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Odongo Kodongo

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Sovereign Debt Sustainability and Private Sector Credit in Kenya

Odongo Kodongo*

Abstract

Typical debt sustainability metrics characterize Kenya's sovereign debt as "unsustainable" since around 2019. Further, the data show that, over time, commercial banks' private sector lending has declined while lending to the government has grown. Given these observations, this study examines whether sovereign debt has a discernible relationship with private sector credit growth and documents a characteristic negative relationship between sovereign debt and private credit growth; the negative relationship is stronger during periods when sovereign debt is arguably unsustainable. Informed by this finding, the study tests for the possible moderating influence of financial conditions on the established empirical relationship. Financial conditions have worsened considerably since around 2013 when our construct turns positive, or "restrictive". The tests show that financial conditions have a significant adverse moderating effect on the relationship between (domestic) sovereign debt and private sector credit growth. Informed by these findings, the study also tests for the possible existence of a threshold level of sovereign debt at which the negative relationship between sovereign debt and credit growth worsens: the results are inconclusive. Guided by these findings, the paper proffers several policy recommendations.

* Wits Business School, University of the Witwatersrand

1.0 Introduction

In their intermediation role, banks mobilize savings from surplus-appropriating economic agents (savers) and allocate them to economic agents appropriating deficits (users). Allocation of the mobilized resources creates assets in the banks' balance sheets in the form of loans and advances, security holdings, real estate, and others (Lucchetti, Papi, and Zazzaro, 2001).

Although these assets may complement each other, a bank's decision on the proportion of each one to hold in its portfolio is often a trade-off that is informed by the assets' prices, riskiness, and safety, as well as by macroeconomic innovations. Thus, macroeconomic shocks affecting market prices and riskiness may induce adjustments to banks' private sector credit supply (Bottero et al., 2020). For example, an expansion in the fiscal deficit may be accompanied by increased sovereign borrowing, which could spark interest rate adjustments. This may alter the riskiness of private borrowers (e.g., higher default risk) more than they do government (higher risk of rollover) because being backed by the government's credit, sovereign debt securities would likely retain some of their safety features. Such changes in borrowers' risk profiles may cause banks to consider derisking their portfolios by shifting credit supply in favor of the government (Fратиanni and Marchionne, 2017).

Additionally, in times of debt unsustainability, sovereign debt may exhibit nontrivial credit risk which may permeate the entire economy, forcing banks to deleverage (Angelini et al., 2014); with higher lending to the government being a natural consequence of the deleveraging. Sovereign debt is generally considered unsustainable if the government cannot repay it without amending its contractual terms or rendering it irrelevant by defaulting on the obligation, restructuring it, or via hyperinflation (Willems and Zettelmeyer, 2022). Thus, sovereign debt is deemed unsustainable if an undesirable event such as debt default or restructuring has been induced by the government's attempt to

settle the debt.¹ However, to ease interpretation, the definition of unsustainability is often linked to the flexibility of fiscal policy. If a change in fiscal policy to facilitate repayment of the debt is infeasible on social or political grounds, or because it might engender costly economic effects (e.g., cutting essential government spending or raising already high taxes), then debt is unsustainable (Willems and Zettelmeyer, 2022). This revised definition fits the Kenyan situation neatly, where, to tackle the burgeoning sovereign debt, the government announced a package of tax increases through the Finance Act 2024. The increased taxes precipitated a cost-of-living crisis that ignited street protests, forcing the government to withdraw the Act. Thus, because of its undesirable economic effects, Kenya's fiscal policy has become inflexible and may not be easily altered to facilitate debt repayment. This situation makes Kenya's sovereign debt arguably unsustainable.

The argument that Kenya's debt might be unsustainable is demonstrable. Existing data show that Kenya's sovereign debt has grown remarkably since 2013 (see Figure 2), showing signs of unsustainability since at least 2019 when all traditional indicators of sustainability (e.g., present value of debt to gross domestic product, debt service to revenues, and external debt to exports) decisively crossed their critical levels (see Figure 1). In such situations, credit terms

for private sector borrowers deteriorate. For example, yields on the ten-year Treasury bond have remained above 12% on average since 2018 and have recently surged beyond 15% (see Figure 3); because the 10-year government bond serves as a pricing benchmark for long-term private sector credit, commercial bank lending rates have also increased.² It is therefore not surprising that private sector credit appears to have fallen during the period, which coincides with arguably unsustainable sovereign debt usage (Figure 2). Motivated by these observations, the main objective of this study, therefore, is to examine the potential effects of sovereign debt unsustainability on private sector credit growth in Kenya. This is important as studies show that adverse shocks to private credit growth may engender negative real sector impacts (Checherita-Westphal and Rother, 2012; Doğan and Bilgili, 2014).

Empirical evidence appears to support the hypothesis that sovereign debt impacts private credit growth. Bofondi *et al.* (2018) find that the onset of sovereign debt crisis caused lending by Italian banks to grow by about 3 percentage points less than lending by foreign banks operating in Italy. Similarly, studies document a negative impact of a sovereign debt shock on capital and funding sources of banks, both of which diminish the supply of bank credit (Popov and van Horen, 2015; De Marco, 2014); and that banks, especially the

1 Technically, debt sustainability is defined using two interrelated concepts. First, debt is sustainable if the intertemporal government budget constraint, $B_{t+1} = (1 + r_t)B_t - S_{t+1}$, holds, where B_t is debt at the end of time t , r_t is the government's borrowing rate, and S_t is the primary balance (government revenues, including seigniorage, minus noninterest expenditures). Secondly, debt is seen as sustainable if sovereign debt-GDP ratio does not explode, the argument being that if the debt ratio explodes, the resources required to service debt might, in future, exceed the government's capacity to tax, forcing the government to engage in costly debt rollovers: in this case, debt is unsustainable if the risk of sovereign debt rollover is elevated.

2. See data from on the Central Bank of Kenya [website](#).



undercapitalized ones, induced by higher sovereign yields, increase their sovereign security holdings while reducing their private sector credit supply (Gennaioli et al., 2015). The latter finding implies a displacement effect, consistent with the Broner et al. (2013) model, in which governments facing turbulent times issue high-interest rate debt that is so attractive to banks it crowds out lending to other economic sectors. Such a high-interest rate environment is evident in the Kenyan case, where Treasury bills yields have ranged between 10% and 16% since January 2023.³

In the African region, a few studies have examined the linkages between sovereign debt, and real sector indicators including private sector credit growth. For example, on the nexus between sovereign debt and investments, Mabula and Mutasa (2019) find no significant relationships between domestic debt and debt service on one hand, and private investment on the other hand, implying sovereign debt neutrality for Tanzania for the period of 1970–2016. Contrarily, the recent study of Asravor et al. (2023), which employs Ghanaian data for the period 1994–2018, finds weak evidence of debt sustainability over the period but documents strong evidence of crowding-in of private investment: the study concludes that domestic sovereign debt in Ghana has been output enhancing. However, the preponderance of evidence points to the crowding out effects of sovereign debt in Africa. For example, Shetta and Kamaly (2014) find that as the government employs more debt to finance its fiscal deficit in Egypt, banks shift their asset portfolio away from risky private loans, stifling private sector credit

growth; the shrinking credit growth adversely affects aggregate investment and output growth. Similarly, Mwakalila (2020) finds that government domestic borrowing crowds out private sector credit by increasing the lending rate in the long run in Tanzania. For a sample of 27 Sub-Saharan African countries for the period 1980–2000, Christensen (2005) finds that a 1% increase in domestic debt over broad money reduces private sector credit by 0.15%.

For Kenya, a review of the empirical literature shows that the few studies that have examined public debt (Were, 2001; Sagire and Muriu, 2021) have focused on its effect on economic growth, with only one paper (Mbate, 2013), which included Kenya in a Sub-Saharan African panel, touching on credit growth. Mbate (2013) finds that domestic debt “crowds out” private sector credit, which deters capital accumulation and private sector growth in Sub-Saharan Africa. Thus, it is interesting to establish whether a similar effect holds in individual countries in the sample, such as Kenya. Single country studies are typically richer than panels (which can mask important country-level idiosyncrasies) as they provide deeper insights that are woven into the country’s context and hence yield results with superior policy-relevance.

Beyond the initial focus on the sovereign debt-credit growth nexus, this paper also attempts to establish if a threshold level exists beyond which sovereign debt affects credit growth differently (e.g., more adversely). That is, if, for example, sovereign debt affects private credit growth and unsustainable sovereign debt

3 Data are from the Central Bank of Kenya’s Interest Rate Statistics.

affects private credit more, it is a useful policy exercise to establish the point at which this transition occurs. Knowledge of the threshold level would facilitate evidence-based formulation of fiscal policy rules such as sovereign debt limits. This is particularly important for Kenya, where the public debt limit has been set haphazardly over time.⁴ The threshold analysis is underpinned by the literature that asserts that different levels of sovereign debt impose different intensities of effect on the real sector, implying that there is a threshold level of sovereign debt at which it becomes unsustainable, thus affecting real sector metrics more. For example, the influential work of Reinhart and Rogoff (2010) documented a threshold debt/GDP ratio of 90% for both advanced and emerging economies. Below 90%, there is a weak relationship between sovereign debt and real GDP growth while above 90%, real output falls more than proportionately to a given rise in sovereign debt. For external debt, however, they find lower threshold levels for emerging economies than for advanced economies.

For the euro area, Checherita-Westphal and Rother (2012) establish a threshold level of between 90% and 100% sovereign debt-to-GDP after which sovereign

debt negatively affects economic growth. Tran (2018) shows that sovereign debt is nonlinearly related to sovereign risk premium and that the premium rises at an increasing rate (approximately 6 times faster) when sovereign debt exceeds their threshold levels, which are in the range of 40–55% for a sample of 14 emerging economies for the period 1999–2016. Further, Karadam (2018) find a nonlinear relationship between debt and economic growth, which depends on the structure of debt and the level of indebtedness. Using a large sample 135 countries (24 industrial, 111 developing) for the period 1970–2012, they find that the debt threshold is lower for developing countries, implying that sovereign debt can hurt growth at lower levels of debt for those economies than for advanced economies. The more recent work of Assoum and Alinsato (2023) examine the role of governance in moderating the relationship between sovereign debt and real output growth using a sample of 39 countries in Sub-Saharan Africa over the period of 2002 to 2019. They find that the impact of public debt on per capita income depends on governance quality, with better governance inducing a positive relationship between the two while weak governance yields a negative relationship.

4. Section 52(2) of the Public Finance Management Act gives the National Assembly power to set the debt limit for the national government. However, a recent amendment to that section gives the Public Debt Management Office the responsibility to advise the national assembly on an annual borrowing limit. Through the amendment, the government secured the flexibility to adjust the borrowing limit every year.

2.0 Theoretical Framework and Hypotheses

Economic theory identifies several channels through which sovereign debt developments (distress, unsustainability, etc.) can affect credit to the private sector and real output. First, sovereign debt distress may lead to the worsening of external credit constraints and terms for private firms especially in countries such as Kenya⁵ where the international capital market is an important source of finance for the private sector (Arteta and Hale, 2008). This channel may work through changes in credit supply (Bottero, Lenzu and Mezzanotti, 2023; Popov and van Horen, 2015) as foreign investors' perceptions of sovereign risk change, or through exogenous shocks affecting both sovereign debt and private sector credit (Drudi and Giordano, 2000; Popov and van Horen, 2015).

Second, sovereign debt shocks may also affect credit to the private sector through the balance sheet channel, which acts via changes in credit demand (Arteta and Hale, 2008). The balance sheet channel operates through changes in borrower net worth. Excessive state borrowing amounts to a restrictive monetary policy which, by design, causes deterioration in borrowers' balance sheets, reducing the collateral value of their assets (Bernanke and Gertler, 1995). Lower collateral values increase borrower risk and induce lenders to demand higher risk premia on loans, which reduces borrower access to loans and real investments. Another mechanism offered by the literature is the bank lending channel (e.g., Bernanke and Blinder, 1988), according to which monetary policy shocks affect access of banks to loanable funds, consequently inducing shifts in the supply of bank loans, affecting the external finance premium⁶ of firms and, by extension, firms' investment activities.

5. Private sector loans has traditionally constituted a large share of the stock of Kenya's capital inflows, averaging 30.5% between 2012 and 2019, according to data from various Foreign Investment Surveys published by the Kenya National Bureau of Statistics.

6. The difference between the cost of internally generated finance such as retained earnings and externally sourced finance such as bank loans.

At the microlevel, studies interrogating increases in bank lending to government (share of sovereign debt securities issued by domestic governments in bank portfolios) especially during crisis periods have proposed additional hypotheses. First is the moral suasion hypothesis (Becker and Ivashina, 2019; Ongena *et al.*, 2019), which argues that in times of fiscal stress when demand for government securities is weak, governments may persuade domestic banks to purchase more domestic sovereign bonds both to preserve their (governments') credibility and to avoid excessive increases in bond yields; and that banks may acquiesce to such pressure if they feel that they have a "moral" or "patriotic" duty to assist the government in such times (Ongena *et al.*, 2019). The second hypothesis argues that banks purchase sovereign bonds to improve their balance sheet which deteriorates during crises (Affinito *et al.*, 2022). In both cases, banks reduce private sector credit allocation to increase their holdings of portfolios of government securities given constraints on their loanable funds; thus, heavy government borrowing is often accompanied by private sector credit tightening (de Marco, 2019). Guided by these arguments, the study's first hypothesis follows:

Hypothesis #1: *Sovereign debt is negatively related to private credit growth*

Finally, I examine the market discipline hypothesis (Bayoumi, *et al.*, 1995), which postulates a positive

relationship between sovereign debt and sovereign risk premium. The market discipline hypothesis argues that lenders impose a penalty on borrowers who accumulate excessive debt both to disincentivize additional borrowing and to provide creditors with more compensation for the extra risk. The risk premium rises smoothly with debt utilization until the lenders cannot tolerate higher risk and denies additional lending to the borrower (Tran, 2018). It is straightforward to extend this relationship to private debt given the commonly observed sovereign debt rating ceiling in which the rating of a corporation is restricted by the rating of the sovereign in whose jurisdiction the corporation operates. Therefore, an increment in sovereign risk premium will necessarily induce an increment in the risk premiums of private sector agents within the jurisdiction of the sovereign. The hypothesis predicts a linear relationship between sovereign debt usage and private credit growth initially (the weak form) and a nonlinear relationship as sovereign debt increases towards and beyond its sustainable levels – strong form and ugly form (Flandreau, *et al.*, 1998). This leads to the second and third hypotheses of this study:

Hypothesis #2: *Unsustainable sovereign debt is negatively related to private credit*

Hypothesis #3: *There is a threshold level of sovereign debt at which private credit growth is adversely affected*

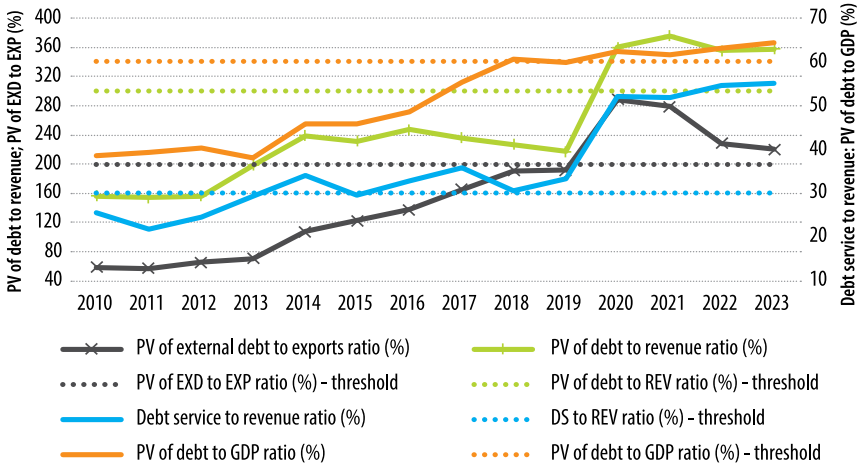
3.0 Methodology

3.1 Data and stylized facts

All the data for this study are from the Central Bank of Kenya. The study uses annual observations of 34 banks with available data. Data are available for the period 2003–2023; however, due to lagging of some variables, the study effectively starts from 2004 and hence uses 20 time series observations. A panel data analysis strategy is employed; the panel is unbalanced as some banks enter the market after 2003 while some exit before 2023. For the threshold regression, a balanced panel is required, so I use 30 banks with data for the 20 years and run multiple imputation to generate missing data (about 0.1% of all observations).

The data show that Kenya has ramped up its use of external public debt since its debut issue of five-year and ten-year Eurobonds in 2014. Many indicators of the country's sovereign debt sustainability show symptoms of unsustainable state borrowing (see **Figure 1**). The debt service to revenue ratio crossed and has stayed above the sustainability critical level (30%) since 2013. Similarly, the present value of external debt as a percentage of exports, an indicator based on the principle of cashflow matching, in which a country can potentially obviate closely linked external shocks technically by “dedicating” export proceeds to meeting external obligations, has been rising rapidly since 2013, crossing the critical level (200%) in 2019. Other important debt sustainability indicators, the present value of debt to gross domestic product and the present value of debt service to revenues, have also been above the threshold level since 2019/2020. In general, while debt sustainability has deteriorated rapidly since 2013, the country's debt situation appears to be unsustainable since 2019 when all the four key indicators shifted decisively across their critical levels.

Figure 1: Debt sustainability analysis



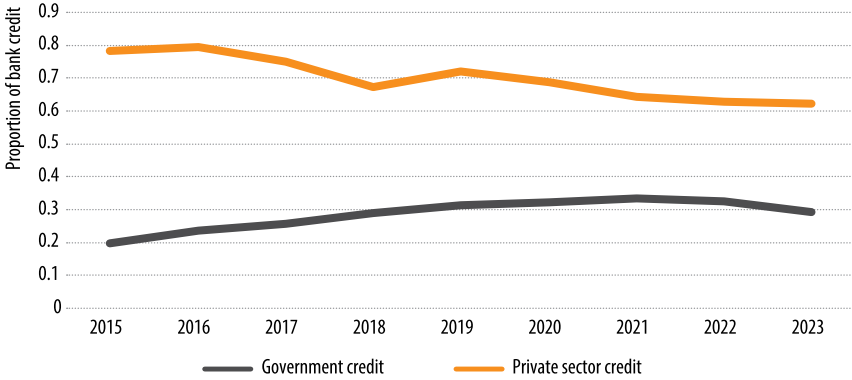
Data source: The Treasury, Kenya

Kenya’s growing indebtedness implies that both domestic and foreign debt utilization have increased in absolute terms and relative to GDP. Indeed, the stocks of external and domestic sovereign debt have grown rapidly from KES 563,198 million (23.6% of GDP) and KES 660,268 million (27.4% of GDP) in 2010 to KES 5,446,561 million (38.2% of GDP) and KES 4,832,113 million (33.3% of GDP) in 2023 respectively.⁷ Growing sovereign indebtedness, regardless of whether a large portion of that debt is sourced externally (as in Kenya’s case), may impose external financing constraints on

deficit-appropriating domestic economic agents (e.g., firms and households). Indeed, as **Figure 2** shows, the share of banks’ private sector credit has been on a declining trend relative to credit to the public sector, which has grown gradually. Expectedly, therefore, there appears to be a close relationship between sovereign debt usage and provisioning of private sector credit by banks. The diminishing availability of private sector credit is often accompanied by deteriorating terms of credit.

7. Data are from various issues of Annual Public Debt Management Reports obtained from Kenya’s Treasury.

Figure 2: Proportion of commercial bank credit to government and private sectors



Data source: The Treasury, Kenya

3.2 Empirical strategy

As explained, the anecdotal evidence (Figure 1) shows that Kenya seems to be operating with debt unsustainability since 2019. During this period, banks appear to have substituted credit to the private sector for credit to the government (Figure 2). Given these observations, I seek foremost to demonstrate, in this paper, that the observed apparent reduction in private

sector credit is attributed to banks' contracting credit supply rather than due to low demand for credit by the private sector. I also attempt to examine the impact of sovereign debt unsustainability on the supply of credit to the private sector. To test my hypotheses, I begin, following Fratianni and Marchionne (2017), by estimating Equation (1) and Equation (2):

$$q_{it} = \gamma_0 ms_{it} + \gamma_1 q_{it-1} + \gamma_2 sovdt_t + \gamma_3 astgth_{it} + \gamma_4 cnpl_{it} + \gamma_5 X_{it}^q + \eta_i + \varepsilon_{it} \dots\dots [1]$$

$$ms_{it} = \lambda_0 q_{it} + \lambda_1 ms_{it-1} + \lambda_2 sovdt_t + \lambda_3 astgth_{it} + \lambda_4 cnpl_{it} + \lambda_5 X_{it}^{ms} + \eta_i + \varepsilon_{it} \dots [2]$$

where q_{it} and ms_{it} are, respectively, the growth in private loans and the growth in the private security holdings of bank i in period t ; $sovdt_t$ is ratio of sovereign debt to GDP (an indicator of the country's aggregate financial constraint); $astgth_{it}$ is the growth (percentage change) in total assets of bank i ; $cnpl_{it}$ captures nonperforming loans in the current period (flow) relative to the stock of nonperforming loans at the end of the previous period as a percentage of total assets; X_{it}^q and X_{it}^{ms} are the set of control variables that inform banks' decisions on security holdings and loans; η_i are the bank fixed effects.

Following Affinito *et al* (2022), I include many bank-level variables that may influence bank asset acquisition decisions, including *Funding Gap* (ratio of total customer loans to total customer deposits), *Deposits* (the ratio of total deposits to total assets), *Tier 1 Ratio* (ratio of core equity capital to total risk-weighted assets), *Return on Average Assets* (the overall profitability of banking activity), *Yield Spread* (difference between lending rates for private loans and government securities, proxied by the 91-day Treasury bills rates), and *Initial Share* (private credit and private securities of each bank at the end of the previous period); and *Liquidity* (ratio of liquid or quick assets to total assets). Some of the variables are in lagged form consistent with the literature (Affinito *et al.*, 2022; Bottero *et al.*, 2020).

The choice of these variables is informed by previous studies, which have proposed many credit growth determinants. These include macroeconomic and bank-level factors such as economic productivity growth, efficiency gains attained through size, and banks' stability implied by capital and liquidity, among others. To begin, a positive nexus is expected between economic growth and private sector credit: a growing economy expands opportunities for investment and, all else equal, leads to higher credit growth (Imran and Nishat, 2013). Studies also find that many bank-level variables influence credit provisioning: for example, Chernykh and Theodossiou (2011) find that banks' capacity to control credit risks associated with long-term business lending and to attract more creditworthy corporate borrowers, especially in emerging markets, depends on various factors including their capitalization and size, and availability of long-term liabilities – their results show that banks

with lower level of capital, and those with lower funding for long term loans, are reluctant to supply credit.

Further, interest rates play an important role in determining credit growth and as Obsfeld (2012) argues, banks' ability to borrow at lower rates of interest and to lend at higher rates has implications for domestic credit growth. Liquidity is another important factor that has a bearing on credit growth (Misra, 2019): for example, in times of crisis, banks hold excess liquid assets as a precautionary motive (e.g., Berrospide, 2013) or to send a positive signal to the market about their solvency (Ramos, 1996), both of which reduce credit provisioning. Another factor that may affect credit provisioning by banks is bank profitability: profitable banks can retain earnings, increase their core capital, offer higher returns to owners, and more easily raise capital on the markets (Flannery & Rangan, 2008), which strengthen their ability to extend credit. However, if higher profitability reflects high market power and/or low competition, it may raise financing obstacles for firms (Klein and Weil, 2022). Further, profitable banks may also be more risk averse, which incentivizes them strongly to screen loans and to monitor borrowers (Holmström & Tirole, 1997), both of which may adversely affect their credit provisioning.

Banks can lower their risk through one of two complementary strategies: either by reducing their total assets relative to equity – de-leveraging or the size effect; or by reducing the proportion of their loans to securities for a given level of total assets – derisking or substitution effect (Fratianni and Marchionne, 2017).



For this study, the main coefficients of interest are γ_2 and λ_2 . I test the hypothesis that bank decisions are neutral in respect to sovereign debt, i.e., $\Gamma_2 = \lambda_2 = 0$, against the alternative that sovereign debt induces banks to reduce their investments in private loans, i.e., $\gamma_2 < 0$ and to

find private securities more desirable, $\lambda_2 > 0$. Second, to understand the specific effect of sovereign debt unsustainability, I employ a modified version of the methodology of Becker and Ivashina (2018), the empirical model of which is presented in Equation (3) and Equation (4):

$$q_{it} = \gamma_0 + \gamma_1 q_{it-1} + \gamma_2 ms_{it} + \beta_1 sovd_t \times D_t + \beta_2 sovd_t \times (1-D_t) + X_{i,t-1} + \eta_i + \varepsilon_{it} \dots [3]$$

$$ms_{it} = \gamma_0 + \gamma_1 ms_{i,t-1} + \gamma_2 q_{it} + \beta_1 sovd_t \times D_t + \beta_2 sovd_t \times (1-D_t) + X_{i,t-1} + \eta_i + \varepsilon_{it} \dots [4]$$

where q_{it} and ms_{it} are, as defined earlier; η_i are the bank fixed effects; $sovd_t$ is sovereign debt in period t ; D_t is an indicator variable taking the value of 1 at time t if the country is in a state of financial unsustainability (from 2019); and in the spirit of Becker and Ivashina (2018), $X_{i,t-1}$ is a vector of lagged and contemporaneous characteristics of bank i . I test the hypothesis of bank private sector credit neutrality to sovereign debt unsustainability, $\beta_1 = 0$, against the alternative that sovereign debt unsustainability induces a contraction effect on bank private sector credit allocation: $\beta_1 < 0$.

Equations (1) through (4) assume a linear relationship between sovereign debt on the one hand and private credit and private investment growth on the other hand. However, one may argue that sovereign debt may influence private credit growth largely through the crowding-out effect (Broner et al., 2014), which happens when there is an “unhealthy” debt utilization by sovereigns (Traum and Yang, 2015). Thus, it is interesting to establish the level at which government

borrowing is considered unhealthy and therefore impacts adversely on (crowds out) private credit growth. Specifically, I take the view that there is a requisite minimum accumulation of sovereign debt, especially when secured domestically, at which it begins to impact domestic private credit significantly negatively. To establish this minimum level, I estimate the model in Equations (5) and (6) using the panel threshold regression model of Kremer et al. (2013).

$$q_{it} = \mu_i + \alpha q_{it-1} + \lambda_1 sovd_t \psi_{it \leq \gamma} + \lambda_2 sovd_t \psi_{it > \gamma} + \delta' X_{it} + \varepsilon_{it} \dots [5]$$

$$ms_{it} = \mu_i + \alpha ms_{it-1} + \lambda_1 sovd_t \psi_{it \leq \gamma} + \lambda_2 sovd_t \psi_{it > \gamma} + \delta' X_{it} + \varepsilon_{it} \dots [6]$$

where ψ is the threshold variable, defined in this paper as the level of sovereign debt; γ is the value of the threshold variable at the inflexion point in the function; α is the estimated coefficient of the lagged dependent variable, and λ are the estimated coefficients of the threshold variable in different regimes; δ is the vector of coefficient estimates of the control variables, μ and ε are, respectively, the cross-sectional fixed effects to deal with unobserved country-level heterogeneity and noise terms.

Table 1: Descriptive statistics

Variables	Summary statistics			Summary statistics											
	Obs.	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1 Sovereign debt	660	0.578	0.013	1.000											
2 Pvt cred growth	660	0.160	0.247	-0.216											
3 Pvt SH growth	660	0.101	0.538	-0.035	0.074										
4 Tier 1 ratio	660	0.228	0.150	-0.137	0.034	-0.024									
5 Assets growth	660	0.155	0.205	-0.209	0.547	0.050	0.091								
6 Liquidity	660	0.357	0.166	0.138	-0.125	-0.066	0.249	-0.014							
7 Deposits	660	0.720	0.295	0.033	0.022	-0.043	-0.084	-0.027	-0.005						
8 NPL portfolio	660	0.154	0.167	0.256	-0.191	0.007	0.139	-0.179	-0.168	-0.020					
9 Funding gap	660	0.906	1.477	0.065	-0.023	0.024	-0.032	-0.052	-0.116	-0.205	0.125				
10 Profitability	660	0.204	0.305	-0.162	0.113	-0.044	-0.054	0.078	0.018	0.111	-0.390	-0.070			
11 GDP growth	660	0.048	0.020	-0.015	0.038	-0.106	0.044	0.063	0.019	0.022	0.042	0.044	0.080		
12 Domestic debt	660	0.283	0.057	0.959	-0.243	-0.009	0.167	-0.208	0.191	0.026	0.176	0.063	-0.142	-0.034	
13 Spread	660	0.062	0.023	-0.579	0.127	-0.050	0.150	0.157	-0.102	-0.024	-0.102	-0.003	0.057	0.131	-0.594



Sovereign debt is the country's total debt expressed as a percentage of the country's gross domestic product (GDP); Pvt cred growth is the annual percentage growth in a bank's private sector lending (loans and advances); Pvt SH growth is the annual percentage change in a bank's holdings in private-sector-issued securities; Liquidity is measured as quick assets a percentage of total assets; Asset growth is the year-on-year percentage change in total assets; Spread is the percentage difference between the 91-day Treasury bills rate and the bank's annual average lending rate; NPL portfolio is impaired loans as a proportion of gross loans and advances; Deposits is the ratio of total deposits to total assets; Funding gap is the ratio of total customer loans to total deposits; Profitability is proxied by the return on average assets. Obs. is number of observations; SD is standard deviation.

3.3 Descriptive analysis

Descriptive statistics are shown in **Table 1**. The mean value of sovereign debt was 57.8% of gross domestic product (GDP) during the 2004–2023 period. Domestic debt comprised of 28.3% of GDP, or approximately 49% of total sovereign debt. Thus, during the period, the country had a little more foreign debt on the average than it had domestic debt, which may put downward pressure on the exchange rate and on the domestic revenue as the domestic currency depreciates. The high usage of domestic debt could also impose crowding out of private sector credit since government debt is generally considered to command a lower default premium (higher quality) relative to private debt. Indeed, the data show that both private credit growth and asset growth averaged only 16%

during the period, with banks cautiously keeping their liquid (quick) assets quite high (36% of total assets) relative to nonperforming loan portfolios, which averaged only about 15.4% of their gross loans and advances.

The spread between lending rates and the risk-free rates, during the period, is quite high at 6.2% compared to the same spread during the interest rates control period (2016–2019), which was fixed at 4%; thus, it does not come as a surprise that banks were making large profits (about 20.4% on average assets). However, it is important to note the high standard deviation associated with profitability, indicating a great deal of heterogeneity in bank profits. It is also worth noting that the period witnessed what appears to be a resilient banking sector with capital adequacy ratio (Tier 1 capital to risk-weighted assets) of 22.8%, which is more than double the Basel III regulatory requirement of 10.5%. Turning now to the associations between the variables, it is evident that correlations are generally low such that the fear of multicollinearity in our estimated equation is negligible.

There are few instances of high correlations, some of which are expected, such as between domestic debt and total sovereign debt (0.96), which is however not of concern as the two are used interchangeably. We also notice moderate correlations in very few other instances, such as between spread and sovereign (and domestic) debt, but which, again, are not concerning because variables such as spread enter our empirical tests in lags.

4.0 Empirical Tests Results

4.1 Sovereign debt and banks' private sector investments

In this section, we present empirical tests results for the effect of sovereign debt (domestic plus foreign) on private sector credit growth (growth in loans and advances to customers and growth in private security holdings of banks). The results are reported in **Table 2**. In columns (1) and (5), we control bank fixed effects to rule out unobserved bank-specific influences on the decision to lend to the private sector or to invest in private sector-issued securities; columns (2) and (6) assume random effects. To deal with potential endogeneity arising, for example, from simultaneity between variables such as assets growth and nonperforming loans on the one hand and investments in private sector-issued securities and private credit on the other hand, we use the two-stage least squares (2SLS) estimation employing the Lewbel (2012) approach. Lewbel's approach, which generates internal instruments using heterogeneity in the error term of the first stage regression, is convenient when it is difficult to identify external instruments or when external instruments are not available. Results are reported in columns (3) and (7).

In columns (4) and (8), we use panel-corrected standard errors, necessitated by the confirmation of the presence of cross-sectional dependence in the panel (see **Table A1** in the Appendix). The procedure allows standard errors to be consistent even though, as seen in **Table A1**, the disturbances from each observation are unlikely to be independent. Specifically, the standard errors are robust to each bank having a different variance of the disturbances and to each bank's observations being correlated with those of the other banks through time. In comparison to the panel generalized least squares estimator (GLS), the panel-corrected standard errors estimator is slightly less efficient (Hoechle, 2007); however, the GLS estimator yields much lower standard errors, which over-reject the null hypothesis. The optimistic (anticonservative) standard errors of the GLS estimator negates the small improvement in its efficiency (Beck and Katz, 1995).

Except for columns (4) and (8), where we report panel-corrected standard errors as explained, we report standard errors that are robust to heteroscedasticity and

autocorrelation. Because of persistence in bank decisions regarding the private sector investment variables, we control initial conditions by estimating each specification in the dynamic form. The lagged dependent variable is, however, consistently statistically zero. In general, the results show that sovereign debt negatively affects both private sector lending decisions of banks (columns 1 through 4) and banks' private security holdings (columns 5 through 8), the latter being weakly significant. These effects are robust to different specifications, and controls for endogeneity and cross-sectional dependence. Interestingly, there appears to be a one-way relationship between private security holdings of banks and direct private sector lending in which the former negatively affects the latter but not vice versa. That is, Kenyan banks appear to hold private sector-issued securities, usually a minimum level for precautionary purposes, regardless of the level of their direct lending to customers but, over time, adjust their holdings above this level upwards or downwards, say for speculative purposes, financing their varying positions with funds that would otherwise be

invested in loans and advances. On the main question of whether sovereign debt affects banks' private credit, the results appear to suggest that the credit channel theory (Bernanke and Gertler, 1995) holds in Kenya. The theory suggests that monetary policy decisions of the government (such as deficit financing) are transmitted to the real economy through either the bank-lending channel (contraction and expansion of loan supply, which we have tested) or through the balance sheet channel, often through the external finance premium faced by firms (the difference between the cost of external finance such as bank loans and the cost of internally generated funds). Our results show a distinct negative relationship between sovereign credit and banks' private sector lending, reminiscent of a phenomenon known in the literature as the "crowding-out" effect (Broner *et al.*, 2014; Traum and Yang, 2015). These effects are stronger for loans and advances to customers than they are for private security holdings of banks—which can potentially be explained by risk asymmetry between private bank borrowers and security issuances of corporates.

Table 2: Effects of total sovereign debt

Dependent variable	Private credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lag dependent variable	-0.028 (0.032)	-0.002 (0.035)	-0.006 (0.037)	-0.024 (0.045)	-0.036 (0.029)	-0.012 (0.029)	-0.019 (0.035)	-0.032 (0.050)
Private security holdings growth	-0.034 (0.021)	-0.034* (0.020)	-0.080** (0.039)	-0.036** (0.014)				
Private credit growth					-0.186 (0.115)	-0.177 (0.113)	-0.115 (0.128)	-0.189** (0.084)
Sovereign debt	-0.133* (0.077)	-0.152** (0.075)	-0.169** (0.083)	-0.166* (0.102)	-0.237 (0.183)	-0.283* (0.170)	-0.312* (0.178)	-0.285* (0.152)

Dependent variable	Private credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.150 (0.329)	0.232 (0.309)	0.294 (0.307)	0.203 (0.571)	-1.557* (0.880)	-1.559* (0.860)	-1.275 (0.886)	-1.531** (0.754)
Asset growth	0.604*** (0.124)	0.607*** (0.130)	0.560*** (0.177)	0.599*** (0.056)	0.146 (0.125)	0.147 (0.122)	-0.100 (0.208)	0.152* (0.093)
Flow in NPL	0.123*** (0.031)	0.127*** (0.032)	0.239*** (0.082)	0.131*** (0.022)	0.749*** (0.063)	0.741*** (0.064)	0.871*** (0.161)	0.744*** (0.043)
Spread	-0.067 (0.578)	-0.301 (0.380)	-0.214 (0.424)	-0.338 (0.516)	-0.745 (0.939)	-1.129 (0.805)	-0.829 (0.879)	-1.093 (0.843)
Lag deposits	-0.039 (0.027)	-0.028 (0.036)	-0.032 (0.038)	-0.029 (0.039)	-0.115 (0.103)	-0.071 (0.081)	-0.073 (0.079)	-0.072 (0.059)
Lag funding gap	-0.002 (0.007)	-0.002 (0.007)	-0.002 (0.007)	-0.002 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.005 (0.004)	-0.004 (0.010)
Lag tier 1	0.320* (0.165)	0.212** (0.091)	0.214** (0.096)	0.227*** (0.071)	0.007 (0.135)	-0.066 (0.108)	-0.055 (0.114)	-0.071 (0.122)
Lag profitability	-0.030 (0.075)	0.030 (0.033)	0.023 (0.035)	0.029 (0.030)	-0.036 (0.097)	-0.065 (0.052)	-0.073 (0.054)	-0.069 (0.056)
Constant	0.169** (0.078)	0.177** (0.070)	0.170** (0.078)	0.194** (0.087)	0.317* (0.182)	0.393*** (0.147)	0.372** (0.170)	0.397*** (0.148)
Fixed effects	Yes	No	No	No	Yes	No	No	No
Endogeneity	No	No	Yes	No	No	No	Yes	No
X-sectional dep.	No	No	No	Yes	No	No	No	Yes
R-sqd (overall)	0.360	0.371	0.347	0.360	0.323	0.326	0.310	0.325
Corr (ui, Xb)	-0.101				-0.017			
Rho	0.073	0.000		0.036	0.041	0.000		0.032
p-value of								
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen			0.202				0.115	
K-P			0.397				0.272	
Observations	659	659	659	659	659	659	659	659

This table presents estimates of various regressions of private credit growth and growth on private security holdings of banks on sovereign debt growth and various control variables. In parentheses are robust standard errors clustered by bank. Rho is the fraction of variance due to the error term. DV is dependent variable; NPL is nonperforming loan portfolios; X-section dep is cross-sectional dependence; K-P is the Kleibergen-Paap test for under-identifying restrictions; Obs. is number of observations. † indicates that the variable is multiplied by 10. *, p<0.10; **, p<0.05, ***, p<0.01.



Unlike private loans, which are directly negotiated with customers (firms and individuals) and are replete with contractual frictions such as higher moral hazard, security issuances, whether directly placed to banks and other institutional lenders in the private debt markets (e.g., commercial paper) or sold in public debt markets (e.g., bonds and notes), allow for collective monitoring by all creditors through a trustee and the use of restrictive covenants, both of which may reduce contractual frictions. Thus, where banks must choose between private security investments and direct credit to firms and households especially in times of sovereign-borrowing-induced liquidity constraints, they are likely to prefer the safer security holdings option, resulting in crowding out of direct lending, consistent with Acharya et al. (2018).

Of the control variables, I document several interesting findings. First, the flow in nonperforming loan portfolios is strongly positively related to both direct lending and growth in private security holdings of banks. That is, increments in nonperforming loans elicit increments in credit provisioning perhaps because banks consider that greater investment in loans and securities might yield income that can be used to cover increasing nonperforming loans. However, this variable is likely to depict simultaneity with the dependent variable making it difficult to interpret. Which is why, in the regressions in columns (3) and (7), it is considered endogenous to credit growth and to growth in securities investments—the results remain similar: significantly positive, but with a higher magnitude of economic effect. The remaining variables, namely liquidity, asset growth, and capital adequacy, yield expected effects on credit growth; similarly, GDP growth is expectedly negatively related to private security holdings since banks are induced to substitute security holdings for

direct lending, which although riskier, promise higher yields in an expanding economy.

4.2 Domestic Borrowing by the Government

The tests in Section 4.1 employ total sovereign debt (domestic debt plus foreign debt). However, one may argue that domestic debt is more closely related to private credit growth in the domestic market since the government, when implementing contractionary fiscal policies, competes directly with the private sector for access to loanable funds in the domestic market. As discussed, this competition may lead to the “crowding-out” of private credit, constraining financing of enterprises and households, a phenomenon in which banks tend to prefer to lend to the government because of the greater safety inherent in government securities relative to private sector assets. The crowding-out phenomenon is often explained through the mechanism of competing demands (Bai *et al.*, 2024): the government’s comparative advantage in this competition implies a diminishing supply of loanable funds to the private sector whenever such funds are constrained (Liu *et al.*, 2023), which is usually the case when capital accumulation is not unlimited.

Thus, to more directly test the crowding-out phenomenon in the Kenyan financial market, the tests in this section use government’s domestic debt, rather than total government debt as was the case in the previous section. **Table 3** reports results. The results show an unambiguous, and stronger (relative to the results in **Table 2**) negative effect of domestic government borrowing on private credit growth. This not only reaffirms the bank lending channel of monetary policy transmission (discussed in Section 4.1), but also establishes the crowding-out phenomenon more formally. Interestingly, government’s domestic

borrowing does not appear to have a statistically significant effect on bank's private sector-issued security holdings although the coefficient estimates report the expected sign. That is, there is an asymmetry in the effect of the contractionary fiscal policy, in which direct loans to customers diminishes with domestic sovereign debt while more established corporate borrowers can exploit their financial strength to compete, with some level of success, with the government for borrowed funds in the securities market.

Table 3: Effects of sovereign domestic debt

Dependent variable	Private credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged DV	-0.034 (0.031)	-0.008 (0.034)	-0.006 (0.035)	-0.030 (0.045)	-0.037 (0.029)	-0.012 (0.029)	-0.016 (0.034)	-0.034 (0.050)
Pvt SH growth	-0.032 (0.021)	-0.033* (0.020)	-0.071** (0.034)	-0.034** (0.014)				
Private credit growth					-0.183 (0.115)	-0.172 (0.112)	-0.104 (0.121)	-0.186** (0.085)
Domestic debt	-0.447** (0.181)	-0.503*** (0.172)	-0.529*** (0.177)	-0.535** (0.249)	-0.205 (0.401)	-0.290 (0.375)	-0.337 (0.380)	-0.299 (0.375)
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	No	No	Yes	No	No	No
Endogeneity	No	No	Yes	No	No	No	Yes	No
x-sectional dep								
R-sqd (overall)	0.364	0.375	0.356	0.364	0.320	0.324	0.314	0.323
Corr (ui, Xb)	-0.087	0.000			-0.021	0.000		
Rho	0.071	0.000		0.037	0.042	0.000		0.035
p-value of								
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen			0.125				0.088	
Kleibergen-Paap			0.319				0.243	
Observations	659	659	659	659	659	659	659	659

This table presents coefficient estimates of various types of regressions of private credit growth and growth on private security holdings of banks on sovereign debt growth and various control variables. In parentheses are robust standard errors clustered by bank. Rho is the fraction of variance due to the error term. DV is dependent variable; NPL is nonperforming loan portfolios; CD is cross-sectional dependence; Obs. is number of observations. † indicates that the variable is multiplied by 10. *, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$.

4.3 Sovereign debt unsustainability

Atingi-Ego et al. (2021) observe that countries in the Sub-Saharan African region have accumulated debt at a tremendous pace since the last debt cancellations of the mid-2000s, attributing the growth to “exogenous shocks (e.g., commodity price volatility), weak fiscal management and macroeconomic policy frameworks, changing composition of debt towards more expensive finance; high public spending; and, in some cases, natural disasters and discovery of previously undisclosed debt.”

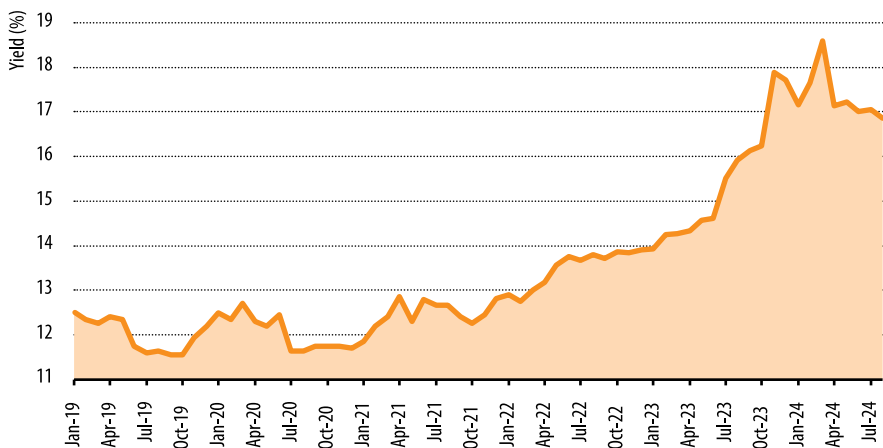
According to Bilicic (2013), the sustainability condition states that the value of the outstanding stock of debt should not exceed the present value of the future stream of primary surpluses as a share of national income. Violation of this condition implies unsustainable sovereign debt utilization. In practice, several other ratios are used to evaluate debt

sustainability as demonstrated in Section 3.1. As the ratios show, Kenya is among the countries that have been adversely affected by the surge in sovereign debt in the region, with debt usage being unsustainable since 2019: public debt has been on an increasing trend since around 2014 when the country made its debut Eurobond issuance. From mid-2015, the composition of public debt shifted in favor of external debt (about 51% of total debt in July), with the government increasingly preferring the often shorter-dated commercial external debt to the typically longer-dated multilateral and bilateral debt.

4.4 Data source: Investing.com

To illustrate, external commercial debt grew almost 400% from approximately KES 58.9 billion in June 2013 to approximately KES 234.8 billion in June 2014; over the same period, multilateral and bilateral debt grew respectively by 16.8% and 14.1%. These

Figure 3: Evolution of 10-year Kenya’s Treasury bond yields



Data source: The Treasury, Kenya

Dependent Variable	Private credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen			0.154				0.159	
K-P			0.309				0.226	
Observations	659	659	659	659	659	659	659	659

This table presents coefficient estimates of various types of regressions of private credit growth and growth on private security holdings of banks on sovereign debt growth and various control variables. In parentheses are robust standard errors clustered by bank. Rho is the fraction of variance due to the error term. DV is dependent variable; NPL is nonperforming loan portfolios; X-sectnl dep is cross-sectional dependence; K-P is the Kleibergen-Paap test for under-identifying restrictions; Obs. is number of observations. † indicates that the variable is multiplied by 10. *, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$.

Table 5: Domestic debt effects during unsustainable debt usage

Dependent Variable	Private credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged DV	-0.038 (0.030)	-0.012 (0.033)	0.008 (0.036)	-0.030 (0.044)	-0.038 (0.030)	-0.012 (0.031)	-0.011 (0.739)	-0.035 (0.050)
Pvt SH growth	-0.031 (0.021)	-0.032 (0.020)	-0.042 (0.037)	-0.033** (0.014)				
Pvt credit growth					-0.177 (0.116)	-0.169 (0.114)	-0.045 (0.698)	-0.182** (0.086)
Dom debt† × D	-0.087*** (0.025)	-0.092*** (0.028)	-0.100*** (0.031)	-0.950*** (0.264)	-0.003 (0.060)	-0.020 (0.060)	-0.030 (0.063)	-0.194 (0.455)
Dom debt† × (1-D)	-0.117*** (0.034)	-0.122*** (0.039)	-0.132*** (0.042)	-1.249*** (0.357)	0.010 (0.082)	-0.014 (0.082)	-0.026 (0.076)	-0.120 (0.589)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	No	No	Yes	No	No	No
Endogeneity	No	No	Yes	No	No	No	Yes	No
X-sectnl dep	No	No	No	Yes	No	No	No	Yes
R-sq (overall)	0.373	0.383	0.373	0.374	0.320	0.324	0.313	0.323

Dependent Variable	Private credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Corr (ui, Xb)	-0.091	0.000			-0.022	0.000		
Rho	0.071	0.000		0.031	0.043	0.000		0.035
p-value of								
Wald	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen			0.162				0.128	
K-P			0.373				0.272	
Observations	659	659	659	659	659	659	659	659

This table presents coefficient estimates of various types of regressions on credit growth and growth on security holdings (SH) of banks on various explanatory variables. In parentheses are robust standard errors clustered by bank. Pvt is private; SH is security holdings; Dom is domestic; x-secln dep refers to cross-sectional dependence; K-P is the Kleibergen-Paap test for under-identifying restrictions; Rho is the fraction of variance due to the error term. DV is dependent variable; D is an indicator variable equal to 1 when year is 2019 or after, and 0 otherwise; NPL is nonperforming loan portfolios. † indicates that the variable is multiplied by 10. *, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$.

The results show, consistent with the findings in Sections 4.1 and 4.2, that sovereign debt adversely affects private credit growth. Specifically, the period of unsustainable debt utilization (Sovn debt×D) appears to have a more significant effect (typically at 5%) on private credit growth than the period of sustainable usage of sovereign debt (typically significant at 10%), indicating stronger effects on the real sectors. In a recent analysis of debt utilization by African governments over the 1980–2019 period, Songwe and Awiti (2021) show a negative correlation between debt levels and GDP growth for African countries. This can be attributed to many mechanisms such as interest rates as demonstrated in Figure 3, and, where governments are a key driver of growth, the narrowing of fiscal space induced by unsustainable debt usage may reduce spending on physical and human capital, with detrimental effects for growth (Ndung’u *et al.*, 2021). Further, the results are consistent with Bofondi

et al. (2018), who find that lending by domestic Italian banks grew by about 3 percentage points less than lending by foreign banks operating in Italy during the sovereign debt crisis.

Related to debt sustainability, sovereign defaults lead to a decline in foreign and domestic credit to the domestic private sector, even if domestic agents do not hold sovereign debt in Sandleris (2014)’s model; interestingly, this effect is amplified by stronger domestic financial institutions. On the other hand, sovereign debt unsustainability has no effect on growth in private security holdings; however, after controlling endogeneity and cross-sectional dependence, debt unsustainability has a weak effect (10% significance), meaning that higher than normal yields on government security may alter banks’ preferences in their favor, eroding even banks’ precautionary private sector security holdings. The



results for domestic debt (**Table 5**) confirm those in Table 4. However, consistent with the results in Table 3, we do not find any evidence of the substitution effect in the securities market (risk shifting between sovereign and private securities) regardless of whether sovereign debt is sustainable or unsustainable. That is, there is no evidence that domestic sovereign debt (often effected through government security issuances) affects banks' appetite for private securities. This contrasts Fratianni and Marchionne (2017), who find that private securities respond positively to sovereign debt while loans are negatively responsive.

4.5 The moderating role of financial conditions

The effect of sovereign debt on domestic private credit growth may be contingent on the overall financial conditions in the country. Studies show that financial conditions tend to affect the economy through the credit channel. For example, to hedge themselves against moral hazard induced by tight financial conditions, banks may ration credit (lower credit supply), ultimately impacting investment and economic output (Swiston,

2008). Therefore, it is important to control for tightening and relaxation of financial conditions when assessing the role of sovereign debt on private sector credit growth. To perform the analysis, I begin by constructing a financial conditions index using commonly used financial metrics.

These include the nominal effective exchange rate (KES/USD), the real interest rate, domestic credit to the private sector, banks' aggregate nonperforming loan portfolios, sovereign spread (defined, following Garita and León (2015), as the difference between the US ten-year bond yields and Kenya's ten-year bond yields), excess money supply growth (defined as the difference between money supply growth for a period and its long term (1967-2023) trend, and, annual returns on the Nairobi 20-share stock market index (Gumata *et al.*, 2012; Garita and Leon, 2015; Brave, 2017). By its constituents, the index accounts for conditions in money markets, capital markets, and the traditional banking systems, using annual data. I use principal component analysis derived weights to capture the relative importance of each constituent.

Accordingly, the financial conditions index is computed as,

$$FCI = 0.494DCPS + 0.479SOVS + 0.264RINT - 0.521NEER - 0.313NPLP - 0.274MKTR - 0.109EMSG$$

where, *DCPS* is domestic credit to the private sector, *SOVS* is sovereign spread, *RINT* is real interest rates, *NEER* is nominal real exchange rate index, *MKTR* is stock market return, and *EMSG* is excess money supply growth. The variables therefore capture liquidity of the financial market (*EMSG*), credit conditions for households and firms (*DCPS*, *RINT*), endogenous (*SOVS*, *NPLP*) and exogenous (*NEER*) sources of risk to the financial sector, and rewards for risk-taking (*MKTR*). Increasing values of the *FCI* are associated with tightening financial conditions, and vice versa. To check the validity of the construct as a financial conditions' indicator, we correlate the construct with inflation and with economic growth. Consistent with other financial

conditions constructs (e.g., Swiston, 2008), *FCI* has a negative correlation with the two (-0.29 and -0.13 respectively). That is, tight financial conditions adversely impact economic growth, possibly through their negative effect on credit growth and investment.

Figure 4 displays the trend in Kenya’s financial conditions between 2003 and 2023. It documents relaxed financial conditions during the early part of the study. From 2023, as the government went on

a borrowing spree, as discussed, credit conditions began to tighten until around 2016 then fell until 2019, when sovereign debt also showed clear signs of unsustainability. To appreciate the moderating role of financial conditions on the effect of sovereign debt on private credit growth, I perform the tests using domestic sovereign debt, which is arguably more responsive to domestic financial conditions. The results are displayed in **Table 6** and **Table 7**.

Figure 4: Kenya’s financial conditions, 2003–2023

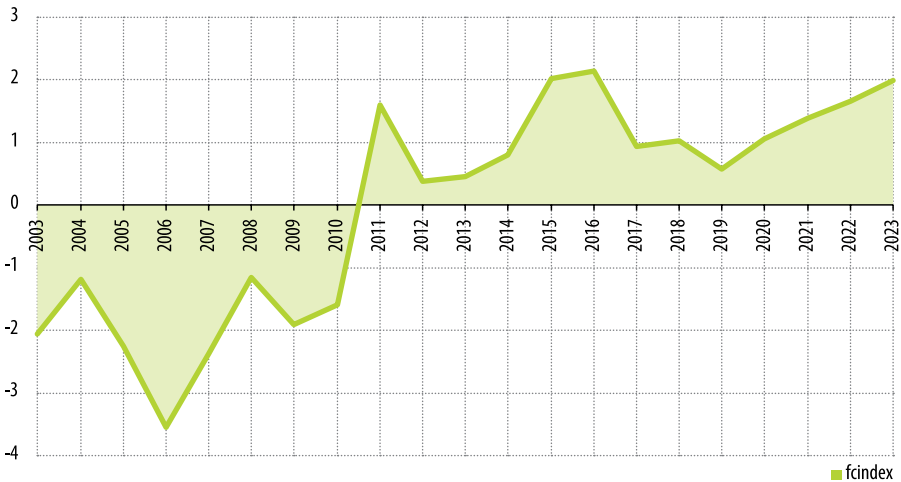


Table 6: Financial conditions and credit growth

	Credit growth holdings growth				Private security			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dom sovereign debt	-0.452** (0.187)	-0.397** (0.185)	-0.428** (0.199)	-0.432* (0.257)	0.037 (0.441)	-0.018 (0.411)	-0.061 (0.431)	-0.022 (0.423)
Financial conditions	0.011 (0.027)	0.039 (0.027)	0.029 (0.028)	0.040 (0.032)	0.073 (0.066)	0.076 (0.055)	0.057 (0.058)	0.077 (0.061)
DSD×FC	-0.030 (0.099)	-0.147 (0.093)	-0.117 (0.098)	-0.151 (0.119)	-0.300 (0.261)	-0.310 (0.209)	-0.251 (0.224)	-0.312 (0.228)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	No	No	Yes	No	No	No
Endogeneity	No	No	Yes	No	No	No	Yes	No
X-secl dep	No	No	No	Yes	No	No	No	Yes
R-sqd. (overall)	0.364	0.377	0.361	0.364	0.322	0.326	0.320	0.324
Corr (ui, Xb)	-0.093				-0.027			
Rho	0.072	0.000		0.042	0.041	0.000		0.033
p-value of								
Wald/Chi-sq.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen			0.109				0.112	
K-P			0.553				0.238	
Observations	659	659	659	659	659	659	659	659

This table presents coefficient estimates of various types of regressions on credit growth and growth on security holdings (SH) of banks on various explanatory variables. In parentheses are robust standard errors clustered by bank. Pvt is private; SH is security holdings; Dom is domestic; DSD stands for domestic sovereign debt; FC stands for financial conditions; x-secl dep refers to cross-sectional dependence; K-P is the Kleibergen-Paap test for under-identifying restrictions; Rho is the fraction of variance due to the error term. DV is dependent variable; D is an indicator variable equal to 1 when year is 2019 or after, and 0 otherwise; NPL is nonperforming loan portfolios. † indicates that the variable is multiplied by 10. *, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$.

The results confirm those of the baseline tests that domestic sovereign debt negatively affects credit growth in Kenya but has no effect on private sector security holdings of banks. Neither financial conditions nor its moderating effect on sovereign debt ($DSD \times FC$) appear to have any effect (Table 6) on both credit growth and private sector security holdings when analyzing domestic debt. However, when analyzing debt sustainability (Table 7), financial conditions significantly moderate the effect of domestic sovereign debt on private credit growth while, expectedly, having no effect on private sector security holdings. Specifically, the results show that

tighter financial conditions worsen the ability or willingness of banks to lend to the private sector. For example, when money supply growth is restricted (liquidity is tight), banks may tighten their credit scoring when evaluating loan applicants or require higher collateral or interest rates on loans advanced to successful loan applicants, which lower the credit demand. Alternatively, banks may shift their supply of loans to the less risky public sector, as is clear from our findings that excessive usage of sovereign debt may induce banks to shift their preference to the less-risky government securities.

Table 7: Financial conditions and sovereign debt sustainability

	Credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dom debt †×D	-0.846*** (0.253)	-0.827*** (0.281)	-0.897*** (0.308)	-0.854*** (0.271)	0.072 (0.635)	-0.065 (0.623)	-0.128 (0.647)	-0.054 (0.490)
Dom debt † ×(1-D)	-1.209*** (0.354)	-1.213*** (0.388)	-1.301*** (0.416)	-1.243*** (0.366)	0.104 (0.854)	-0.107 (0.853)	-0.167 (0.875)	-0.083 (0.625)
Financial conditions	0.056* (0.032)	0.078*** (0.027)	0.073** (0.028)	0.079*** (0.029)	0.069 (0.063)	0.081 (0.053)	0.062 (0.053)	0.080 (0.065)
DSD×FC	-0.201* (0.119)	-0.295*** (0.092)	-0.285*** (0.096)	-0.298*** (0.107)	-0.285 (0.245)	-0.326* (0.195)	-0.270 (0.196)	-0.323 (0.245)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	No	No	Yes	No	No	No
Endogeneity	No	No	Yes	No	No	No	Yes	No
X-secln dep	No	No	No	Yes	No	No	No	Yes
R-sqd. (overall)	0.378	0.389	0.377	0.380	0.322	0.326	0.318	0.324
Corr (ui, Xb)	-0.088				-0.027			

	Credit growth				Private security holdings growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rho	0.067	0.000		0.031	0.042	0.000		0.033
p-value of								
Wald/Chi-sq.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen			0.102				0.108	
K-P			0.501				0.280	
Observations	659	659	659	659	659	659	659	659

This table presents coefficient estimates of various types of regressions on credit growth and growth on security holdings (SH) of banks on various explanatory variables. In parentheses are robust standard errors clustered by bank. Pvt is private; SH is security holdings; Dom is domestic; DSD stands for domestic sovereign debt; FC stands for financial conditions; x-secl dep refers to cross-sectional dependence; K-P is the Kleibergen-Paap test for under-identifying restrictions; Rho is the fraction of variance due to the error term. DV is dependent variable; D is an indicator variable equal to 1 when year is 2019 or after, and 0 otherwise; NPL is nonperforming loan portfolios. † indicates that the variable is multiplied by 10. *, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$.

4.6 Threshold effects

Given our findings of negative relationship between sovereign debt and credit growth which is stronger during periods when sovereign debt usage is unsustainable, it is interesting to establish whether the effect is empirically nonlinear. That is, I respond to the question of whether there is a region in the sovereign debt-credit growth relationship in which the effect is potentially positive or less negative. To achieve this, I run the panel threshold test of Kremer et al. (2013). In the results, presented in **Table 6**, I document inconclusive and mixed findings. First, the threshold level for total sovereign debt is insignificant for private credit growth; and only weakly significant

(at 10%) for growth in private security holdings. When significant, it indicates that the negative relationship between sovereign debt and growth in private security holdings is stronger at lower levels of sovereign debt (i.e., below 42.5% of GDP). For domestic debt on the other hand, the threshold level for private credit growth is strongly significant at 26.8% of GDP – below this level of total sovereign debt, there's almost a one-to-one match in growth of private credit as sovereign debt grows. Beyond this level, changes in sovereign credit do not affect private credit growth.

Table 6: Threshold regression output

Variable	Private credit growth		Private security holdings growth	
	(1)	(2)	(3)	(4)
Threshold	0.610 [0.575 0.630]	0.268 [0.263 0.282]	0.425 [0.415 0.439]	0.316 [0.294 0.328]
F-test (threshold)	5.27 (0.720)	16.55** (0.020)	10.06* (0.060)	7.47 (0.220)
Total sovereign debt				
Region 1	-0.468*** (0.175)		-1.249*** (0.421)	
Region 2	-0.332** (0.129)		-0.663** (0.282)	
Domestic sovereign debt				
Region 1		1.004** (0.448)		1.252 (0.964)
Region 2		0.477 (0.344)		0.690 (0.727)
Bank controls	Yes	Yes	Yes	Yes
R-squared (overall)	0.129	0.150	0.043	0.033
p-value of Wald	0.000	0.000	0.013	0.110
Corr (ui, Xb)	-0.012	0.018	-0.028	-0.012
Rho	0.061	0.061	0.029	0.027

*This table presents coefficient estimates of panel threshold regressions of private credit growth and growth on private security holdings (SH) of banks on sovereign debt growth and various control variables. In parentheses are robust standard errors clustered by bank. Rho is the fraction of variance due to the error term. DV is dependent variable; NPL is nonperforming loan portfolios; DV is dependent variable; Obs. is number of observations. † variable multiplied by 10. *, $p < 0.10$; **, $p < 0.05$; ***, $p < 0.01$.*

5.0 Conclusions

5.1 Summary

Ancedotal evidence shows an increase in Kenya's usage of sovereign debt over the last few years, which has caused several of the country's indicators of debt sustainability to document an unsustainable debt position since 2019. Further, credit terms have worsened considerably, with Treasury bonds rates increasing to more than 17% by the end of 2023. Amidst these changes, lending to the private sector appears to be on a declining trend while lending to government is growing. These observations raise several questions: What is the nexus, if any, between sovereign debt and private credit growth?

Does the relationship between sovereign debt and private credit growth change during periods of unsustainable usage of sovereign debt? Is there a threshold level at which sovereign debt begins to have a noticeable adverse impact on private credit growth? An examination of the literature shows that no study has examined the nexus between the unsustainable debt of a country and growth in private credit provision by banks. Thus, this study sought answers to this question using Kenyan data for the period 2004–2023. The study employs the traditional panel fixed effects and random effects regressions and then corrects for endogeneity and cross-sectional dependence in the first instance. Secondly, the I use the panel threshold regression analysis to establish the level of sovereign debt that triggers adverse private credit growth responses.

I report interesting findings. First, changes in sovereign debt elicit unequivocal negative responses on credit growth in Kenya. This is especially so during periods of heightened public debt usage when sovereign debt is considered unsustainable. This "crowding-out" phenomenon is occasioned by deteriorating terms of credit for borrowers, which induce banks, possibly due to higher default risk by private borrowers or due to greater safety of government securities, to shift risk away from private assets to government assets. The nexus between sovereign debt and private credit growth is especially strong when domestic state borrowing is considered, which characterizes the "crowding-out" effect. Second,

the relationship between sovereign debt and banks' holdings of private securities is less pronounced and, in some cases, particularly when sovereign debt is proxied by state domestic borrowing, is non-existent. This may indicate that banks have a minimum level of investment in private securities, say for precautionary purposes, which they do not trade with other assets including sovereign debt. Thus, heavy government borrowing is funded by banks using funds that would otherwise finance customers' loans and advances.

5.2 Policy implications

Several policy implications are gleaned from these findings. First, as indicated in Section 2, Kenya's fiscal policy operates on rules such as sovereign debt limits, which have often been set haphazardly. This may be because the threshold level of sovereign debt has not been empirically established for the country. Although this study attempts to establish the sovereign debt threshold level for optimizing private credit growth, the results are not conclusive. Thus, I am unable to prescribe a firm public debt limit that the government could consider. However, this study shows a clear negative linkage between sovereign debt and private sector credit growth, with the negative relationship being stronger during the periods when debt usage is arguably unsustainable. Because private sector credit is important for financing investments, the results of this study suggest that excessive usage of sovereign debt would be harmful to real output growth and other facets of the real economy as well. The key policy derivative from this finding is two-fold: first, that a sovereign debt limit should be established at a level consistent with those of economies considered Kenya's development peers for which such thresholds have been clearly established – in this regard,

the recent study of Olaoye et al (2022) which find threshold levels of between 57% public debt to GDP (in respect of exchange rates) and 61% (in respect of inflation) for a sample of Sub-Saharan African countries that includes Kenya is germane. Second, that once a debt limit is established, it is important that the limit be hedged from arbitrary alterations. Considering that fiscal policy rules in Africa have been largely ignored and therefore tend to worsen debt sustainability (Abubakar et al., 2024), the country could consider entrenching the established debt limit in the constitution. Currently, public debt limits are governed by legislation: Section 52(2) of the Public Finance Management Act gives discretion to the national assembly to set the limit periodically. Recent amendments to the Act give power to the Public Debt Management Office to recommend an appropriate limit to the national assembly on an annual basis. However, as recent practice has evidenced, such flexibility in the legal framework can be abused. If the rules cannot be entrenched in the constitution, it would be useful for the statutes to specify sanctions, with clear modalities for implementation, whenever the limits are violated.

The establishment of firm fiscal policy rules, such as the debt limit, restricts government spending without imposing similar constraints on expenditure needs. For example, because a close linkage has been established between public infrastructure investment and economic growth in Africa (Kodongo and Ojah, 2016), African governments stand advised to focus closer attention to infrastructure types such as telecommunications, which heavily impact the services sectors and energy, which have direct effects on economic activities like manufacturing. However,



where fiscal policy rules such as those recommended in this paper impose constraints on capital spending, governments not be unable to finance their investments using nontraditional approaches. In this regard, Kenya needs to consider availing itself of innovative sources of finance by tapping into private sector resources (public-private partnerships are a good example) and global and sustainability focused funding options such as carbon finance and blended finance. Alongside this policy, the fiscal policy measures should be adopted that reduce inefficient spending (for example, reduce the size of the government and eliminate subsidies while reducing taxes to caution citizens against the resulting higher prices of the hitherto subsidized goods) to create space for pro-growth spending (for example, support to micro-, small- and medium-size enterprises, and ICT infrastructure) and discretion against shocks (Ncube and Brixiová, 2014).

Second, this study finds an asymmetric response between credit growth and growth in private security holdings of banks to sovereign debt changes in which the response of private credit growth is more pronounced. As argued, negative effects on private sector credit have a cascading effect on investments and output. However, Kenya arguably has a high monetary policy space relative to the typical advanced economy and could therefore use monetary policy to ease the adverse effects on investment and output of (corrective) fiscal adjustment measures imposed by excessive debt. Because of their adverse effects on credit growth and investments, fiscal adjustments often precipitate “debt traps”, which, in the long term, worsen sovereign debt sustainability. Indeed, Kenya’s debt overhang arguably emanates partly from fiscal

adjustments in the 2017–2022 period to address previous periods’ excessive borrowing. Barring its potential effect on the domestic currency value, which complicates external debt servicing, the country could consider employing an expansionary monetary policy to hedge the economy from the credit and output growth-retarding effects of fiscal adjustments.

Third, the study finds that the effect of government debt, particularly domestic debt, on bank investment in private securities is muted. This is likely because the country’s corporate bond market is not as vibrant as the Treasury bond market due to the former’s small and illiquid nature, implying that the market avails limited investment opportunities to banks and other institutional investors. Thus, most of the institutional investors on the corporate bond market, particularly banks, are likely to do so for precautionary purposes. By their nature, precautionary investments are infrequently traded, making them generally insensitive to endogenous shocks such as changes in the volume of offerings of the relatively low-risk Treasury assets. To encourage broader and more robust bank participation in the corporate bond market, policy measures that encourage deepening of the corporate debt/bond market should be enacted. A vibrant corporate bond market will benefit the economy by availing an expanded pool of lower-cost long-term financial resources to corporate borrowers and facilitate banks and other institutional investors seeking relatively safe assets with higher yields than Treasury assets for their excess liquidity. Strategies for deepening the corporate bond market include strengthening disclosure requirements for bond issuers; and encouraging more market makers to enter the market to provide liquidity to bond traders wishing to liquidate their positions

(e.g., through a policy framework that incentivizes incentivize entry of new players). The third tool at disposal of policymakers for boosting the corporate bond market is the promotion of greater respect for

market autonomy (e.g., repealing or amending laws that impose stringent requirements on pension funds' portfolio holdings).

References

1. Abubakar, A. B., McCausland, W. D. and Theodosiou, T., 2024. Do debt relief and fiscal rules improve public debt sustainability? The experience of sub-Saharan African countries. *Journal of Policy Modeling*, (forthcoming).
2. Affinito, M., Albareto, G., and Santioni, R., 2022. Purchases of sovereign debt securities by banks during the crisis: The role of balance sheet conditions. *Journal of Banking and Finance*, 138, 105575.
3. Angelini, P., and Grande, G. and Panetta, F., 2014. The Negative feedback loop between banks and sovereigns (February 20, 2014). *Bank of Italy Occasional Paper No. 213*, Available at SSRN: <http://dx.doi.org/10.2139/ssrn.2419943>
4. Arteta, C. and Hale, G., 2008. Sovereign debt crises and credit to the private sector. *Journal of International Economics*, 74, 53–69.
5. Asravor, R. K., Arthur, L. A., Acheampong, V., Lamptey, C. and Yeboah, M., 2023. Domestic debt sustainability and economic growth: Evidence from Ghana. *Research in Globalization*, 7, 100144.
6. Assoum, F. and Alinsato, A. S., 2023. Only under good governance does public debt improve national income: Evidence from dynamic panel threshold model for Sub-Saharan African countries. *Journal of Government and Economics*, 10, 100078.
7. Atingi-Egoa, M., Timunob, S. and Makuveb, T., 2021. Public debt accumulation in SSA: A looming debt crisis. *Journal of African Economies*, 30(AERC Supplement 1), i103–i139.
8. Bai, Y., Xu, J. and Jin, C., 2024. The crowding-out effect of government debt: A loan financing-based perspective. *Borsa Istanbul Review*, 24(5), 1059–1066.
9. Bayoumi, T., Goldstein, M., and Woglom, G., 1995. Do credit markets discipline sovereign borrowers? Evidence from U.S. states. *Journal of Money, Credit and Banking*, 27(4), 1046–1059.
10. Beck, N. L., and Katz, J. N., 1995. What to do (and not to do) with time-series cross-section data. *American Political Science Review*, 89: 634–647.
11. Becker, B. and Ivashina, V., 2018. Financial repression in the European sovereign debt crisis. *Review of Finance*, 22(1), 83–115.
12. Bernanke, B. S. and Blinder, A. S., 1988. Credit, money and aggregate demand. *American Economic Review*, 78(2), 435–439.
13. Bernanke, B. S. and Gertler, M., 1995. Inside the black box: the credit channel of monetary policy transmission. *Journal of Economic Perspectives*, 9(4), 27–48.

14. Berrospide, J. M. and Edge, R. M., 2010. The effects of bank capital on lending: What do we know, and what does it mean? *International Journal of Central Banking*, 6(4), 5–54.
15. Bofondi, M., Carpinelli, L., and Sette, E., 2018. Credit supply during a sovereign debt crisis, *Journal of the European Economic Association*, 16(3), 696–729.
16. Bottero, M., Lenzu, S. and Mezzanotti, F., 2023. Sovereign debt exposure and the bank lending channel: Impact on credit supply and the real economy. *Journal of International Economics*, 126, 103328.
17. Brave, S. A., 2017. Introducing the Chicago Fed's new adjusted national financial conditions index. *Federal Reserve Bank of Chicago Essays on Issues* No. 386, Federal Reserve Bank of Chicago.
18. Broner, F., Erce, A., Martin, A. and Ventura, J., 2014. Sovereign debt markets in turbulent times: Creditor discrimination and crowding-out effects. *Journal of Monetary Economics*, 61, 114–142.
19. Chernykh, L. and Theodossiou, A.K., 2011. Determinants of bank long-term lending behavior: evidence from Russia. *Multinational Finance Journal*, 15(3/4), 193–216.
20. Christensen, J., 2005. Domestic debt markets in Sub-Saharan Africa. *IMF Working Paper* No. 04/46, Washington: IMF.
21. de Marco, P. 2019. Bank lending and the European sovereign debt crisis. *Journal of Financial and Quantitative Analysis*, 54(1), 155–182.
22. Drudi, F., and Giordano, R., 2000. Default risk and optimal debt management. *Journal of Banking and Finance*, 24(6), 861–891.
23. Flandreau, M., Cacheux, J. L., Zumer, F., Dornbusch, R., and Honohan, P., 1998. Stability without a pact? Lessons from the European gold standard, 1880-1914. *Economic Policy*, 13(26), 115–162.
24. Flannery, M., and Rangan, K., 2008. What caused the bank capital build-up of the 1990s? *Review of Finance*, 12(2), 391–429.
25. Fratianni, M. and Marchionne, F., 2017. Bank asset reallocation and sovereign debt. *Journal of International Financial Markets, Institutions and Money*, 47, 15–32.
26. Garita, J. and León, J., 2015. Determinants of sovereign spread in Costa Rica. *Research Document DI-XX-2015*, Economic Research Department, Banco Central de Costa Rica, June.
27. Gennaioli, N., Martin, A. and Rossi, S., 2015. Government default, bonds, and bank lending around the world: What do the data say? *Economics Working Papers*, 1378.
28. Gumata, N., Klein, N., and Ndou, E., 2012. A financial conditions index for South Africa. *IMF Working Paper WP/12/196*, IMF.

29. Hoehle, D. 2007. Robust standard errors for panel regressions with cross-sectional dependence. *Stata Journal* 7: 281–312.
30. Holmström, B., and Tirole, J., 1997. Financial intermediation, loanable funds, and the real sector. *Quarterly Journal of Economics*, 112(3), 663–691.
31. Imran, K. and Nishat, M., 2013. Determinants of bank credit in Pakistan: A supply side approach. *Economic Modelling*, 35(September), 384–390.
32. Karadam, D. Y., 2018. An investigation of nonlinear effects of debt on growth. *Journal of Economic Asymmetries*, 18, e00097.
33. Klein, P.-O. and Weill, L., 2022. Bank profitability and economic growth. *Quarterly Review of Economics and Finance*, 84, 183–199.
34. Kremer, S., Bick, A. and Nautz, D., 2013. Inflation and growth: new evidence from a dynamic panel threshold analysis. *Empirical Economics*, 44, 861–878.
35. Kodongo, O. and Ojah, K., 2016. Does infrastructure really explain economic growth in Sub-Saharan Africa? *Review of Development Finance*, 6(2), 105–125.
36. Lewbel, A., 2012. Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business and Economic Statistics*, 30(1), 67–80.
37. Liu, Q., Bai, Y., and Song, H., 2023. The crowding out effect of government debt on corporate financing: Firm-level evidence from China. *Structural Change and Economic Dynamics*, 65, 264–272.
38. Lucchetti, R., Papi, L., and Zazzaro, A., 2001. Banks' inefficiency and economic growth: A micro-macro approach. *Scottish Journal of Political Economy*, 48(4), 400–424.
39. Mabula, S., and Mutasa, F., 2019. The effect of public debt on private investment in Tanzania. *African Journal of Economic Review*, 7(1), 109–135.
40. Mbate, M., 2013., Domestic debt, private sector credit and economic growth in Sub-Saharan Africa. *African Development Review*, 25(4), 434–446.
41. Misra, S. D., 2019. Bank capital, bank liquidity and credit growth: evidence from India. *IUP Journal of Applied Finance*, 25(2), 25–44.
42. Mwakalila, E., 2020. Crowding Out of Private Sector in Tanzania: Government Expenditure, Domestic Borrowing, and Lending Rates. *Emerging Economy Studies*, 6(1), 123–135.
43. Ncube, M. and Brixiov, Z., 2015. Public debt sustainability in Africa: building: resilience and challenges ahead. *Development Policy Review*, 33(5): 555–580
44. Ndung'u, N., Shimeles, A. and Manda, D. K., 2021. Growing with debt in African economies: options, challenges and pitfalls. *Journal of African Economies*, 30(AERC Supplement 1), i3–i19.

45. Obstfeld, M., 2012. Does the current account still matter? *American Economic Review*, 102(3), 1–23.
46. Olaoye, O. O., Tabash, M. I., Omokanmi, O. J., Ogunjumo, R. A., Ojelade, M. O., and Ishola, J. A., 2022. Macroeconomic implications of escalating stock of public debt: Evidence from sub-Saharan African economies. *African Development Review*, 34, 527–540.
47. Ongena, S., Popov, A. and van Horen, N., 2019. The invisible hand of the government: moral suasion during the European sovereign debt crisis. *American Economic Journal: Macroeconomics*, 11(4): 346–379.
48. Popov, A. and van Horen, N., 2015. Exporting sovereign stress: Evidence from syndicated bank lending during the Euro area sovereign debt crisis. *Review of Finance*, 19, 1825–1866.
49. Ramos A. M., 1996. Deposit insurance, bank capital structures and the demand for liquidity. *Working Paper No. WP-96-8*, Federal Reserve Bank of Chicago Issues in Financial Regulation.
50. Reinhart, C. M. and Rogoff, K. S., 2010. Growth in a time of debt. *American Economic Review*, 100(2), 573–578.
51. Sagire, L and Muriu P.W., 2021. Economic growth and public debt threshold: New evidence from an emerging economy. *Journal of Economic Development*, 46(4), 105–121.
52. Sandleris, G., 2014. Sovereign defaults, credit to the private sector, and domestic credit market institutions. *Journal of Money Credit Banking*, 46 (2–3), 321–345.
53. Shetta, S. and Kamaly, A., 2014. Does the budget deficit crowd-out private credit from the banking sector? The case of Egypt". *Topics in Middle Eastern and North African Economies, Electronic Journal*, 16, Middle East Economic Association and Loyola University Chicago.
54. Songwe, V. and Awiti, C., 2021. African countries' debt: A tale of acceleration at multiple speeds and shades. *Journal of African Economies*, 30(AERC Supplement 1), i14–i32.
55. Swiston, A., 2008. A U.S. financial conditions index: putting credit where credit is due. *IMF Working Paper WP/08/161*, IMF.
56. Tran, N., 2018. Debt threshold for fiscal sustainability assessment in emerging economies. *Journal of Policy Modeling*, 40(2), 375–394.
57. Traum N. and Yang S.-C. S., 2015. When does government debt crowd out investment? *Journal of Applied Economics*, 30(1), 24–45.
58. Were, M., 2001. The Impact of external debt on economic growth in Kenya: An empirical assessment. *UNU/ WIDER Discussion Paper No. 2001/116* (October).
59. Willems, T. and Zettelmeyer, J., 2022. Sovereign debt sustainability and central bank credibility. *Annual Review of Financial Economics*, 14, 75–93.



Appendix

Table A1: Tests for cross-sectional dependence

	Test score	p-value
Growth in private credit	15.65	0.000
Growth in private security holdings	3.63	0.000
Deposits (% of total assets)	3.20	0.001
Funding gap (customer loans, % of total deposits)	7.94	0.000
Tier 1 ratio	7.23	0.000
Growth in total assets	15.57	0.000
Profitability (return on average assets)	13.26	0.000
Liquidity (quick assets, % of total assets)	16.17	0.000
Flows in nonperforming loans	7.13	0.000
Spread (lending rates less Treasury bill rates)	89.89	0.000

Note: the null hypothesis for the test is cross-sectional independence.

Kenya Bankers Association

13th Floor, International House, Mama Ngina Street

P.O. Box 73100– 00200 NAIROBI

Telephone: 254 20 2221704/2217757/2224014/5

Cell: 0733 812770/0711 562910

Fax: 254 20 2221792

Email: research@kba.co.ke

Website: www.kba.co.ke



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