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Bank-Specific Determinants of Profitability: Evidence from Nepalese Commercial Bank

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ABSTRACT

This study examines the effects of non-performing loans (NPL), loan loss provisions (LLP), the capital adequacy ratio (CAR) and the liquidity ratio (LIQ) on the profitability of Nepalese commercial banks and identifies which of these bank-specific indicators exerts the strongest influence. Profitability is measured by return on assets (ROA), reflecting asset-level efficiency, and return on equity (ROE), reflecting returns to shareholders. The study uses a balanced panel of 120 bank-year observations drawn from the audited annual reports of ten Class "A" commercial banks for fiscal years 2014/15–2025/26. Descriptive statistics, Pearson correlations and multiple regression on the pooled panel were applied, and the results were verified with random- and fixed-effects panel estimators, heteroskedasticity-robust standard errors and a bootstrapped mediation test. Loan loss provisioning is the strongest determinant: it significantly reduces ROA ($\beta = -0.61$) in every specification with bank effects and, less robustly, ROE ($\beta = -0.30$), although much of its effect is common to all banks in a given year. CAR significantly reduces ROE but has no significant effect on ROA, indicating that additional capital dilutes shareholder returns without a measurable gain in asset returns. NPL and liquidity have no significant direct effect on either measure once provisions and capital are controlled for; however, NPL lowers profitability indirectly by raising provisions, so the cost of credit risk reaches earnings mainly through the provisioning channel. The findings imply that banks should strengthen ex-ante credit appraisal, monitoring and recovery to contain provisioning charges and should deploy capital held above regulatory minima more productively, while Nepal Rastra Bank should weigh the shareholder-return cost of capital requirements when calibrating future buffers. The study contributes parallel ROA and ROE evidence from a frontier banking market covering the post-Basel III and post-consolidation period.

Keywords: Bank profitability; Capital adequacy ratio; Liquidity; Loan loss provision; Non-performing loans.

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1.INTRODUCTION

Commercial banks are the backbone of Nepal's bank-based financial system. They channel credit to productive sectors and mobilize most household and corporate savings; their profitability is therefore a concern not only for shareholders but also for financial stability and economic growth (Lamothe et al., 2024; Sharma, 2024). Return on assets (ROA), return on equity (ROE) and net interest margin are the most widely used indicators of bank profitability, as they show how efficiently a bank generates income from its resources in a competitive and changing regulatory environment (Dhodary & Rajbanshi, 2024; Gurung & Gurung, 2022; Mishra et al., 2021). Because management has considerable discretion over credit allocation, provisioning, capital and liquidity, bank-specific factors have become a major focus of profitability research in South Asia and other emerging markets (Chantha et al., 2024; Sarkar & Rakshit, 2024; Yuan et al., 2022).

The Nepalese banking system has undergone considerable structural and regulatory change over the last decade. The Monetary Policy for 2015/16 of Nepal Rastra Bank (NRB) raised the minimum paid-up capital of commercial banks fourfold, to NPR 8 billion, triggering a wave of mergers and acquisitions that reduced the number of commercial banks from thirty-two to twenty (NRB, 2023). NRB also introduced a Basel III-based Capital Adequacy Framework requiring a minimum total capital ratio of 11 percent, including the capital conservation buffer (NRB, 2015); tightened loan classification and provisioning norms through its Unified Directives; and replaced the credit-to-core-capital-plus-deposit ratio with a credit-to-deposit ceiling to manage liquidity. The subsequent expiry of pandemic-era forbearance required the reclassification of restructured loans and additional provisioning charges, with a direct effect on reported earnings (Dahal et al., 2026; NRB, 2023).

These developments make the management of internal balance-sheet ratios a pressing concern for Nepalese banks. Higher capital requirements enlarge the equity base on which returns must be earned, rising credit risk translates into provisioning charges, and recurring cycles of excess liquidity and liquidity shortage affect the yield on bank assets. Whether these regulation-driven ratios strengthen or erode profitability is therefore of direct relevance to bank managers, supervisors and investors. Recent Nepalese evidence, however, is inconclusive. Several studies report that credit risk and provisioning reduce profitability (Dahal & Dhungana, 2025; Khatiwoda et al., 2025; Poudel et al., 2024) others show that the effect of capital depends on its composition and on the credit-risk profile of the bank (Joshi, 2024; Lamichhane et al., 2026), and the role of liquidity continues to be debated (Poudyal et al., 2025 32; Sigdel & Deswal, 2025). Three gaps motivate the present study. First, existing Nepalese studies examine different combinations of bank-specific variables over different periods, which makes their results difficult to compare (Bohara, 2024; Devkota et al., 2025; Dongol & Shrestha, 2024; Hakuduwal, 2021; Kunwar & Jnawali, 2023; Pathak, 2023; Sejuwal et al., 2025a). Second, few studies systematically distinguish between ROA and ROE, even though ROE equals ROA multiplied by the equity multiplier, so that capital is theoretically expected to affect the two measures differently. Third, little evidence covers the period in which Basel III-based capital rules, mandated consolidation and the post-pandemic credit-quality shock coincided. Accordingly, the study pursues two objectives: (i) to examine the effects of NPL, LLP, CAR and liquidity on the ROA and ROE of Nepalese commercial banks, and (ii) to identify which of these indicators exerts the greatest influence on profitability.

The study makes three contributions. First, it provides integrated evidence on four core bank-specific determinants for a frontier banking market that remains under-represented in the international literature. Second, by estimating parallel

models for ROA and ROE, it tests the theoretically grounded proposition that capital affects asset returns and equity returns asymmetrically. Third, because its sample spans the implementation of Basel III-based capital rules, mandated consolidation and the post-pandemic period, its findings inform the ongoing prudential debate in Nepal on the trade-off between bank soundness and shareholder returns.

2. LITERATURE REVIEW

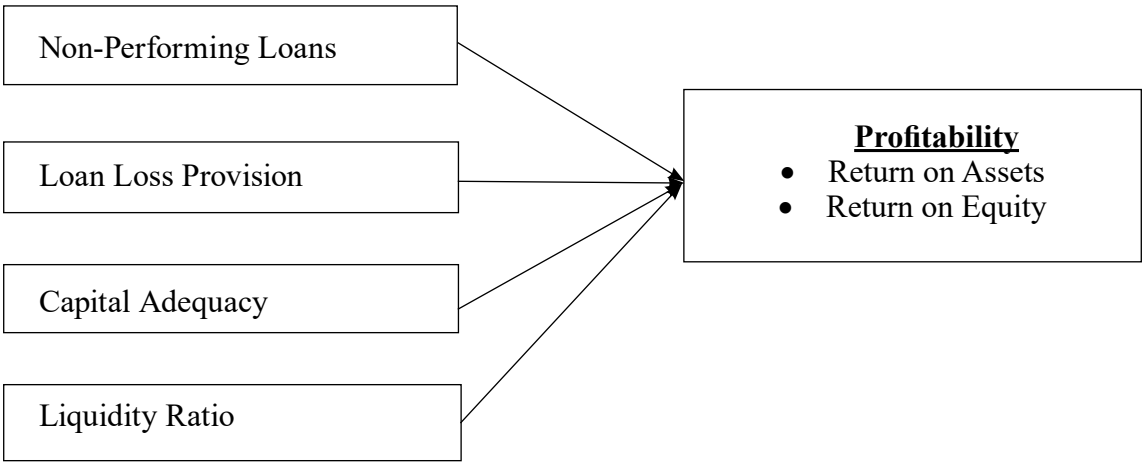
Theoretical Foundation

This study is grounded in the theory of financial intermediation, which views banks as intermediaries that reconcile the asset preferences of surplus units with the liability preferences of deficit units and earn a spread for doing so (Gurley & Shaw, 1960; Diamond, 1984).The key driver of bank profitability is therefore the efficiency with which management allocates funds and manages risk (Saona,2016; Lamothe et al., 2024). Nepalese evidence indicates that a large share of the variation in bank profitability is attributable to internal factors under management control (Bohara, 2024; Dongol, 2025; Hakuduwal, 2021). Within this framework, credit risk is the principal constraint on earnings: under the bad-management and bad-luck hypotheses (Berger& DeYoung, 1997) non-performing loans stop generating interest income while continuing to incur funding, monitoring and recovery costs, and the provisions they require reduce net income (Chantha et al., 2024; Poudel et al., 2024). Two opposing views exist on the role of capital. The expected bankruptcy cost and signalling hypotheses suggest that better-capitalized banks enjoy lower funding costs and greater depositor confidence and hence earn higher returns on assets(Berger, 1995). By contrast, capital structure theory and the leverage identity (ROE = ROA × total assets / equity) imply that, for a given ROA, a higher capital ratio lowers the equity multiplier and hence ROE (Diamond & Rajan, 2000; Modigliani & Miller, 1958; Myers, 1984) particularly when equity capital is costly (Arifin et al., 2024). In Nepal, capital adequacy acts as a shock absorber (Joshi, 2024), but its relationship with ROA depends on the bank's credit-risk profile (Bhattarai, 2016; Gautam, 2020) and, as evidence from the microfinance sector suggests, on the mix of core and supplementary capital (Lamichhane et al., 2026). Effective cost management is also needed to balance large capital and liquidity buffers against profitability (Mahaseth, 2024; Sah & Saud, 2022) Loan loss provisions are the accounting recognition of expected credit losses. They reduce reported earnings immediately, but they also restrain risk-taking and smooth income over the credit cycle (Bushman & Williams, 2012 ; Laeven & Majnoni, 2003). In Nepal, provisioning is largely rule-based under the NRB Unified Directives, which prescribe minimum provisioning rates by loan classification; it therefore transfers credit risk to earnings with limited scope for managerial discretion. Recent evidence indicates that Nepalese banks must balance short-term profitability against long-term stability in their provisioning decisions (Dahal et al., 2026) and higher levels of non-performing loans and provisions are associated with lower profitability (Karki & Aryal, 2019).

Finally, liquidity theory holds that banks keep liquid reserves to meet stochastic deposit withdrawals and avert runs (Bryant, 1980; Diamond & Dybvig, 1983) but such reserves carry an opportunity cost because they earn low yields. Bordeleau and Graham (2010) reconcile these views by showing that profitability rises with liquidity up to an optimum and falls thereafter. Recent Nepalese studies have revived this question under the credit-to-deposit regime (Poudyal et al., 2025; Sigdel & Deswal, 2025).

Research Hypotheses

The conceptual framework (Figure 1) posits that four bank-specific variables, the non-performing loan ratio (NPL), the loan loss provision ratio (LLP), the capital adequacy ratio (CAR) and the liquidity ratio (LIQ), determine bank profitability,



Source: Authors' construction based othe literature review

Fig.1. :Conceptual Framework

measured alternatively by ROA and ROE. ROA captures the efficiency with which management deploys the bank's total resources and is independent of capitalstructure, whereas ROE captures the return to shareholders and is sensitive to leverage (Athanasoglou et al., 2008; Rose & Hudgins, 2018). Because theory predicts that some determinants, notably capital, affect the two measures in opposite directions, hypotheses are formulated separately for each.

Non-Performing Loans and Profitability

The negative association between non-performing loans and profitability is one of the most robust findings in the international literature. Athanasoglou et al. (2008) report a significant negative effect for Greek banks, a result confirmed for Swiss banks by Dietrich and Wanzenried (2011) and for Spanish banks by Trujillo-Ponce (2013). In emerging and developing economies such as Ghana (Laryea et al., 2016) Sub-Saharan Africa (Flamini et al., 2009) and Cambodia (Ma'aji et al., 2023) ,non-performing loans are negatively related to ROA and ROE, and weaker supervisory regimes are associated with higher NPLs and lower profitability (Boudriga et al., 2009) . In Nepal, Poudel (2012) and Bhattarai (2016) show that the default rate and the NPL ratio are important negative drivers of profitability. Recent studies using post-pandemic data reach the same conclusion (Dahal & Dhungana, 2025; Khatiwoda et al., 2025; Poudel et al., 2024). Based on this evidence, we propose the following hypotheses.

H_{1a}: *The non-performing loan ratio has* a significant negative effect on the return *on assets of Nepalese commercial banks.*

H_{1b}: *The non-performing loan ratio has a significant negative effect on the return on equity of Nepalese commercial banks.*

Loan Loss Provisions and Profitability

Provisions are the mechanism through which expected credit losses are charged against income, so their direct effect is to reduce net profit (Bushman & Williams, 2012; Laeven & Majnoni, 2003). Empirical evidence is consistent on this point: provisioning reduces profitability in Greece (Athanasoglou et al., 2008) ,Switzerland (Dietrich & Wanzenried, 2011) , China (Sufian & Habibullah, 2009) and Sub-Saharan Africa (Flamini et al., 2009), and its pro-cyclicality amplifies the negative effect during downturns (Bikker & Metzemakers, 2005). In Nepal, loan loss provisions are negatively associated with commercial bank profitability (Dahal et al., 2026; Karki & Aryal, 2019; Poudel et al., 2024) and provisioning charges rose after pandemic-era forbearance ended

(NRB, 2023). Hence:

H_{2a}: The loan loss provision ratio has a significant negative effect on the return on assets of Nepalese commercial banks.

H_{2b}: The loan loss provision ratio has a significant negative effect on the return on equity of Nepalese commercial banks.

Capital Adequacy and Profitability

When performance is measured by ROA, empirical work broadly supports the expected bankruptcy cost hypothesis. Berger (1995) finds a positive causal relationship from capital to earnings among United States banks; Demirgüç-Kunt and Huizinga (1999) report that well-capitalized banks are more profitable across eighty countries; and Goddard et al. (2004), Pasiouras and Kosmidou (2007), Athanasoglou et al. (2008) and Kosmidou (2008) confirm the positive effect for European banks. The evidence is markedly less uniform for ROE. Trujillo-Ponce (2013) finds that the equity-to-assets ratio is positively related to ROA but negatively related to ROE among Spanish banks, precisely the asymmetry predicted by the leverage identity, and Dietrich and Wanzenried (2011) show that the sign of the capital effect depends on the period and on the profitability measure used. Evidence from transition and South Asian economies likewise shows that the capital effect is conditioned by institutional context (Djalilov & Piesse, 2016; Yuan et al., 2022). In Nepal, capital adequacy is found to support profitability (Joshi, 2024) but the effect depends on credit risk and on capital composition (Bhattarai, 2016; Lamichhane et al., 2026). Based on this review, we propose the following hypotheses:

H_{3a}: The capital adequacy ratio has a significant positive effect on the return on assets of Nepalese commercial banks.

H_{3b}: The capital adequacy ratio has a significant negative effect on the return on equity of Nepalese commercial banks.

Liquidity and Profitability

The liquidity–profitability relationship is the least settled empirically. Bourke (1989) finds a positive relationship across twelve countries, whereas Molyneux and Thornton (1992) find a negative relationship for European banks, Pasiouras and Kosmidou (2007) report that the effect differs between domestic and foreign banks, and Bordeleau and Graham (2010) document an inverted-U relationship. Emerging-market evidence is also divided (Flamini et al., 2009 ; Sufian & Habibullah, 2009) and recent Nepalese studies continue to examine the issue under the credit-to-deposit regime (Poudyal et al., 2025; Sigdel & Deswal, 2025). Because the liquidity ratio in this study is measured as liquid assets relative to total deposits, and because Nepalese banks have at times held liquidity well above regulatory requirements, the opportunity-cost view is expected to dominate:

H_{4a}: The liquidity ratio has a significant negative effect on the return on assets of Nepalese commercial banks.

H_{4b}: The liquidity ratio has a significant negative effect on the return on equity of Nepalese commercial banks.

Research Gap

The review yields three conclusions. First, the international literature is consistent on the negative effects of NPL and LLP and on the positive CAR–ROA effect, but divided on the CAR–ROE effect and on liquidity. Second, the systematic review by Andesfa and Masdupi (2019) confirms that CAR, NPL and liquidity are the most frequently examined internal determinants and that results vary with institutional context, which limits the transferability of findings from developed markets to frontier economies. Third, Nepalese studies, although growing rapidly, examine the four determinants in different combinations and periods, focus increasingly on development banks and microfinance institutions (Kandel, 2024; Lamichhane et al., 2026; Sejuwal

et al., 2025b) and pay inconsistent attention to the ROA–ROE distinction. To our knowledge, none has explicitly tested the predicted asymmetry of the capital effect on commercial banks over the post-Basel III and post-consolidation period, which is the gap addressed here.

3.METHODOLOGY

Research Design

The study uses a quantitative explanatory research approach based on the positivist paradigm, in which theory-derived hypotheses are tested empirically against observable data (Saunders et al., 2019) .Because the independent variables are observed as they occur in audited financial records rather than manipulated, the study adopts a causal–comparative (ex post facto) design (Creswell & Creswell, 2018). The design is longitudinal and employs a balanced panel that combines cross-data offer more variability and degrees of freedom than pure cross-sectionsor single time series (Baltagi, 2021; Hsiao, 2014) and panel analysis is the dominant approach in the bank-profitability literature (Andesfa & Masdupi, 2019; Athanasoglou et al., 2008; Dietrich & Wanzenried, 2011).

Population and Sample

As of mid-July 2026, twenty commercial banks operate in Nepal. Ten of them were selected by simple random sampling: EBL, HBL, MBL, NBL, NMB, NSBI, RBB, SANIMA, SBL and SCBL, a sample that includes state-owned, joint-venture and private domestic banks. Data on all variables were collected from the audited annual reports of the sample banks and cross-checked against NRB supervision reports. The study period covers fiscal years 2014/15 to 2025/26 (Nepalese fiscal years run from mid-July to mid-July), yielding twelve annual observations per bank and a balanced panel of 120 bank-year observations. Table 1 defines the variables.

Table 1:Variables and Measurement

Variable	Symbol	Measurement	Source
Return on assets	ROA	Net profit after tax / total assets (%)	Athanasoglou et al. (2008)
Return on equity	ROE	Net profit after tax / shareholders' equity (%)	Dietrich & Wanzenried (2011)
Non-performing loan ratio	NPL	Non-performing loans / total loans and advances (%)	Louzis et al. (2012)
Capital adequacy ratio	CAR	Total regulatory capital / risk-weighted assets (%)	Berger (1995)
Loan loss provision ratio	LLP	Loan loss provisions / total loans and advances (%)	Laeven & Majnoni (2003)
Liquidity ratio	LIQ	Liquid assets / total deposits (%)	Bordeleau & Graham (2010)

Note. Expected signs (ROA / ROE): NPL (−/−), LLP (−/−), CAR (+/−), LIQ (−/−).

Model Specification and Estimation

The following models were estimated separately for the two profitability measures:

$$ROAit = \beta_0 + \beta_1 NPL_{it} + \beta_2 LLP_{it} + \beta_3 CAR_{it} + \beta_4 LIQ_{it} + \varepsilon_{it} \quad (1)$$

$$ROEit = \gamma_0 + \gamma_1 NPL_{it} + \gamma_2 LLP_{it} + \gamma_3 CAR_{it} + \gamma_4 LIQ_{it} + u_{it} \quad (2)$$

where i denotes the bank (i = 1, …, 10), t denotes the fiscal year, β and γ are the coefficients to be estimated, and ε and u are error terms.

Data Analysis

The models were first estimated by ordinary least squares (OLS) on the pooled panel using SPSS 20. Descriptive statistics and Pearson correlation coefficients were computed first, multicollinearity was assessed with tolerance values and variance inflation factors (VIF), and the relative influence of each determinant (objective ii) was assessed with standardized coefficients (β). Because pooled OLS ignores unobserved bank heterogeneity, both models were re-estimated as a robustness check with bank fixed-effects and random-effects estimators; the choice among the pooled, fixed- and random-effects specifications was guided by the F test for bank effects, the Breusch–Pagan Lagrange multiplier test and the Hausman test (Baltagi, 2021; Breusch & Pagan, 1980; Hausman, 1978) . Heteroskedasticity was tested with the Breusch–Pagan test and addressed with heteroskedasticity-consistent (HC3) and robust panel standard errors (Long & Ervin, 2000; White, 1980).

Finally, the indirect effect of NPL on profitability through LLP was tested with a percentile bootstrap based on 5,000 resamples (Preacher & Hayes, 2008). The robustness estimations were performed in Python (statsmodels and linearmodels). Statistical significance was evaluated at the 5 percent level.

4. RESULTS AND FINDINGS

Descriptive Statistics

Table 2 reports descriptive statistics for the 120 bank-year observations. The mean NPL ratio is 1.87 percent (SD = 1.593; range 0.01–7.39; CV = 85.20 percent) and the mean LLP ratio is 2.44 percent (SD = 1.646; range 0.39–7.97; CV = 67.55 percent), indicating that the credit-risk indicators vary widely across banks and years. The mean CAR is 13.73 percent

(SD = 2.283; range 7.49–22.99; CV = 16.63 percent),

comfortably above the 11 percent regulatory minimum, and is the least variable of all the series; only six observations, all from 2014/15–2016/17, fall below 11 percent. The mean liquidity ratio is 28.10 percent (SD = 5.872; range 20.04–53.84; CV = 20.90 percent).

Mean ROA and ROE are 1.47 percent (SD = 0.492; CV = 33.38 percent) and 14.79 percent (SD = 5.281; CV = 35.71 percent), respectively.

The ranking of coefficients of variation (NPL > LLP > ROE > ROA > LIQ > CAR)

shows that credit-risk indicators are far more heterogeneous than capital and liquidity positions, which are anchored by regulatory requirements. Over the sample period, the mean NPL and LLP ratios rose from 1.58 and 1.29 percent in 2014/15 to 3.84 and 4.80 percent in 2025/26, while mean ROA fell from 1.78 to 1.11 percent.

Table 2: Descriptive Statistics

	Mean	SD	CV	N
Non-performing loan	1.87	1.593	85.20	120
Loan Loss Provision	2.44	1.646	67.55	120
Capital Adequacy Ratio	13.73	2.283	16.63	120
Liquidity Ratio	28.10	5.872	20.90	120
Return on Assets	1.47	0.492	33.38	120
Return on Equity	14.79	5.281	35.71	120

Note. All variables are in percent. SD = standard deviation; CV = coefficient of variation; N = number of bank-year observations.

Correlation Analysis

Table 3 reports the Pearson correlation coefficients. ROA and ROE are positively correlated ($r = .561$, $p < .01$), confirming that they capture related but distinct dimensions of profitability. ROA is significantly and negatively correlated with NPL ($r = -.285$, $p < .01$) and LLP ($r = -.511$, $p < .01$),

whereas its correlations with CAR ($r = .151$) and liquidity ($r = -.151$) are not significant. ROE is significantly and negatively correlated with LLP ($r = -.225$, $p < .05$) and CAR ($r = -.239$, $p < .01$), but not with NPL ($r = -.073$) or liquidity ($r = -.113$). Among the explanatory variables, NPL and LLP are strongly and positively correlated ($r = .685$, $p < .01$), consistent with provisions rising with the stock of problem loans. NPL is positively correlated with liquidity ($r = .339$, $p < .01$) and negatively correlated with CAR ($r = -.185$, $p < .05$), and LLP is positively correlated with liquidity ($r = .372$, $p < .01$). No correlation among the explanatory variables exceeds .70, and the tolerance and VIF values reported below confirm that multicollinearity is not a serious concern.

Table 3:Pearson Correlation Matrix

	ROA	ROE	NPL	LLP	CAR	LIQ
Return on Assets	1					
Return on Equity	.561**	1				
Non-performing loan	-.285**	-.073	1			
Loan Loss Provision	-.511**	-.225*	.685**	1		
Capital Adequacy Ratio	.151	-.239**	-.185*	-.064	1	
Liquidity Ratio	-.151	-.113	.339**	.372**	.175	1

Note. N = 120. ** Correlation is significant at the .01 level (two-tailed); * significant at the .05 level (two-tailed).

Regression Analysis

Table 4 presents the pooled OLS results for ROA. The model is statistically significant, $F_{(4, 115)} = 11.62$, $p < .001$, and explains 28.8 percent of the variation in ROA ($R^2 = .288$; adjusted $R^2 = .263$). LLP is the only significant predictor: a one-percentage-

point increase in the provisioning ratio is associated with a 0.18 percentage-point decline in ROA, holding the other variables constant (B = -0.183, SE = 0.033, t = -5.53, p < .001). Its standardized coefficient (β = -0.611) is roughly four times larger in absolute value than that of any other regressor. The effects of NPL (B = 0.050, p = .152), CAR (B = 0.031, p = .089) and liquidity (B = -0.000, p = .971) are not statistically significant. Multicollinearity diagnostics indicate no serious problem: tolerance values range from .495 to .901 and VIF values from 1.110 to 2.019, well below the conventional threshold of 10 and the stricter threshold of 5. Because the same four regressors enter both models, these diagnostics apply equally to Model 2.

Table 4:Regression Results: Determinants of Return on Assets (Model 1)

Variable	Coefficient (B)	Std. error	t	p	Beta (β)	VIF
Constant	1.413	0.280	5.040	< .001		
Non-performing loan	0.050	0.035	1.442	.152	0.161	2.019
Loan Loss Provision	-0.183	0.033	-5.532	< .001	-0.611	1.968
Capital Adequacy Ratio	0.031	0.018	1.713	.089	0.142	1.110
Liquidity Ratio	-0.000	0.007	-0.037	.971	−0.003	1.254

Note. Dependent variable: ROA. R^2 = .288; adjusted R^2 = .263; $F_{(4, 115)}$ = 11.62; p < .001; N = 120. B = unstandardized coefficient; β = standardized coefficient.

Table 5 :Regression Results: Determinants of Return on Equity (Model 2)

Variable	Coefficient (B)	Std. error	t	p	Beta (β)	VIF
Constant	24.075	3.347	7.192	< .001		
Non-performing loan	0.282	0.412	0.684	.495	0.085	2.019
Loan Loss Provision	-0.975	0.394	-2.476	.015	-0.304	1.968
Capital Adequacy Ratio	-0.568	0.213	-2.665	.009	-0.246	1.110
Liquidity Ratio	0.013	0.088	0.147	.883	0.014	1.254

Note. Dependent variable: ROE. R^2 = .119; adjusted R^2 = .089; F(4, 115) = 3.89; p = .005; N = 120. B = unstandardized coefficient; β = standardized coefficient.

Table 5 reports the results for ROE. The model is statistically significant, $F_{(4, 115)}$ = 3.89, p = .005, although the four ratios jointly explain only 11.9 percent of the variation in ROE (R^2 = .119; adjusted R^2 = .089). Both LLP (B = -0.975, SE = 0.394, t = -2.48, p = .015; β = -0.304) and CAR (B = -0.568, SE = 0.213, t = -2.67, p = .009; β = -0.246) have significant negative effects; a one-percentage-point increase in the capital adequacy ratio is associated with a 0.57 percentage-point decline in ROE. NPL (B = 0.282, p = .495) and liquidity (B = 0.013, p =.883) do not significantly predict ROE.

Table 6 summarizes the hypothesis tests. Two of the eight hypotheses are fully sup ported andone is partially supported. LLP has a significant negative effect on ROA (H_{2a} supported) andon ROE in the pooled estimates (H_{2b} partially supported; see Section 4.4), and CAR has asignificant negative effect on ROE (H_{3b} supported). The CAR–ROA coefficient is positive, as

Table 6: Summary of Hypothesis Tests

Hypothesis	Relationship	Observed effect	Decision
H_{1a}	NPL → ROA	+ (p = .152)	Not supported
H_{1b}	NPL → ROE	+ (p = .495)	Not supported
H_{2a}	LLP → ROA	− (p < .001)	Supported
H_{2b}	LLP → ROE	− (p = .015; RE p = .058)	Partially supported
H_{3a}	CAR → ROA	+ (p = .089)	Not supported
H_{3b}	CAR → ROE	− (p = .009)	Supported
H_{4a}	LIQ → ROA	− (p = .971)	Not supported
H_{4b}	LIQ → ROE	+ (p = .883)	Not supported

Note. NPL = non-performing loan ratio; LLP = loan loss provision ratio; CAR = capital adequacy ratio; LIQ = liquidity ratio; ROA = return on assets; ROE = return on equity. Hypotheses are tested at the .05 level. N = 120. H2b is significant in pooled OLS and with HC3 standard errors but only marginally significant under random effects (p = .058).

H_{3a} predicts, but is not significant at the 5 percent level (p = .089), so H_{3a} is not supported. NPL has no significant direct effect on ROA or ROE (H_{1a} and H_{1b} not supported), and liquidity has no significant effect on either measure (H_{4a} and H_{4b} not supported).

Robustness and Diagnostic Tests

Pooled OLS assumes that all banks share a common intercept and that the errors are independent and homoscedastic. The diagnostic tests in Table 7 reject these assumptions. The F test for bank effects (ROA: $F_{(9, 106)} = 2.89$,p=.004; ROE: $F_{(9, 106)} = 4.01$, p < .001) and the Breusch–Pagan LM test (ROA: $\lambda^2_{(1)} = 7.58$, p = .006; ROE: $\lambda^2_{(1)} = 18.89$, p < .001) indicate significant unobserved bank heterogeneity; the Breusch–Pagan test indicates heteroskedastic errors (ROA: $\lambda^2_{(4)} = 14.39$, p = .006; ROE: $\lambda^2_{(4)} = 9.66$, p = .047); and the Durbin–Watson statistics (1.42 and 1.46) point to positive serial correlation (both values lie below the 5 percent lower bound of about 1.63). The Hausman test does not reject the random-effects specification for ROA ($\lambda^2_{(4)} = 3.88$, p = .423), and for ROE the Hausman statistic is negative, which is conventionally interpreted as failure to reject the random-effects assumption. The random-effects model with robust standard errors is therefore the preferred specification.

The core findings survive these corrections. In the random-effects models, LLP remains highly significant for ROA (B = -0.175, p < .001) and CAR remains significant for ROE (B = -0.614, p = .011); the CAR–ROE effect is also significant with bank fixed effects (B = -0.702, p =.013). The LLP–ROE effect is less robust: it is significant with HC3 standard errors (p = .037) but only marginally significant in the random-effects model (B = -0.788, p = .058). NPL and liquidity remain insignificant in every specification. Excluding two RBB observations with implausibly high implied leverage (ROE/ROA > 30) leaves all conclusions unchanged (LLP→ ROE: B = -1.001, p = .009). Adding year fixed effects absorbs most of the LLP effect on ROA, because more than half of the variation in LLP (R^2 = .55 on year dummies) is common to all banks in a given year; with both bank and year effects, the ROE estimates become unstable, reflecting the limited variation that remains in a panel of ten banks.

5.DISCUSSION AND CONCLUSION

The mos robust finding is that loan loss provisioning is the dominant bank-specific determinant of profitability in Nepalese commercial banks. LLP is the only variable that significantly reduces both ROA and ROE, supporting H_{2a} and, partially, H_{2b}, and its standardized effect

Table 7: Robustness Checks: Random-Effects Estimates and Specification Tests

Variable / test	ROA: random effects	ROE: random effects	HC3 p (ROA / ROE) or decision
Constant	1.642*** (0.347)	25.789*** (3.830)	< .001 / < .001
NPL	0.031 (0.056)	0.092 (0.586)	.361 / .635
LLP	−0.175*** (0.041)	−0.788† (0.411)	< .001 / .037
CAR	0.018 (0.022)	−0.614* (0.239)	.137 / .024
LIQ	−0.002 (0.006)	−0.029 (0.086)	.965 / .885
F test, bank effects = 0 [F(9, 106)]	2.89 (p = .004)	4.01 (p < .001)	Bank heterogeneity present
Breusch–Pagan LM, RE vs pooled [$\chi^2(1)$]	7.58 (p = .006)	18.89 (p < .001)	RE preferred to pooled OLS
Hausman, FE vs RE [$\chi^2(4)$]	3.88 (p = .423)	< 0 (not rejected)	RE retained
Breusch–Pagan heteroskedasticity [$\chi^2(4)$]	14.39 (p = .006)	9.66 (p = .047)	Robust SEs used
Overall R^2	.282	.115	

Note. Random-effects (GLS) coefficients with heteroskedasticity-robust standard errors in parentheses. HC3 = p-values from pooled OLS with HC3 heteroskedasticity-consistent standard errors. RE = random effects; FE = fixed effects. *** p < .001; ** p < .01; * p < .05; † p < .10. N = 120 (10 banks × 12 years).

on ROA (β = −0.611) is the largest of any variable in either model, which answers the study's second objective. The economic magnitude is substantial: a one-standard-deviation increase in the provisioning ratio (1.65 percentage points) lowers ROA by about 0.30 percentage points, roughly one-fifth of mean ROA, and ROE by about 1.6 percentage points, roughly one-ninth of mean ROE. This follows directly from the accounting mechanism of provisioning, since provisions are charged against income before net profit is determined (Bikker & Metzemakers, 2005; Laeven & Majnoni, 2003). The finding replicates, for a frontier market, the negative provisioning effects reported for Greece (Athanasoglou et al., 2008) , Switzerland (Dietrich & Wanzenried, 2011) and China (Sufian & Habibullah, 2009) and it is consistent with recent Nepalese evidence (Dahal et al., 2026; Dahal & Dhungana, 2025; Poudel et al., 2024).

Two features of the Nepalese context explain why the provisioning channel is so strong, and the data support both. First, the NRB Unified Directives prescribe minimum provisioning rates by loan classification, so provisioning is largely rule-driven and its cost cannot easily be managed away through income smoothing (Bushman & Williams, 2012). Consistent with this, more than half of the variation in LLP is common to all sample banks in a given year, and the provisioning effect on ROA is largely absorbed once year effects are introduced: provisioning moves with regulatory and credit-cycle shocks that affect the whole system rather than with idiosyncratic managerial choices. Second, the sample period spans the expiry of pandemic-era forbearance (NRB, 2023) . The mean LLP ratio rose from 1.29 percent in 2014/15 to 4.80 percent in 2025/26 and the mean NPL ratio from 1.58 to 3.84

percent, while mean ROA declined from 1.78 to 1.11 percent. In a rules-based provisioning regime, therefore, the earnings-reduction channel of provisioning dominates its risk-disciplining channel in the short run. The weaker robustness of the LLP–ROE link ($p = .058$ under random effects) is itself informative: because ROE is additionally shaped by leverage, a given provisioning charge translates less predictably into equity returns than into asset returns.

The capital results provide the study's principal theoretical contribution. CAR has a significant negative effect on ROE, supporting H_{3b}, but a positive and insignificant effect on ROA, so H_{3a} is not supported. The negative ROE effect is precisely what the leverage identity ROE = ROA × (assets/equity) predicts: when additional capital leaves ROA essentially unchanged, it lowers the equity multiplier and therefore the accounting return to shareholders (Modigliani & Miller, 1958; Myers, 1984). The data support this mechanism directly: the equity multiplier falls significantly as CAR rises ($r = -.331$, $p < .001$), and the CAR–ROE effect persists with bank fixed effects ($B = -0.702$, $p = .013$), so it reflects capital increases within banks over time rather than permanent differences between well- and thinly-capitalized banks. Economically, a one-standard-deviation increase in CAR (2.28 percentage points) reduces ROE by about 1.3 percentage points, about 9 percent of mean ROE. The result replicates the ROA–ROE asymmetry documented for Spanish banks by Trujillo-Ponce (2013) , accords with the period-dependent capital effects reported by Dietrich and Wanzenried (2011) and is consistent with evidence that costly equity lowers ROE (Arifin et al., 2024). It differs from Nepalese studies reporting a positive capital–profitability relationship (Joshi, 2024) a divergence that may reflect differences in the profitability measure and the sample period. Its policy relevance lies in its timing: the sample coincides with the phased implementation of Basel III-based capital rules and the fourfold increase in minimum paid-up capital, so the negative coefficient can be read as an estimate of the accounting cost, borne by shareholders, of strengthening the capital base of the Nepalese banking system. A lower accounting ROE is not, however, necessarily a loss of shareholder value, because higher capital also lowers the risk borne by equity holders and hence their required return (Admati & Hellwig, 2013).

The positive but insignificant CAR–ROA coefficient ($p = .089$) is directionally consistent with the expected bankruptcy cost hypothesis (Berger, 1995; Berger & Bouwman, 2013), but the evidence is too weak to conclude that higher capital improves asset returns in Nepal, and the coefficient weakens further under random and fixed effects. Two explanations are plausible. First, CAR has the lowest relative variability in the sample (CV = 16.63 percent) because most banks hold capital within a narrow band above the regulatory minimum, which limits the variation available to identify an effect. Second, when capital increases are driven by regulation rather than chosen by banks, the funding-cost and signalling benefits emphasized by the bankruptcy-cost hypothesis are likely to be small; evidence from Nepalese microfinance institutions also suggests that the composition of capital, not merely its level, shapes return (Lamichhane et al., 2026). The combination of a significant ROE effect and an insignificant ROA effect implies that, over the study period, additional capital diluted shareholder returns without a measurable offsetting gain in asset efficiency.

The credit-risk results require careful interpretation. NPL is significantly and negatively correlated with ROA ($r = -.285$), yet it has no significant direct effect on either ROA or ROE in the multivariate models, so H1a and H1b are not supported. The mediation evidence resolves this apparent contradiction. NPL strongly predicts LLP ($a = 0.661$, $p <$

.001), the indirect effect of NPL on ROA through LLP is negative and significant (95% CI [−0.198, −0.062]) and NPL regains a significant negative effect on ROA when LLP is omitted (B = −0.071, p = .020). Credit risk therefore does reduce profitability, but its cost reaches the income statement through provisioning; once provisions are held constant, the NPL coefficient captures only the residual association between problem loans and profitability. This supports the view that credit risk affects profitability largely through provisioning (Dahal et al., 2026; Laryea et al., 2016; Nkusu, 2011) and qualifies Nepalese studies that report a direct NPL effect without controlling for provisions (Bhattarai, 2016; Poudel et al., 2024). The low average NPL ratio (1.87 percent) further limits the independent variation available to identify a direct effect, and the positive, insignificant direct coefficient is compatible with the skimping hypothesis (Berger & DeYoung, 1997) , under which banks that economize on underwriting and monitoring report higher short-run earnings even as problem loans accumulate. The practical implication is that the NPL ratio alone understates the earnings cost of credit risk; provisioning intensity is the more informative signal.

Liquidity has no significant effect on either ROA or ROE in any specification, so neither H_{4a} nor H_{4b} is supported. This null result mirrors the divided international evidence (Bordeleau & Graham, 2010; Bourke, 1989; Molyneux & Thornton, 1992) and adds to the continuing Nepalese debate(Poudyal et al., 2025; Sigdel & Deswal, 2025). Two contextual features help to explain it. First, liquidity holdings in Nepal are tightly regulated through the cash reserve ratio, the statutory liquidity ratio and the credit-to-deposit ceiling, so the liquidity ratio largely reflects compliance rather than a strategic profitability choice; consistent with this, nearly half of its variation is common to all banks in a given year. Second, the liquidity ratio ranges from 20 to 54 percent, and its mean rose from 27.2 percent in 2022/23 to 38.4 percent in 2025/26, a period of excess liquidity and subdued credit growth, so observations may lie on both sides of the optimum identified by Bordeleau and Graham (2010), with positive and negative effects offsetting each other in a linear specification. The positive correlations of liquidity with NPL (r = .339) and LLP (r = .372) further suggest that high liquidity in recent years is a symptom of weak credit demand and deteriorating asset quality rather than an independent drag on earnings. Finally, the four ratios explain 28.8 percent of the variation in ROA but only 11.9 percent of the variation in ROE. The lower explanatory power for ROE reflects the additional influence of leverage, dividend and capital-raising decisions and other bank-level characteristics on equity returns, and the significant bank and year effects identified in Section 4.4 confirm that balance-sheet risk ratios are important but not sufficient to account for profitability differences among Nepalese commercial banks.

This study examined the effects of non-performing loans, loan loss provisions, capital adequacy and liquidity on the profitability of Nepalese commercial banks, using a balanced panel of 120 bank-year observations from ten banks over 2014/15–2025/26 and measuring profitability by both ROA and ROE. Four conclusions follow. First, loan loss provisioning is the most influential bank-

specific determinant of profitability: it significantly reduces ROA in the pooled, random-effects and fixed-effects estimations and reduces ROE in the pooled estimates, although much of the ROA effect is common to all banks and is absorbed when year effects are included. Second, capital adequacy significantly lowers ROE but has no significant effect on ROA, consistent with the asymmetric effect of capital predicted by the leverage identity; additional capital diluted shareholder returns without a measurable gain in asset returns over the study period. Third, non-performing loans have no significant direct effect on profitability once provisions are controlled for, but they reduce profitability indirectly by raising provisions, so the cost of credit risk reaches earnings through the provisioning channel; liquidity has no significant effect in any specification. Fourth, the four ratios explain 28.8 percent of the variation in ROA and 11.9 percent of the variation in ROE, indicating that they are important but not sufficient determinants of bank performance. Theoretically, the study shows that testing capital effects against a single profitability measure can conceal opposite-signed mechanisms, and that credit-risk effects are better modelled as operating through provisioning than alongside it.

For bank managers, the dominance of provisioning means that the most direct way to protect profitability is to prevent loans from migrating into higher provisioning categories. Banks should strengthen ex-ante credit appraisal and borrower screening, use early-warning monitoring of stressed accounts and accelerate recovery so that problem loans are resolved before they trigger further provisions. Because a higher CAR lowers ROE without significantly raising ROA, banks should avoid holding idle capital far above regulatory minima and buffers; capital planning should target an adequate but efficient buffer, with surplus capital deployed into good-quality earning assets. Investors and analysts should treat provisioning intensity and capital position, rather than the NPL ratio alone, as the more informative bank-specific signals of future ROA and ROE.

For Nepal Rastra Bank, the negative CAR–ROE relationship indicates that higher capital requirements carry a measurable cost in accounting returns to shareholders, although not necessarily in shareholder value, because better capitalization also reduces equity risk. Any further increase in capital requirements should therefore be phased and risk-sensitive, so that soundness is strengthened without unnecessary erosion of equity returns or of banks' capacity to raise new capital. The strong, system-wide provisioning effect shows that the rule-based provisioning framework transmits credit risk into earnings effectively; supervisors should monitor sector-wide provisioning trends as an early indicator of profitability pressure and recognize that simultaneous tightening of provisioning and capital rules compounds the pressure on ROE. The study finds no evidence that current liquidity requirements impose a measurable profitability penalty on banks.

The study has several limitations. It covers ten of the twenty commercial banks and four bank-specific ratios, so its findings may not generalize to all commercial banks or to development banks and finance companies. Because the sample was

drawn from banks operating today, banks that exited through mergers during the period are excluded, which may introduce survivorship bias, and merger years may create discontinuities in the ratios of the sample banks. Macroeconomic and industry variables (GDP growth, inflation, interest rates, market concentration), bank size, operating efficiency and income diversification were not included, which partly explains the modest explanatory power of the ROE model. The provisioning measure relates loan loss provisions to total loans; future work should distinguish the provision expense (a flow) from the loan loss allowance (a stock), since the two capture different aspects of provisioning behaviour (Beatty & Liao, 2014). Although the main results were checked with random- and fixed-effects estimators and robust standard errors, a panel of ten banks is too small for reliable cluster-robust inference (Cameron & Miller, 2015) or for dynamic panel estimators, and the ROE estimates become unstable when bank and year effects are included together. Future research could use the full population of banks, dynamic panel (GMM) estimators to capture the persistence of profitability, non-linear specifications for liquidity and capital, and a separation of core and supplementary capital.

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