Impact of Capital Adequacy Ratio, Net Interest Margin, and Debt to Equity Ratio on the Financial Performance of Nepalese Commercial Banks

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Abstract

This study examines the impact of capital adequacy ratio, net interest margin, and debt-equity ratio on the financial performance of Nepalese commercial banks. Return on assets (ROA) and return on equity (ROE) are the selected dependent variables. The selected independent variables are non-performing loans, capital adequacy ratio, net interest margin, loan-to-deposit ratio, debt to equity ratio, and bank size. The study is based on secondary data of 15 commercial banks with 105 observations for the study period from 2015/16 to 2021/22. The data were collected from Bank Supervision Report published by Nepal Rastra Bank (NRB) and annual reports of the selected commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of capital adequacy ratio, net interest margin, and debt-equity ratio on the financial performance of Nepalese commercial banks.

The study showed that non-performing loan has a negative impact on return on assets and return on equity. It indicates that increase in non-performing loan leads to decrease in return on assets and return on equity. Similarly, capital adequacy ratio has a negative impact on return on assets and return on equity. It indicates that increase in capital adequacy ratio leads to decrease in return on assets and return on equity. Likewise, net interest margin has a positive impact on return on assets and return on equity. It indicates that increase in net interest margin leads to increase in return on assets and return on equity. In contrast, loan-to-deposit ratio has a negative impact on return on assets and return on equity. It indicates that higher the loan-to-deposit ratio, lower would be the return on assets and return on equity. In addition, debt-to-equity ratio has a negative impact on return on assets and return on equity. It indicates that increase in debt-to-equity ratio leads to decrease in return on assets and return on equity. Moreover, bank size has a positive impact on return on assets and return on equity. It indicates that larger the bank size, higher would be the return on assets and return on equity.

Keywords: non-performing loans, capital adequacy ratio, net interest margin, loan-to-deposit ratio, debt to equity ratio bank size, return on assets, return on equity

1. Introduction

The banking sector is the driving force for a country's economy. Bank performance greatly affects the level of public trust, so it is important for banks to maintain good performance (Safitri *et al.,* 2020). Poor bank performance will lead to failure and lead to financial crises that will have negative consequences for economic development. Profit is one of the main goals of the banking industry. Performance is the company's ability to earn profits or a measure of the effectiveness of company management. A high

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level of performance indicate that the bank is working efficiently. A high level of performance can also illustrate that the productivity of the bank is getting better, and can show the development of the bank itself. Therefore, performance is very important both for the bank itself and for the customers (Suyono *et al.,* 2017). Similarly, Athanasoglou *et al.* (2006) stated that the banking sector acts as the life blood of modern trade and commerce to provide them with a major source of finance. This increasing phenomenon of globalization has made the concept of efficiency more important both for the non-financial and financial institutions and banks are the part of them. Banks largely depends on competitive marketing strategy that determines their success and growth. The modalities of the banking business have changed a lot in the new millennium compared to the way they used to be in the years bygone (Hussain and Bhatti, 2010).

Ramadhanti *et al.* (2019) examined the effect of capital adequacy, liquidity and credit risk on the performance of commercial banks. The study revealed that capital adequacy ratio (CAR) has a significant positive impact on performance. Similarly, non-performing loan (NPL) has a negative and significant impact on financial performance. Similarly, Rajindra *et al.* (2021) examined the effect of costs and operational revenue and loan to deposit ratio on return on assets in the context of Indonesia. The study found that operational costs, operational income, and loan to deposit ratio have significant impact on ROA. Similarly, operational costs and operational income have significant negative impact on return on assets. Moreover, Setiawan and Nupus (2021) analyzed the effect of capital adequacy ratio and loan to deposit ratio on banking performance. The result found that capital adequacy ratio (CAR) and loan to deposit ratio (LDR) have positive and significant influence on the performance in State Owned Banks. However, asset size has a positive and significant impact on performance in foreign bank. Likewise, Agustiningrum (2013) analyzed the impacts of non-performing loans (NPL) and loan to deposit ratio (LDR) towards performance. The study showed that loan to deposit ratio has a positive and significant impact on performance. In contrast, Ahmad *et al.* (2012) revealed that loan to deposit ratio has a negative and significant impact on the performance.

Hadian (2021) examined the effect of non-performing loans and loan to deposit ratio on return on assets in the banking industry. The study revealed that non-performing loan has a negative impact on return on assets. Similarly, loan to deposit ratio has a positive and significant impact on return on assets. Similarly, Lawati (2021) examined the effect of loan to deposit ratio and debt to equity ratio on return on equity. The results showed that loan to deposit ratio has a positive and significant impact on return on equity. In addition, Brastama and Yadnya (2020) analyzed the effect of capital adequacy ratio and

non-performing loan on banking stock prices with performance as intervening variable. The results stated that capital adequacy ratio has a positive impact on return on assets. Similarly, the non-performing loan has a negative impact on return on assets. Moreover, Sukmadewi (2020) examined the effect of capital adequacy ratio, loan to deposit ratio, operating-income ratio, non-performing loans, and net interest margin on banking financial performance. The results revealed that capital adequacy ratio, non-performing loan, and loan to deposit ratio have positive and significant impact on return on assets. Similarly, Solihati (2020) analyzed the factors affecting banking performance. The results revealed that non-performing loan and capital adequacy ratio have significant impact on return on assets (ROA). Meanwhile, non-performing loan has a significant and negative impact on return on assets (ROA) and capital adequacy ratio is not significantly affected by return on assets (ROA). Moreover, Utu (2019) examined non-performing loan, net interest margin, and loan to deposit ratio as well as their effects on return on asset in bank Sultra. The results revealed that non-performing loan (NPL) and loan to deposit ratio (LDR) have positive and significant impact on return on assets (ROA).

Dao (2020) investigated bank capital adequacy ratio and bank performance in Vietnam. The study concluded that capital adequacy ratio has a statistically significant relationship with bank performance. Likewise, the results stated that expenses ratio and the non-performing loan play crucial role in explaining the performance of rural banks in Indonesia. The study also indicated that efficiency and prudence in management policies for banking industry in Indonesia becomes more important. Likewise, Chou and Buchdadi (2016) examined the bank performance and its underlying factors in rural banks in Indonesia. The study stated that expenses ratio and non-performing loan play crucial role in explaining the performance of bank. Moreover, Samad (2015) explored the determinants of financial performance of Bangladesh's commercial banks. The study empirically concluded that bank specific factors such as loan to deposit ratio, loan loss provision to total assets, equity capital to total assets, and operating expenses to total assets are significant factors. The study also concluded that bank size and macroeconomic variables have no impacts on bank profit. Likewise, Rahman *et al*. (2015) examined the determinants of financial performance of Bangladesh's banks. The results found that bank size has a positive and significant impact on return on assets (ROA) and inflation has a negative and significant impact on return on assets (ROA) and return on equity (ROE).

Safitri and Oktavia (2022) analyzed the role of interest rates on the effect of non-performing loans and capital adequacy ratios on banking performance. The study revealed that non-performing loan has a negative and significant effects on return on assets (ROA). Similarly, capital adequacy ratio has a

positive and significant effects on return on assets (ROA). Likewise, Wu (2020) examined the internal determinants of performance of commercial banks in China using panel data modeling. The study reported that return to assets is positively related to capital adequacy ratio and negatively associated with non-performing loan ratio and bank size. Moreover, Menicucci and Paolucci (2016) assessed the relationship between bank-specific characteristics and performance in European banking sector. The study found that capital adequacy ratio and size have positive impact on financial performance in Europe, while higher asset quality results in lower performance levels. Likewise, Jaouad and Lahsen (2018) examined the factors affecting bank performance in Morocco. The study revealed that bank size is positively and statistically significant with return on assets (ROA). Similarly, Almazari (2014) assessed the impact of internal factors on financial performance in the context of Saudi Arabia and Jordan. The study found that there is a negative correlation between bank size and return on assets.

Kingu *et al*. (2018) examined the impact of non-performing loans on bank's performance. The study revealed that occurrence of non-performing loan is negatively associated with the level of performance in commercial banks in Tanzania. Similarly, Silaban (2017) assessed the effect of capital adequacy ratio, net interest margin and non-performing loans on financial performance in Indonesia. The study concluded that capital adequacy ratio (CAR) does not have a significant effect on financial performance and non-performing loans (NPL) has a negative impacts on financial performance. Likewise, Anggari and Dana (2020) examined the effect of non-performing loans (NPL) and capital adequacy ratio (CAR) on performance measured by return on assets (ROA) at PT. Bank Central Asia (BCA), TBK. The study found that non-performing loans do not affect the return on assets. However, capital adequacy ratio has a significant impact on return on asset. Similarly, Martiningtiyas and Nitinegeri (2020) assessed the effect of non-performing loans on the performance of banking sector in Indonesia. The study revealed that non-performing loan has a significant and negative influence on performance of bank. Similarly, liquidity ratio and gross domestic product have significant positive influence on performance of bank whereas capital adequacy ratio does not have significant influence on performance of bank. In addition, Djaya and Yanuarti (2021) examined the influence of capital adequacy ratio and non-performing loan on the performance of commercial banks listed on Indonesia stock exchange. The results stated that the capital adequacy ratio and non-performing loan simultaneously affect the performance.

In the context of Nepal, Chalise (2019) examined the impacts of capital adequacy ratio and cost income ratio on the performance of Nepalese commercial banks. The study revealed that capital adequacy ratio has a

negative and an insignificant impacts with bank performance measured by return on assets. However, bank size has a positive and an insignificant impact on bank performance. Similarly, Adhikari *et al*. (2020) assessed the impact of bank capital, liquidity, and credit risk on the performance of Nepalese commercial banks. The study stated that liquidity ratio and non-performing loan have negative impacts on return on assets and return on equity. The study also revealed that bank capital has a significant impact on performance of Nepalese commercial banks. Likewise, Budhathoki *et al.* (2020) examined the impacts of liquidity, leverage, and total size on banks' performance. The study revealed that loan to deposit ratio has a negative effect on the bank's return on assets and return on equity. Further, Neupane (2020) found that the performance of Nepalese commercial banks is insignificantly affected by size of the bank, deposit amount, capital base, loan and advances, number of branches and activities relating to off-balance sheet as the internal factors. Similarly, Gnawali (2018) analyzed the non-performing asset and its effects on performance of Nepalese commercial banks. The study found a negative effect of the non-performing loans on return on assets in the context of Nepalese public banks. Moreover, capital adequacy ratio, loan to deposit ratio and loan loss provision have positive relationship with the performance of banks in Nepal. Likewise, Khati (2020) examined the impacts of liquidity on performance of Nepalese commercial banks. The study found that credit to deposit ratio has a positive significant relationship with financial performance.

The above discussion shows that empirical evidences vary greatly across the studies on the impact of capital adequacy ratio, net interest margin, and debt-equity ratio on the financial performance of commercial banks. Though there are above mentioned empirical evidences 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 the study is to examine the impact of capital adequacy ratio, net interest margin, and debt-equity ratio on the financial performance of Nepalese commercial banks. Specifically, it examines the relationship of non-performing loans, capital adequacy ratio, net interest margin, loan-to-deposit ratio, debt to equity ratio, and bank size with financial performance 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 section draws the conclusion.

2. Methodological aspects

The study is based on the secondary data which were collected from

15 Nepalese commercial banks from 2015/16 to 2021/22, leading to a total of 105 observations. The study employed stratified sampling method. Strata was formed on the basis of ownership structure. The main sources of data collected from the Bank Supervision Report published by Nepal Rastra Bank (NRB) and annual reports of the selected commercial 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
	Public banks		
1	Nepal Bank Limited	2015/16-2021/22	7
	Joint venture banks		
2	Himalayan Bank Limited	2015/16-2021/22	7
3	Everest Bank Limited	2015/16-2021/22	7
4	NMB Bank Limited	2015/16-2021/22	7
	Private banks		
5	Nabil Bank Limited	2015/16-2021/22	7
6	Kumari Bank Limited	2015/16-2021/22	7
7	Century Commercial Bank Limited	2015/16-2021/22	7
8	Machhapuchchhre Bank Limited	2015/16-2021/22	7
9	NIC Asia Bank Limited	2015/16-2021/22	7
10	Sanima Bank Limited	2015/16-2021/22	7
11	Siddhartha Bank Limited	2015/16-2021/22	7
12	Global IME Bank Limited	2015/16-2021/22	7
13	Sunrise Bank Limited	2015/16-2021/22	7
14	Prime Commercial Bank Limited	2015/16-2021/22	7
15	Citizens International Bank Limited	2015/16-2021/22	7
Total number of observations			105

Thus, the study is based on the 105 observations.

The model

The model used in this study assumes that financial performance depends upon capital adequacy ratio, net interest margin, and debt-equity ratio. The dependent variables selected for the study are return on assets and return on equity. Similarly, the selected independent variables are non-performing loans, capital adequacy ratio, net interest margin, loan-to-deposit ratio, debt

to equity ratio, and bank size. Therefore, the models take the following forms:

$$\text{ROA} = \beta_0 + \beta_1\,\text{NPL} + \beta_2\,\text{CAR} + \beta_3\,\text{NIM} + \beta_4\,\text{LDR} + \beta_5\,\text{DER} + \beta_6\,\text{BSIZE} + e_{it}$$

$$\text{ROE} = \beta_0 + \beta_1\,\text{NPL} + \beta_2\,\text{CAR} + \beta_3\,\text{NIM} + \beta_4\,\text{LDR} + \beta_5\,\text{DER} + \beta_6\,\text{BSIZE} + e_{it}$$

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.

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

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

NIM = Net interest margin as measured by the ratio of net interest income to total assets, in percentage.

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

DER = Debt to equity ratio as measured by the ratio of total debt to total equity, in percentage.

BSIZE = Bank size as measured by total assets, Rs. in billion.

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

Non-performing loan

Non-performing loan is measured as the percentage of non-performing loans to total loans. Similarly, non-performing loan is a loan where the borrower has stopped paying the installments on the principal (original amount) and interest (Singh *et al*., 2021). The level of credit crunch is usually indicated by the ratio of bank's non-performing loans (Alexandri and Santoso, 2015). Similarly, Kadioglu and Ocal (2017) investigated whether non-performing loans affect the bank's performance in Turkey. The study found that non-performing loan has a negative relationship with return on assets and return on equity. Similarly, Islam and Rana (2017) revealed a significant negative relationship between non-performing loan and performance of banks in Bangladesh as measured by return on equity. Moreover, Kwashie (2022) showed that non-performing loan has a negative impact on financial performance measured by return on assets and return on equity. Based on it, this study develops the following hypothesis.

H$_1$: There is a negative relationship between non-performing loan and financial performance.

Capital adequacy ratio

Capital adequacy ratio is measured as the summation of primary and supplementary capital divided by risk weighted assets. Kumar *et al.* (2020) investigated the relationship between monetary policy and financial performance in New Zealand. The study revealed that capital adequacy ratio is positively related to return on assets. Similarly, Almumani (2013) showed a positive relationship between capital adequacy ratio and performance of Jordanian banks. Moreover, Ariwidanta and Wiksuana (2018) determined the relationship between credit and liquidity risk to performance through the capital adequacy ratio as a mediating variable. The study concluded that capital adequacy ratio is positively related to return on assets. Likewise, Widyastuti *et al.* (2017) found that capital adequacy ratio has a positive impact on performance. Based on it, this study develops the following hypothesis.

H_2: There is a positive relationship between capital adequacy ratio and financial performance.

Net interest margin

Net interest margin is one of the factors that measure the bank efficiency. NIM is calculated by dividing net interest income by total assets. Ho and Saunders (1981) used net interest margin as a bank profit measure in the empirical study of bank. A higher net interest margin could reflect riskier lending practices associated with substantial loan loss provisions (Khrawish, 2011). Similarly, Hardiyanti *et al.* (2016) found that net interest margin has a positive effect on return on assets. Likewise, Pranowo *et al.* (2020) also showed a positive effect of net interest margin on return on assets. Similarly, Silaban (2017) revealed that high net interest margin ratios tend to indicate high profit growth as well. Based on it, this study develops the following hypothesis:

H_3: There is a negative relationship between net interest margin and financial performance.

Loan-to-deposit ratio

Loan to deposit ratio is measured by the ratio of total loan provided by the banks out of the deposit collected. Mehta and Bhavani (2017) examined the determinants of performance of UAE banks. The study showed that credit to deposit ratio is negatively related to return on assets and return on equity. Similarly, Chowdhury and Zaman (2018) found that credit to deposit ratio has a negative relationship with return on assets and return on equity. Likewise, Purbaningsih and Fatimah (2014) revealed that credit to deposit ratio is negatively related to return on assets. In addition, Suroso (2022) analyzed the effect of capital adequacy ratio (CAR) and loan to deposit ratio (LDR) on the profits of public banks in the Indonesia stock exchange. The study showed

that loan to deposit ratio has a negative effect on performance. Based on it, this study develops the following hypothesis.

H_4: There is a negative relationship between loan-to-deposit ratio and financial performance.

Debt to equity ratio

A company's financial leverage is measured by its debt/equity ratio, which is calculated by dividing its total liabilities by the value of its stockholders' equity. Profitability is negatively correlated to debt to equity (leverage) ratio (Shah *et al.*, 2004). Similarly, Lawati (2021) examined the effect of loan to deposit ratio and debt to equity ratio on return on equity. The study found that debt to equity ratio has a negative impact on return on equity. According to Birru (2016), return on assets is significantly and negatively associated with capital structure proxies such as debt to equity ratio. Similarly, Ulzanah and Murtaqi (2015) revealed that debt to equity ratio has a negative and significant impact on profitability measured by return on assets. In addition, Abubakar (2015) found that debt to equity ratio has a negative and significant impact on financial performance proxy by return on equityBased on it, this study develops the following hypothesis:

H_5: There is a negative relationship between debt to equity ratio and financial performance.

Bank size

Bank size is measured by the total assets of the bank. Hernandez *et al.* (2019) examined the determinants of bank efficiency in Latin America banking industry. The study confirmed that there is a positive and significant relationship between bank size and performance. Similarly, Lardic and Terraza (2019) assessed the financial ratios that determine the bank performance in the German banking sector. The study revealed that there is a positive and significant relationship between performance and medium sized banks. In addition, Smirlock (1985) found that bank size has a positive impact on financial performance. Gul *et al.* (2011) found a direct relationship between the bank size and performance. Based on it, this study develops the following hypothesis.

H_6: There is a positive relationship between bank size and financial performance.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2015/16 to 2021/22.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 15 Nepalese commercial banks for the study period of 2015/16 to 2021/22. The dependent variables are ROA (Return on assets as measured by the ratio of net profit to total asset, in percentage) and ROE (Return on equity as measured by the ratio of net profit to total equity, in percentage). The independent variables are NPL (Non-performing loans as measured by the ratio of non-performing loans to total loans, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage.), NIM (Net interest margin as measured by the ratio of net interest income to total assets, in percentage), LDR (Loan-to-deposit ratio as measured by the ratio of total loans to total deposits, in percentage), DER(Debt to equity ratio as measured by the ratio of total debt to total equity, in percentage), and BSIZE (Bank size as measured by total assets, Rs. in billions).

Variables	Minimum	Maximum	Mean	Std. Deviation
ROA	0.04	2.58	1.43	0.48
ROE	0.30	27.63	12.42	5.36
NPL	0.01	2.11	0.74	0.53
CAR	11.27	17.01	13.58	1.23
NIM	0.09	4.79	3.07	0.89
LDR	65.38	97.69	86.46	5.88
DER	1.15	50.09	17.78	11.45
BSIZE	3.42	419.82	146.05	70.45

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 bivariate Pearson's correlation coefficients of dependent and independent variables of 15 Nepalese commercial banks for the study period of 2015/16 to 2021/22. The dependent variables are ROA (Return on assets as measured by the ratio of net profit to total asset, in percentage) and ROE (Return on equity as measured by the ratio of net profit to total equity, in percentage). The independent variables are NPL (Non-performing loans as measured by the ratio of non-performing loans to total loans, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage.), NIM (Net interest margin as measured by the ratio of net interest income to total assets, in percentage), LDR (Loan-to-deposit ratio as measured by the ratio of total loans to total deposits, in percentage), DER (Debt to equity ratio as measured by the ratio of total debt to total equity, in percentage), and BSIZE (Bank size as measured by total assets,

Rs. in billions).

Variables	ROA	ROE	NPL	CAR	NIM	LDR	DER	BSIZE
ROA	1							
ROE	0.417**	1						
NPL	-0.352**	-0.451**	1					
CAR	-0.050	-0.030	0.132	1				
NIM	0.400**	0.214*	-0.038	-0.006	1			
LDR	-0.206*	-0.041	0.163	0.075	-0.250*	1		
DER	-0.230*	-0.345**	0.152	0.118	0.331**	-0.132	1	
BSIZE	0.180	0.011	0.004	-0.365**	-0.255**	-0.241*	0.020	1

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

Table 3 shows that non-performing loan has a negative relationship with return on assets. It means that increase in non-performing loan leads to decrease in return on assets. Similarly, there is a negative relationship between capital adequacy ratio and return on assets. It means that increase in capital adequacy ratio leads to decrease in return on assets. Likewise, there is a positive relationship between net interest margin and return on assets. It indicates that increase in net interest margin leads to increase in return on assets. In contrast, loan-to-deposit ratio has a negative relationship with return on assets. It indicates that higher the loan-to-deposit ratio, lower would be the return on assets. In addition, debt-to-equity ratio has a negative relationship with return on assets. It indicates that increase in debt-to-equity ratio leads to decrease in return on assets. Moreover, bank size has a positive relationship with return on assets. It indicates that larger the bank size, higher would be the return on assets.

Similarly, the result also shows that non-performing loan has a negative relationship with return on equity. It means that increase in non-performing loan leads to decrease in return on equity. Similarly, there is a negative relationship between capital adequacy ratio and return on equity. It means that increase in capital adequacy ratio leads to decrease in return on equity. Likewise, there is a positive relationship between net interest margin and return on equity. It indicates that increase in net interest margin leads to increase in return on equity. In contrast, loan-to-deposit ratio has a negative relationship with return on equity. It indicates that higher the loan-to-deposit ratio, lower would be the return on equity. In addition, debt-to-equity ratio has a negative relationship with return on equity. It indicates that increase in debt-to-equity ratio leads to decrease in return on equity. Moreover, bank size has a positive relationship with return on equity. It indicates that larger the bank size, higher would be the return on equity.

Regression analysis

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

Table 4

Estimated regression results of non-performing loans, loan loss provisions, capital adequacy ratio, net interest margin, loan-to-deposit ratio and bank size with return on assets

The results are based on panel data of 15 commercial banks with 105 observations for the period of 2015/16-2021/22 by using the linear regression model and the model is ROA = $\beta_0 + \beta_1 \, NPL_{it} + \beta_2 \, CAR_{it} + \beta_3 \, NIM_{it} + \beta_4 \, LDR_{it} + \beta_5 \, DER_{it} + \beta_6 \, BSIZE_{it} + e_{it}$ where, the dependent variable is ROA (Return on assets as measured by the ratio of net profit to total asset, in percentage). The independent variables are NPL (Non-performing loans as measured by the ratio of non-performing loans to total loans, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), NIM (Net interest margin as measured by the ratio of net interest income to total assets, in percentage), LDR (Loan-to-deposit ratio as measured by the ratio of total loans to total deposits, in percentage), DER (Debt to equity ratio as measured by the ratio of total debt to total equity, in percentage), and BSIZE (Bank size as measured by total assets, Rs. in billions).

Model	Intercept	Regression coefficients of						Adj. R_bar²	SEE	F-value
		NPL	CAR	NIM	LDR	DER	BSIZE			
1	1.667 (22.068)**	-0.318 (3.815)**						0.115	0.453	14.550
2	1.701 (3.233)**		-0.020 (0.510)					0.007	0.483	0.260
3	0.772 (4.967)**			0.216 (4.433)**				0.152	0.443	19.654
4	2.890 (4.226)**				-0.017 (2.135)*			0.033	0.473	4.557
5	1.606 (18.874)**					-0.010 (2.404)*		0.044	0.470	5.778
6	4.072 (2.859)**						0.237 (1.853)	0.023	0.476	3.435
7	1.687 (3.404)**	-0.317 (3.757)**	-0.001 (0.040)					0.107	0.455	7.206
8	1.035 (2.178)*	-0.304 (3.933)**	-0.001 (0.041)	0.209 (4.567)**				0.252	0.416	12.690
9	1.455 (2.166)*	-0.296 (3.825)**		0.201 (4.269)**	-0.005 (0.671)			0.255	0.415	12.896
10	1.703 (2.735)**	-0.238 (3.271)**		0.263 (5.748)**	-0.007 (1.086)	-0.015 (4.311)**		0.366	0.383	16.002
11	3.147 (1.933)	-0.236 (3.239)**		0.247 (5.054)**	-0.009 (1.337)	-0.015 (4.199)**	0.109 (0.960)	0.365	0.383	12.976

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 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 similar to the findings of Kadioglu and Ocal (2017). Similarly, the beta coefficients for capital adequacy ratio are negative with return on assets. It indicates that capital adequacy ratio has a negative impact on return on assets. This finding is similar to the findings of Widyastuti *et al.* (2017). Likewise, the beta coefficients for net interest margin are positive with return on assets. It indicates that net interest margin has a positive impact on return on assets. This finding is consistent with the findings of Hardiyanti *et al.* (2016). In addition, the beta coefficients for loan-to-deposit ratio are negative with return on assets. It indicates that loan-to-deposit ratio has a negative impact on return on assets. This finding is consistent with the findings of Purbaningsih and Fatimah (2014). Further, the beta coefficients for debt-to-equity ratio are negative with return on assets. It indicates that debt-to-equity ratio has a negative impact on return on assets. This finding is similar to the findings of Lawati (2021). Moreover, the beta coefficients for bank size are positive with return on assets. It indicates that bank size has a positive impact on return on assets. This finding is similar to the findings of Smirlock (1985).

Table 5

Estimated regression results of non-performing loans, loan loss provisions, capital adequacy ratio, net interest margin, loan-to-deposit ratio and bank size with return on equity

The results are based on panel data of 15 commercial banks with 105 observations for the period of 2015/16-2021/22 by using the linear regression model and the model is ROE = β_0 + β_1 NPL$_{it}$ + β_2 CAR$_{it}$ + β_3 NIM$_{it}$ + β_4 LDR$_{it}$ + β_5 DER$_{it}$ + β_6 BSIZE$_{it}$ + e$_{it}$ where, the dependent variable is ROE (Return on equity as measured by the ratio of net profit to total equity, in percentage). The independent variables are NPL (Non-performing loans as measured by the ratio of non-performing loans to total loans, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), NIM (Net interest margin as measured by the ratio of net interest income to total assets, in percentage), LDR (Loan-to-deposit ratio as measured by the ratio of total loans to total deposits, in percentage), DER (Debt to equity ratio as measured by the ratio of total debt to total equity, in percentage), and BSIZE (Bank size as measured by total assets, Rs. in billions).

Model	Intercept	Regression coefficients of						Adj. R_bar²	SEE	F-value
		NPL	CAR	NIM	LDR	DER	BSIZE			
1	15.760 (19.634)**	-4.539 (5.130)**						0.196	4.807	26.322
2	14.212 (2.422)*		-0.132 (0.307)					0.009	5.384	0.094
3	16.365 (8.867)**			1.287 (2.226)*				0.037	5.261	4.957
4	9.210 (1.184)				-0.037 (0.413)			0.008	5.382	0.171
5	15.289 (16.719)**					-0.161 (3.729)**		0.110	5.056	13.902
6	14.156 (0.878)						0.156 (0.108)	0.010	5.386	0.012
7	14.010 (2.662)**	-4.579 (5.108)**	-0.131 (0.336)					0.189	4.828	13.104
8	18.351 (3.428)**	-4.667 (5.631)**	0.130 (0.345)	1.391 (2.701)**				0.236	4.685	11.708
9	13.490 (1.514)	-4.758 (5.389)**	-0.116 (0.305)	1.301 (2.442)*	-0.056 (0.683)			0.232	4.698	8.851
10	13.956 (1.608)	-4.374 (5.012)**	-0.221 (0.595)	0.862 (1.577)	-0.038 (0.468)	-0.108 (2.548)*		0.272	4.574	8.769
11	17.808 (0.763)	-4.362 (4.959)**	-0.192 (0.472)	0.903 (1.518)	-0.033 (0.383)	-0.107 (2.480)*	0.264 (0.178)	0.265	4.596	7.241

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 non-performing loans are negative with return on equity. It indicates that non-performing loans has a negative impact on return on equity. This finding is consistent with the findings of Islam and Rana (2017). Similarly, the beta coefficients for capital adequacy ratio are negative with return on equity. It indicates that capital adequacy ratio has a negative impact on return on equity. This finding is similar to the findings of Almumani (2013). Likewise, the beta coefficients for net interest margin are positive with return on equity. It indicates that net interest margin has a positive impact on return on equity. This finding is consistent with the findings of Pranowo *et al.* (2020). Further, the beta coefficients for loan-to-deposit ratio are negative with return on equity. It indicates that loan-to-deposit ratio has a negative impact on return on equity. This finding is consistent with the findings of Suroso (2022). Moreover, the beta coefficients for debt-to-equity ratio are negative with return on equity. It indicates that debt-to-equity ratio has a negative impact on return on equity. This finding is similar to the findings of Ulzanah and Murtaqi (2015). Furthermore, the beta coefficients for bank size are positive with return on equity. It indicates that bank size has a positive impact on return on equity. This finding is similar to the findings of Gul *et al.* (2011).

4. Summary and conclusion

Commercial banks are important financial intermediaries that play a greater role in economic development of any country. They collect funds from surplus units and provide loan to deficit units earning profit in between those function. During these activities, commercial banks carry a huge risk of loan default and difficulty in payment to depositors which may be affiliated to various factors such as instability in the government, instable economic condition or other bank related factors that may or may not be avoided. These risks may hinder the performance and ultimately the stability of banking system. Commercial banks must analyze the factors that may be associated with their performance to come up with a way to minimize the negative effects so that the overall financial system (in general) and economy (as a whole) will be stable.

This study attempts to analyze the impact of capital adequacy ratio, net interest margin, and debt-equity ratio on the financial performance of Nepalese commercial banks. The study is based on secondary data of 15 commercial banks with 105 observations for the period from 2015/16 to 2021/22.

The major conclusion of this study is that non-performing loans, capital adequacy ratio, loan-to-deposit ratio and debt to equity ratio have negative impact on return on assets and return on equity. It indicates that increase in non-performing loans, capital adequacy ratio, loan-to-deposit ratio and debt to equity ratio leads to decrease in return on assets and return on equity. Similarly, net interest margin and bank size have positive impact on return on assets and return on equity. It indicates that increase in net interest margin and bank size leads to increase in return on assets and return on equity. Likewise, the study also concluded that bank size followed by net interest margin is the most influencing factor that explains the changes in the return on asset of Nepalese commercial banks. Similarly, the study also concluded that net interest margin followed by bank size is the most influencing factor that explains the changes in return on equity in context of Nepalese commercial banks.

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