

MODERATING EFFECT OF BANK SIZE ON THE FACTORS AFFECTING THE FINANCIAL PERFORMANCE OF DOMESTIC COMMERCIAL BANKS IN SRI LANKA

¹Mithila, G. and ²Kabishka, T.

^{1,2} Department of Financial Management, Faculty of Management Studies and Commerce, University of Jaffna

gmithila@univ.jfn.ac.lk

ABSTRACT

This study examines the impact of internal bank-specific factors on the financial performance of domestic commercial banks in Sri Lanka, with a particular focus on the moderating role of bank size. Employing panel data from thirteen licensed commercial banks listed on the Colombo Stock Exchange over the period 2014 to 2023, the analysis examines the effects of capital adequacy, cost-to-income ratio, liquidity, and non-performing loans on two key performance indicators, which are net interest margin and return on assets. Fixed and random effects panel regression models were estimated, incorporating interaction terms to capture the moderating impact of bank size, and the Hausman test was used to determine model appropriateness. The findings reveal that internal determinants significantly affect bank performance. Higher cost inefficiency and greater credit risk are negatively associated with return on assets, while liquidity demonstrates a positive association. Capital adequacy exhibits a marginally positive relationship with net interest margin, but a significant negative effect on return on assets, indicating a trade-off between financial stability and profitability. Bank size exerts both a direct negative influence on return on assets and a significant moderating effect. Specifically, large banks exhibit reduced sensitivity to the adverse impacts of cost-to-income ratio and non-performing loans and derive diminishing performance benefits from liquidity and capital adequacy. These results suggest that the effectiveness of managerial strategies and regulatory frameworks may vary by institutional scale. The study contributes to the literature by highlighting the conditional nature of internal performance linkages and the importance of scale-sensitive policies in enhancing bank profitability. Future research should explore these dynamics in broader samples and macroeconomic contexts.

Keywords: Bank Performance, Bank Size, Capital Adequacy, Cost Efficiency, Liquidity

Introduction

The commercial banking sector remains a cornerstone of financial intermediation and macroeconomic stability, particularly in emerging and frontier economies. In Sri Lanka, banks play an important role in financing private sector growth, mobilizing savings, and supporting government fiscal operations. However, the sector has recently faced high volatility due to external and internal shocks, including the COVID-19 pandemic, political instability, and the sovereign debt default in 2022. By mid-2022, Sri Lanka declared insolvency on over USD 50 billion in foreign debt, triggering rapid reserve depletion, credit rating downgrades, and capital flight (The World Bank, 2022). These developments have exposed significant vulnerabilities in the banking system and intensified calls for empirical scrutiny of the factors that determine financial performance and institutional resilience.

Bank profitability, commonly measured through Return on Assets (ROA) and Net Interest Margin (NIM), is shaped by a combination of internal bank-specific factors and external macroeconomic conditions. The literature identifies internal determinants such as capital adequacy, operational efficiency, liquidity management, and credit risks as core drivers of bank performance (Athanasoglou et al., 2008; Dietrich & Wanzenried, 2014; Petria et al., 2015). For example, capital buffers can reduce

funding costs, absorb losses, and support balance sheet expansion, enhancing profitability (Berger, 1995; Elnahass et al., 2021). Conversely, high cost-to-income ratios signal inefficiencies that erode margins, while deteriorating asset quality, an increase in high non-performing loan ratios, constrain income, and raise provisioning expenses (Mirović et al., 2024; Sewanyina et al., 2025).

A growing body of literature emphasizes the importance of bank size not only as a direct determinant of profitability but also as a moderating variable that conditions the effects of internal factors on performance. Larger banks are often presumed to benefit from economies of scale, improved diversification, and systematic importance, leading to enhanced profitability (Chowdhury et al., 2024; Herlina & Wilujeng, 2025; Nhu, 2025). However, recent evidence produces opposing arguments as well. Studies show that above a certain level, increased size may lead to bureaucratic level, risk concentration and operational inefficiencies (Elnahass et al., 2021; Karim & Waaje, 2025).

This divergence across contexts highlights the need for a localized analysis, especially considering the structural changes in Sri Lankan banks experienced during the last decade. Given these empirical inconsistencies and theoretical differences, this study seeks to advance the literature by addressing two research questions. First, what is the effect of internal bank-specific factors, capital adequacy, cost-to-income ratio, liquidity, and non-performing loans on the financial performance of domestic commercial banks in Sri Lanka? Next, does bank size moderate these relationships? In other words, does the strength or direction of these associations vary systematically across banks of different scales?

This study contributes in three keyways. First, it provides updated empirical insights into Sri Lanka's commercial banking sector over the 2014 to 2023 period, including both stable and crisis phases. Second, it extends prior models by incorporating bank size as a moderating variable, using interaction terms to assess scale-conditioned effects. Finally, it applies panel econometric techniques to ensure coefficient stability and model validity.

The results are expected to produce significant implications for financial regulators and bank executives. Where the effects of internal factors on profitability are contingent upon institutional scale, standardized approaches to capital adequacy, liquidity management, or operational efficiency may be insufficient. Instead, differentiated strategies aligned with bank size may be required to enhance resilience, optimize resource allocation and support sustainable performance across the sector.

The findings have important implications for both financial regulators and bank management. Where the effects of internal factors on profitability are contingent upon institutional scale, standardized approaches to capital adequacy, liquidity management, or operational efficiency may be insufficient. Instead, differentiated strategies—aligned with bank size—may be required to enhance resilience, optimize resource allocation, and support sustainable performance across the sector.

Literature Review

Capital Adequacy

This is measured by the capital to risk-weighted assets ratio, which reflects a bank's capacity to absorb losses and maintain solvency. Strong capital buffers are theorized to reduce funding costs, enhance resilience and support sustainable growth (Berger, 1995). Recent empirical evidence offers mixed findings. A global study of emerging markets during COVID-19 found that banks with higher pre-crisis regulatory and tier 1 capital ratios achieved superior profitability, particularly among smaller institutions with strong liquidity and asset quality (Jalloh, 2024; Alkhazali et al., 2024). In contrast, a 2025 study of Ethiopian banks identified a negative link between capital adequacy and performance, suggesting that excess capital may signal conservative lending strategies or operational inefficiencies (Kebede, 2025). A meta-analysis of over 1,600 global estimates further indicated that higher capital ratios modestly constrain credit growth, potentially reducing returns (Malovaná et al., 2024).

H1a: Capital adequacy has a significant effect on bank performance (ROA and NIM), with the direction to be determined empirically.

Cost to Income Ratio

The cost-to-income ratio (CIR), defined as the proportion of operating expenses to operating income, is a recognized indicator of a bank's operational efficiency. A higher CIR reflects cost inefficiency and is associated with reduced profitability.

Recent empirical evidence supports a negative relationship between CIR and performance metrics such as return on assets and net interest margin. A 2024 study of European banks confirms that the higher CIR significantly undermines profitability, even when controlling for size, credit risk, and capital adequacy (Laporšek et al., 2024). Similarly, a global analysis by Lamothe et al. (2024) highlights CIR as a key determinant of bank performance, emphasizing that increased costs directly lower returns. These findings highlight that cost management remains an important driver of profitability across banking systems.

H1b: The cost-to-income ratio has a significant negative effect on bank performance (ROA and NIM).

Liquidity

This is measured as the ratio of liquid assets to total assets and reflects a bank's ability to meet short-term obligations. The relationship between liquidity and profitability is not straightforward. Higher liquidity can reduce financial risks and improve stability, especially during periods of market stress. For example, banks with strong liquidity positions were better able to maintain lending and avoid fire sales during the recent crisis (Aquilina et al., 2025; Porcellacchia & Sheedy, 2024). On the other hand, excess liquidity assets typically yield lower income compared to loans. Recent evidence also shows that during stable periods, liquidity hoarding may hurt profitability due to inefficient use of funds (Niu, 2024; Bilal et al., 2024).

These mixed findings suggest that the effect of liquidity on performance depends on context and risk conditions.

H1c: Liquidity has a significant effect on bank performance (ROA and NIM), with the direction to be determined empirically.

Credit Risk

Non-performing loans (NPLs) represent the portion of a bank's loan portfolio that is not generating income and reflects poor asset quality. A higher NPL ratio typically signals increased credit risk, leading to lower profitability through reduced interest income and elevated loan provisions. Recent studies consistently confirm this negative relationship. A 2024 study on Turkish banks found that rising NPLs significantly decreased return on assets, even after controlling for capital and operational factors (Kalkan, 2024). Similarly, research on South Asian banking sectors, including Nepal and Bangladesh, shows that credit risk remains a key constraint on bank performance, particularly in times of economic stress (Pradhan et al., 2024; Zabin et al., 2024). These findings highlight that effective credit risk management is essential for sustaining profitability in emerging market banking systems.

H1d: Non-performing loans have a significant negative effect on bank performance (ROA and NIM)

Bank Size as a moderating variable

Bank size plays a critical role in shaping financial performance, both directly and through its influence on the effectiveness of internal factors. Larger banks often benefit from economies of scale, diversified income sources, and greater market access. However, recent studies highlight that these advantages may not be universal. Herlina and Wilujeng (2025) found that bank size moderated the impact of risk on profitability in ASEAN banks, with smaller institutions more adversely affected during crises. Similarly, Elmahdy et al. (2025) showed that larger Egyptian banks were able to convert efficiency improvements, such as FinTech adoption, into higher profitability. Conversely, Nhu (2025) reported that in Vietnam, bank size did not significantly alter the relationship between human capital and performance, suggesting that scale effects alter relationship between human capital and performance, suggesting that scale effects may be limited in certain contexts.

From these findings, the following hypotheses are proposed

H2a: Bank size moderates the effect of capital adequacy on performance. Large banks may leverage capital buffers more effectively due to market access and diversification

H2b: Bank size moderates the effect of cost efficiency on performance. Larger banks may dilute inefficiencies through scale, whereas small banks, yet serve as a strategic buffer for larger institutions with broader funding access.

H2c: Bank size moderated the effect of liquidity on performance. Higher liquidity may pose opportunity costs for small banks yet serve as a strategic buffer for larger institutions with broader funding access.

H2d: Bank size moderates the impact of credit risk (NPL) on the performance. Larger banks typically have more diversified portfolios and risk management capabilities, potentially softening NPL-related performance declines.

Methodology

Research Methods

This study adopts a quantitative research approach, which is well-suited for collecting relevant data to analyze and derive the study's results in numerical terms. Since the study relies on numerical values and secondary data, this approach is appropriate. Panel data econometrics on bank year observations is employed to measure the factors affecting the financial performance of each company, using secondary data obtained from annual reports.

Data collection

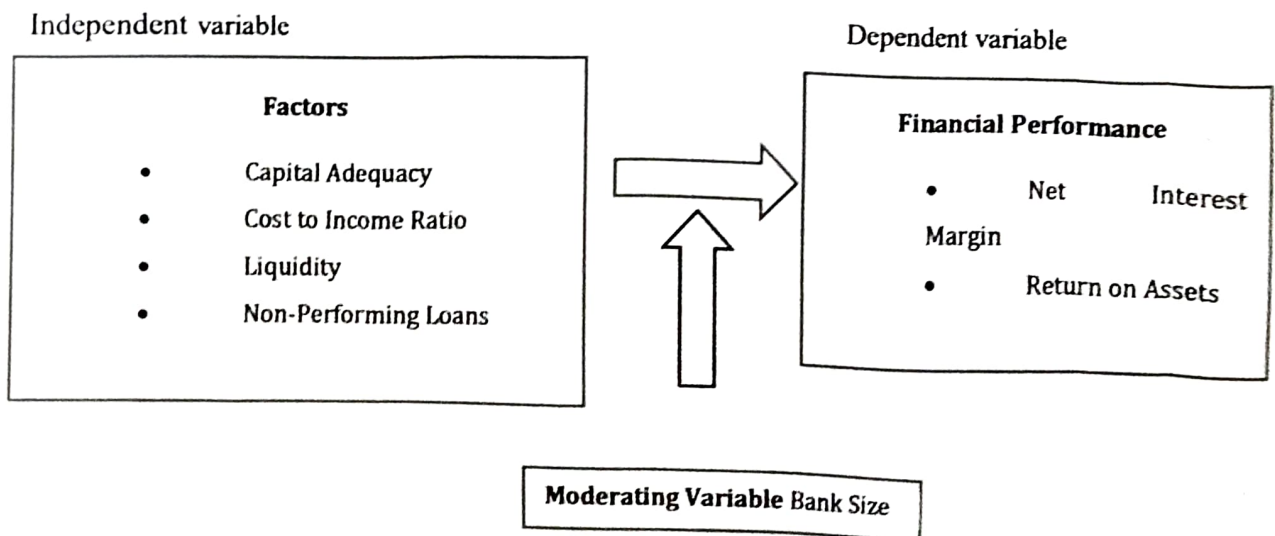
This study is based on secondary data collection. The researcher obtained data from the annual reports of selected companies listed on the Colombo Stock Exchange (CSE) for the period between 2014 and 2023. Information related to factors affecting financial performance was collected specifically for this study. The sources of data include the annual publications of the CSE, as well as the annual reports and official websites of the CSE and the respective companies.

Population and Sample

The population for this study included all twenty-four licensed commercial banks regulated by the Central Bank of Sri Lanka. The target sampling population comprised all licensed commercial banks listed on the Colombo Stock Exchange (CSE) at the time of sampling; all thirteen domestic licensed commercial banks were selected.

Conceptualization

Figure 1: conceptualization model developed by researcher



Operationalization

Table 1: Variables of Operationalization

Concept	Variable	Measurement	Sources
Independent variable	Capital Adequacy	(Tier 1 Capital + Tier 2 Capital) / Risk Weighted Assets	Anginer et al. (2018)
Factors	Cost to Income Ratio	Operating Expenses / Operating Income	Laporšek et al. (2024)
	Liquidity	Liquid Assets / Total Assets	Niu (2024)
	Non-Performing Loans	Total Non-Performing Loan / Total Loan and Advances	Kalkan (2024)
Dependent variable	Net Interest Margin	Net Interest Income / Interest Earning Assets	(Maudos & Fernández de Guevara, 2004)
	Return on Assets	Net Income/ Average Total Assets	(Athanasoglou et al., 2008)
Moderating Variable	Bank Size	Log of Total Assets	Elmahdy et al. (2025)

Baseline Specifications

The following regression models are used to identify the factors influencing financial performance.

$$\text{ROA or NIM} = \beta_0 + \beta_1 \text{CA} + \beta_2 \text{CIR} + \beta_3 \text{LQ} + \beta_4 \text{NPL} + \beta_5 \text{FS} + \varepsilon$$

$$\text{ROA or NIM} = \beta_0 + \beta_1 \text{CA} + \beta_2 \text{CIR} + \beta_3 \text{LQ} + \beta_4 \text{NPL} + \beta_5 \text{FS} + \beta_1 \text{CA} * \text{FS} + \beta_2 \text{CIR} * \text{FS} + \beta_3 \text{LQ} * \text{FS} + \beta_4 \text{NPL} * \text{FS} + \varepsilon$$

ROA= Return on Assets

NIM=Net Interest Margin

CA=Capital Adequacy

CIR=Cost income ratio

LQ= Liquidity ratio

NPL= Nonperforming loans

FS=Bank Size

β_0 =Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Model coefficient

ε =Error

Data Analysis

Multicollinearity

Table 2: Multicollinearity analysis

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	5.792813	970.3257	NA
CA	0.000197	12.14225	2.23847
CIR	3.30E-05	17.0643	2.586192
LQ	0.000255	24.53643	1.355272
NPL	0.001086	4.870597	1.143445
FS	0.037866	854.5215	2.142465

Table 2 shows the centered Variance Inflation Factor (VIF) values of Capital Adequacy (CA), Cost to

Income Ratio (CIR), Liquidity (LR), Non-Performing Loans (NPL) and Firm Size (FS), indicating that it is significantly lower than 10, confirming that each explanatory variable contributes distinct information to the model. Hence, there is no evidence of problematic multicollinearity among the independent variables, and model estimates can be interpreted with confidence.

Descriptive Statistics

Table 3: Descriptive Statistics

	CA	CIR	LQ	NPL	FS	NIM	ROA
Mean	17.34	51.20	23.28	4.53	11.59	4.09	0.94
Median	15.73	48.37	21.63	4.31	11.67	3.88	1.04
Maximum	85.44	181.67	42.67	14.42	12.64	7.72	3.01
Minimum	10.83	22.03	13.83	0.89	9.83	1.80	-3.13
Std. Dev.	8.27	21.72	5.65	2.52	0.58	1.07	0.76

The descriptive results in Table 3 indicate variability in bank performance and internal factors. Capital adequacy and cost-to-income ratio show high dispersion. Liquidity was relatively stable across the sample with a mean of 23.2% and modest dispersion. Non-performing loans averaged 4.53% while profitability measures varied with ROA ranging from -3.13% to 3.01%. Further net interest margin averaged 4.09% with some banks reaching a maximum of 7.72%.

Correlation Analysis

Table 4: Correlation Analysis

Correlation	CA	CIR	LQ	NPL	FS	NIM	ROA
Probability							
CA	1.000						

CIR	0.674	1.000					
	0.000	-----					
LQ	0.191	-0.100	1.000				
	0.029	0.257	-----				
NPL	-0.060	-0.090	0.238	1.000			
	0.496	0.310	0.006	-----			
FS	-0.528	-0.679	0.204	-0.063	1.000		
	0.000	0.000	0.020	0.480	-----		
NIM	0.116	-0.177	0.178	0.262	-0.214	1.000	
	0.191	0.044	0.043	0.003	0.015	-----	
ROA	-0.528	-0.775	-0.076	-0.257	0.437	0.194	1.000
	0.000	0.000	0.390	0.003	0.000	0.027	-----

Table 4 shows the correlation matrix, which reveals several statistically significant relationships among the study variables. Capital adequacy and cost-to-income are positively correlated, suggesting that banks with higher operating costs. Bank size is negatively associated with both capital adequacy and cost inefficiency. ROA shows a strong negative correlation with cost inefficiency and capital adequacy, implying that excessive costs and conservative capital levels may reduce profitability. Net interest margin shows weaker correlations overall but is negatively linked to cost inefficiency and positively

associated with liquidity and credit risks. Importantly, all correlation coefficients remain below 0.8, indicating no immediate concerns of multicollinearity for regression analysis.

Regression analysis

The Hausman specification test guided the choice between fixed and random effects models. For net interest margin, the test indicated a preference for the fixed effects model both without moderation ($p = 0.041$) and with moderation ($p = 0.0017$), confirming consistency in model selection. For ROA, the fixed effects model was strongly supported in both specifications, with p -values below 0.001. These results validate the use of fixed effects in both NIM and ROA, particularly when accounting for bank size as a moderating variable.

Regression analysis without Moderation

Table 5: Fixed effect model summary

Dependent Variable: NIM				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.6444	5.1736	4.1836	0.0001
CA	0.0210	0.0130	1.6164	0.1088
CIR	-0.0445	0.0053	-8.4457	0.0000
LQ	0.0177	0.0140	1.2670	0.2078
NPL	0.0232	0.0350	0.6606	0.5102
FS	-1.3934	0.4445	-3.1348	0.0022
Root MSE	0.5933	R-squared		0.6914
Mean dependent var	2.2322	Adjusted R-squared		0.6446
Sum squared resid	45.7680	F-statistic		14.7612
Durbin-Watson stat	1.4175	Prob(F-statistic)		0.0000

Under the fixed effect test, the model explains a substantial proportion of the variation in NIM with the adjusted R^2 of 64.46% and a statistically significant F statistic ($p < 0.001$). The relatively low root MSE and improved Durbin-Watson statistics of 1.4 indicate better model fit and reduced autocorrelation compared to the random effects model. Cost to cost-to-income ratio is strongly negative and statistically significant, confirming that operational inefficiencies directly compress interest margins. This aligns with recent evidence from emerging markets showing that higher CIR values erode profitability due to limited cost pass-through under competitive and pricing environments (Bortoluzzo et al., 2024). Bank size is also negative and significant, suggesting that larger banks in Sri Lanka may experience diseconomies of scale or lower pricing power. Similar patterns are observed in cross-country studies, where margin advantages diminish beyond a certain size threshold (Bortoluzzo et al., 2024).

Capital adequacy has a positive but statistically insignificant effect, reflecting a potential offset between the stability benefits of stronger capital buffers and the margin compression from reduced leverage (Anginer et al., 2018). Liquidity is positive but not significant, which suggests that stronger liquidity positions may offer funding flexibility and support margins, although the effect is not robust in the Sri Lankan context. Similar mixed evidence is found in recent studies, liquidity can enhance profitability in bank-based systems (Bilal et al., 2024). But it may also reduce returns when excess funds are held in low-yield assets (Mohammad & Khan, 2024). Non-performing loans show no significant effect in this specification, although prior research typically reports a negative impact on margins due to provisioning

burdens (Alnabulsi et al., 2023). Overall, the results highlight cost efficiency and scale management as key levers for sustaining NIM in the Sri Lankan banking sector, while the effects of capital, liquidity, and asset quality appear more context-dependent.

Regression analysis without Moderation

Table 6: Fixed effect model summary

Dependent Variable: ROA					
Variable	Coefficient	Std. Error	t-Statistic		Prob.
C	24.1384		2.1543	11.2049	0.0000
CA	-0.0140		0.0054	-2.5879	0.0109
CIR	-0.0420		0.0022	-19.1464	0.0000
LQ	0.0141		0.0058	2.4203	0.0171
NPL	-0.1076		0.0146	-7.3735	0.0000
FS	-1.7811		0.1851	-9.6231	0.0000
Root MSE	0.2471	R-squared			0.8939
Mean dependent var	0.9391	Adjusted R-squared			0.8778
Hannan-Quinn criter.	0.4800	F-statistic			55.4922
Durbin-Watson stat	1.7041	Prob(F-statistic)			0.0000

The fixed effects model explains a substantial proportion of the variation in ROA, indicating strong explanatory power. The Durbin-Watson statistics suggest no severe autocorrelation issues. Capital adequacy exhibits a significant negative relationship with ROA. This aligns with the return dilution view, whereby excess capital reduces leverage and constrains income from risk-weighted assets, as observed in emerging market studies (Anginer et al., 2018; Bitar et al., 2018). However, another research highlights that strong capital buffers can enhance stability and lower funding costs, highlighting a trade-off between profitability and resilience (Bitar et al., 2018). CIR has a strong negative effect on ROA, indicating that operational inefficiencies significantly reduce profitability. This is consistent with cross-country evidence showing that higher CIR values are associated with lower returns, particularly in competitive or regulated banking systems (Bortoluzzo et al., 2024). Liquidity has a positive and significant effect on ROA, indicating that stronger liquidity buffers enhance profitability, particularly during economic stress (Haris et al., 2024). However, its benefits are context dependent, with well-managed liquidity improving margins mainly in adverse market conditions (Eltweri et al., 2024). NPL significantly reduces ROA in Sri Lankan banks by increasing provisioning costs and lowering interest income. This is consistent with recent evidence from MENA region (Alnabulsi et al., 2023), Turkey (Kalkan, 2024), and Indonesia (Sewanyina et al., 2025), highlighting that poor asset quality strongly undermines profitability and reinforcing the need for robust credit risk management. Bank size has a significant negative effect on ROA, indicating diseconomies of scale or reduced marginal returns in Sri Lankan banks. Similar patterns are observed in emerging and European markets, where profitability declines once banks exceed optimal size thresholds, suggesting that expansion without efficiency gains may hinder performance (Lamothe et al., 2024; Grzeta et al., 2023). The results indicate that improving cost efficiency and asset quality should be the primary focus for enhancing ROA in Sri Lankan banks, while optimal capital and liquidity strategies should balance stability with return generation. The persistent negative size effect suggests that consolidation or unchecked asset growth may not translate into higher profitability without structural reforms.

Regression analysis with Moderation

Table 7: Fixed effect model summary

Dependent Variable: NIM				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.3637	6.8369	3.4173	0.0009
CA	0.1933	0.2292	0.8435	0.4008
CIR	0.3221	0.0646	4.9842	0.0000
LQ	-0.8125	0.2302	-3.5301	0.0006
NPL	0.7281	0.6303	1.1551	0.2506
FS	-1.3166	0.6012	-2.1900	0.0307
FS_CA	-0.0184	0.0217	-0.8484	0.3981
FS_CIR	-0.0347	0.0060	-5.7466	0.0000
FS_LQ	0.0703	0.0194	3.6254	0.0004
FS_NPL	-0.0626	0.0562	-1.1140	0.2677
Root MSE	0.5035	R-squared		0.7778
Mean dependent var	4.0943	Adjusted R-squared		0.7346
Hannan-Quinn criter.	2.0011	F-statistic		18.0042
Durbin-Watson stat	1.4997	Prob(F-statistic)		0.0000

The fixed effects model with bank size interactions is jointly significant ($F=18.00$, $p<0.001$) with strong explanatory power (Adjusted $R^2 = 0.735$). The fixed effects regression with interaction terms reveals that bank size significantly moderated the impact of cost efficiency and liquidity on net interest margins. Cost inefficiencies have a positive main effect on NIM for smaller banks but turns strongly negative as size increases, indicating that large banks experience greater margin erosion from rising costs, consistent with evidence that efficiency- profitability linkages strengthen with scale (Chowdhury et al., 2024, Avignone et al., 2025). Liquidity exerts a negative influence on NIM in smaller institutions but becomes neutral to positive in larger banks, reflecting their ability to monetize liquidity advantages through funding diversification and market access (Vu, 2024; Lu & Wang, 2023). By contrast, bank size does not significantly moderate the effects of capital adequacy or non-performing loans on NIM, suggesting these relationships are largely scale invariant. The results imply that efficiency and liquidity management strategies should be explicitly size-contingent to optimize interest margins.

Regression analysis with Moderation

Table 8: Fixed effect model summary

Dependent Variable: ROA				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26.3115	2.9447	8.9352	0.0000
CA	-0.2067	0.0987	-2.0937	0.0386
CIR	-0.1690	0.0278	-6.0712	0.0000
LQ	0.3899	0.0991	3.9337	0.0001
NPL	-0.7126	0.2715	-2.6248	0.0099
FS	-2.0671	0.2589	-7.9832	0.0000
FS_CA	0.0187	0.0094	2.0001	0.0480
FS_CIR	0.0121	0.0026	4.6401	0.0000
FS_LQ	-0.0318	0.0084	-3.8101	0.0002
FS_NPL	0.0535	0.0242	2.2124	0.0290
Root MSE	0.2168	R-squared		0.9183

Mean dependent var	0.9391	Adjusted R-squared	0.9024
Hannan-Quinn criter.	0.3164	F-statistic	57.7671
Durbin-Watson stat	1.6990	Prob(F-statistic)	0.0000

The fixed effects model with bank size interactions explains over 90% of ROA variation, showing that the profitability effects of internal bank factors are scale dependent. Capital adequacy has a negative main effect, consistent with the return dilution argument in emerging markets (Anginer et al., 2018; Bitar et al., 2018), but the positive interaction with size suggests that larger banks can leverage capital buffers more effectively (Berger & Bouwman, 2013). Cost inefficiency significantly reduces ROA (Bortoluzzo et al., 2024), yet the moderation term indicates that larger banks better absorb such inefficiencies (Avignone et al., 2025). Liquidity buffers boost profitability in smaller banks (Eltweri et al., 2024), but their benefits diminish at larger scales, consistent with an inverted U liquidity-profitability pattern (Vu, 2024). High NPLs depress ROA (Athanasoglou et al., 2008; Alnabulsi et al., 2023) although large banks can partially mitigate these losses through stronger recovery and diversification. The direct negative size effect aligns with evidence that profitability declines once banks exceed optimal scale (Bortoluzzo et al., 2024).

Discussion of Hypotheses

The empirical results largely support the hypothesized relationships between internal bank factors, profitability, and the moderating role of bank size. H1b and H1d are strongly validated, cost-to-income ratio and non-performing loans exert significant negative effects on both ROA and NIM, confirming the well-established efficiency-profitability and asset quality-profitability linkages (Bortoluzzo et al., 2024; Alnabulsi et al., 2023). H1c is partially supported, as liquidity shows a significant positive relationship with ROA but not with NIM, suggesting its profitability benefits are context-specific and more pronounced during periods of financial stress (Eltweri et al., 2024). H1a receives mixed evidence – capital adequacy’s effect on ROA is significantly negative, aligning with the return dilution hypothesis (Anginer et al., 2018; Bitar et al., 2018), while its effect on NIM is statistically insignificant, indicating that stability gains may be offset by margin compression.

Among moderation hypotheses, H2b and H2c are strongly supported, and bank size significantly moderates the effects of CIR and liquidity advantages, whereas smaller banks are more vulnerable to operational and funding constraints (Avignone et al., 2025; Vu, 2024). H2a and H2d receive partial support; size enhances the profitability impact of capital adequacy in ROA models and mitigates NPL effects, but these moderating relationships are absent or weak in NIM models. Collectively, the findings indicate that efficiency, liquidity, and capital-profitability tradeoffs are not uniform across size classes, highlighting the importance of a scale-sensitive approach to performance optimization.

Implications

Theoretical Implications

This study extends the bank performance literature by empirically integrating bank size as a moderator in a frontier market context, demonstrating that size-contingent effects significantly alter the magnitude and direction of traditional bank-specific determinants. It contributes to the ongoing debate on the scale-profitability relationship by showing that diseconomies of scale can coexist with selective moderating benefits, thereby reconciling conflicting evidence from economies of scale theory (Demirgüç-Kunt & Huizinga, 1999) and the complexity cost hypothesis (Bortoluzzo et al., 2024).

Practical Implications

For bank managers, the results highlight cost efficiency and asset quality as the most consistent drivers of profitability across size classes. Large banks should leverage their technological and funding advantages to eliminate inefficiencies and strategically deploy liquidity, while small and mid-sized banks

should prioritize lean cost structures and active liquidity management to offset their narrower margins and funding constraints. Capital management strategies should be calibrated to balance stability and profitability objectives, particularly in high spread frontier markets where overcapitalization can erode returns.

Policy Implications

For regulators, the findings argue against uniform prudential benchmarks. Capital adequacy and liquidity requirements could be differentiated by bank size to reflect varying capacity to absorb shocks without impairing returns. Macroprudential policy should also account for size-related differences in efficiency, resilience, and credit risk absorption, ensuring that stability mandates do not inadvertently suppress profitability in smaller institutions. Encouraging competitive neutrality while avoiding excessive concentration will be critical to sustaining sectoral resilience and efficiency in Sri Lanka's evolving banking landscape.

Conclusion

This study examined the impact of bank-specific factors, capital adequacy, cost-to-income ratio, liquidity, and non-performing loans affect profitability, and whether bank size moderates these relationships in Sri Lanka's domestic commercial banking sector. Using fixed effects panel regressions on data from 2014 to 2023, the results demonstrate that operational efficiency and asset quality are the most important determinants of both ROA and NIM, while the effects of capital adequacy and liquidity are context dependent. The moderating analysis reveals that bank size shapes the profitability implications of cost efficiency, liquidity, and capital adequacy, highlighting the importance of tailoring strategic and regulatory approaches to institutional scale. The findings have significant implications for theory, practice, and policy. Theoretically, they highlight the internal factor performance linkages across size classes, extending the bank performance literature in frontier markets. Practically, they guide managers toward size-appropriate strategies for efficiency enhancement, liquidity deployment and credit risk management. From a policy perspective, they advocate for prudential regulation that differentiates by bank size, ensuring that stability goals are achieved without unduly compromising profitability. Overall, the evidence suggests that Sri Lanka's banking sector would benefit from a scale-sensitive approach to performance optimization, balancing growth with efficiency and resilience to navigate a competitive and evolving financial environment.

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