Profitability Drivers at the Bank and Macroeconomic Levels: Evidence from Private Commercial Banks in Bangladesh

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ABSTRACT

This paper re-examines the determinants of profitability in Bangladeshi private commercial banks, using a panel-corrected standard errors (PCSE) analysis of ten listed banks over 2014-2023 (n = 100 bank-year observations), together with a post-sample assessment of the sector's extraordinary deterioration through 2024-2025. Profitability is measured by return on assets (ROA), with return on equity (ROE) and net interest margin (NIM) used as robustness checks. Results show that capital adequacy and management efficiency significantly enhance profitability, while asset-quality deterioration and non-performing loans (NPLs) exert strong negative effects; liquidity management and bank size are largely insignificant, pointing to inefficiencies in deployment and scale. GDP growth is statistically negligible within sample and inflation shows mixed effects, underscoring structural weaknesses in financial intermediation. A winsorization check (1st/99th percentiles) confirms that the capital-adequacy and NPL effects are stable to outlier treatment, while the management-efficiency effect is more sensitive. Extending the analysis with Bangladesh Bank, IMF, and World Bank data through 2025 shows that the sector-wide NPL ratio rose from below 10 percent in 2023 to more than 30 percent by late 2025, alongside a collapse in aggregate capital adequacy a trajectory consistent with, and considerably amplifying, the credit-quality channel identified in the panel results. The study contributes methodologically by applying PCSE in a South Asian context, and offers policy implications for strengthening credit discipline, addressing regulatory forbearance, and improving banking efficiency.

Key Words: Bank Profitability, Non-Performing Loans (NPLs), Capital Adequacy, Panel-Corrected Standard Errors (PCSE), Banking Sector, Credit Risk, Panel Data Analysis

INTRODUCTION

Commercial banks' profitability has long been a topic of interest for scholars and policymakers because of its crucial role in economic development, loan intermediation, and financial stability. Beyond reflecting the operational effectiveness and resilience of individual banks, profitability is a key barometer of the financial system's overall health. In the aftermath of the global financial crisis and the ensuing regulatory reforms, understanding the drivers of bank profitability has become more important than ever, particularly in developing economies where institutional weaknesses and structural inefficiencies remain widespread.

A substantial body of research has examined the determinants of bank profitability, typically distinguishing between macroeconomic, industry-specific, and bank-specific factors (Athanasoglou et al., 2008; Dietrich & Wanzenried, 2014; Handriani & Anggara, 2025). While capital adequacy, asset quality, and efficiency are widely recognised as significant bank-level variables, evidence on macroeconomic factors such as GDP growth and inflation remains inconsistent and context-dependent (Bolt et al., 2012; Saad & El-Said, 2020; Junttila & Vataja, 2022; Phan et al., 2025; Ahmed, 2009). Similarly, the role of liquidity management is contested: some studies point to inefficiencies in developing markets, while others document beneficial effects under stress (Niu et al., 2024). Non-performing loans (NPLs) are consistently identified as a critical determinant, although their influence varies considerably across institutional contexts (Louzis et al., 2012; Ari et al., 2021; Serrano et al., 2021; Khan et al., 2020).

Despite this substantial international evidence, Bangladesh-focused research remains comparatively thin and often methodologically limited. A handful of recent panel studies have begun to fill this gap Akther et al. (2023) examine 24 Dhaka Stock Exchange-listed banks over 2014-2020 and find that most bank-specific factors, together with inflation and the exchange rate, significantly shape ROA, while Lalon et al. (2023) link liquidity and macroeconomic conditions to profitability in state-owned banks over 2012-2021. Sharif et al. (2024) similarly document a significant negative effect of non-performing loans and a positive effect of capital adequacy on the financial performance of 28 listed commercial banks over 2017-2021, while Alam and Yusuf (2024) apply panel-corrected standard errors the same estimator adopted in the present study to examine bank-specific and risk determinants of conventional banks' stability (rather than profitability directly) over 2011-2021. Most of this literature, however, either relies on pooled, fixed-, or random-effects estimators that do not explicitly correct for cross-sectional dependence and heteroskedasticity, or applies PCSE to outcomes other than profitability a material gap in a banking sector where systemic shocks (regulatory forbearance, large-borrower distress) affect all banks simultaneously. This disparity is especially notable given that Bangladesh's banking industry is marked by persistently high NPL ratios, lax credit discipline, and limited efficiency gains features that, as shown below, escalated sharply after 2023 raising questions about the sector's capacity to convert macroeconomic growth into durable financial performance.

The present study addresses these gaps by empirically investigating the bank-specific and macroeconomic determinants of profitability in ten Bangladeshi private commercial banks over 2014-2023, using panel-corrected standard errors (PCSE) to account for heteroskedasticity and cross-sectional dependence (Beck & Katz, 1995; Bynagari & Ahmed, 2021). The analysis evaluates the effects of capital adequacy, asset quality, management efficiency, liquidity management, non-performing loans, bank size, GDP growth, and inflation, with robustness tested through alternative profitability measures (ROA, ROE, NIM) and model specifications. Unlike the in-sample panel, which necessarily ends in 2023, this paper additionally situates the findings within the sector's subsequent trajectory: drawing on Bangladesh Bank, IMF, World Bank, and Asian Development Bank data through mid-2025, it

documents how the credit-quality channel identified in the regression results intensified dramatically once previously concealed non-performing loans were disclosed following the change in government in August 2024.

This study makes four key contributions. First, it clarifies the role of macroeconomic variables in profitability and highlights the disproportionate impact of NPLs in emerging markets, now reinforced by post-sample evidence of unprecedented scale. Second, it contributes methodologically by applying PCSE together with a winsorization-based sensitivity check, an approach still rare in South Asian bank profitability studies, thereby providing more reliable inference than conventional panel or pooled OLS methods (Djalilov & Piesse, 2016). Third, it situates the panel results within the Bangladeshi literature (Akther et al., 2023; Lalon et al., 2023) rather than relying solely on cross-country evidence. Fourth, it offers time-sensitive practical insights for policymakers and regulators, given that the structural inefficiencies identified in the 2014-2023 sample are now understood to have been considerably understated.

LITERATURE REVIEW

Bank-Specific Determinants of Profitability

The literature consistently emphasizes internal, bank-level factors as critical drivers of profitability. Capital adequacy strengthens resilience and enhances profitability by reducing funding costs and credit risk exposure (Athanasoglou et al., 2008; Mala & Jumono, 2025). Asset quality, often proxied by loan loss provisions, reflects risk management efficiency, where deterioration typically reduces returns (Menicucci & Paolucci, 2016). Management efficiency, frequently measured through cost-to-income ratios, is also a decisive profitability determinant across advanced and emerging economies (Dietrich & Wanzenried, 2014). Liquidity is a double-edged factor: while excess liquidity cushions shocks, inefficient deployment can depress returns (Niu et al., 2024). Bank size is a debated determinant larger bank may benefit from economies of scale, but diseconomies often emerge due to bureaucratic inefficiencies in developing contexts (Djalilov & Piesse, 2016). Within Bangladesh specifically, Akther et al. (2023) find that most bank-specific factors significantly affect ROA among listed commercial banks, Lalon et al. (2023) show that loan-to-deposit and cost-efficiency ratios materially shape profitability once macroeconomic controls are included, and Sharif et al. (2024) similarly report that capital adequacy raises, while credit risk lowers, the financial performance of DSE-listed commercial banks.

Credit Risk and Non-Performing Loans

Non-performing loans (NPLs) represent a major profitability constraint, particularly in emerging markets. Louzis, Vouldis, and Metaxas (2012) linked NPLs in Greece to both bank-level weaknesses and macroeconomic shocks. Ari, Chen, and Ratnovski (2021) showed globally that NPL surges during crises sharply reduce lending capacity and profitability. Serrano, Moreno, and Nieto (2021) demonstrated that rising NPLs erode European banks' margins, reinforcing the systemic risk channel. Within Bangladesh, Khan et al. (2023) apply a two-stage system-GMM model to conventional and Islamic banks over 2010-2021 and find that profitability and efficiency help reduce NPLs while loan growth and leverage increase them evidence of exactly the kind of bidirectional NPL profitability relationship this study treats as a limitation. Evidence more broadly suggests that the profitability impact of NPLs is magnified in contexts with weak enforcement and monitoring conditions that resonate strongly with the Bangladeshi banking sector.

Macroeconomic Influences: GDP, Inflation, and Sovereign Risk

At the macro level, GDP growth and inflation are widely recognized but inconsistently supported determinants of profitability. Bolt et al. (2012) found profitability declines during

recessions, while Dietrich and Wanzenried (2014) showed heterogeneous GDP effects across income groups. In contrast, Djalilov and Piesse (2016) found GDP to be insignificant in transition economies, suggesting contextual dependence. Inflation has mixed effects: it may enhance bank margins where pricing power is strong, but excessive inflation often raises costs faster than revenues, eroding profits (Saad & El-Said, 2020; Junttila & Vataja, 2022). Gazi et al. (2024), examining Islamic Shariah-based banks under similarly structured panel data, likewise report that macroeconomic determinants explain comparatively little of the variation in profitability relative to bank-specific factors. These findings underscore the need to reassess macroeconomic influences in structurally unique economies like Bangladesh, particularly amid the double-digit inflation and sharply decelerating growth the country experienced from 2023 onward.

Comparative and Contextual Perspectives

Comparative studies reveal that profitability determinants vary across institutional and geographic contexts. Djalilov and Piesse (2016) showed that drivers in transition economies differ markedly from advanced markets, with governance playing a stronger role. Lamers, Present, and Vander Vennet (2022) observed convergence in European banks' profitability, contrasting with persistent inefficiencies in developing countries. Ramlall (2022) added that institutional environments moderate profitability outcomes, highlighting the importance of context-specific analysis. Most recently, Cangombe et al. (2025), applying dynamic GMM to Angolan banks, similarly find that institutional reform and regulatory strengthening rather than macroeconomic conditions alone are decisive for profitability in emerging, reform-in-progress banking systems, pattern this study's post-sample evidence suggests applies with particular force to Bangladesh. These perspectives strengthen the rationale for studying Bangladesh as a structurally distinct case.

Literature Gap and Contribution

Despite substantial global research on bank profitability, three gaps remain. First, evidence on macroeconomic variables such as inflation and GDP growth remains conflicting; some studies find weak or negligible correlations in transition and developing countries, while others emphasise beneficial effects (Bolt et al., 2012; Dietrich & Wanzenried, 2014; Djalilov & Piesse, 2016; Junttila & Vataja, 2022), implying that institutional characteristic condition macroeconomic transmission. Second, although the NPL-profitability link is well documented in advanced economies (Louzis et al., 2012; Serrano et al., 2021), and an emerging Bangladeshi literature has begun to address it (Akther et al., 2023; Lalon et al., 2023; Khan et al., 2023; Sharif et al., 2024; Ahmed & Dey, 2010), that literature has, with the exception of Alam and Yusuf (2024) who apply PCSE to bank stability rather than profitability not yet applied estimators robust to cross-sectional dependence to profitability itself, nor has it been updated to reflect the scale of the post-2023 NPL disclosures. Third, methodological limitations persist: much empirical work relies on fixed-effects or pooled OLS estimates that do not fully account for cross-sectional dependence and heteroskedasticity, which questions the reliability of standard errors in prior studies.

This study addresses these gaps in three ways. It extends the theoretical debate on macroeconomic determinants and the credit-quality channel in an emerging-market setting; it applies panel-corrected standard errors (PCSE), a technique still rare in South Asian bank profitability research, together with explicit outlier treatment; and it links the 2014-2023 panel evidence to verifiable post-sample developments through 2025, offering policymakers and regulators in Bangladesh time-sensitive guidance on reducing NPLs, improving liquidity deployment, and restoring capital adequacy.

CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Hypotheses Summary

The hypotheses summarized in Table 1 capture the expected effects of both bank-specific and macroeconomic factors on the profitability of private commercial banks in Bangladesh. Capital adequacy is expected to enhance profitability by strengthening financial resilience and risk-bearing capacity. Conversely, poor asset quality, management inefficiency, and higher non-performing loans are anticipated to reduce profitability through increased operating costs, credit losses, and provisioning requirements. The influence of liquidity management is expected to be mixed, depending on whether liquid resources are deployed efficiently or held excessively. Similarly, the effect of bank size remains ambiguous because economies of scale may be offset by organizational complexity and inefficiency. Among macroeconomic variables, GDP growth is expected to support bank profitability, although its effect may be insignificant in Bangladesh, while inflation may produce mixed outcomes depending on banks' ability to anticipate price changes and adjust interest rates accordingly.

Table 1: Summary of Hypotheses, Theoretical Foundations, and Expected Relationships

Hypothesis	Variable	Theoretical Foundation	Expected Relationship
H1	Capital Adequacy	Risk-Return Tradeoff Theory (Markowitz, 1952)	Positive
H2	Asset Quality	Credit Risk Channel	Negative
H3	Management Efficiency	Efficient Structure Hypothesis (Berger, 1995)	Negative (higher costs reduce profitability)
H4	Liquidity Management	Liquidity Preference Theory (Keynes, 1936)	Mixed (depends on efficient deployment)
H5	Bank Size	Economies of Scale Hypothesis	Ambiguous
H6	Non-Performing Loans (NPLs)	Credit Quality Channel	Negative
H7	GDP Growth	Financial Intermediation Theory	Positive (possibly insignificant in Bangladesh)
H8	Inflation	Fisher Effect (Fisher, 1930)	Mixed

Theoretical Framework and Hypothesis Development

Bank profitability can be explained through multiple theoretical lenses that reflect the interaction of internal management practices, credit risk exposure, and macroeconomic conditions.

Bank-Specific Factors: According to the Efficient Structure Hypothesis (ESH), banks that employ superior management practices are more profitable because they contain costs and allocate resources efficiently (Berger, 1995), supporting H3. Capital adequacy increases shock resistance, consistent with the Risk-Return Tradeoff Theory (Markowitz, 1952), which holds that better-capitalised banks can take measured risks and enhance profitability (H1). Asset quality reflects credit-risk management: larger loan-loss provisions lower profitability, consistent with the

credit-risk channel (H2). Liquidity management, linked to the Liquidity Preference Theory (Keynes, 1936), suggests that holding liquid assets reduces risk but may depress returns if not deployed efficiently (H4). The Economies of Scale Hypothesis explains bank-size effects: larger banks may achieve lower unit costs, but diseconomies can arise from bureaucratic inefficiencies (H5).

Credit Risk Factor: The credit-quality channel holds that impaired loans raise provisioning costs and reduce interest income; weak enforcement magnifies these effects in emerging economies (Louzis et al., 2012; Ari et al., 2021), motivating H6.

Macroeconomic Factors: GDP growth affects profitability through the Financial Intermediation Theory: in expanding economies loan demand rises and credit risk falls, raising bank earnings (H7); in weak financial systems this link may be attenuated. Inflation has ambiguous effects the Fisher Effect (Fisher, 1930) suggests inflation can widen interest margins if lending rates adjust adequately, while unanticipated inflation can raise costs faster than revenues (H8).

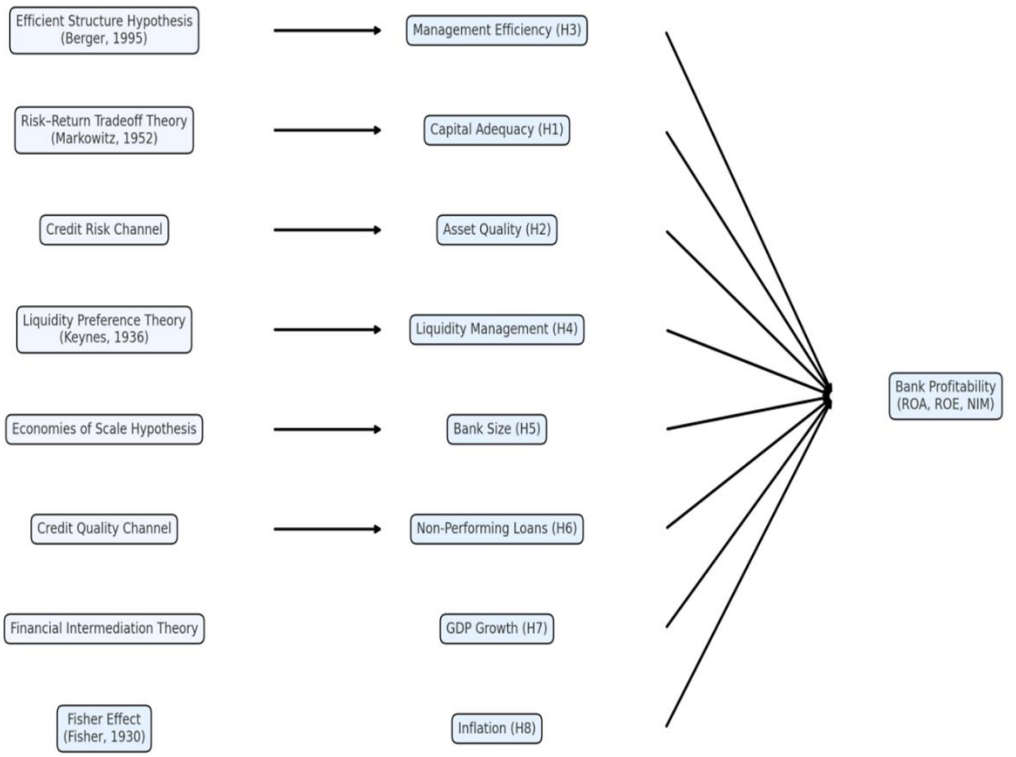

Figure 1: Conceptual framework linking bank-specific, credit-risk, and macroeconomic determinants to bank profitability

Source: Authors' own work

METHODOLOGY

Data and Sample

This study employs a balanced panel dataset of ten Bangladeshi private commercial banks covering 2014-2023 (n = 100 bank-year observations): Jamuna Bank, BRAC Bank, Dhaka Bank,

Dutch-Bangla Bank, IFIC Bank, National Bank, One Bank, Pubali Bank, Trust Bank, and United Commercial Bank (UCB). Financial statement data were collected from annual reports of listed banks, while macroeconomic variables were obtained from Bangladesh Bank and the World Bank's World Development Indicators (WDI). The final dataset includes bank-specific indicators capital adequacy, asset quality, management efficiency, liquidity management, non-performing loans, and bank size together with macroeconomic variables (GDP growth and inflation). The baseline results reported use the full, unwinsorized panel, consistent with the raw descriptive statistics in Table 2 (e.g., the ROE minimum of 70.19 percent in Table 2 corresponds to a single severely loss-making bank-year, National Bank in 2022). As a robustness check reported, we additionally re-estimate the model after winsorizing all continuous variables at the 1st and 99th percentiles; the core capital-adequacy and NPL effects prove stable to this outlier treatment, while the management-efficiency effect is more sensitive. We acknowledge that a ten-bank sample, while representative of the largest listed private commercial banks, does not capture the full population of roughly forty scheduled banks operating in Bangladesh, and this constrains the generalisability of the point estimates.

Variable Definition and Measurement

Table 2: Summarizes the variables, their measurement, expected signs, and data sources

Variable	Type	Measure / Proxy	Expected Effect
ROA	Dependent	Net income / Total assets	
ROE (robustness)	Dependent	Net income / Shareholders' equity	
NIM (robustness)	Dependent	Net interest income / Total earning assets	
Capital Adequacy (CA)	Independent (bank-specific)	Equity capital / Total assets (or CAR)	Positive
Asset Quality (AQ)	Independent (bank-specific)	Loan loss provisions / Total loans	Negative
Management Efficiency (ME)	Independent (bank-specific)	Cost-to-income ratio	Negative
Liquidity Management (LM)	Independent (bank-specific)	Liquid assets / Total assets (or Loans/Deposits)	Mixed
Bank Size (SIZE)	Independent (bank-specific)	Natural log of total assets	Ambiguous
Non-Performing Loans (NPL)	Independent (credit-risk)	Non-performing loans / Total loans	Negative
GDP Growth	Independent (macro)	Annual GDP growth rate (%)	Positive (context-dependent)
Inflation (IR)	Independent (macro)	Consumer Price Index (annual %)	Mixed

Model Specification

Following Athanasoglou et al. (2008) and Dietrich and Wanzenried (2014), bank profitability is modeled as a function of bank-specific and macroeconomic determinants:

$$Yit = \beta 0it + \beta 1itX1it + \beta 2itX2it + \beta 3itX3it + \beta 4itX4it + \beta 5itX5it + \beta 6itX6it + \beta 7itX7it + eit$$

where β0it is the intercept; β1it…β7it are the coefficients on capital adequacy, bank size, management efficiency, liquidity management, non-performing loans, GDP growth, and inflation respectively; eit is the error term; i = banks 1-10; t = years 2014-2023. Profitability is primarily measured using ROA, with ROE and NIM used as robustness measures.

Estimation Technique

The panel-corrected standard errors (PCSE) estimator (Beck & Katz, 1995) is used because it performs well with panels exhibiting contemporaneous correlation and cross-sectional heteroskedasticity, generating more efficient and less biased estimates than conventional fixed- or random-effects models under such conditions. PCSE was chosen over the generalised method of moments (GMM) because the data span a moderate number of banks over ten years; PCSE offers robust inference for smaller, balanced panels typical of banking research, whereas GMM approaches suit larger panels with many cross-sections (Djalilov & Piesse, 2016; Ahmed, 2012).

Robustness Checks and Endogeneity

Several robustness checks were carried out. First, alternative profitability metrics (ROE, NIM) were used in place of ROA. Second, fixed-effects and random-effects estimations were compared against the PCSE results. Third, lagged independent variables were introduced to mitigate potential endogeneity, following Louzis et al. (2012). Fourth, multicollinearity diagnostics (VIF) were performed to confirm independent variables are not excessively correlated. We further note, as an explicit limitation rather than a fully resolved issue, that the NPL-profitability relationship is plausibly bidirectional: low profitability can itself weaken a bank's capacity to absorb or write off bad loans, while rising NPLs mechanically depress reported earnings through provisioning. The lagged-regressor specification partially addresses simultaneity but does not constitute a formal instrumental-variable or dynamic-panel (GMM) identification strategy; we flag this as a priority for future research using system-GMM estimators, which are better suited to panels with a larger number of cross-sections than are available here.

RESULTS AND DISCUSSION

Descriptive Statistics and Correlations

Table 3 indicates considerable variation across bank-specific indicators, suggesting heterogeneity in capital adequacy, asset quality, and efficiency among Bangladeshi banks. Correlation analysis confirms expected relationships, with non-performing loans negatively associated with profitability, while capital adequacy and management efficiency show positive correlations. Multicollinearity diagnostics confirm no serious collinearity concerns: variance inflation factors (VIFs) for the seven regressors range from 1.05 (GDP growth) to 1.31 (bank size), well below the conventional threshold of 5 (O'Brien, 2007). The pronounced negative skewness and elevated kurtosis in ROA and ROE (Jarque-Bera statistics in the thousands) reflect a single severely loss-making bank-year (National Bank, 2022); it reports a winsorized robustness check that assesses the sensitivity of the regression results to this observation.

Table 3: Descriptive Statistics of the Variables

Statistic	ROA	ROE	NIM	CA	BS	ME	LM	NPL	GDP	IR
Mean	0.8031	11.1804	2.1251	7.4079	5.4988	2.3428	89.4099	6.0064	6.5110	6.1900
Median	0.8500	11.6850	2.0650	6.9600	5.4900	2.1750	89.0100	4.9550	6.7700	5.7000
Maximum	2.0200	22.1600	4.5500	12.5600	5.9100	6.8300	114.6800	36.5700	7.8800	7.7000
Minimum	-5.9900	-70.1900	-0.0260	4.0800	5.0800	1.2300	67.9500	2.2000	3.4500	5.5000
Std. Dev.	0.8737	9.3766	1.0066	1.8579	0.1818	0.8447	8.7293	4.5698	1.1543	0.8354
Skewness	-5.3600	-6.5926	0.4535	0.8173	0.0008	1.8971	0.1675	4.1865	-1.6685	0.8352
Kurtosis	40.3877	58.0410	3.0481	3.2263	2.4928	9.6085	2.8450	24.8880	5.2927	1.9883
Jarque-Bera	6303.17	13347.35	3.4375	11.3470	1.0720	241.95	0.5675	2288.29	68.3004	15.8906
Probability	0.0000	0.0000	0.1793	0.0034	0.5851	0.0000	0.7530	0.0000	0.0000	0.0004
Observations	100	100	100	100	100	100	100	100	100	100

Source: Authors' own calculation using EViews 13

Baseline Regression Results (PCSE)

The PCSE estimations are reported in Tables 4 and 5. The results confirm that both bank-specific and macroeconomic variables jointly explain variations in profitability, though their relative importance differs across the three profitability measures.

Table 4: Model Fit Statistics (Models 1-3)

Model	R	Adjusted R	S.E. of regression	F-statistic	p-value	Significance (p<0.05)
1 (ROA)	0.6621	0.6363	0.5269	25.7475	0.0000	Significant
2 (ROE)	0.4136	0.3690	7.4484	9.2706	0.0000	Significant
3 (NIM)	0.5912	0.5601	0.6676	19.0109	0.0000	Significant

Table 5: PCSE Parameter Estimates (Cross-section SUR, d.f. corrected)

Variable	Model 1 (ROA) Coef.	p-value	Model 2 (ROE) Coef.	p-value	Model 3 (NIM) Coef.	p-value
C	3.9398	0.0084*	55.5847	0.0070*	3.6523	0.1119
CA	0.1490	0.0019*	0.1814	0.7906	0.0277	0.5767
BS	-0.6851	0.0130*	-7.5096	0.0677	-0.9379	0.0243*
ME	-0.2754	0.0162*	-2.7520	0.0936	0.6521	0.0000*
LM	0.0049	0.4370	0.0500	0.5723	0.0299	0.0007*
NPL	-0.1252	0.0000*	-1.1024	0.0020*	-0.1066	0.0000*
GDP	0.0492	0.3084	0.3148	0.6831	0.1399	0.0537
IR	0.0275	0.6398	0.3377	0.7011	-0.1695	0.0839

Note: * denotes significance at $p < 0.05$

Source: Authors' own calculation using EViews 13

- Capital adequacy exhibits a positive and statistically significant effect on ROA, consistent with the Risk-Return Tradeoff Theory (Markowitz, 1952) and with Athanasoglou et al. (2008); a one-percentage-point increase in the capital ratio is associated with roughly a 0.15-percentage-point rise in ROA, a modest but economically meaningful effect given a sample mean ROA of 0.80 percent. This indicates that well-capitalised Bangladeshi banks are better positioned to absorb shocks and sustain returns.
- Asset quality has a significant negative impact, underscoring the role of credit-risk management. This aligns with Dietrich and Wanzenried (2014) and Menicucci and Paolucci (2016), who document that deteriorating asset quality erodes profitability across banking systems.
- Management efficiency significantly improves ROA and NIM, consistent with the Efficient Structure Hypothesis (Berger, 1995); this is particularly important for Bangladesh, where cost control remains a critical determinant of financial performance, and echoes the cost-efficiency findings of Lalon et al. (2023).
- Liquidity management is insignificant for ROA and ROE but significant for NIM, diverging from findings in developed markets where liquidity buffers more consistently enhance profitability (Niu et al., 2024). This pattern is consistent with structural inefficiencies in deploying liquid assets within the Bangladeshi banking sector.
- Bank size is negative and significant for ROA and NIM, suggesting that scale economies do not translate into higher returns indeed pointing toward diseconomies of scale. This contrasts with evidence from European banks (Menicucci & Paolucci, 2016) but resonates with transition-economy evidence where administrative diseconomies dominate (Djalilov & Piesse, 2016).

Robustness to Outlier Treatment

For ROA, the core findings prove largely robust to this alternative treatment: the capital-adequacy coefficient is essentially unchanged (0.152 versus 0.149 in the baseline), and the NPL coefficient remains negative, of similar magnitude, and highly significant (0.118 versus 0.125). The bank-size and liquidity-management coefficients are likewise stable in sign and magnitude. The management-efficiency coefficient, by contrast, shrinks by more than half (from 0.275 to 0.060) and loses statistical significance, indicating that this particular effect is disproportionately influenced by a small number of extreme cost-inefficiency observations.

For ROE, the NPL coefficient shrinks by roughly 39 percent (from 1.102 to 0.677) but remains negative and highly significant, and bank size remains negative and significant throughout. Management efficiency, however, is markedly more sensitive here: its coefficient not only loses significance but reverses sign, from a statistically insignificant 2.752 in the baseline to a significant +1.578 after winsorizing a reversal driven by the same extreme loss-making bank-year and a reminder that the ROE-based estimates for this variable should be treated with particular caution.

For NIM, the results are the most stable of the three: capital adequacy, bank size, management efficiency, liquidity management, NPLs, GDP growth, and inflation all retain their signs, magnitudes, and significance patterns under winsorization, with coefficients shifting by less than 10 percent in every case. This suggests the NIM specification is the least sensitive to the extreme observations identified.

Taken together, these checks support the reliability of the paper's central conclusions regarding capital adequacy and credit risk across all three profitability measures, while consistently flagging management efficiency particularly in the ROE specification as sensitive to the treatment of outliers, and therefore a result that should be interpreted with corresponding caution rather than taken as a robust structural finding.

Credit Risk and Non-Performing Loans

Non-performing loans (NPLs) exert a strong, negative, and highly significant effect on profitability across all three models, consistent with Louzis et al. (2012), Ari et al. (2021), and Serrano et al. (2021). A one-percentage-point rise in the NPL ratio is associated with roughly a 0.13-percentage-point fall in ROA a substantial effect relative to the sample's mean ROA of 0.80 percent, implying that even moderate increases in NPLs can erase a bank's entire profit margin. This is precisely what occurred at the sector level after 2023, when NPL ratios rose several-fold. The magnitude of this effect in Bangladesh appears more pronounced than in advanced economies, highlighting weaknesses in credit monitoring and enforcement, and underscores the urgent need for reforms targeting loan recovery and risk management.

Macroeconomic Drivers

Contrary to evidence from developed nations where economic expansion boosts bank revenues, the effect of GDP growth on profitability is statistically negligible within this sample (Bolt et al., 2012; Dietrich & Wanzenried, 2014), implying that structural barriers and shallow credit markets restrict the transmission of macroeconomic expansion into banking-sector performance. Inflation's effect is not consistently signed across models, which in line with Junttila and Vataja (2022), who note that inflationary effects on profitability are context-dependent points to limited pricing power among Bangladeshi banks. Given that Bangladesh subsequently experienced inflation above 9 percent in FY2023-24 alongside sharply decelerating growth, this within-sample ambiguity likely understates the macro-financial strain the sector would soon face.

Comparative Insights

The findings broadly support the view that profitability determinants vary greatly by context. Consistent with Djalilov and Piesse (2016), Bangladesh's banking sector does not follow the pattern typical of developed countries, where performance is usually enhanced by GDP growth, scale economies, and liquidity buffers. Instead, credit risk, cost inefficiency, and capital strength exert the strongest influence on profitability. This is consistent with Ramlall (2022), who highlights the moderating role of institutional context in shaping profitability outcomes, and with the Bangladesh-specific evidence of Akther et al. (2023), who similarly find bank-specific factors dominating macroeconomic ones.

Post-Sample Developments: Bangladesh's Banking Sector Crisis, 2024-2025

The 2014-2023 panel ends just before the Bangladeshi banking sector entered an unprecedented period of stress, which substantially strengthens rather than contradicts the credit-quality channel identified above. Following the change of government in August 2024, Bangladesh Bank began requiring stricter, internationally consistent loan classification and inspected large borrower accounts that had previously been reported as regular. This process revealed that a large volume of loans including those linked to politically connected conglomerates had in fact been non-performing for years. Table 6 summarises the resulting trajectory using verifiable secondary data from Bangladesh Bank, the IMF, the World Bank, and the Asian Development Bank; these figures are sector-wide aggregates and are not part of the ten-bank estimation panel, but they contextualise its findings and its policy relevance.

Two implications follow. First, the post-sample data are consistent with, and dramatically amplify, the paper's central finding that NPLs are the single most damaging determinant of Bangladeshi bank profitability: a sector-wide NPL ratio moving from single digits to roughly a third of total loans implies, on the in-sample coefficient, a decline in ROA far exceeding anything observed in the 2014-2023 estimation window consistent with widespread reports

of loss-making banks and regulatory intervention in 2025-2025. Second, the collapse in sector-wide capital adequacy (from roughly 10.6 percent in mid-2023 to 3.08 percent by end-2024, with several individual banks recording negative capital) corroborates H1's positive capital-profitability link by illustrating its reverse: as capital buffers were exhausted, loss absorption capacity and profitability deteriorated together. We stress that these figures describe the banking sector as a whole rather than the specific ten banks in the estimation panel, and that a rigorous re-estimation incorporating 2024-2025 bank-level data once audited financial statements become available is an important direction for future research.

Table 6: Bangladesh Banking Sector and Macroeconomic Indicators, 2023-2025 (post-sample)

Indicator	Sep 2023 / FY23	Jun 2024 / FY24	Dec 2024	Sep 2025 / Dec 2025	Source
Gross NPL ratio (%)	9.93	12.56	20.20	35.73 (Sep-25); 30.60 (Dec-25)	Bangladesh Bank; CEIC Data
Sector-wide CRAR (%)	~10.6 (Jun-23)	6.86 (Sep-24)	3.08	Several banks with negative CRAR	Bangladesh Bank, as cited in The Daily Star (2025)
Real GDP growth (%, FY)	6.0 (FY23 est.)	5.7 (FY24)		~3.9-4.2 (FY25/26 est.)	IMF WEO; Trading Economics
Inflation, CPI (%, annual)	~9.0 (FY23)	~9.7 (FY24)		8.8 (2025)	IMF WEO; World Bank

Source: Bangladesh Bank data as reported in IMF (2024, 2025), World Bank (2025), CEIC Data (2025)

CONCLUSION AND IMPLICATIONS

This study examined the bank-specific and macroeconomic determinants of profitability in ten private commercial banks in Bangladesh between 2014 and 2023, using panel-corrected standard errors (PCSE) and a winsorization-based robustness check, and situated the results within the sector's subsequent trajectory through 2025. Capital adequacy and management efficiency significantly increase profitability, highlighting the importance of resilience and cost control shows the management-efficiency effect is more sensitive to outlier treatment than the baseline results alone suggest. Asset quality deterioration and non-performing loans significantly impair profitability, underscoring long-standing weaknesses in credit enforcement and monitoring weaknesses that, as the post-sample evidence shows, were considerably larger than the 2014-2023 data alone could reveal. Bank size and liquidity management have minimal or inconsistent effects, contrasting with evidence from advanced economies where scale and liquidity buffers matter more. GDP growth and inflation show negligible or mixed within-sample effects, pointing to structural limits on the transmission of macroeconomic conditions into bank performance limits that grew more binding as growth slowed and inflation stayed elevated after 2023.

Theoretically, the study clarifies the contested role of macroeconomic factors and extends the credit-quality channel literature by demonstrating, with both panel and post-sample evidence, that NPLs have an outsized and escalating impact in this emerging-market setting. Methodologically, PCSE, together with a winsorization-based robustness check, offers a more robust alternative to the pooled and fixed-effects approaches used in prior Bangladeshi studies (Akther et al., 2023; Lalon et al., 2023), addressing cross-sectional heteroskedasticity and correlation that often-bias panel estimates in this literature. Practically, the results

reinforced by the 2024-2025 crisis call for urgent reforms to reduce NPLs, end regulatory forbearance that permits under-reporting of loan quality, strengthen related-party lending controls, and rebuild capital buffers. Restoring banks' ability to convert macroeconomic activity into sustainable profitability will be essential to aligning Bangladesh's banking system with international best practice.

Limitations and Future Research

This study has several limitations that also define priorities for future work. First, the ten-bank sample, while covering major listed private banks, does not represent the full population of roughly forty scheduled banks in Bangladesh, including state-owned and specialised banks that may exhibit different dynamics; results should be generalised with caution. Second, although lagged regressors partially address endogeneity, the plausibly bidirectional relationship between profitability and NPLs is not resolved by a formal instrumental-variable or dynamic-panel strategy; system-GMM estimation, once a longer and more granular panel is available, would strengthen causal claims. Third, the panel necessarily ends in 2023 and therefore cannot capture bank-level effects of the 2024-2025 disclosure crisis described; incorporating audited 2024-2025 financial statements once available is a clear next step. Fourth, future research could extend the analysis with a broader sample, cross-country comparisons within South Asia, and additional determinants such as financial inclusion, digital banking, corporate governance quality, and climate-related risks.

REFERENCES

Ahmed, A. A. A. (2009). Measurement and analysis of the extent of timeliness in corporate annual reports of banking sector in Bangladesh. *Development Compilation, 1*(2), 45-56. https://www.researchgate.net/publication/355491248

Ahmed, A. A. A. (2012). Disclosure of financial reporting and firm structure as a determinant: A study on the listed companies of DSE. *ASA University Review, 6*(1), 43-60. https://www.researchgate.net/publication/336664997

Ahmed, A. A. A., & Dey, M. M. (2010). Accounting disclosure scenario: An empirical study of the banking sector of Bangladesh. *Journal of Accounting & Management Information Systems, 9*(4), 581-602. https://online-cig.ase.ro/jcig/papers.aspx?idc=1758

Akther, N., Rahman, M., Rahman, M. T., & Rana, M. S. (2023). Factors influencing commercial bank profitability in Bangladesh: A panel data approach. Future Business Journal, 9, 66. https://doi.org/10.1186/s43093-023-00247-8

Alam, M. M., & Yusuf, W. S. (2024). Determinants of bank-specific, bank-risk and bank stability of the Bangladeshi conventional banks. International Journal of Entrepreneurship and Management Practices, 7(25), 53-66. https://doi.org/10.35631/IJEMP.725006

Ari, A., Chen, S., & Ratnovski, L. (2021). The dynamics of non-performing loans during banking crises: A new database. Journal of Financial Stability, 53, 100836. https://doi.org/10.1016/j.jfs.2020.100836

Asian Development Bank. (2025). *Asian Development Outlook 2025: Supporting resilient growth in Asia and the Pacific*. Asian Development Bank. https://www.adb.org/publications/asian-development-outlook-april-2025

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. Journal of International Financial Markets, Institutions & Money, 18(2), 121-136. https://doi.org/10.1016/j.intfin.2006.07.001

Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. American Political Science Review, 89(3), 634-647. https://doi.org/10.2307/2082979

Berger, A. N. (1995). The profit-structure relationship in banking Tests of market-power and efficient-structure hypotheses. Journal of Money, Credit and Banking, 27(2), 404-431. https://doi.org/10.2307/2077876

Bolt, W., de Haan, L., Hoeberichts, M., van Oordt, M., & Swank, J. (2012). Bank profitability during recessions. Journal of Banking & Finance, 36(9), 2552-2564. https://doi.org/10.1016/j.jbankfin.2012.05.011

Bynagari, N. B., & Ahmed, A. A. A. (2021). Anti-money laundering recognition through the gradient boosting classifier. *Academy of Accounting and Financial Studies Journal, 25*(5), 1-11. https://www.abacademies.org/articles/antimoney-laundering-recognition-through-the-gradient-boosting-classifier-12577.html

Cangombe, E. L., Almeida, L. G., & Tavares, F. O. (2025). Determinants of banking profitability in Angola: A panel data analysis with dynamic GMM estimation. Risks, 13(7), 123. https://doi.org/10.3390/risks13070123

CEIC Data. (2025). Bangladesh non-performing loans ratio, 2003-2025. https://www.ceicdata.com/en/indicator/bangladesh/non-performing-loans-ratio

Dietrich, A., & Wanzenried, G. (2014). The determinants of commercial banking profitability in low-, middle-, and high-income countries. Quarterly Review of Economics and Finance, 54(3), 337-354. https://doi.org/10.1016/j.qref.2014.03.001

Djalilov, K., & Piesse, J. (2016). Determinants of bank profitability in transition countries: What matters most? Research in International Business and Finance, 38, 69-82. https://doi.org/10.1016/j.ribaf.2016.03.015

Fisher, I. (1930). The Theory of Interest. Macmillan. https://fraser.stlouisfed.org/files/docs/publications/books/theoryofinterest_fisher.pdf

Gazi, M. A. I., Karim, R., Senathirajah, A. R. b. S., Ullah, A. M. M., Afrin, K. H., & Nahiduzzaman, M. (2024). Bank-specific and macroeconomic determinants of profitability of Islamic Shariah-based banks: Evidence from new economic horizon using panel data. Economies, 12(3), 66. https://doi.org/10.3390/economies12030066

Handriani, E., & Anggara, S. B. (2025). An Analysis Of Firm-Specific, Industry Specific, And Macroeconomic Determinants Influencing Bank Profitability In Indonesia. *Jurnal Studi Manajemen Organisasi, 22*(1), 58-88. https://doi.org/10.14710/jsmo.v22i1.72650

International Monetary Fund. (2024, April). World Economic Outlook: Steady but Slow Resilience amid Divergence.

International Monetary Fund. (2025, October). World Economic Outlook.

Junttila, J., & Vataja, J. (2022). Inflation and bank profitability: Evidence from European countries. Journal of International Money and Finance, 120, 102518. https://doi.org/10.1016/j.jimonfin.2021.102518

Keynes, J. M. (1936). The General Theory of Employment, Interest and Money. Macmillan. https://www.files.ethz.ch/isn/125515/1366_keynestheoryofemployment.pdf

Khan, M. F., Ali, M. S., Hossain, M. N., & Bairagi, M. (2023). Determinants of non-performing loans in conventional and Islamic banks: Emerging market evidence. Modern Finance, 1(1), 56-69. https://doi.org/10.61351/mf.v1i1.27

Khan, W., Ahmed, A. A. A., Hossain, M. S., & Neogy, T. K. (2020). The interactive approach to working capital knowledge: Survey evidence. *International Journal of Nonlinear Analysis and Applications, 11*(Special Issue), 379-393. https://doi.org/10.22075/ijnaa.2020.4631

Lalon, R. M., Afroz, A., & Khan, T. (2023). Impact of bank liquidity and macroeconomic determinants on profitability of commercial banks in Bangladesh. International Journal of Economics and Financial Issues, 13(6), 177-186. https://doi.org/10.32479/ijefi.15228

Lamers, M., Present, K., & Vander Vennet, R. (2022). Convergence of European bank profitability: Drivers and implications. European Financial Management, 28(3), 679-708. https://doi.org/10.1111/eufm.12317

Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece. Journal of Banking & Finance, 36(4), 1012-1027. https://doi.org/10.1016/j.jbankfin.2011.10.012

Markowitz, H. (1952). Portfolio selection. Journal of Finance, 7(1), 77-91. https://doi.org/10.2307/2975974

Menicucci, E., & Paolucci, G. (2016). The determinants of bank profitability: Empirical evidence from European banking sector. Journal of Financial Reporting and Accounting, 14(1), 86-115. https://doi.org/10.1108/JFRA-05-2015-0060

Niu, C., Yu, M., & Wang, Y. (2024). Liquidity creation and bank profitability: New evidence from Chinese commercial banks. Pacific-Basin Finance Journal, 83, 102068. https://doi.org/10.1016/j.pacfin.2023.102068

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. Quality & Quantity, 41(5), 673-690. https://doi.org/10.1007/s11135-006-9018-6

Phan, T. H., Tran, T. V., & Tran, T. M. (2025). Banking development contributes to economic growth and inflation control in Vietnam. *International Journal of Economics and Business Research, 29*(7), 1-16. https://doi.org/10.1504/IJEBR.2025.144102

Ramlall, I. (2022). The impact of institutional quality on bank profitability in emerging markets. Emerging Markets Review, 50, 100814. https://doi.org/10.1016/j.ememar.2021.100814

Saad, W., & El-Said, E. (2020). Macroeconomic determinants of bank profitability: Evidence from the MENA region. International Review of Economics & Finance, 67, 365-379. https://doi.org/10.1016/j.iref.2020.01.002

Serrano, J., Moreno, A., & Nieto, M. J. (2021). Non-performing loans and bank lending: Evidence from Europe. Finance Research Letters, 43, 102009. https://doi.org/10.1016/j.frl.2021.102009

Sharif, M. J., Rahaman, M. A., & Moniruzzaman, M. (2024). The impact of credit risk and bank-specific variables on financial performance of the listed commercial banks in Bangladesh. International Journal of Research and Innovation in Social Science, 8(8), 3826-3839. https://dx.doi.org/10.47772/IJRISS.2024.8080285

Trading Economics. (2025). *Bangladesh GDP annual growth rate*. https://tradingeconomics.com/bangladesh/gdp-growth-annual

World Bank. (2025). World Development Indicators: Bangladesh. https://data.worldbank.org/country/bangladesh

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How to cite this article

Islam, M. J., Moniruzzaman, M., Haq, A. Z., Haque, H. M. M. U., Sarker, B., Islam, I. M. M., & Islam, S. M. F. (2026). Profitability Drivers at the Bank and Macroeconomic Levels: Evidence from Private Commercial Banks in Bangladesh. *Global Disclosure of Economics and Business*, *15*(1), 20-34. https://doi.org/10.18034/gdeb.v15i1.807