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Assessing the Sovereign-Bank Nexus: The Case of Eswatini

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Abstract

This study explored the sovereign-bank nexus in Eswatini and assessed how the interaction between sovereign debt and the domestic banking sector influences financial stability. The nexus—characterized by banks’ significant holdings of government securities—creates potential vulnerabilities by linking sovereign and banking risks. Although widely analysed in advanced economies, evidence from smaller developing countries like Eswatini remains scarce, despite their unique challenges of shallow financial markets, high refinancing risks, and exposure to external shocks. Using quarterly data from 2014–2023 and an Autoregressive Distributed Lag model, the study estimated the effects of sovereign debt exposure on banks’ capital adequacy, liquidity, and profitability. The findings show that government securities bolster capital adequacy and profitability but weaken liquidity in the long term. Inflation and exchange rate volatility reduce profitability, while interest rates improve capital adequacy ratio. The results highlight liquidity risks as public debt rises, recommending diversification, stricter exposure limits, stronger credit infrastructure, and fiscal discipline to protect stability.

Keywords: Sovereign Exposure, Financial Stability, Crowd out

JEL Classification: E44, E58, G01, G21, H63

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I. Introduction

The IMF (2022) Report defines the sovereign-bank nexus as the strong ties between banks and governments, mainly through banks' large holdings of government debt. This connection can create negative feedback loops, where shocks in one sector amplify risks in the other, worsening financial instability—as demonstrated during the Eurozone debt crisis. Banks are central to the financial system, primarily tasked with mobilizing savings and providing liquidity not only to individual borrowers but also to various institutions, including governments. However, fiscal crises often prompt governments to implement austerity measures, such as significant cuts in public spending and an increase in taxes. While these actions might improve fiscal stability in the long term, they tend to depress economic activity in the short term by reducing aggregate demand and this has a direct effect on financial stability (Borio, et al., 2023).

The immediate impact of these measures includes higher default rates among borrowers and decreased demand for credit. Increased default rates and weakened economic activity can strain banks' balance sheets, as they face higher loan losses and lower profitability. Moreover, when governments themselves face fiscal stress (increasing sovereign risk), it can lead to increased borrowing costs for banks and a more cautious approach to lending, thereby constraining the availability of credit for the nonfinancial corporate sector (Borio & Restoy, 2020). This reduction in credit can lead to lower capital expenditure by firms, which can dampen economic growth and recovery prospects.

The sovereign-bank link is a known source of systemic risk but the research on its impact on financial stability remains limited and largely inconclusive (Foglia, et al., 2023; Bolton and Jeanne, 2011). Foglia & Angelini (2020) suggest that bank risk leads to sovereign risk via bailouts, while Langedijk & Fontana (2019) and Alter & Schüller (2021) find the direction shifts—from banks to sovereigns before bailouts, and vice versa thereafter. Fratzscher & Rieth (2023) also noted a stronger Sovereign-bank nexus but without clear causality, during the debt crisis.

Additionally, in the literature, the linkages between sovereign and banking sector risk have been well explored for advanced economies but there is a dearth of knowledge on developing economies, which tend to have different structural characteristics—such as a lower level of financial sector development, a larger share of foreign-currency denominated public debt and higher refinancing risks (Acharya et al. 2022; Foglia and Angelini, 2020; International Monetary Fund, 2022). These factors could render them more sensitive to external shocks and strengthen the interconnectedness between the sovereign and banking sectors.

Moreover, while the potential risks and challenges associated with the sovereign-bank nexus relationship have been recognized, there is a lack of empirical evidence that provides a comprehensive understanding of the specific channels through which the nexus particularly affects financial stability, especially in developing countries. Though the theoretical channels have been somewhat explored, the linkages between sovereign-bank risk and financial stability are not clear in Eswatini. It is therefore important to comprehensively analyse and understand the effects of the sovereign-bank nexus on financial stability as well as to determine which of the identified theoretical channels are most effective in Eswatini. Understanding this nexus is vital for policymakers and financial actors.

The primary objective of this study therefore is to investigate how the interdependencies between sovereign debt and the banking sector influence systemic risk and potential contagion effects in the case of Eswatini.

Specifically, this study aims to achieve the following objectives:

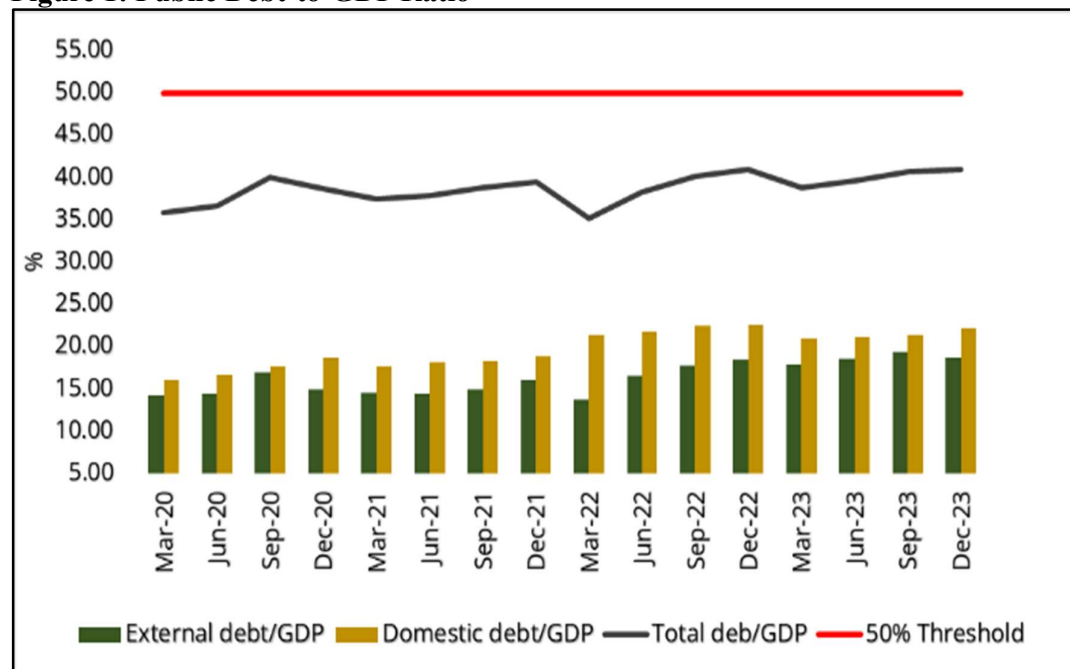
- To analyse the transmission mechanisms and contagion effects between the sovereign and banks during periods of stress and crisis.
- To assess the impact of the sovereign-bank nexus on stability of the financial system.

This study contributes to the existing literature by providing valuable insights for policymakers and regulators, and offer a comprehensive understanding of the effects of the sovereign-bank nexus on financial stability based on data from Eswatini

II. Stylised Facts of the Sovereign-Bank Nexus in Eswatini

The public debt indicators in Eswatini depict an increasingly constrained fiscal sector as public debt ratios remain elevated. The total public debt-to-GDP ratio remained above 40 percent since 2022 and above 30 percent over the last 13 years with domestic debt rising in recent years, leading to elevated risks of sovereign-bank exposure. Despite the total debt-to-GDP ratio remaining below the observed critical ratio of 50 percent, government debt persists on a gradual upward trajectory, approaching the observed critical ratio.

Figure 1: Public Debt-to-GDP Ratio

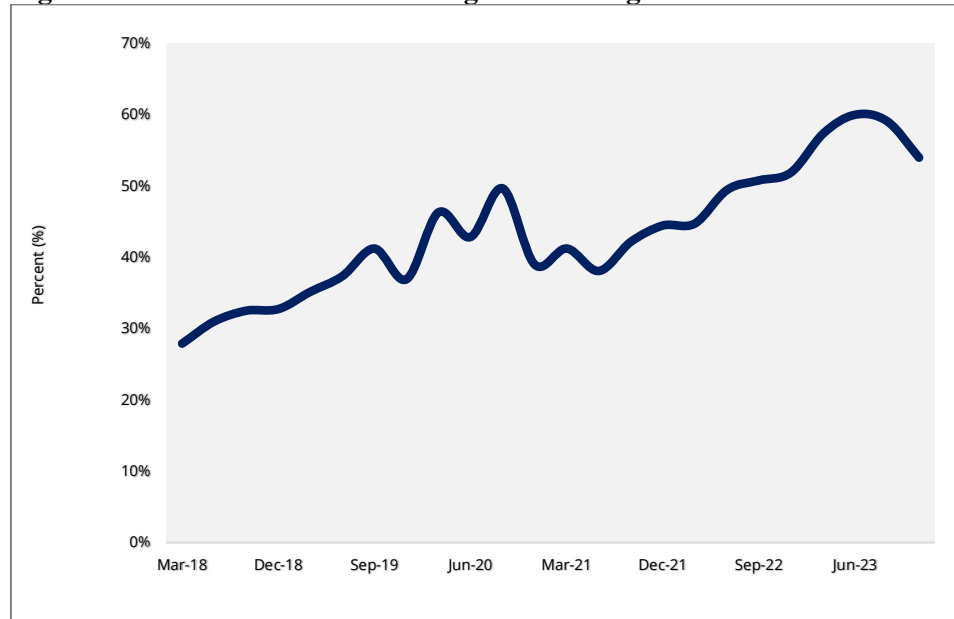


Source: Central Bank of Eswatini

Domestic debt, as a proportion of total debt, exceeds external debt. In 2023Q4, external public debt as a percentage of total debt stood at 46 percent from 45 percent recorded in Q4-2022. Domestic debt to total debt stood at 54 percent in Q4-2023 from 55 percent in Q4-2022.

Figure 2 depicts that public debt as a percentage of total banking sector assets has been on an upward trend, from about 28 percent in March 2018 to about 54 percent in December 2023. This shows that the risks to the sovereign-bank nexus have almost doubled in a space of five years, with the highest risks being recorded in 2020 due to the COVID-19 pandemic and 2022/2023 in line with geopolitical tensions and resultant supply constraints. The increasing dependence of the sovereign sector on domestic banks for financing needs, with a higher exposure to government debt, increases the probability of transmission of shocks within the sectors.

Figure 2: Public Debt as a Percentage of Banking Sector Assets



Source: Central Bank of Eswatini

III. Literature Review

This literature review explores the mechanisms, empirical evidence, post-crisis developments, emerging market perspectives, and policy implications related to the sovereign-bank nexus. Data from most emerging and developing economies over the last decade suggest that this nexus is rising. The growth of the nexus is observed from several perspectives. First, banks have increased their exposure to their sovereigns. Second, government debt has grown while fiscal positions have deteriorated. Third, banking sector assets and bank credit to the private sector are growing, making it harder for sovereigns to contain a banking crisis. Fourth, there is growing evidence of the existing nexus, which suggests that it has increased in the last decade. (Feyen and Zuccardi, 2019).

Banks typically hold large quantities of sovereign debt due to regulatory frameworks that often treat such debt as low risk. However, during periods of fiscal stress, the value of these assets can decline, directly impacting bank balance sheets and solvency. Acharya, et al., (2022) highlights how deteriorations in sovereign creditworthiness led to significant losses for banks with large holdings of government bonds, demonstrating the direct link between sovereign risk and banking stability.

The Eurozone crisis provides a compelling case study of the sovereign-bank nexus. Banks in countries like Greece, Italy, and Spain held substantial amounts of their own governments' debt. When these governments faced fiscal difficulties, the banks' solvency was directly impacted. Altavilla, et al., (2017) showed that increases in sovereign spreads led to higher funding costs for banks, reducing their lending capacity and further deepening the economic downturn.

Concerns over the sustainability of public finance caused negative feedback loops between vulnerable banks, indebted sovereigns, and weak economies. This led to a sequence of downgrading of sovereign ratings and most marketable securities issued by banks in the stressed countries. These reductions in banks and sovereign prices of securities weakened their balance sheets and increased the cost of recapitalization through the issuance of new equity. (Hobelsberger et al., 2023).

Langedijk & Fontana (2019) examined the Bank-Sovereign Loop and Financial Stability in the Euro Area, focusing on the link between bank and sovereign credit risk. The study developed a framework based on detailed actual bank balance sheets and tested the model on 35 large EU banking groups, across 7 European countries. The effects of the feedback loops, in most cases, more than double the effect of the initial shock on bank losses and the sovereign risk premium. The study further documented that a single EU bank resolution mechanism, the European Stability Mechanism (ESM), direct bank recapitalisations, and bondholder “bail-in” can be effective to dampen the bank-sovereign loop. Addressing the home bias in banks' sovereign bond holdings by reducing excessive exposure to domestic sovereigns has only a limited benefit in terms of lower crisis doom loop effects, as contagion effects increase.

Studies using African data are scanty and they mainly focused relationship between macroeconomic variables and bank stability without highlighting the impact of sovereign debt on bank performance. Notably, Kwofie (2022) examined the relationship between macroeconomic variables and banking sector stability in Ghana using the ARDL approach. This study analysed the short and long-run dynamics between macroeconomic variables and bank stability measured by the capital adequacy ratio. The bounds test results showed a long-run relationship between the variables of the study. From the ARDL error correction model, the exchange rate and return on assets have a positive long-term impact on bank stability. On the other hand, the Ghanaian bank's stability was negatively impacted in the short term by the exchange rate. The study shows that the variables return to equilibrium at a rate of 28.9 percent. The study recommended that banks should establish internal policies that ensure adequate liquidity levels, strengthen the institutional environment in the country, ensure strict compliance with laws and regulations, and implement currency hedging.

In a similar study, Atiti et al., (2022) used the ARDL model in examining the linkages between macroeconomic shocks and credit risk in the Kenyan banking sector. The study established the existence of a short-run and long-run relationships. The study also found that there is a negative relationship between credit risk and GDP growth, although not significant. The relationship between bank profitability and asset quality was found to be negative in the short-run but positive in the long-run. The paper also documented a positive short-run relation between asset quality and private sector credit growth, which turns negative in the long run. Furthermore, the bank asset quality-capital nexus was positive in the short-run but turned negative in the long-run. The concave relationship suggested that NPLs will rise with increases in capital to a certain threshold (moral hazard effect), after which more capital build-ups decrease NPLs (disciplinary or regulatory effect).

IV. Methodology

4.1 The Model

To capture both the short- and long-run dynamics between sovereign debt exposure and banking sector performance, this study employs the Autoregressive Distributed Lag (ARDL) framework, consistent with prior empirical work (Atiti et al., 2022; Kwofie, 2022). The ARDL model is well-suited for small samples and for variables integrated of different orders, $I(0)$ and $I(1)$.

The general ARDL representation is given by:

$$\begin{aligned}\Delta Y_t = & \beta_0 + \beta_1 Y_{t-1} + \beta_2 INT_{t-1} + \beta_3 INF_{t-1} + \beta_4 VIX_{t-1} + \beta_5 Dom_debt_GDP_{t-1} \\ & + \sum_{i=1}^p \alpha_i \Delta Y_{t-i} + \sum_{i=1}^q \alpha_i \Delta INT_{t-i} + \sum_{i=1}^q \alpha_i \Delta INF_{t-i} + \sum_{i=1}^q \alpha_i \Delta VIX_{t-i} \\ & + \sum_{i=1}^q \alpha_i \Delta DOM_DEBT_GDP_{t-i} + \varepsilon_t\end{aligned}$$

where t denotes time, β_0 is the intercept, β_i are the long-run coefficients, and α_i represent the short-run coefficients. Y_t represents banking sector variables, including capital adequacy (CAR), liquidity ratio (LIQR), and profitability (ROA). INF denotes inflation, INT represents the discount rate, $DOMDEBTGDP$ is the domestic debt-to-GDP ratio, VIX measures market volatility, and ε_t is the error term.

The ARDL framework allows for both long-run equilibrium relationships and short-run dynamic adjustments. Accordingly, three separate models are estimated for capital adequacy, liquidity, and profitability to assess how banks' exposure to government securities influences each of these stability indicators, while controlling for relevant macroeconomic factors.

4.2 Description of Variables and Unit Root Tests

Three categories of variables were selected: Commercial Banks' share of government securities as an indicator of sovereign debt variables, Banking Sector (capital adequacy, liquidity ratio and return on assets-ROA) and Macroeconomic variables (Inflation rate, discount rate and market volatility).

The study used quarterly data from 2014 to 2023, equivalent to 40 observations. The specific variables used in the study are mostly ratios and they are as follows: Commercial banks' share of government securities, capital adequacy ratio, domestic debt to GDP, liquidity ratio, return on equity, return on assets, inflation rate, discount rate, and exchange rate volatility (VIX). The data was sourced from the Central Bank of Eswatini, the South African Reserve Bank, and the Ministry of Finance, Eswatini.

The discount and inflation rates were relatively high from 2014 to 2019. However, in 2020, the discount rate dropped drastically as monetary authorities cut interest rates in response to the COVID-19 pandemic. Inflation, on the other hand, increased in 2020 due to decreased production and increased demand. The inflation rate remains elevated, hovering around 4 percent in 2021 and increasing further in 2022 due to the Russia-Ukraine conflict and resultant supply chain disruptions. In a bid to control the rising inflation, the Central Bank of Eswatini increased the discount rate, which grew steadily from 2021 through to 2023 (Annex 1).

The liquidity ratio was on a steady upward trend from 2014 to 2019, recording its maximum of 42.8 percent in 2019. Notably, the bank's liquidity fell in 2020 due to the COVID-19 pandemic and remained on a downward trend through 2021 to 2023. The banks' profitability measures, ROE and ROA, were tracking each other throughout the sample period, on a downward trend from 2014 to 2020. The profitability measures dipped in 2020 before growing steadily through to 2023.

The study employed the Augmented Dicky Fuller (ADF) test to determine whether the variables are stationary and the Akaike Information Criterion (AIC) test for optimum lag length selection. The unit root results are reported in Annex 2. The results indicate that domestic debt to GDP ratio, capital adequacy ratio, liquidity ratio, return on assets, inflation, and interest rates have a unit root, indicating that they are non-stationary, and they are integrated of order one, i.e., I(1). On the other hand, Market volatility (VIX) is stationary, hence the ARDL model can be used since the variables are I(0) and I(1).

The study further used the Bounds test for cointegration to establish the existence of a long-run relationship between the variables, (Nkoro and Uko, 2016; Narayan, 2005). The null hypothesis of no cointegration was tested and it was rejected if the F-statistic was higher than the upper bound critical values or if the p-value was less than the significance level. Pesaran et.al (2001) posit that the test is inconclusive if the F-statistic lies between the upper and lower bound values. All relevant diagnostic tests were also conducted to validate the appropriateness of the selected model (Annex 3).

V. Empirical Results

The study estimated three different models using the risk on liquidity, capital adequacy and profitability of the banks as dependent variables.

5.1 Bounds Test for Cointegration

The bounds tests results for cointegration, are presented in Tables 1, 2 and 3. The results of the tests indicate that the variables in the liquidity and profitability models are cointegrated since the F-statistic is higher than the critical upper bound at the 5 percent level. The test for the capital adequacy model points to the existence of a long-run relationship but at the 10 percent significance level.

5.1.1 Capital Adequacy Ratio Model

Table 1: Cointegration Tests Results for the Capital Adequacy Model

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	4.83167	10percent	2.46	3.46
k	4	5percent	2.94	4.08
		1percent	4.09	5.53

5.1.2 Liquidity Model

Table 2: Cointegration Tests Results for the Liquidity Model

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	7.884108	10percent	2.46	3.46
k	4	5percent	2.94	4.08
		1percent	4.09	5.53

5.1.3 Profitability Model

Table 3: Cointegration Tests Results for Profitability Model

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.736155	10percent	2.46	3.46
k	4	5percent	2.94	4.08
		1percent	4.09	5.53

5.2 Long-run ARDL Model Results

5.2.1 Capital Adequacy Ratio Model

Table 4: ARDL Long-run Estimates-Capital Adequacy Ratio Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CAR(-1)	0.242518	0.143905	1.685268	0.1020
GOVSEC	0.070076	0.031730	2.208539	0.0347
GOVSEC(-1)	0.059526	0.034468	1.726996	0.0941
INF	-0.107539	0.179164	-0.600227	0.5527
INT	0.277608	0.208135	1.333790	0.1920
VIX	-0.005880	0.037973	-0.154860	0.8779
VIX(-1)	-0.048957	0.040700	-1.202883	0.2381
C	10.49390	2.739397	3.830733	0.0006
R-squared	0.855095	Mean dependent var		19.87197
Adjusted R-squared	0.822375	S.D. dependent var		2.570907
S.E. of regression	1.083524	Akaike info criterion		3.178997
Sum squared resid	36.39477	Schwarz criterion		3.520240
Log likelihood	-53.99044	Hannan-Quinn criter.		3.301432
F-statistic	26.13338	Durbin-Watson stat		1.995367
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent test results do not account for model selection.

The results in Table 4 indicate that interest rates and the banks' share of government securities have a positive effect on the capital adequacy ratio in the long run. A 1 percent increase in the bank's share of government securities increases the capital adequacy ratio by between 0.06 to 0.07 percent, indicative of a positive relationship between the capital adequacy ratio and the bank's holding of government securities.

The results further show that an increase in interest rates has a positive effect on the capital adequacy ratio in the long run. This result can be explained by the fact that higher interest rates lead to higher earnings for banks from lending activities and investment portfolios, which boost their overall capital base, thus improvement of the CAR. Additionally, as interest rates rise, banks reprice their assets, such as loans and securities, at higher rates, leading to an increase in the value of the banks' assets, which positively affects the capital base. However, the relationship between interest rate and capital adequacy is not statistically significant.

The positive long-run relationship between banks' holdings of government securities and capital adequacy suggests that sovereign exposure strengthens rather than weakens banks' solvency in Eswatini. This outcome aligns with the sovereign–bank nexus literature (Atiti et al., 2022; Kwofie, 2022), which posits that government securities, classified as low-risk assets under Basel II/III capital regulations, enhance banks' capital buffers by reducing risk-weighted assets. These instruments provide stable income streams and serve as reliable collateral, particularly in small, bank-dominated financial systems with limited investment alternatives. Thus, banks' exposure to sovereign debt can improve their capital adequacy through both risk mitigation. However, the relationship may reverse in cases of fiscal distress or debt concentration, underscoring the importance of prudent portfolio diversification and sovereign risk monitoring.

5.2.2 Liquidity Ratio Model

Table 5: ARDL Long-run Estimates – Liquidity Ratio Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LIQR(-1)	0.526297	0.154090	3.415524	0.0017
VIX	-0.060364	0.104220	-0.579199	0.5664
INT	-0.383047	0.507930	-0.754132	0.4561
INF	-0.004235	0.458722	-0.009232	0.9927
GOVSEC	-0.127871	0.067945	-1.881986	0.0687
C	23.83167	8.245067	2.890416	0.0068
R-squared	0.644463	Mean dependent var		33.82426
Adjusted R-squared	0.590593	S.D. dependent var		4.897969
S.E. of regression	3.133959	Akaike info criterion		5.263110
Sum squared resid	324.1162	Schwarz criterion		5.519042
Log likelihood	-96.63064	Hannan-Quinn criter.		5.354936
F-statistic	11.96346	Durbin-Watson stat		2.240303
Prob(F-statistic)	0.000001			

*Note: p-values and any subsequent test results do not account for model selection.

Table 5 shows that there is a negative relationship between the bank's liquidity ratio and all the regressors; however, the results are not significant in the long run for exchange rate volatility, interest rates, and the inflation rate. The result show that a 1 percent increase in the bank's share of government securities decreases the bank's liquidity by 0.12 percent in the long run.

5.2.3 Profitability Model

Table 6: ARDL Long-run Estimates-Profitability Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ROA(-1)	0.686713	0.116533	5.892852	0.0000
VIX	-0.012143	0.007798	-1.557159	0.1299
INT	0.165446	0.106384	1.555177	0.1304
INT(-1)	0.001809	0.157623	0.011479	0.9909
INT(-2)	-0.171447	0.095043	-1.803893	0.0813
INF	-0.077992	0.038445	-2.028681	0.0514
GOVSEC	0.011088	0.005933	1.868785	0.0714
C	0.966756	0.355383	2.720322	0.0107
R-squared	0.848696	Mean dependent var		2.312160
Adjusted R-squared	0.813392	S.D. dependent var		0.527938
S.E. of regression	0.228059	Akaike info criterion		0.066241
Sum squared resid	1.560330	Schwarz criterion		0.410996
Log likelihood	6.741429	Hannan-Quinn criter.		0.188902
F-statistic	24.03957	Durbin-Watson stat		2.284156
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent test results do not account for model selection.

Results for the profitability model in Table 6 indicate that the interest rates and inflation have a negative and significant impact on return on assets (profitability indicator) while the banks' share of government securities have a positive effect on the banks' return on assets in the long run.

5.3 Short Run ARDL Estimates

5.3.1 Profitability Model

The results of the short-run model are presented in Table 7. The results show that the exchange rate volatility has a negative impact on the return on assets, which is the measure of profitability used in the study. A 1 percent increase in the exchange rate volatility decreases profitability by 0.01 percent. The lagged twice exchange rate volatility also has a negative impact on the bank's profitability; a 1 percent increase in the exchange rate volatility lagged twice result in a 0.03 percent decrease in the bank's profitability. The results also indicate that interest rates have a positive impact on the bank's profitability. A 1 percent increase in the interest rate and the one-lag interest rate result in a 0.39 and a 0.17 percent increase in the bank's return on assets. This result would imply that higher interest rates lead to an improved net interest margin NIM, which is the difference between the interest income generated by banks and the amount of interest paid out to their lenders. A better NIM contributes to higher profitability.

The inflation rate has a negative effect on bank profitability, whilst the lagged inflation rate has a positive effect on bank profitability. A 1 percent increase in the inflation rate results in a 0.14 percent decline in the return on assets in the short run. A 1 percent increase in the inflation rate lagged once and twice result in a 0.30 and 0.29 percent increase in the return on assets, respectively.

The banks' share of government securities has a negative effect on the banks' profitability. A 1 percent increase in the first lag of the bank's share of government securities will result in a 0.03 percent decline in the return on assets. Similarly, a 1 percent increase in the bank's share of government securities lagged twice will result in a 0.02 percent decrease in the return on assets. The results also indicate that about 86 percent of the deviation from the long-run path is corrected in each quarter.

Table 7: Short Run ARDL Estimates- Profitability Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.856378	0.128319	-6.673796	0.0000
D(VIX)	-0.013814	0.006221	-2.220532	0.0370
D(VIX(-1))	-0.005198	0.006739	-0.771333	0.4487
D(VIX(-2))	-0.029074	0.007102	-4.093967	0.0005
D(VIX(-3))	-0.020872	0.007212	-2.894121	0.0084
D(INT)	0.385790	0.085265	4.524617	0.0002
D(INT(-1))	0.176404	0.081264	2.170754	0.0410
D(INF)	-0.148698	0.037687	-3.945643	0.0007
D(INF(-1))	0.306099	0.059608	5.135155	0.0000
D(INF(-2))	0.289522	0.061395	4.715743	0.0001
D(INF(-3))	0.205108	0.047835	4.287845	0.0003
D(GOVSEC)	0.012284	0.005997	2.048515	0.0526
D(GOVSEC(-1))	-0.034201	0.010776	-3.173881	0.0044
D(GOVSEC(-2))	-0.020746	0.007104	-2.920124	0.0079
R-squared	0.789217	Mean dependent var		-0.011768
Adjusted R-squared	0.664663	S.D. dependent var		0.276561
S.E. of regression	0.160152	Akaike info criterion		-0.540087
Sum squared resid	0.564270	Schwarz criterion		0.075726
Log likelihood	23.72157	Hannan-Quinn criter.		-0.325152
F-statistic	6.336348	Durbin-Watson stat		2.251434
Prob(F-statistic)	0.000084			

* p-values are incompatible with t-Bounds distribution.

5.3.2 Liquidity Model

The results presented in Table 8 indicate that the lagged liquidity ratio has a significant negative effect on the bank's liquidity ratio. A 1 percent increase in the liquidity ratio lagged once, twice and three times will result in a 0.70, 0.34 and 0.29 percent decline in the liquidity ratio, respectively. An increase in the interest rate has a significant negative impact on the liquidity ratio. A 1 percent increase in the interest rates decreases banks' liquidity by 2.93 percent in the short run, the interest rate lagged three times results in a decline of 2.50 percent in the bank's liquidity ratio in the short run. The inflation rate, on the other hand, has a positive effect on

liquidity, with a 1 percent increase in its first lag increasing banks' liquidity by 2.27 percent in the short run.

The results also indicate that there is no statistically significant relationship between the bank's share of government securities and the liquidity ratio in the short run. Approximately 11 percent of the deviation from the long-run path is corrected every quarter, reflecting slower adjustment dynamics relative to capital adequacy.

Table 8: Short Run ARDL Estimates-Liquidity Ratio Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.108787	0.013993	-7.774627	0.0000
D(LIQR(-1))	-0.702490	0.103580	-6.782136	0.0000
D(LIQR(-2))	-0.347546	0.114830	-3.026623	0.0060
D(LIQR(-3))	-0.285080	0.091343	-3.120971	0.0048
D(VIX)	-0.280420	0.053017	-5.289217	0.0000
D(VIX(-1))	-0.091333	0.052861	-1.727794	0.0974
D(VIX(-2))	-0.174522	0.047354	-3.685507	0.0012
D(INT)	-2.934373	0.639539	-4.588264	0.0001
D(INT(-1))	-0.705027	0.801471	-0.879666	0.3881
D(INT(-2))	0.983959	0.795267	1.237270	0.2285
D(INT(-3))	-2.492925	0.756926	-3.293486	0.0032
D(INF)	0.223803	0.278149	0.804615	0.4293
D(INF(-1))	2.267410	0.333441	6.800042	0.0000
R-squared	0.887755	Mean dependent var		0.054188
Adjusted R-squared	0.829192	S.D. dependent var		3.326595
S.E. of regression	1.374846	Akaike info criterion		3.748758
Sum squared resid	43.47465	Schwarz criterion		4.320585
Log likelihood	-54.47765	Hannan-Quinn criter.		3.948341
F-statistic	15.15903	Durbin-Watson stat		2.343843
Prob(F-statistic)	0.000000			

* p-values are incompatible with t-Bounds distribution.

** The variable representing banks' holdings of government securities (DOMDEBTGDP) was included in the initial short-run ARDL specification but excluded due to statistical insignificance

5.3.3 Capital Adequacy Model

Table 9 indicates that the banks' share of government securities has a positive relationship with the banks' capital adequacy. A 1 percent increase in the domestic debt and the banks' share of government securities increases the capital adequacy ratio by 0.08 percent, in the short run. However, the capital adequacy ratio does not have a significant relationship with interest rates, inflation rate and the exchange rate volatility in the short run. The results also indicate that about 72.6 percent of the deviation from the long run is corrected every quarter.

Table 9: Short Run ARDL Estimates -Capital Adequacy Ratio Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.726460	0.205420	-3.536460	0.0014
D(CAR(-1))	-0.012707	0.152001	-0.083599	0.9340
D(VIX)	-0.006201	0.034640	-0.179015	0.8592
D(VIX(-1))	-0.017155	0.036143	-0.474626	0.6387
D(INT)	-0.155313	0.478031	-0.324902	0.7477
D(INT(-1))	0.110433	0.455232	0.242587	0.8101
D(INF)	-0.280107	0.215351	-1.300704	0.2040
D(INF(-1))	0.101941	0.191967	0.531032	0.5996
D(GOVSEC)	0.085279	0.035646	2.392395	0.0237
D(GOVSEC(-1))	0.022622	0.042024	0.538311	0.5946
R-squared	0.556287	Mean dependent var	-0.085001	
Adjusted R-squared	0.413666	S.D. dependent var	1.392033	
S.E. of regression	1.065914	Akaike info criterion	3.186477	
Sum squared resid	31.81284	Schwarz criterion	3.617421	
Log likelihood	-50.54306	Hannan-Quinn criter.	3.339803	
F-statistic	3.900436	Durbin-Watson stat	1.932285	
Prob(F-statistic)	0.002635			

* p-values are incompatible with t-Bounds distribution.

VI. Conclusion and Recommendations

The primary objective of this study was to examine the impact of the sovereign bank nexus on financial stability using the ARDL model. Specifically, the study sought to investigate how the interdependencies between sovereign debt and the banking sector influence systemic risk and potential contagion effects in the case of Eswatini. The study focused on three models with dependent variables as follows: Capital adequacy, liquidity and profitability.

The results show that an increase in bank holdings of government securities have a positive effect on capital adequacy ratio and profitability but a negative effect on liquidity in the long run. In the short run the results also show a positive relationship between bank holdings of government securities and capital adequacy but no relationship between the holdings of government securities and liquidity. The relationship between holdings of government securities by banks is both positive and negative on profitability depending on the number of lags on the coefficient of bank holdings of government securities.

The negative impact of holdings of government securities by banks on liquidity would imply decreased lending to the private sector with potential negative implications on monetary policy transmission. Additionally, the more banks hold sovereign debt, the more exposed their balance sheet is to the sovereign's debt levels and fiscal fragility with negative implications on businesses and investment and possible increase in non-performing loans and negative effects on bank liquidity.

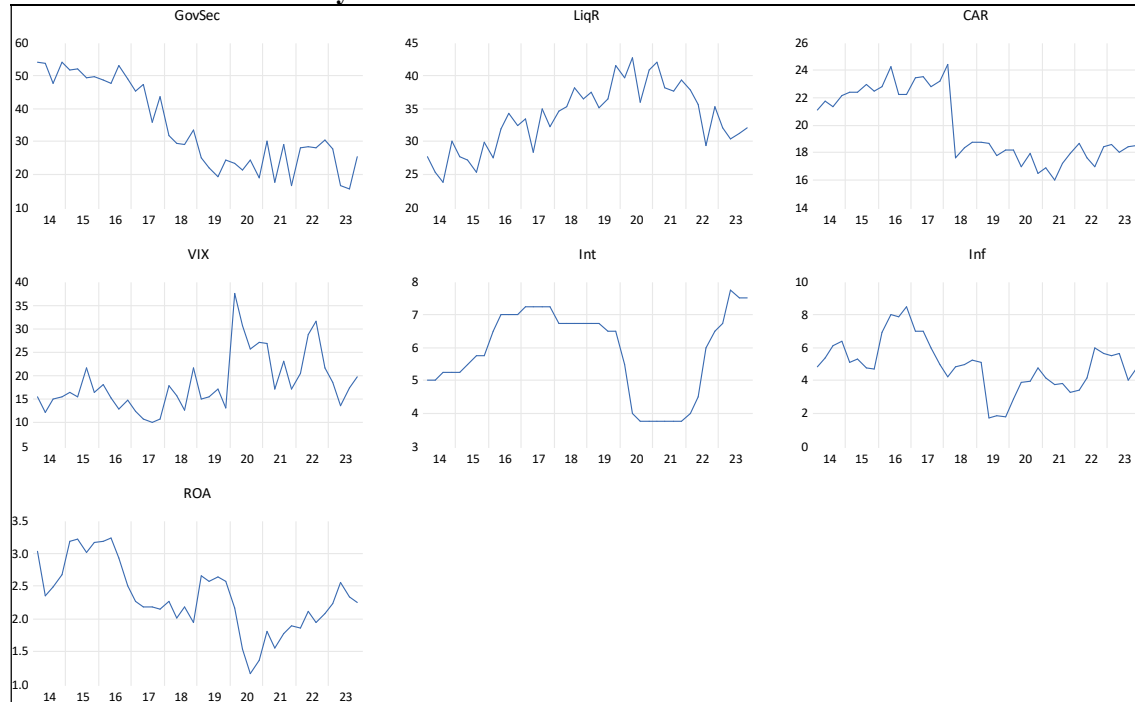
The results further show that the exchange rate volatility, interest rate and inflation have a negative impact on profitability while an increase in interest rates has a positive effect on the capital adequacy ratio in the long run. In the short run, the results indicate that the inflation rate has a positive effect on the bank's liquidity but a negative effect on bank profitability. However, the capital adequacy ratio does not have a significant relationship with interest rates, inflation rate and the exchange rate volatility in the short run.

Based on these results therefore, the study recommends imposition of limits on the proportion of a bank's portfolio that can be invested in sovereign debt, higher capital requirements for sovereign debt holdings to make it less attractive for banks to hold large amounts of government securities, strengthening of credit infrastructure to enhance the attractiveness of lending to the private sector and fiscal discipline

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Annex 1: Evolution of Key Variables



Annex 2: Unit Root Test Results

Variable	Levels	1 st Difference	Decision
GovSec	-1.254633	-11.84709	I(1)
CAR	-1.677590	-8.154760	I(1)
LIQR	0.213929	-10.39326	I(1)
ROA	-0.855808	-6.035983	I(1)
INF	-0.608990	-5.669074	I(1)
INT	-1.794540	-3.645599	I(1)
VIX	-3.326806		I(0)

Annex 3: Model Diagnostics

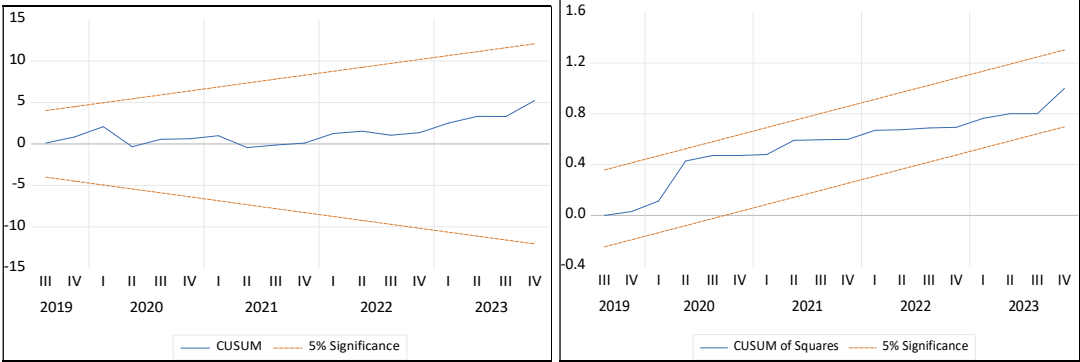
Model	Capital Adequacy		Liquidity		Profitability	
Test	F-statistic	Prob.	F-statistic	Prob.	F-statistic	Prob.
LM Test	0.057972	0.9438	2.131782	0.1746	3.163472	0.0696
Breuch-Pegan-Godfrey	0.528558	0.9095	0.860835	0.6381	0.762754	0.7095
Jarque Bera	2.069	0.3552	0.7592	0.6841	1.1223	0.5704

The results in Annex 3 show that the serial correlation LM test for all the models was insignificant, indicating that there is no serial correlation; hence, we fail to reject the null hypothesis of no serial autocorrelation. The Breusch-Pagan-Godfrey test for heteroskedasticity was not significant, hence the null hypothesis of homoskedasticity cannot be rejected. Lastly, the residuals were found to be normally distributed as the Jarque-Bera test for normality was found to be statistically insignificant.

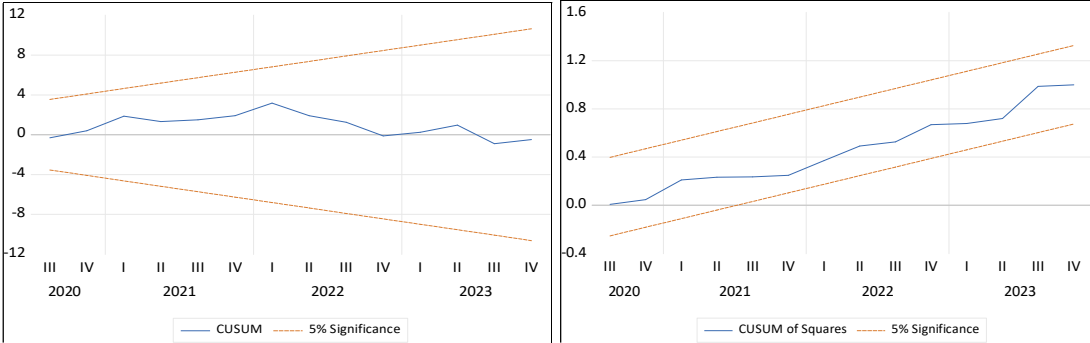
Annex 4: CUSUM and CUSUM of Squares

The CUSUM and CUSUM of Squares graphs lie within the 5 percent confidence bounds, implying that the models are stable.

Profitability Model



CAR Model



Liquidity Model

