Effect of Liquidity Risk, Credit Risk, and Market Risk on Profitability of Nepalese Commercial Banks

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Abstract

The study examines the effect of liquidity risk, credit risk, and market risk on the profitability of Nepalese commercial. Return on assets and return on equity are selected as the dependent variables. The selected independent variables are interest spread rate, loan loss provision, non-performing loan, capital adequacy ratio, net interest margin, leverage and loan to deposit ratio. The study is based on secondary data of 10 commercial banks with 100 observations for the period from 2013/14 to 2022/23. The data were collected from Banking and Financial Statistics published by Nepal Rastra Bank, reports published by the Ministry of Finance and the annual report of respective banks. The correlation coefficients and regression models are estimated to test the significance and importance of liquidity risk, credit risk, and market risk on the profitability of Nepalese commercial banks.

The study showed that interest spread rate has positive impact on return on assets and return on equity. It shows that increase in interest spread rate leads to increase in return on assets and return on equity. Similarly, loan loss provision has a negative impact on return on assets and return on equity. It implies that increase in loan loss provision leads to decrease in return on assets and return on equity. Moreover, non-performing loan has a negative impact on return on assets and return on equity. It shows that increase in non-performing loan leads to decrease in return on assets and return on equity. Similarly, capital adequacy ratio has a positive impact on return on assets and negative impact on return on equity. It means increase in capital adequacy ratio leads to increase in return on assets and decrease in return on equity. Likewise, net interest margin has a positive impact on return on assets and return on equity. It means that increase in net interest margin leads to increase in return on assets and return on equity. Similarly, leverage has a negative impact on return on assets and return on equity. It means that increase in leverage leads to decrease in return on assets and return on equity. Furthermore, loan to deposit have a negative impact on return on assets and return on equity. It means that increase in loan to deposit leads to decrease in return on assets and return on equity.

Keywords: interest spread rate, loan loss provision, non- performing loan, capital adequacy ratio, net interest margin, leverage, loan to deposit, return on assets, return on equity

1. Introduction

A profitable banking sector acts as a stabilizing force within an economy. It provides the financial resilience necessary to withstand shocks, supports continued economic activity through lending, and maintains the confidence of market participants, all of which contribute to the stability of the financial system (Mirzaei et al., 2013). Liquidity risk refers to the potential difficulty a company or financial institution might face in meeting its short-term obligations due to the inability to convert assets into cash without significant losses. Credit risk is the risk of loss arising from a borrower failing to repay a loan or meet contractual obligations. It represents the possibility that a lender or creditor will not receive the owed principal and interest, resulting in financial loss. Market risk refers to the risk of losses in investments or other financial instruments due to adverse movements in market prices. This

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includes changes in interest rates, currency exchange rates, commodity prices, and equity prices. Profitability is a measure of the efficiency of a company in generating profits from its operations. It is typically expressed as a percentage and indicates how well a company is managing its resources to produce earnings relative to its expenses and other costs. A profitable banking sector is better positioned to manage risks associated with market fluctuations, such as interest rate changes, currency devaluations, or declines in asset prices. The financial strength gained from profitability enables banks to withstand these shocks without resorting to drastic measures, which could destabilize the financial system. Profitability signals financial health, which can boost confidence among depositors, investors, and other stakeholders. During times of economic uncertainty, this confidence is crucial for maintaining stability, as it reduces the likelihood of bank runs or widespread panic in the financial markets (Aghion et al., 2004).

Al-Habashneh (2022) analyzed the effect of financial leverage, liquidity, and bank size on the financial performance of commercial banks listed on the Amman Stock Exchange as performance was measured through the return on equity (ROE). The result showed a statistically significant positive effect of financial leverage on the financial performance of banks, while it showed a statistically significant negative effect of volume on financial performance. The study also concluded that there is no effect of liquidity on financial performance. Mulbah *et al.* (2024) examined the effect of bank size, net interest margin, and capital adequacy ratio on commercial banks' return on assets in Tanzania. The estimation results showed that capital adequacy ratio and bank size have positive significant effects on the financial performance of commercial banks in Tanzania. However, the study found inconsistent results for the effect of net interest margin; while the random effect model showed a marginally significant positive effect on return on assets, the GLS regression showed a significant negative effect, indicating that the effect of net interest margin could be either positive or negative depending on the context. Promise *et al.* (2024) measured the effect of net interest margin on financial performance of deposit money banks in Nigeria. The study established that net interest margin is statistically significant and has a positive effect on operating income (OI). Taees (2023) revealed that there is an existence of an inverse effect of the financial leverage ratio on the profitability of Iraqi commercial banks, as the higher the financial leverage ratio, the lower the profitability of banks. This study recommended the need to direct Iraqi commercial banks to finance by increasing capital and using retained earnings, and not relying on debt financing (financial leverage) due to the negative impact of financial leverage on profitability.

Ndiritu *et al.* (2024) examined the effect of interest rate spread on the performance of commercial banks in Kenya. Using random effects model, the study found a positive and significant relationship between interest rate spread and the performance of the banks. Musah *et al.* (2018) examined the effect of interest rate spread on the profitability of commercial banks in Ghana. The results of the study showed that there is a positive and statistically significant association between interest rate spread and bank profitability in Ghana. The study found that the demand for loans exceed the supply of same allowing banks to charge higher interest on lending relative to deposits to increase profitability. Benkheznadji *et al.* (2024**)** found that the capital adequacy ratio has a significant negative impact on return on equity. It implies that increase in the capital adequacy standard observed among the banks in the sample drove to a decrease in the banks' ROE. The study concluded that procedures used to raise capital, which also require internal or external financing, which in turn causes the

latter to distribute profits and add them to capital over a longer period of time, which cause a decrease in the return on equity ratio. Pinasti and Mustikawati (2018) analyzed the effect of capital adequacy ratio, third party fund, loan to deposit ratio, and bank size to profitability in banking companies listed in Indonesia Stock Exchange by using annual financial reports published in 2016-2018. the study showed that loan to deposit ratio (LDR) has a negative effect and has no significant effect on profitability.

Handayani *et al.* (2024) analyzed the effect of non-performing loans and loan to deposit ratio on profitability with inflation as a moderating variable in banking companies listed on Indonesia stock exchange period 2018-2022. The results of this study showed that non-performing loans have a negative effect on profitability and loan to deposit ratio has a positive effect on profitability. Meanwhile, inflation cannot moderate the relationship between non-performing loans and loan to deposit ratio to profitability. Suroso (2022) determined the effect of the capital adequacy ratio and loan to deposit ratio (LDR) on the profitability of banks that go public on the Indonesia Stock Exchange (IDX) for the period 2016 - 2021. The study concluded that capital adequacy ratio and loan to deposit ratio have significant effect on return on assets. Do *et al.* (2020) examined the effect of non-performing loans on profitability of commercial banks of Vietnam in the period of 2008 to 2017. The results showed that when the rate of nonperforming loans increases, the bank's ROA will decrease, meaning that the bank profitability will be lowered. Furthermore, the results have pointed out that in the case of Vietnam, the loans to deposits rate and the growth of GDP both have impact on the bank's performance; while the bank size does not matter. Alshebmi *et al.* (2020) assessed the non-performing loans and their effect on banks profitability in the Saudi Arabia banking sector. The correlation result showed a negative insignificant weak relationship between nonperforming loans ratio (NPLs) and return on assets ratio (ROA), growth gross domestic product (GGDP), bank liquidity risk (BLQ), and credit risk. It further indicates a positive insignificant weak relationship between the NPL and capital adequacy ratio (CAR).

In Nepalese context, Gurung *et al.* (2023) analyzed the influence of loan loss provision on the profitability of commercial banks in Nepal. The study found insignificant relation between provisions for loan losses with the Nepalese commercial banks' profitability. The study concluded that the increased provision for loan losses adversely affects profitability of commercial banks. Reshmi (2023) examined the impact of nonperforming loan on the profitability of Nepalese commercial banking sector. The study found that nonperforming loan ratio have major effect on the Nepalese commercial bank's profitability. This implies that the burning issue of rise in NPL can be attributed to decline in the Nepalese bank's profits. The study found that the profitability of the commercial banks in Nepal is influenced by other factors such as loan-to-deposit ratio and bank size. Neupane (2020) investigated the key determinants of profitability of Nepalese commercial banks. The study concluded that the profitability of Nepalese commercial banks measured by return on assets is significantly influenced by the external factors. Among external factors, industry specific factors have high degree of impact on return on assets. Further, the profitability measured by net interest margin (NIM) is significantly influenced only by capital adequacy, absolute number of branches and annual inflation rate. Bhandari (2023) examined the effect of credit performance and interest spread on the profitability of commercial banks in Nepal using panel least squares regression model. The study found that nonperforming loan ratio had a negative and statistically significant impact on return on asset, whereas interest rate spread had a positive

and statistically significant impact on return on asset. However, credit to deposit ratio had a positive but statistically insignificant impact on return on asset.

The above discussion shows that empirical evidences vary greatly across the studies on the effect of liquidity risk, credit risk, and market risk on bank profitability. Though there is above-mentioned empirical evidence in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The major objective of this study is to examine the effect of liquidity risk, credit risk, and market risk on the profitability of Nepalese commercial banks. Specifically, it examines the effect of interest spread rate, loan loss provision, non-performing loan, capital adequacy ratio, net interest margin, leverage, loan to deposit ratio on return on assets and return on equity of Nepalese commercial banks.

The remainder of this study is organized as follows. Section two describes the sample, data and methodology. Section three presents the empirical results and the final sections draws conclusion.

2. Methodological aspects

The study is based on the secondary data which were gathered from 10 Nepalese commercial banks for the study period from 2013/14 to 2022/23, leading to a total of 100 observations. The study has employed purposive sampling method. The main sources of data include Banking and Financial Statistics published by Nepal Rastra Bank, reports published by Ministry of Finance and the annual report of respective banks. This study is based on descriptive as well as causal comparative research designs. Table 1 shows the list of commercial banks selected for the study along with the study period and number of observations.

Table 1

List of commercial banks selected for the study along with study period and number of observations

S.N.	Name of the banks	Study period	Observations
1	Nepal bank Limited	2013/14 -2022/23	10
2	Agricultural Development Bank Limited	2013/14 -2022/23	10
3	Everest Bank Limited	2013/14 -2022/23	10
4	Siddhartha Bank Limited	2013/14 -2022/23	10
5	NIC Asia Bank Limited	2013/14 -2022/23	10
6	Nepal SBI Bank Limited	2013/14 -2022/23	10
7	Prime Commercial Bank Limited	2013/14 -2022/23	10
8	Sanima Bank Limited	2013/14 -2022/23	10
9	Standard Chartered Bank Nepal Limited	2013/14 -2022/23	10
10	Machhapuchchhre Bank Limited	2013/14 -2022/23	10
Total number of observations			**100**

Thus, the study is based on 100 observations.

The model

The model used in the study assume that bank profitability depends upon liquidity risk, credit risk, and market risk. The dependent variables selected for the study are return on assets and return on equity. Similarly, the selected independent variables are loan loss provision, interest rate spread, loan to deposit, net interest margin, capital adequacy ratio, leverage, non-performing loan. Therefore, the model takes the following forms:

$$ROA = \beta_0 + \beta_1 ISR + \beta_2 LLP + \beta_3 NPL + \beta_4 CAR + \beta_5 NIM + \beta_6 LEV + \beta_7 LTD + e_{it}$$

$$ROE = \beta_0 + \beta_1 ISR + \beta_2 LLP + \beta_3 NPL + \beta_4 CAR + \beta_5 NIM + \beta_6 LEV + \beta_7 LTD + e_{it}$$

Where,

ROA = Return on assets as measured by the ratio of net income to total assets, in percentage.

ROE = Return on equity as measured by the ratio of net income to total equity, in percentage.

CAR = Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage.

NPL = Non-performing loan ratio as measured by the ratio of non-performing loan to total loans, in percentage.

NIM =Net interest margin as measured by the ratio of net interest income to bank's interest-earning assets, in percentage.

ISR= Interest rate spread as measured by the difference between the interest rate earned on loans and the interest rate paid on deposits, in percentage.

LLP= Loan loss provision as measured by the amount set aside to cover potential loan losses, in percentage.

LEV = Leverage as measured by the ratio of total debt to total equity, in percentage.

LTD= Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percentage.

The following section describes the independent variables used in this study along with the hypothesis formulation:

Interest rate spread

Bhandari (2023) examined the effect of credit performance and interest spread on the profitability of commercial banks in Nepal using panel least squares regression model. The study used data from 16 commercial banks (2013-2021) and found that the interest rate spread (IRS) positively and significantly affect the return on assets (ROA). Musah *et al.* (2018) analyzed the effect of interest rate spread on the profitability of 24 commercial banks in Ghana over ten years. Using net interest income and net interest margin (NIM) to measure IRS, and ROA and return on equity (ROE) to measure profitability, the study found a positive and significant association between IRS and bank profitability. Ndiritu *et al*. (2024) investigated the impact of IRS on the performance of 42 commercial banks in Kenya (2008-2018) using a random effects model. The study reported a positive and significant relationship between IRS and bank performance. Based on it, this study develops the following hypothesis:

H_1: There is a positive relationship of interest rate spread on return on equity and return on

assets.

Loan loss provision

Nwanna and Oguezue (2017) concluded that non-performing loan and loan loss provision are negatively related to profitability of banks. Further, Afriyie and Akotey (2012) found a negative relationship between non-performing loans, loan loss provision and bank profitability. Gurung *et al.* (2023) examined the loan loss provision maintained by Nepalese commercial banks. The study also analysed the influence of loan loss provision on the profitability of commercial banks in Nepal. The study found that the increased provision for loan losses adversely affects the profitability of commercial banks in Nepal. Dahal *et al.* (2024) analyzed the influence of loan loss provision on the profitability of commercial banks in Nepal. The study found insignificant negative relation between provisions for loan losses with the Nepalese commercial banks' profitability. Based on it, the study develops following hypothesis:

H_2: There is a negative relationship of loan loss provision on return on equity and return on assets.

Non-performing loan

Banks might take on risky loans to boost short-term profits, which could result in a temporary increase in ROE and ROA. However, as these loans begin to default, NPLs rise, and the bank's profitability declines. Anggriani and Muniarty (2020) stressed that banks should lower the level of non-performing loan to increase return on asset suggesting a negative relationship between non-performing loan and profitability. Brastama and Yadnya (2020) concluded that non-performing loan is negatively related to bank profitability. Moreover, Dewi and Badjra (2020) revealed that non-performing loan has a negative relationship with bank profitability. Based on it, the study develops following hypothesis:

H_3: There is a positive relationship of non-performing loan on return on equity and return on assets.

Capital adequacy ratio

Balami and Chalise (2023) examined the impact of capital adequacy on the profitability of commercial banks in Nepal, utilizing secondary data from all commercial banks spanning 2013 to 2022. The study concluded that capital adequacy ratio has a positive impact on bank profitability. Uddin (2022) analyzed the influence of leverage, non-performing loan, and capital adequacy ratio on the profitability of commercial banks in Bangladesh. The study found that the capital adequacy ratio (CAR) has a positive and significant effect on ROA. Benkheznadji *et al.* (2024**)** measured the impact of the capital adequacy ratio as required by the Basel Committee on a set of bank's profitability that operating in the Middle East countries and North Africa, during the period (2014-2020). The study found that the capital adequacy ratio has a significant positive impact on return on equity. Based on it, the study develops following hypothesis:

H_4: There is a positive relationship of capital adequacy ratio on return on equity and return on assets.

Net interest margin

Promise *et al.* (2024) assessed the effect of net interest margin on financial

performance of deposit money banks in Nigeria. The study established that net interest margin is statistically significant and has a positive effect. Chronopoulos *et al*. (2015) showed a positive association between assets growth, interest margin and bank profitability in the context of US bank. Neupane (2020) investigated the profitability determinants of Nepalese commercial banks. The study found net interest margin as a key determinant of profitability of Nepalese commercial banks. Based on it, the study develops following hypothesis:

H_5: There is a positive relationship of net interest margin on return on equity and return on assets.

Leverage

Uddin (2022) examined the effect of leverage, operating efficiency, non-performing loan, and capital adequacy ratio on profitability of commercial banks in Bangladesh. The study found that the debt-equity ratio (DER) has a negative and insignificant influence on profitability (ROA). Taees (2023) identified the impact of the use of financial leverage on the profitability of Iraqi commercial banks. This study recommended the need to direct Iraqi commercial banks to finance by increasing capital and using retained earnings, and not relying on debt financing (financial leverage) due to the negative impact of financial leverage on profitability. Based on it, the study develops following hypothesis:

H_6: There is a negative relationship of leverage on return on equity and return on assets.

Loan to deposit

Suroso (2022) determined the effect of the capital adequacy ratio and loan to deposit ratio (LDR) on the profitability of banks that go public on the Indonesia Stock Exchange (IDX) for the period 2016 - 2021. The study concluded loan to deposit ratio has a negative effect on ROA. Pinasti and Mustikawati (2018) showed that loan to deposit ratio (LDR) has a negative effect on profitability. Hapsari (2018) concluded loan to deposit ratio has a negative effect on financial performance. Based on it, the study develops following hypothesis:

H_7: There is a negative relationship of loan to deposit on the return on equity and return on assets.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2013/14 to 2022/23.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 10 Nepalese commercial banks for the study period from 2013/14 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage) and ROE (Return on equity as measured by the ratio of net income to total equity, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), ISR (Interest rate spread as measured by the difference between the interest rate earned on loans and the interest rate paid on deposits, in percentage), LLP (Loan loss provision as measured by the amount set aside to cover potential loan losses, in percentage), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage as

measured by the ratio of total debt to total equity, in percentage), NIM (Net interest margin as measured by the ratio of net interest income to bank's interest-earning assets, in percentage) and NPL (Non-performing loan ratio as measured by the ratio of non-performing loan to total loans, in percentage).

Variables	Minimum	Maximum	Mean	Std. Deviation
ISR	0.00	8.99	4.06	1.44
LLP	-1.40	2.36	0.26	0.37
NPL	0.00	5.41	0.97	1.30
CAR	4.55	23.68	13.96	2.67
NIM	0.91	5.60	3.28	0.81
L	0.00	74.98	19.38	21.50
LTD	57.00	107.01	79.06	9.05
ROA	0.13	3.57	1.63	0.56
ROE	3.79	54.68	15.99	7.03

Source: SPSS output

Correlation analysis

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and the results are presented in Table 3.

Table 3

Pearson's correlation coefficients matrix

This table shows the descriptive statistics of dependent and independent variables of 10 Nepalese commercial banks for the study period from 2013/14 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage) and ROE (Return on equity as measured by the ratio of net income to total equity, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), ISR (Interest rate spread as measured by the difference between the interest rate earned on loans and the interest rate paid on deposits, in percentage), LLP (Loan loss provision as measured by the amount set aside to cover potential loan losses, in percentage), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage as measured by the ratio of total debt to total equity, in percentage), NIM (Net interest margin as measured by the ratio of net interest income to bank's interest-earning assets, in percentage) and NPL (Non-performing loan ratio as measured by the ratio of non-performing loan to total loans, in percentage).

Variables	ISR	LLP	NPL	CAR	NIM	L	LTD	ROA	ROE
ISR	1								
LLP	-0.145	1							
NPL	-0.260**	-0.229*	1						
CAR	0.137	-0.052	0.003	1					
NIM	0.231	0.219*	0.544**	0.234*	1				
L	-0.029	0.348**	-0.113	-0.177	0.132	1			
LTD	0.147	0.059	0.130	0.089	0.114	0.292**	1		
ROA	0.068	-0.571**	-0.131	0.357**	0.483**	-0.467**	-0.046	1	
ROE	0.148	-0.375**	-0.077	0.372**	0.207*	-0.165	-0.379**	0.420**	1

Note: The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent levels respectively.

Table 3 shows that loan to deposit is negatively correlated to return on equity. It shows that increase in loan to deposit leads to decrease in return on equity. Similarly, leverage is negatively correlated to return on equity. It implies that increase in leverage leads to decrease in return on equity. Likewise, there is a negative relationship between loan loss provision and return on equity. It shows that increase in loan loss provision leads to decrease in return on equity. However, net interest margin is positively correlated to return on equity. It means that increase in net interest margin leads to increase in return on equity. Likewise, there is a positive relationship between capital adequacy ratio and return on equity. It means that increase in capital adequacy ratio leads to increase in return on equity. Similarly, there is a negative relationship between non-performing loan and return on equity. It means that increase in non-performing loan leads to decease in return on equity. Furthermore, there is positive relationship between interest spread rate and return on equity. It means that increase in interest spread rate leads to increase in return on equity.

On the other hand, net interest margin is positively correlated to return on assets. It shows that increase in net interest margin leads to increase in return on assets. Similarly, capital adequacy ratio is positively correlated to return on assets. It implies that increase in capital adequacy ratio leads to increase in return on assets. Likewise, there is a negative relationship between non-performing loan and return on assets. It shows that increase in non-performing leads to decrease in return on assets. Similarly, interest spread rate is positively correlated to return on assets. It means increase in interest spread rate leads to increase in return on assets. However, there is a negative relationship between loan loss provision and return on assets. It means that increase in loan loss provision leads to decrease in return on assets. Likewise, there is a negative relationship between loan to deposit and return on assets. It means that increase in loan to deposit leads to decrease in return on assets. Furthermore, there is a negative relationship between leverage and return on assets. It means that increase in leverage leads to decrease in return on assets.

Regression analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4 and Table 5. More specifically, Table 4 shows the regression results of interest spread rate, loan loss provision, non-performing loan, capital adequacy ratio, net interest margin, leverage and loan to deposit ratio on return on assets of Nepalese commercial banks.

Table 4

Estimated regression results of interest spread rate, loan loss provision, non-performing loan, capital adequacy ratio, net interest margin, leverage and loan to deposit ratio on return on assets

The results are based on panel data of 10 commercial banks with 100 observations for the period 2013/14 to 2022/23 by using linear regression model. The model is $ROA = \beta_0 + \beta_1 ISR + \beta_2 LLP + \beta_3 NPL + \beta_4 NIM + \beta_5 CAR + \beta_6 L + \beta_7 LTD + e_{it}$ where the dependent variable is ROA (Return on assets as measured by the ratio of net income to total assets, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), ISR (Interest rate spread as measured by the difference between the interest rate earned on loans and the interest rate paid on deposits, in percentage), LLP (Loan loss provision as measured by the amount set aside to cover potential loan losses, in percentage), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage as measured by the ratio of total debt to total equity, in percentage), NIM (Net interest margin as measured by the ratio

of net interest income to bank's interest-earning assets, in percentage) and NPL (Non-performing loan ratio as measured by the ratio of non-performing loan to total loans, in percentage).

Model	Intercept	Regression coefficients of							Adj. R_bar^2	SEE	F-value
		ISR	LLP	NPL	CAR	NIM	L	LTD			
1	1.53	0.026							0.006	0.567	0.449
	(9.022)	(0.670)									
2	1.869		-0.868						0.319	0.466	47.453
	(32.585)		(6.889)								
3	1.584			-0.057					0.007	0.563	1.722
	(22.431)			(1.312)							
4	0.585				0.075				0.119	0.531	14.325
	(2.063)				(3.785)						
5	0.530					0.337			0.225	0.498	29.818
	(2.537)					(5.461)					
6	1.878						-0.012		0.211	0.502	27.408
	(27.675)						(5.235)				
7	1.864							-0.003	0.008	0.568	0.204
	(3.716)							(0.452)			
8	1.894	0.006	0.871						0.313	0.469	23.510
	(12.617)	(0.185	(6.809)								
9	1.894	0.006	-0.870	-0.002					0.305	0.471	15.513
	(12.509)	(0.191)	(6.626)	(0.050)							
10	0.824	0.013	-0.836	-0.002	0.070				0.411	0.434	18.262
	(2.870)	(0.426)	(6.893)	(0.056)	(4.264)						
11	0.296	0.008	-0.785	-0.097	0.047	0.310			0.535	0.385	23.777
	(1.075)	(0.291)	(7.258)	(2.656)	(3.085)	(5.133)					
12	0.512	0.007	-0.657	-0.101	0.039	0.309	-0.007		0.588	0.363	24.552
	(1.926)	(0.278)	(6.105)	(2.935)	(2.660)	(5.440)	(3.621)				
13	0.419	0.009	-0.658	-0.102	0.038	0.308	-0.007	0.001	0.584	0.365	20.860
	(1.087)	(0.322)	(6.077)	(2.940)	(2.558)	(5.406)	(3.518)	(3.333)			

Notes:

i. Figures in parenthesis are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Return on assets is the dependent variable.

Table 4 shows that the beta coefficients for interest spread rate are positive with return on assets. It indicates that interest spread rate has positive impact on return on assets. This finding is similar to the findings of Bhandari (2023). Similarly, the beta coefficients for non-performing loan are negative with return on assets. It indicates that non-performing loan has a negative impact on return on assets. This finding is consistent with the findings of Handayani *et al.* (2024). Likewise, the beta coefficients for capital adequacy ratio are positive with return on assets. It indicates that capital adequacy ratio has a positive impact on return on assets. This finding is similar to the findings of Mulbah *et al.* (2024). Similarly, the beta coefficients for net interest margin are positive with return on assets. It indicates that the net interest margin has a positive impact on return on assets. This finding is consistent with the findings of Promise *et al.* (2024). However, the beta coefficients for loan loss provision are negative with return on assets. It indicates that loan loss provision has a negative impact on return on assets. This finding is similar to the findings of Gurung *et al.* (2024).

Table 5 shows the regression results of interest spread rate, loan loss provision, non-performing loan, capital adequacy ratio, net interest margin, leverage and loan to deposit on return on equity of Nepalese commercial banks.

Table 5

Estimated regression results of interest spread rate, loan loss provision, non- performing loan,

capital adequacy ratio, net interest margin, leverage and loan to deposit on return on equity

The results are based on panel data of 10 commercial banks with 100 observations for the period 2013/14 to 2022/23 by using linear regression model. The model is ROE = β_0 + β_1 ISR + β_2 LLP + β_3 NPL + β_4 NIM + β_5 CAR + β_6 *L* + β_7 LTD + e_{it} where the dependent variable is ROE (Return on equity as measured by the ratio of net income to total equity, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), ISR (Interest rate spread as measured by the difference between the interest rate earned on loans and the interest rate paid on deposits, in percentage), LLP (Loan loss provision as measured by the amount set aside to cover potential loan losses, in percentage), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage as measured by the ratio of total debt to total equity, in percentage), NIM (Net interest margin as measured by the ratio of net interest income to bank's interest-earning assets, in percentage) and NPL (Non-performing loan ratio as measured by the ratio of non-performing loan to total loans, in percentage).

Model	Intercept	Regression coefficients of							Adj. R_bar^2	SEE	F-value
		ISR	LLP	NPL	CAR	NIM	L	LTD			
1	13.082	0.717							0.012	6.994	2.184
	(6.251)	(1.478)									
2	17.869		-7.087						0.132	6.556	16.048
	(22.194)		(4.006)								
3	15.588			0.417					0.004	7.051	0.591
	(17.660)			(0.769)							
4	29.637				0.976				0.129	6.565	15.704
	(8.458)				(3.963)						
5	10.081					1.798			0.033	6.918	4.399
	(3.471)					(2.097)					
6	17.043						-0.054		0.017	6.975	2.741
	(18.108)						(1.656)				
7	39.265							-0.294	0.135	6.545	16.424
	(6.795)							(4.053)			
8	15.919	0.463	-6.826						0.132	6.555	8.532
	(7.590)	(1.007)	(3.818)								
9	15.975	0.501	-6.950	-0.181					0.124	6.585	5.674
	(7.558)	(1.054)	(3.791)	(0.339)							
10	31.400	0.213	-7.450	-0.125	1.015				0.266	6.026	9.992
	(7.886)	(0.484)	(4.431)	(0.255)	(4.432)						
11	26.367	0.005	-6.968	-1.027	1.235	2.950			0.335	5.737	10.985
	(6.450)	(0.012)	(4.335)	(1.898)	(5.415)	(3.290)					
12	27.570	0.010	-6.258	-1.049	1.282	2.945	-0.037		0.340	5.717	9.491
	(1.926)	(0.278)	(6.105)	(2.935)	(2.660)	(5.440)	(3.621)				
13	44.754	0.254	-6.239	-0.828	1.282	3.018	-0.002	-0.272	0.444	5.246	12.302
	(8.077)	(0.650)	(4.012)	(1.662)	(2.660)	(3.681)	(0.066)	(4.298)			

Notes:

i. Figures in parenthesis are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Return on equity is the dependent variable.

Table 5 shows that the beta coefficients for interest spread rate are positive with return on equity. It indicates that interest spread rate has positive impact on return on equity. This finding is similar to the findings of Musah *et al.* (2018). However, the beta coefficients for loan loss provision are negative with return on equity. It indicates that loan loss provision have a negative impact on return on equity. This finding is consistent with the findings of Dahal *et al.* (2024). Similarly, the beta coefficients for non-performing loan are negative with return on equity. It indicates that non-performing loan has a negative impact on return on equity. This finding is similar to the findings of Anggriani and Muniarty (2020). Likewise, the beta coefficients for capital adequacy ratio are positive with return on equity. It indicates

that capital adequacy ratio has a positive impact on return on equity. This finding is consistent with the findings of Benkheznadji *et al.* (2024**)**. Moreover, the beta coefficients for net interest margin are positive with return on equity. It indicates that the net interest margin has a positive impact on return on equity. This finding is similar to the findings of Promise *et al.* (2024).

4. Summary and conclusion

The profitability of Nepalese commercial banks is significantly influenced by liquidity risk, credit risk, and market risk. Effective management practices are crucial for mitigating these risks. Banks need to adopt robust risk management frameworks to ensure adequate liquidity, minimize credit losses, and manage market exposures. Balancing these aspects efficiently can help in maintaining or enhancing profitability, while poor management of these risks can adversely affect financial performance.

This study attempts to examine the effect of liquidity risk, credit risk, and market risk on the profitability of Nepalese commercial banks. The study is based on secondary data of 10 commercial banks with 100 observations for the period from 2013/14 to 2022/23.

The study showed that interest spread rate, capital adequacy ratio and net interest margin have positive effect on return on assets and return on equity of Nepalese commercial banks. Similarly, loan loss provision, non-performing loan, leverage and loan to deposit ratio have negative effect on return on assets and return on equity of Nepalese commercial banks. The study concluded that key financial metrics, such as the interest spread rate, capital adequacy ratio, and net interest margin, positively influence the return on assets (ROA) and return on equity (ROE), thereby contributing to the overall financial health and stability of Nepalese commercial banks. Conversely, factors like loan loss provision, non-performing loans, leverage, and the loan-to-deposit ratio negatively impact ROA and ROE, underscoring the challenges faced by banks in managing credit risk and maintaining financial efficiency. The study also concluded that effective management of these variables is crucial for enhancing the profitability and sustainability of Nepalese commercial banks.

References

Afriyie, H. O., and J. O. Akotey, 2012. Credit risk management and profitability of selected rural banks in Ghana. *Ghana: Catholic University College of Ghana* 7(4), 176-181.

Aghion, P., P. Bacchetta, and A. Banerjee, 2004. Financial development and the instability of open economies. *Journal of Monetary Economics* 51(6), 1077-1106.

Al-Habashneh, A. G., 2022. Impact of financial leverage and return on investment on the profitability of Jordanian commercial banks. *International Journal of Academic Research in Accounting and Management Sciences* 12(3), 804-822.

Alshebmi, A. S., M. H. M. Adam, A. M. Mustafa, and M. T. D. O. E Abdelmaksoud, 2020. Assessing the non-performing loans and their effect on banks profitability: Empirical evidence from the Saudi Arabia banking sector. *International Journal of Innovation* 11(8), 69-93.

Anggriani, R., and P. M. Muniarty, 2020. The effect of non-performing loans (NPL) and capital adequacy ratio (CAR) on profitability (ROA) at PT. Bank Central Asia (BCA), TBK. *Ilomata International Journal of Management* 1(3), 121-126.

Balami, S., and D. R. Chalise, 2023. Capital adequacy and its influence on bank profitability in Nepal. *International Journal of Silkroad Institute of Research and Training* 1(2), 106-114.

Benkheznadji, A., Q. S. Shukri, and F. Bensalem, 2024. The effect of capital adequacy on profitability-panel data evidence from North Africa and Middle East Commercial Banks (2014-2020). *Journal of North African Economies* 20(34), 57-70.

Bhandari, N. R., 2023. Effect of credit performance and interest spread on profitability of commercial banks in Nepal. *Nepalese Journal of Management Research* 3(1), 50-58.

Brastama, R. F., and I. P. Yadnya, 2020. The effect of capital adequacy ratio and non-performing loan on banking stock prices with profitability as intervening variable. *American Journal of Humanities and Social Sciences Research* 4(12), 43-49.

Chronopoulos, D. K., H. Liu, F. J. McMillan, and J. O. Wilson, 2015. The dynamics of US bank profitability. *The European Journal of Finance* 21(5), 426-443.

Dahal, S., R. Gurung, R. K. Dahal, and B. Ghimire, 2024. The influence of non-performing loans on the profitability of Nepal's national level development bank. *Nepalese Journal of Management Science and Research* 7(1), 210-223.

Dewi, N. K. C., and I. B. Badjra, 2020. The effect of NPL, LDR and operational cost of operational income on ROA. *American Journal of Humanities and Social Sciences Research* 4(7), 171-178.

Do, H., T. Ngo, and Q. Phung, 2020. The effect of non-performing loans on profitability of commercial banks: Case of Vietnam. *Accounting* 6(3), 373-386.

Gurung, R., B. Ghimire, and P. Dahal, 2023. Exploring the impact of loan loss provision on profitability: an analysis of commercial banks in Nepal. *Journal of Business and Management* 7(2), 61-75.

Handayani, S., F. N. Nasution, and N. B. Siregar, 2024. The effect of non-performing loans and loan to deposit ratio on profitability with inflation as a moderating variable in banking companies listed on Indonesia stock exchange period 2018-2022. *International Journal of Current Science Research and Review* 7(5), 2771-2780.

Hapsari, I., 2018. Moderating role of size in the effect of loan to deposit ratio and non-performing loan toward banking financial performance. *Research Journal of Finance and Accounting* 23(5), 351-354.

Mirzaei, A., T. Moore, and G. Liu, 2013. Does market structure matter on banks' profitability and stability? Emerging vs. advanced economies. *Journal of Banking and Finance* 37(8), 2920-2937.

Mulbah, K. T., S. Kurbonov, and B. Nasriddinov, 2024. The effect of bank size, net interest margin, and capital adequacy ratio on commercial banks' return on assets, Empirical Evidence from Tanzania. *European Scientific Journal* 28(1), 474-479.

Musah, A., F.K. Anokye, and E. D. Gakpetor, 2018. The impact of interest rate spread on bank profitability in Ghana. *European Journal of Business, Economics and Accountancy* 6(1), 27-39.

Ndiritu, G., C. Iraya, K. Okiro, and S. Nyandemo, 2024. The effect of interest rate spread on performance of commercial banks in Kenya. *European Journal of Business and Management Research* 9(3), 86-90.

Neupane, B. P., 2020. Profitability determinants of Nepalese commercial banks. *PressAcademia Procedia* 12(1), 40-45.

Nwanna, I. O., and F. C. Oguezue, 2017. Effect of credit management on profitability of deposit money banks in Nigeria. *International Journal of Banking and Finance Research* 3(2), 137-160.

Pinasti, W. F., and R. I. Mustikawati, 2018. Pengaruh CAR, BOPO, NPL, NIM dan LDR terhadap profitabilitas bank umum periode 2011-2015. *Nominal Barometer Riset Akuntansi dan*

Management 7(1), 126-142.

Promise, E., A. C. Chidi, E. J. Kelechi, and O. V. Chik, 2024. Effect of net interest margin on financial performance of Deposit Money Banks in Nigeria. *Journal of Multidisciplinary Cases* 4(4), 1-11.

Reshmi, B., 2023 Non-performing loan and profitability of commercial banks in Nepal. *International Journal of Finance and Commerce* 5(2), 43-50.

Suroso, S., 2022. Analysis of the effect of capital adequacy ratio (CAR) and loan to deposit ratio (LDR) on the profits of go public banks in the Indonesia Stock Exchange (IDX) Period 2016–2021. *Economit Journal: Scientific Journal of Accountancy, Management and Finance* 2(1), 45-53.

Taees, K. M., 2023. The impact of using financial leverage on the profitability of commercial banks: An analytical study of a sample of Iraqi Commercial Banks. *Tikrit Journal of Administrative and Economic Sciences* 19(61), 454-467.

Uddin, M. K., 2022. Effect of leverage, operating efficiency, non-performing loan, and capital adequacy ratio on profitability of commercial banks in Bangladesh. *European Journal of Business and Management Research* 7(3), 289-295.