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Capital Structure and Profitability of Nepali Commercial Banks: Evidence from Panel Data

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Abstract

This study examines how capital structure relates to the profitability of Nepalese commercial banks, distinguishing deposit financing from non-deposit interest-bearing debt. Using a panel of eight commercial banks over 2009/10–2024/25, it estimates pooled OLS models with year fixed effects and bank fixed-effects models with Driscoll–Kraay standard errors. Profitability is measured by return on assets (ROA) and return on equity (ROE), and the estimation sample contains 126 bank-year observations. Deposit financing is negatively and significantly associated with ROA under both estimators. Its association with ROE is also negative and becomes significant at the 10% level in the fixed-effects model. Non-deposit interest-bearing debt has negative but statistically insignificant coefficients in all specifications. The non-performing loan ratio is negatively associated with ROE, whereas bank size is weakly and positively associated with ROA within banks. Asset growth shows no significant association with either profitability measure. The negative direction of the deposit-financing coefficient is consistent across both profitability measures and both estimators. These findings suggest that, in a deposit-dominated banking system, heavier reliance on deposits relative to equity coincides with lower asset returns. The study contributes by separating two components of bank debt that prior Nepalese research has usually combined. The study also demonstrates that the measurement of profitability at the asset or equity level influences conclusions about bank capital structure.

Keywords: Capital Structure, Deposit Financing, Non-Deposit Debt, Bank Profitability, Panel Data, Driscoll–Kraay, Nepal.

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1. INTRODUCTION

Commercial banks finance most of their assets with liabilities rather than equity. Unlike non-financial firms, however, their principal liability, customer deposits, is also a core banking product (Diamond & Dybvig, 1983; Kashyap et al., 2002). Banks transform these deposits into loans to borrowers whom they are better placed to screen and monitor than individual savers (Allen & Santomero, 1997; Diamond, 1984). Because this intermediation role generates value, high leverage

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can be optimal for banks, in contrast to the conventional corporate view of debt (DeAngelo & Stulz, 2015).

Capital-structure theories developed for non-financial firms therefore explain only part of how banks are financed (Gropp & Heider, 2010). For banks, the composition of liabilities is likely to matter as much as their overall level. Customer deposits are generally stable and relatively inexpensive, because banks hold some market power over deposit rates (Drechsler et al., 2017). Non-deposit interest-bearing debt, such as borrowings, debentures and interbank funding, is usually priced closer to market rates and may be withdrawn more readily (Huang & Ratnovski, 2011).

Cross country evidence has shown the difference in funding sources impacts banking's performance. Banks funded by equity tend to have reduced profit margins as well as increased their level of risk taking compared to banks who fund through non-equity based means. Conversely, there are many examples of banks funded via deposit accounts having high levels of profitability (Trujillo-Ponce, 2013; Saif-Alyousfi, 2022).

Commercial Banks of Nepal are depended mostly on deposits and several other sources of funds. Bhatt (2020) studied 18 commercial banks and found that roughly 90.6 percent of overall funding is via debt although most of the debt is obtained from deposits. Furthermore, the regulation of commercial banking in Nepal has been under the supervision of the Nepal Rastra Bank (NRB) since 2015. In its supervision of commercial banking, NRB requires banks to maintain a minimum credit/deposit ratio of 90% on all deposits received by July 15, 2022 (NRB, 2022). These constraints can impair the efficiency with which fresh deposits are turned into revenue generating assets and so into earnings.

Existing research on Nepal have largely measured capital structure by aggregate debt ratios. These findings are consistent with favorable (Khatri, 2024; Mallik & Agrawal, 2025), negative (Mukhiya, 2024) and no connection (Bhatt, 2020) with profitability. Aggregate ratios may aggregate funding sources with offsetting impacts, since debt dominates bank financing. Many of this research are also based on tiny samples and pooled regressions without bank or year effects. There is a lack of evidence on the differential impact of deposit financing and non-deposit debt on the profitability of Nepalese banks.

This study addresses this gap using a panel of eight Nepalese commercial banks over 2009/10–2024/25. It separates customer deposits (DR) from non-deposit interest-bearing debt (NDDR) and controls for asset growth, bank size and asset quality. Profitability is measured by both ROA and ROE. The models are estimated with pooled OLS, including year fixed effects, and with bank fixed effects using Driscoll–Kraay standard errors.

The study makes three contributions. First, it provides Nepalese evidence on the separate associations of deposit and non-deposit funding with bank profitability. Second, it indicates that the deposit-financing result differs in strength between ROA and ROE, which clarifies the role of leverage in bank capital structure. Third, it assesses whether the findings hold across estimators suited to a small panel observed over a long period. The study therefore addresses the following research questions:

1. Does non-deposit interest-bearing debt affect the profitability of Nepalese commercial banks?
2. Does the deposit financing affect the profitability of Nepalese commercial banks?
3. How do asset growth, bank size and loan quality influence the profitability of Nepalese commercial banks?
4. Are the relationships consistent when alternative profitability measures and panel estimation procedures are used?

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Theoretical background

The Modigliani and Miller (1958) theorem says that a company's value is unaffected by its capital structure. This theorem is the benchmark for study in this area. This claim is moderated by the trade-off paradigm that balances the tax benefits against the expected costs of distress (Kraus & Litzenberger, 1973). The pecking-order theory emphasizes the importance of knowledge asymmetry, leading corporations to prioritize internal finance and then debt (Myers, 1984; Myers & Majluf, 1984). Debt can monitor managerial performance but it can also lead to agency problems between shareholders and creditors (Jensen & Meckling, 1976) as suggested by agency theory.

These theories apply only partly to banks. Regulatory capital requirements, rather than tax benefits, largely determine bank equity, and deposits are raised as a product rather than as residual finance. Gropp and Heider (2010) show that, for large U.S. and European banks, time-invariant bank characteristics are the most important determinant of capital structure. DeAngelo and Stulz (2015) further argue that high leverage is optimal for banks because they earn a premium for producing liquid claims.

Bank-specific theories therefore provide a more direct foundation for the present study. Financial intermediation theory explains why banks fund illiquid loans with demandable deposits (Allen & Santomero, 1997; Diamond, 1984; Diamond & Rajan, 2001). Liquidity-provision theories show that stable deposit funding allows banks to hold illiquid assets profitably (Hanson et al., 2015; Kashyap et al., 2002). Uninsured creditors may discipline bank managers (Calomiris & Kahn, 1991), yet short-term wholesale creditors may also withdraw funding abruptly (Huang & Ratnovski, 2011). Finally, the risk–return framework links credit risk, growth and scale to earnings. This framework underlies the extensive literature on bank-specific determinants of profitability (Athanasoglou et al., 2008; Dietrich & Wanzenried, 2011; Pasiouras & Kosmidou, 2007; Sufian & Habibullah, 2009).

2.2 Non-deposit interest-bearing debt and profitability

Non-deposit interest-bearing debt includes borrowings, debentures, debt securities and interest-bearing amounts owed to other financial institutions. Theory predicts opposing effects of such funding on profitability. On the one hand, it is usually costlier and less stable than deposits, which may lower returns on assets. On the other hand, it diversifies funding sources, and the leverage it adds can raise returns on equity. Cross country evidence seems to show a negative effect of using wholesale funds as an alternative source of funding. The authors, in this study used data from 1334

banks across 101 countries. They find that use of wholesale funding increases the cost of capital for banks by lowering their return on assets; however, they also find that when wholesale funding is used at lower levels, it has the added benefit of reducing bank risk. Banks relying on short-term market funding also performed worse during the global financial crisis (Beltratti & Stulz, 2012). Similarly, weaker structural liquidity before the crisis predicted later bank failure (Vazquez & Federico, 2015).

But the impact seems to depend on the bank's business style and market. According to Köhler (2015), the more retail-oriented European banks become less stable with an increased reliance on non-deposit funding and investment banks become more stable. Banks in Vietnam with more diversified funding sources were more profitable but riskier (Pham & Nguyen, 2023). Noisy signals about asset quality also cause wholesale financiers to withdraw funds from smaller banks, according to (Nguyen & Ho Thuy, 2024).

There is little indication of this source of finance in Nepal. Bhatt (2020) shows insignificant positive relationship between long term debt and ROE and insignificant negative relationship for short term debt. However, these measures do not separate interest-bearing non-deposit liabilities from long-term deposits. Given the opposing theoretical predictions and the scarcity of direct evidence, the first hypothesis is stated in non-directional form.

H1: Non-deposit interest-bearing debt (NDDR) has a significant effect on bank profitability.

2.3 Deposit financing and profitability

Deposit funding is expected to support profitability as deposits provide a stable and relatively low cost source of funding. Banks have market power over deposit rates, which means they can pay depositors below the market rate (Drechsler et al., 2017). Banks can also maintain higher-yielding illiquid assets due to stable deposit funding (Hanson et al., 2015).

There is an abundance of research that supports the idea. Financial institutions in Spain are very profitable because of their high volume of client deposits. In China, financial institutions were even more profitable as well as retained a larger amount of client deposits than those in Spain (García-Herrero et al., 2009). Mergaerts and Vander Vennet (2016), investigated the retail funding strategy at 505 European banking institutions and reported that it resulted in increased bank profitability and lower risk. Saif-Alyousfi (2022) discovered that in 47 different countries within Asia there were 2446 institutions that experienced greater profitability based on higher volumes of demand deposits.

The benefits of deposits are based upon the costs associated with accessing those deposits. As such, when interest rates are higher it can be expected that deposit rates will be influenced by market interest rate levels; this reduces the cost savings of using deposits for bank funding. Due to their cost of finance Nepalese banks have lower profits (Acharya & Vyas, 2022) and there has been a negative relationship between deposit growth and returns on assets (ROA) as well as returns on equity (ROE) (Khatri, 2024). Further, the NRB requires that banks maintain a minimum credit-to-deposit ratio of 90% (NRB, 2022); this ratio means that banks will be limited from making additional loans with each unit of deposits. Another aspect is that a higher deposit share, everything else equal, suggests a lesser equity portion. Better-capitalized banks tend to earn higher returns

(Berger, 1995; Mehran & Thakor, 2011) and this relationship can be non-linear (Beltratti & Paladino, 2015). The influence of capital on the profitability of banks varied across Asia by the types of banks, income levels and regions (Lee & Hsieh, 2013). Also, capital-strong financial institutions exhibited resilience to recent economic shocks (Alkhazali et al., 2024). The second theory is non-directional, because these mechanisms may negate the funding-cost benefit of deposits.

H2: Deposit financing (DR) has a significant effect on bank profitability.

2.4 Asset growth (AG) and profitability

An increase in the loan activity might lead to an expansion of the asset base and hence to an increase in profitability, as interest revenue would increase and fixed expenses would be spread over more units. More assets can mean more profitability, but if it grows too fast, lending rules may be relaxed and operating expenditures may rise. Evidence on this risk channel is substantial. Using more than 16,000 banks in 16 countries, Foos et al. (2010) show that loan growth raises loan-loss provisions over the following three years. Loan growth also reduces relative interest income and capital ratios. Vithessonthi (2023) revealed that Asian banks' loan growth was not connected with increased profitability but was associated with higher non-performing loans. Also, bad loans reduce the cost efficiency of commercial banks (Berger & DeYoung, 1997). Khatri (2024) finds asset growth has a negative impact on ROA and ROE of 12 commercial banks of Nepal. Because the gains from growth may arise immediately while its costs appear later, the net contemporaneous effect is theoretically ambiguous.

H3: Assets growth (AG) has a significant effect on bank profitability.

2.5 Bank size and profitability

Larger banks may benefit from economies of scale, diversification and market power in loan and deposit pricing. Conversely, greater size may increase organizational complexity and agency costs. Large banks may also take more risk, and they contribute more to systemic risk when their capital is low (Laeven et al., 2016). These conflicting mechanisms are consistent with empirical evidence. Hughes and Mester (2013) show that large U.S. banks benefit from scale economies if their risk-taking is modeled. The size also leads to higher ROA and ROE among the 69 Indian commercial banks (Almaqtari et al., 2019). However, Bortoluzzo et al. (2024) find a negative link between size and incomes across 101 countries. Some studies revealed no relationship (Athanasoglou et al., 2008; Goddard, 2004; Trujillo-Ponce, 2013). According to Bolívar et al. (2023) corporate strategy decisions are more important than size peers. Evidence from Nepal is similarly ambiguous. Bhatt (2020) finds a favorable substantial impact of size on ROE. Shrestha (2024) also discovered that size has a negative impact on net interest margin. Mukhiya (2024) finds no relevant association. Therefore, the fourth hypothesis is non-directional one.

H4: Bank size (SIZE) has a significant effect on bank profitability.

2.6 Asset quality and profitability

This study measures asset quality using the non-performing loan ratio (NPLR). Non-performing loans reduce profitability through several channels. They stop generating interest income, require

provisions that are charged against earnings, and absorb management resources in recovery (Berger & DeYoung, 1997). There is a clear and consistent pattern of evidence internationally to suggest there is a harmful relationship. Credit risk is a negative effect on the profitability of banks in Greece and Spain (Athanasoglou et al., 2008; Trujillo-Ponce, 2013). As for 47 nations in Asia, the non-performing loans have a major impact on profitability (Saif-Alyousfi, 2022). A major factor in profitability for 110 countries is impaired loans (Lamothe et al., 2024). The authors of Mwanjilinji et al. (2025) discovered that NPLR impacts more on less profitable banks. Low profit banks have been identified as having credit risk (Bortoluzzo et al., 2024). This is supported by most of the inquiries that we receive in Nepal. Shrestha (2020) shows there is a negative relationship between Credit Risk with ROA. Acharya & Vyas (2022) and Gurung et al., (2024) reported that NPLRs and NIMs have a negative effect on profitability. However, recent studies indicate that the NPLRs lead to a drop in ROA during the period of the study (2016/17 – 2022/23) (Pradhan et al., 2024; Shrestha & Khadka, 2024). The overall impact is negative, although small (Ranabhat & Subedi, 2022). The profitability may also be one of the factors impacting the loan quality (Singh et al., 2021). Because the mechanism is direct and the evidence is broadly consistent, a negative direction is specified for this hypothesis only.

H5: Asset quality, measured by the NPLR, has a significant negative effect on bank profitability.

3. DATA AND METHODOLOGY

3.1 Data and sample

This study adopts a quantitative, explanatory research design based on bank-level panel data. The sample comprises eight Nepalese commercial banks observed annually from fiscal year 2009/10 to 2024/25. Data on net income, total assets, shareholders' equity, customer deposits, non-deposit interest-bearing liabilities, and total loans are obtained from the bank supervision reports published by Nepal Rastra Bank. Data on the non-performing loan ratio (NPLR) are obtained from the Key Financial Indicators Archives of Commercial Banks, published on the official website of Nepal Rastra Bank. The raw panel contains 128 bank-year observations. After accounting for observations with missing values required for the regression variables, the estimation sample contains 126 observations. Because the sample banks are not drawn randomly, the findings are interpreted as evidence for the selected banks rather than for the entire banking sector. The 16-year period nevertheless provides substantial variation in financing structure within banks over time.

3.2 Variables and measurement

Table 1 defines the variables and their corresponding measures. The dependent variables are ROA and ROE. The main financing-structure variables are NDDR and DR. The bank-specific control variables are GROWTH, SIZE and NPLR. ROA and ROE are additional measures of performance of banks that have been frequently applied to measure bank performance across countries and within South Asia (Bortoluzzo et al., 2024; Almaqtari et al., 2019; Saif-Alyousfi, 2022), including most recently by several researchers in relation to the Nepali banking system (Khatri, 2024; Acharya & Vyas, 2022).

The two measurements are different measures of bank performance. The ROA is an indicator of the bank's capability to create earnings from the asset base regardless of how the asset base is financed

(Bortoluzzo et al., 2024). ROE, in contrast, assesses the return attributable to shareholders and consequently includes the effect of financial leverage (Bortoluzzo et al., 2024). Since ROE may be written as ROA times the ratio of total assets to equity, the financing-structure variables may be correlated with ROE through the influence they have on leverage, even if their correlation with ROA is rather weak. Hence, the use of both measures simultaneously helps to differentiate effects on asset-based profitability from effects associated with financial leverage, and provides a sensitivity test to the main findings.

Table 1. *Variables and measurement*

Category	Variable	Measurement	Role
Dependent	ROA	$=\frac{Net\ income}{Total\ assets}$	Profitability
Dependent	ROE	$=\frac{Net\ income}{Total\ equity}$	Profitability
Capital structure	NDDR	$=\frac{Non-deposit\ interest-bearing\ debt}{Total\ assets}$	Main independent variable
Capital structure	DR	$=\frac{Customer\ deposits}{Total\ assets}$	Main independent variable
Control	AG	$=\frac{(\text{Total assets}_t - \text{Total assets}_{t-1})}{\text{Total assets}_{t-1}}$	Control
Control	SIZE	Natural logarithm of total assets (Rs. million)	Control
Control	NPLR	$=\frac{\text{Non-performing loans}}{\text{Total loans}} \times 100$	Control
Time	YEAR	Fiscal-year dummy variables	Year effects
Bank	BANK	Bank-specific effects	Bank effects

Note. Non-deposit interest-bearing debt comprises identifiable interest-bearing funding other than customer deposits, such as borrowings, debentures, debt securities issued, subordinated liabilities and interest-bearing amounts due to banks, financial institutions and Nepal Rastra Bank. All ratios except NPLR are expressed as decimals. NPLR is expressed in percent, so its coefficient measures the change in profitability associated with a one-percentage-point change in the NPLR.

3.3 Model specification and estimation strategy

The relationship between capital structure and profitability is examined using the following panel model:

$$PROF_{it} = \alpha + \beta_1 NDDR_{it} + \beta_2 DR_{it} + \beta_3 AG_{it} + \beta_4 SIZE_{it} + \beta_5 NPLR_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Here, PROF denotes ROA or ROE for bank i in fiscal year t. The term μ_i captures unobserved bank-specific effects, λ_t captures year fixed effects, and ε_{it} is the error term. Hypotheses H1 to H5 are tested through the coefficients β_1 to β_5, respectively. Each model is estimated separately for ROA and ROE.

The empirical analysis begins with pooled OLS, including year fixed effects. This specification provides a common benchmark. In this model, the bank effects μ_i are omitted, and standard errors are clustered at the bank level. Breusch–Pagan Lagrange multiplier tests support this benchmark (Breusch & Pagan, 1980). They do not reject the null hypothesis of no bank-specific random effects for either ROA ($p = 1.000$) or ROE ($p = 0.2375$).

The second specification employs bank fixed effects with Driscoll–Kraay standard errors. The fixed-effects estimator controls for unobserved time-invariant characteristics of banks (Wooldridge, 2010). Driscoll–Kraay standard errors remain valid in the presence of heteroskedasticity, serial correlation and cross-sectional dependence (Driscoll & Kraay, 1998; Hoechle, 2007).

This approach is particularly appropriate for the present study because the panel contains a relatively small number of banks observed over a relatively long-time dimension. With only eight banks, cluster-robust standard errors may understate uncertainty (Cameron et al., 2008; Cameron & Miller, 2015). Driscoll–Kraay standard errors, by contrast, rely on the time dimension of the panel rather than on the number of banks (Hoechle, 2007). Accordingly, the fixed-effects Driscoll–Kraay specification is treated as the preferred robustness specification.

Pairwise correlations among the explanatory variables are used to assess multicollinearity, because capital structure and profitability may be jointly determined, the estimated coefficients are interpreted as associations rather than causal effects.

4. RESULTS

4.1 Descriptive statistics

Table 2 reports descriptive statistics for the variables. Average ROA is 1.56%, and ROA is positive every bank year. Average ROE is 11.94%, but its standard deviation of 36.54% shows far greater dispersion than ROA. Because net income is positive throughout, the negative ROE values arise from negative reported equity rather than from net losses. The sample banks are overwhelmingly financed by deposits, as confirmed by the funding variables. Customer deposits finance on average 82.08% of total assets, ranging from 58.06% to 97.81%. Non-deposit interest-bearing debt finances only 3.56% of total assets on average, and some banks report none in certain years. Total assets grew by an average of 16.66% per year, while the NPLR averaged 2.21% and peaked at 10.92%.

Table 2. *Descriptive statistics*

Variable	Obs.	Mean	SD	Min	Max
ROA	128	0.0156	0.0073	0.0001	0.0399
ROE	128	0.1194	0.3654	−3.6124	1.0291
NDDR	128	0.0356	0.0327	0.0000	0.1698
DR	128	0.8208	0.0648	0.5806	0.9781
AG	128	0.1666	0.1199	−0.1095	0.7147
SIZE	128	11.5614	0.8491	8.8872	13.2805
NPLR (%)	126	2.2098	2.1405	0.01	10.92

Note. The maximum number of observations is 128 (8 banks × 16 years). NPLR has two missing observations, resulting in 126 observations in regression models that contain NPLR.

4.2 Correlation analysis

Table 3 presents pairwise correlation coefficients. ROA is negatively correlated with NDDR, DR and SIZE, and each of these correlations is significant at the 10% level. Among the explanatory variables, ROE is significantly correlated only with NPLR, and that correlation is negative. The strongest correlation among the explanatory variables is between NDDR and DR ($r = -0.382$), followed by NDDR and SIZE ($r = 0.312$). These patterns indicate that larger banks rely somewhat

more on non-deposit debt and less on deposits. Because no correlation among the explanatory variables exceeds 0.39 in absolute value, multicollinearity is unlikely to be a serious concern.

Table 3. *Correlation matrix*

	ROA	ROE	NDDR	DR	AG	SIZE	NPLR
ROA	1						
ROE	0.195*	1					
NDDR	−0.218*	−0.078	1				
DR	−0.286*	−0.048	−0.382*	1			
AG	−0.110	−0.045	0.027	0.024	1		
SIZE	−0.161*	0.022	0.312*	−0.232*	−0.169*	1	
NPLR	0.117	−0.178*	0.027	−0.166*	−0.228*	0.083	1

Note. * Denotes significance at the 10% level.

4.3 Regression results

Table 4 reports the estimates for ROA and ROE under both specifications. The ROA models explain a considerably larger share of variation than the ROE models. Their R-squared values are about 0.47, compared with about 0.13–0.15 for ROE. This difference is consistent with the much greater dispersion of ROE reported in Table 2.

Table 4. *Regression results*

Variable	(1) ROA: Pooled OLS	(2) ROA: DK-FE	(3) ROE: Pooled OLS	(4) ROE: DK-FE
NDDR	−0.018 (0.647)	−0.025 (0.133)	−0.374 (0.538)	−1.675 (0.220)
DR	−0.058*** (0.003)	−0.039*** (0.001)	−1.023 (0.243)	−1.647* (0.076)
AG	−0.011 (0.163)	−0.004 (0.184)	−0.297 (0.224)	−0.452 (0.228)
SIZE	0.003 (0.416)	0.006* (0.097)	0.109 (0.366)	0.068 (0.286)
NPLR	−0.001 (0.454)	0.000 (0.519)	−0.054** (0.012)	−0.074** (0.010)
Year fixed effects	Yes	Yes	Yes	Yes
Bank fixed effects	No	Yes	No	Yes
Standard errors	Clustered by bank	Driscoll–Kraay	Clustered by bank	Driscoll–Kraay
Observations	126	126	126	126
R-squared	0.467	0.480	0.133	0.152

Note. P-values are in parentheses. DK-FE denotes bank fixed effects with Driscoll–Kraay standard errors. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Constants and year-effect coefficients are not reported.

Non-deposit interest-bearing debt (H1). NDDR has a negative coefficient in all four models. For ROA, the coefficient is −0.018 under pooled OLS and −0.025 under the Driscoll–Kraay fixed-effects model. For ROE, the coefficient is −0.374 under pooled OLS and −1.675 under the fixed-effects specification. However, none is statistically significant. The significant negative correlation between NDDR and ROA in Table 3 therefore does not persist once the other variables are controlled for. H1 is not supported.

Deposit financing (H2). DR is negatively and significantly associated with ROA under both pooled OLS ($\beta = -0.058$, $p = 0.003$) and DK-FE ($\beta = -0.039$, $p = 0.001$). In the pooled model, a one-

standard-deviation increase in DR is associated with ROA about 0.38 percentage points lower. This difference equals roughly a quarter of mean ROA. For ROE, DR is negative in both models but significant only under DK-FE, at the 10% level ($\beta = -1.647$, $p = 0.076$). H2 is therefore supported, more strongly for ROA than for ROE.

Asset growth (H3). AG has a negative coefficient in all four models. For ROA, the coefficient is −0.011 under pooled OLS and −0.004 under the Driscoll–Kraay fixed-effects model. For ROE, the coefficient is −0.297 under pooled OLS and −0.452 under the fixed-effects specification. None of these coefficients, however, are statistically significant. H3 is not supported.

Bank size (H4). SIZE is positive in all four models but significant only in the DK-FE model for ROA, at the 10% level ($\beta = 0.006$, $p = 0.097$). Because this model relies on variation within banks, the result indicates that ROA tended to be higher when a given bank was larger. For ROE, the coefficients are positive but statistically insignificant. H4 is therefore weakly supported only for ROA.

Asset quality (H5). NPLR is negatively and significantly associated with ROE under both pooled OLS ($\beta = -0.054$, $p = 0.012$) and DK-FE ($\beta = -0.074$, $p = 0.010$). In the pooled model, a one-percentage-point increase in the NPLR ratio is associated with ROE about 5.4 percentage points lower. NPLR has no significant association with ROA in either model. H5 is therefore partially supported, for ROE only.

Table 5. *Summary of hypothesis tests*

Hypothesis	Variable	ROA	ROE	Outcome
H1	NDDR	Negative, insignificant	Negative, insignificant	Not supported
H2	DR	Negative, significant at 1% in both models	Negative, significant at 10% in DK-FE	Supported; stronger for ROA
H3	AG	Negative, insignificant	Negative, insignificant	Not supported
H4	SIZE	Positive, significant at 10% in DK-FE	Positive, insignificant	Weakly supported for ROA
H5	NPLR	Insignificant	Negative, significant at 5% in both models	Partially supported for ROE

4.4 Robustness analysis

The robustness analysis compares pooled OLS with a bank fixed-effects model using Driscoll–Kraay standard errors. The central result concerning DR is preserved across specifications, because its coefficient remains negative in all four models. For ROA, the negative association is statistically significant under both pooled OLS and DK-FE. For ROE, the coefficient remains negative and becomes statistically significant at the 10% level under DK-FE. This consistency in coefficient direction indicates that the principal finding on deposit dependence is not simply an artifact of one estimation procedure. The other coefficients are also stable in sign across both estimators. The only exception is NPLR in the ROA equation, which is close to zero in both models. The association between NPLR and ROE remains significant under both estimators, while NDDR and AG remain insignificant throughout. The use of ROE as an alternative profitability measure provides a further

sensitivity assessment ROA and ROE capture different dimensions of profitability. The results indicate that the negative association between DR and profitability is stronger and more statistically robust when profitability is measured by ROA.

5. DISCUSSION

The main finding of the study is the negative relationship between deposit financing and ROA. This is contrasted with international evidence relating greater deposit share to increased profitability (García-Herrero et al., 2009; Saif-Alyousfi, 2022; Trujillo-Ponce, 2013). This however is consistent with the Nepalese evidence that the cost of funds diminishes profitability (Acharya & Vyas, 2022) and deposit growth reduces ROA and ROE (Khatri, 2024).

The existing data do not allow a complete separation of three explanations consistent with this pattern. First, the DR coefficient is computed while holding the NDDR fixed such that a higher deposit share corresponds to a smaller share of assets financed by equity. Thus, the negative coefficient may represent in part the positive correlation between capital and earnings found in other studies (Berger, 1995; Beltratti & Paladino, 2015; Mehran & Thakor, 2011). Second, deposits can be expensive relative to the lending margin, especially when interest rates are high (Emin et al., 2025). Third, the 90 percent credit to deposit ratio may limit the amount of extra deposits that can be lent (NRB, 2022). Then the marginal reserves might be kept in liquid assets which earn less.

The connection between DR and ROE decreased as a result of the increased leverage ratio in the same way that the relationship was presented. When banks have a greater percentage of deposits, they can reduce their equity base and subsequently increase ROE, and partially counteract the decrease in returns from assets. Moreover, this conclusion suggests that alternative measures of profitability (i.e. metrics) will yield different results in the analysis of bank profitability depending on capital structures (Bortoluzzo et al., 2024). Thus, the mixture of ROA and ROE in banking study can be helpful (Almaqtari et al., 2019; Bortoluzzo et al., 2024).

In contrast to the negative relationship between cross-border research has reported (Demirgüç-Kunt & Huizinga, 2010; Wang et al., 2024) and interest-bearing non-deposit debt and profit, there was no significant association found. One possible reason for this is that variance was very small, because NDDR averaged only 3.56 percent of total assets across all banks, and in some cases was zero. The second potential explanation relates to the type of financing used. Most international literature addresses the issue of short-term wholesale funding that can be withdrawn at any moment (Huang & Ratnovski, 2011; Nguyen & Ho Thuy, 2024). Therefore, it could be appropriate to view small coefficients as “no evidence” rather than a demonstration that there is “no effect.

The negative association observed between NPLR and ROE was consistent with the prior studies on credit risk in Nepal (Acharya & Vyas, 2022; Gurung et al., 2024; Shrestha, 2020) and in the international context where credit losses negatively affect profitability (Saif-Alyousfi, 2022; Mwanjilinji et al., 2025). Unlike Pradhan et al. (2024) however there are no statistically significant relationships shown by this research between NPLR and ROA. Shrestha and Khadka (2024) argued that the asset quality changes may be mainly common across banks. So the year fixed effects may capture a lot of its effect on ROA. Also, the significant dispersion of ROE in the sample can affect the ROE outcome.

The concept of scale economies is backed by empirical studies of Indian banking firms (Almaqtari et al. 2019) and positive relationships between bank size and ROA (Hughes and Mester 2013). However, it also corroborates a broad range of global studies but limits its importance to the 10% level (Goddard et al. 2004; Bortoluzzo et al. 2024). In addition, the insignificance of the coefficients on Asset Growth (AG) (Vithessonthi, 2023) support findings in Asian research which show that an increase in lending does not contribute positively to firm profitability. Finally, many of these costs may not be apparent until sometime after rapid growth occurs (Foos et al. 2010); thus, contemporary estimates may understate the ultimate effects of rapid expansion.

Taken together, the results indicate that separating deposits from non-deposit debt is informative for Nepalese banks. The direction of the deposit result, however, differs from much of the international evidence. Deposit financing is the funding component most clearly associated with lower asset returns, whereas the effect of non-deposit debt cannot be established with precision in this sample.

6. CONCLUSION

This study examined the relationship between bank funding structure and profitability among eight Nepalese commercial banks over 2009/10–2024/25. It distinguished deposit financing from non-deposit interest-bearing debt and used both ROA and ROE as profitability measures. First, deposit financing is negatively and significantly associated with ROA under both pooled OLS and fixed-effects estimation. Its association with ROE is also negative but weaker. However, the negative direction of the deposit-financing result is consistent across profitability measures and estimators. This suggests that greater reliance on deposits relative to total assets is not necessarily associated with greater profitability. Second, non-deposit debt and asset growth (AG) show no significant association with profitability. Thus, the study does not find sufficient evidence that non-deposit interest-bearing debt independently determines profitability during the study period. Third, asset quality matters for shareholder profitability. The NPLR is negatively and significantly associated with ROE. This supports the importance of effective credit-risk management in protecting bank profitability. Fourth, bank size is weakly positively associated with ROA in banks.

7. IMPLICATIONS

The findings serve as a reminder to bank management that growing the deposit base alone does not mean higher asset returns. This is especially the case when deposits are raised at a high cost or cannot be completely used for lending. So managing deposit costs and keeping an adequate equity basis may be more important than deposit volume. The connection of NPLR with ROE also suggests that the quality of credit has a direct impact on shareholder returns. The results suggest that regulators' rules on the link between deposits and lending may have ramifications for bank profitability. Requirements such as the credit-to-deposit ratio influence the funding decisions and the deposits' allocation (NRB, 2022). Thus, their potential impacts on profitability merit continuous scrutiny. The substantially wider dispersion of ROE compared to ROA means that for investors ROE should be considered in conjunction with ROA and the health of a bank's equity position. Taken together, these metrics can give a fuller picture of bank profitability and the role of financial leverage in driving shareholder returns.

8. LIMITATIONS AND FUTURE RESEARCH

There are some drawbacks to this study. First, the sample consists of eight banks selected based on data availability rather than random selection and so the conclusions may not be generalized to the whole commercial banking sector. Second, the study uses mostly accounting-based indicators of profitability and consequently does not reflect market-based characteristics of bank success. Third, capital structure and profitability might be jointly determined, so the estimates should be considered as associations rather than causal effects. Fourth, the very modest variation in NDDR and the significant dispersion in ROE may lower the precision of some calculations. Finally, we do not directly quantify the costs of deposits, which limits the investigation of the effect of the cost of deposit mobilization on the relationship between the structure of financing and profitability.

Future research could address these limitations by extending the sample to a broader selection of commercial banks and using direct measurements of deposit costs and deposit composition, notably the shares of current and savings accounts. Future research should also include market-based measures of performance, such as Tobin's Q and stock-market returns, if relevant. Future study can analyze lagged impacts of AG and explicitly assess whether the estimated NDDR and DR coefficients differ among measures of profitability or model settings. These additions may offer more insight into the influence of financing structure on bank profitability in Nepal and other deposit dominated banking systems.

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