarly, investment,

trade openness, and current account balances also exhibit considerable variability, pointing to structural differences in economic performance and global integration within the region.

To ensure model reliability, several diagnostic tests were conducted. The Im-Pesaran-Shin (IPS) panel unit root test confirmed all variables are stationary at levels. Pesaran's cross-sectional dependence (CD) test was performed to examine whether residuals across countries were correlated. The test statistic was insignificant ( $p > 0.05$ ), indicating no evidence of cross-sectional dependence, and thus validating the assumption of cross-sectional independence in the model. The correlation matrix ruled out multicollinearity, and this was confirmed by the mean VIF statistic of 1.109. tests. Autocorrelation was addressed by using lagged dependent variables in the SGMM estimation. Heteroskedasticity was handled using robust standard errors to ensure efficiency of estimates.

**Table 3:** Effect of capital account liberalization on external debt in SSA

Variables	All 42 SSA Countries		Excluding Nigeria and South Africa	
	One-step SGMM Ext_Debt	Two-step SGMM Ext_Debt	One-step SGMM Ext_Debt	Two-step SGMM Ext_Debt
Ext_Debt_1	0.994*** (0.0406)	1.005*** (0.0389)	0.993*** (0.0415)	1.003*** (0.0391)
KAOPEN	0.344* (0.186)	0.397** (0.187)	0.344* (0.187)	0.402** (0.191)
RGDP	-0.285*** (0.0878)	0.397** (0.0684)	-0.292*** (0.0897)	-0.275*** (0.0676)
Inflation	0.0972 (0.0675)	0.0976 (0.0758)	0.100 (0.0721)	0.110 (0.0822)
Exch_rate	-0.0304** (0.0148)	-0.0355** (0.0136)	-0.0303* (0.0152)	-0.0356** (0.0145)
Investment	0.104*** (0.0359)	0.110*** (0.0338)	0.106*** (0.0368)	0.110*** (0.0338)
CAB	-0.0377 (0.0297)	-0.0361 (0.0284)	-0.0395 (0.0292)	-0.0392 (0.0268)
TOPEN	-0.0174* (0.0088)	-0.0193** (0.0088)	-0.0178* (0.0088)	-0.0208** (0.0088)

	(0.00975)	(0.00902)	(0.00983)	(0.00868)
Constant	-274.9 (276.6)	-65.59 (225.7)	2.960 (2.694)	2.792 (2.087)
Year Dummies	Yes	Yes	Yes	Yes
Observations	549	549	521	521
Number of Countries	40	40	38	38
Number of Instruments	36	36	36	36
J-Hansen test (p value)	0.194	0.194	0.221	0.221
AR(2) p value	0.309	0.315	0.330	0.339

Table 3 presents the dynamic panel estimates of the system GMM model. The Arellano-Bond test for second-order autocorrelation (AR(2)) and the Hansen J-test for over-identifying restrictions supports the reliability of the results. The AR(2) p-values across all model specifications are above the 5% significance level (e.g., 0.309 and 0.339), indicating no evidence of second-order serial correlation. Similarly, the Hansen J-statistics yield p-values above 0.1 (e.g., 0.194 and 0.221), suggesting that the instruments used are valid and uncorrelated with the error term. Each model employs 36 instruments, further supporting the consistency of the GMM estimator.

We find a positive and significant relationship between the capital account liberalization index (KAOPEN) and external debt. This implies that greater capital account openness leads to higher external debt levels. This result conforms to studies by Mughogho & Alagidede (2019), Brafu-Insaidoo & Biekpe (2014), and Agnello & Sousa (2015), who all found that financial liberalization increases capital flows and, consequently, external borrowing. This finding resonates with Bataka (2021), who made the case that financial liberalization, an aspect of economic liberalization, raises the level of public debt in both long and short run. Additionally, Dong (2021) emphasized that financial openness in other nations raises the domestic external public debt. However, Zehri (2017) observed a negative association in South Mediterranean countries, suggesting macroeconomic stability's role in mitigating debt-increasing effects.

Our findings also show a strong influence of the stock of external debt on the build-up of current debt, as indicated by the significant positive coefficients of the lagged external debt variable (Ext\_Debt\_1) in all models. This suggests that once SSA countries accumulate external debt, there is an increased likelihood of remaining indebted. This finding aligns with Sedik & Sun (2012), who opine that financial integration can lead to sustained capital inflows and higher external debt, necessitating careful debt management to avoid debt traps.

Regarding the control variables, the study finds a negative and significant relationship between real GDP growth (RGDP) and external debt. Higher economic growth reduces the need for external borrowing, supporting findings by Okada (2013) and Eichengreen et al. (2011). This indicates that sustainable economic growth can help manage external debt effectively, aligning with the debt overhang hypothesis by Siddique et al. (2016). The study also resonates with Kim et al. (2018) and Senadza et al. (2018), who discovered a comparable inverse connection between economic growth and external debt.

Investment has a positive effect on external debt. Claessens et al. (2007) found that higher levels of investment, which are indicative of better developed domestic financial systems, are linked to larger issuance of foreign currency debt. This suggests that investment drives the need for external financing, supporting the positive correlation observed in this study. This aligns with Ampah et al. (2018) and Adeola (2017), who found that investment projects in SSA often rely on external funding. The positive correlation emphasizes the need for the strategic use of borrowed funds to ensure productive investments and efficient debt repayment. This finding can partly be explained by the prevalence of debt-financed investment in SSA, where large infrastructure and development projects are frequently funded through external borrowing due to limited domestic savings and shallow financial markets. Thus, rising investment levels often translate into higher external debt accumulation as governments and private entities seek external capital to bridge financing gaps.

Trade openness (TOPEN) negatively and significantly affects external debt, indicating that more open trade policies reduce reliance on external borrowing. This finding aligns with Brafu-Insaidoo & Biekpe (2014) and Khan et al. (2021), who noted that open trade policies enhance export growth, improve foreign exchange earnings, and reduce external borrowing. Kim et al. (2018) also found that trade openness is associated with reduced government debt. Inflation and the current account balance, however, do not show significant effects on external debt. The insignificant effect of inflation diverges from some empirical literature like Sedik & Sun (2012) and Orimolade & Olusola (2018) but the insignificant effects of current account balance on external debt aligns with the study of Zehri (2017). The insignificant effects of this variable may be due to different analysis periods or SSA's unique economic characteristics. Thus, inflation and current account balance might not be a primary driver of external debt levels in SSA. A further explanation could be that inflation and current account balance are less influential in SSA compared to structural drivers such as capital account openness, growth, and investment. In some cases, measurement challenges and data inconsistencies across countries may also contribute to the insignificance of these variables. Additionally, in SSA economies with high aid inflows and concessional lending, external debt dynamics may not respond strongly to short-term price movements or current account fluctuations.

## Limitations of the study

Despite its contributions, the study has limitations. The KAOPEN index used as the main measure of capital account liberalization reflects de jure openness and may overstate the degree of actual openness, since it does not capture informal restrictions or weak enforcement. Furthermore, the analysis excludes important institutional variables such as governance quality and rule of law, which are critical for debt sustainability. It also does not account for exogenous shocks such as geopolitical tensions, global financial crises, or policy uncertainty, all of which may shape the CAL-debt relationship. Future research could address these limitations by incorporating institutional and shock variables, testing for nonlinearities in the CAL-debt nexus, and employing alternative measures that capture both de jure and de facto openness. Comparative studies between SSA and other developing regions would also help to contextualize the findings within a broader global framework. In addition, further studies can conduct sub-group analysis, for example, by distinguishing between resource-rich and non-resource-rich countries, low-income and middle-income SSA economies, or fragile and stable states, to better understand the heterogeneity of CAL's effects on external debt across different country contexts.

## Conclusion

This study explored the effect of capital account liberalization (CAL) on external debt in Sub-Saharan Africa (SSA), using the system GMM estimation technique on a panel dataset of 42 countries from 2007 to 2021. The findings reveal a significant positive relationship between CAL and external debt, indicating that increased openness to international capital flows is linked with higher external borrowing. Additionally, the persistence of external debt over time was confirmed, while real GDP growth, trade openness, and exchange rates were found to reduce debt levels. Investment, on the other hand, contributed to increased external debt. These results highlight the dual nature of capital account liberalization while it provides access to external capital for development, it also increases vulnerability to debt accumulation.

The study contributes to theory and literature in two keyways. First, it provides empirical support for the debt overhang hypothesis by showing how accumulated debt perpetuates further borrowing and potentially constrains long-term growth. Second, it advances the literature by isolating the impact of capital account liberalization on external debt in SSA, a region where evidence remains relatively scarce compared to other developing economies. By demonstrating the dual nature of CAL as both a source of financing for development and a driver of debt vulnerability, the study offers region-specific insights that represent an extension of previous studies that mainly considered the effect of broader financial liberalization.

The findings carry important policy implications. Governments in SSA should adopt a cautious and strategic approach to economic liberalization, supported by strengthened

institutional capacity to ensure that domestic financial systems, regulatory institutions, and macroeconomic buffers are sufficiently developed to absorb external shocks. Related to this is the need to strengthen debt management systems, which are critical in minimizing the accumulation and poor management of public debt. This is particularly important because it improves the capacity of debt management units to monitor external borrowing, negotiate favourable terms, and ensure alignment with long-term fiscal sustainability. Since investment was found to contribute to higher external debt, policymakers should prioritize directing borrowed resources toward productive, growth-enhancing projects rather than recurrent expenditure. In addition, promoting sustained economic growth and enhancing trade competitiveness will reduce borrowing pressures by improving foreign exchange earnings and expanding fiscal space. Regional collaboration among SSA countries can further help harmonize monitoring frameworks and mitigate spillover risks from volatile global financial conditions.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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