Measurement of Bank Performance in Nepal

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Abstract

This study examines the measurements of performance in the context of Nepalese commercial banks. Return on assets and return on equity are the selected dependent variables. The selected independent variables are capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth and inflation. The study is based on secondary data of 15 commercial banks with 135 observations for the study period from 2014/15 to 2022/23. The data were collected from Banking and Financial Statistics published by Nepal Rastra Bank, reports published by Ministry of Finance and annual report of respective commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth and inflation on the profitability of Nepalese commercial banks.

The study showed that liquidity has a negative impact on return on assets and return on equity. It means that increase in liquidity ratio leads to decrease in return on assets and return on equity. Likewise, leverage has a negative impact on return on assets and return on equity. It shows that higher the leverage ratio, lower would be the return on assets and return on equity. Moreover, non-performing loan has a negative impact on return on assets and return on equity. It means that increase in non-performing loan leads to decrease in return on assets and return on equity. In addition, inflation has a negative impact on return on assets. It indicates that increase in inflation leads to decrease in return on assets. Similarly, GDP growth has a positive impact on return on assets and return on equity. It means that higher the GDP growth rate, higher would be the return on assets and return on equity. In addition, bank size has a positive impact on return on assets. It means that increase in bank size leads to increase in return on assets. Similarly, capital adequacy ratio has a positive impact on return on assets. It means that increase in capital adequacy ratio leads to increase in return on assets.

Keywords: bank performance, capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth, inflation

1. Introduction

An essential component of the financial industry is the measurement of bank performance, which offers information about the stability, efficacy, and efficiency of bank operations. For a variety of stakeholders, including investors,

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regulators, policymakers, and bank management, knowing and assessing bank performance is crucial because it enables them to make well-informed decisions about risk management, investments, and regulatory compliance (Mills and Haines, 2015). The banking system plays an important role in the modern economic world. By facilitating the mobilization of depositor funds and directing them toward profitable ventures through lending, banks play a crucial role in the economy. Banks serve as financial mediators, effectively allocating resources to support economic growth and development. As a result, evaluating their performance is essential to preserving financial stability and fostering economic growth. Regarding bank performance, various stakeholders have different expectations and areas of interest. While depositors place a higher priority on security and dependability, regulators concentrate on safety and soundness, investors pursue profitability and shareholder value, and politicians strive for systemic stability and fair access to financial services (Van Greuning and Iqbal, 2008). Metrics and measurement instruments are made to meet the various demands of different stakeholders. A variety of financial measures and indicators are employed to assess various facets of bank performance. These metrics include capital adequacy ratios, asset quality measurements, efficiency ratios, liquidity ratios, and profitability indicators like return on assets and return on equity. Stakeholders can evaluate a bank's financial health, pinpoint areas of strength and weakness, and compare its performance to that of its competitors and industry norms by analyzing trends and benchmarks (Reille et al., 2002).

The banking sector functions within a dynamic and competitive milieu that is distinguished by swift technical progress, fluctuating macroeconomic conditions, evolving regulatory frameworks, and shifting customer inclinations. Because of this, the process of measuring bank performance needs to be continuously adjusted and improved in order to take new issues and trends into account (Smith and Fischbacher, 2009). Banks are subject to a number of hazards, such as operational, credit, interest rate, and liquidity concerns. Strong risk management procedures are essential to preserving the stability and resilience of banks. Risk-adjusted measures are incorporated into performance measurement frameworks in order to evaluate how well risk-taking and risk management techniques are working. Financial networks and interbank transactions link banks, which can increase the risk of shocks and contagion spreading throughout the banking system. To protect financial stability and avert systemic crises, systemic risk indicators and individual bank performance metrics must be closely watched and assessed (Acemoglu

et al., 2015).

Al-Chahadah *et al*. (2022) examined the relationship between liquidity risk and the profitability among commercial banks listed on the Amman Stock Exchange. The results showed no statistically significant relationship between the liquidity risk indicators and the majority of profitability indicators. However, the cash reserve ratio (CRR) index was statistically significant with the utilization ratio (UR). Additionally, there was a statistically significant relationship between the return on equity and the legal reserve ratios and the funds' investment. Similarly, Sawitri (2018) analyzed the influence of third-party funds, Bank Indonesia Certificates, and non-performing loans on return on assets and loan deposit ratio and the effect of loan deposit ratio on return on assets of commercial banks in Indonesia. The study showed that there is a significant positive effect of loan deposit ratio on return on assets of commercial banks in Indonesia. 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 identified that loan to deposit ratio has a positive effect on profitability. Khalid *et al*. (2021) assessed the impact of credit risk management on the financial performance of banking sector in Sudan. The result showed that there is a positive relationship between the banks' financial performance and capital adequacy ratio. Likewise, Putri and Dewi (2021) indicated that LDR does not have a positive effect on financial performance with the assumption that a low LDR will cause the company's liquidity to increase and in the end, it will also increase the quantity of idle funds which will have a direct impact on financial performance.

Silaban (2017) determined the Bank's health level consisting of capital adequacy ratio, net interest margin, and non-performing loans partially or simultaneously on bank profitability based on data from the Indonesian Stock Exchange. The results indicate that capital adequacy ratio does not have a significant effect on bank profitability. Net interest margin improves the growth of bank profitability. Akter and Roy (2017) analyzed the impact of non-performing loan (NPL) on profitability of listed banks in Dhaka Stock Exchange (DSE) during 2008 to 2013. The study showed that non-performing loan is one of the major factors of influencing banks profitability and it has statistically significant negative impact on net profit margin (NPM) of listed banks for the study periods. Poor management in the banking institutions results in bad quality loans, and therefore, escalates the level of non-performing loans (Khan et al., 2020). The results also showed that the operating efficiency and profitability indicators have a negative association with NPLs but were

statistically significant. Kwashie (2022) showed that the non-performing loans have a negative impact on the measures of financial performance. Similarly, Kumar et al. (2020) investigated the relationship between monetary policy and bank profitability in New Zealand. The study revealed that capital adequacy ratio is positively related to return on assets. A high capital adequacy ratio can enable the bank increase its scope of profitable investments. On the other hand, a bank with a low capital adequacy ratio will most likely have a narrow scope of profitable investments. Akhtar et al. (2011) examined the impact of how the bank-specific factors of profitability affects the performance of Islamic banks of Pakistan from period 2006 to 2009. The study found a positive relationship between gearing ratio, debt ratio and bank profitability. Mahmud et al. (2016) assessed the bank specific variables that affect the profitability of commercial banks of Bangladesh. The study showed that gearing ratio (risk), liquidity, debt ratio, non-performing loan ratio and operating expense ratio have negative effect on the bank profitability of Bangladesh. Obamuyi (2012) determined the relationship of different bank specific and macro-economic variable with profitability of 20 commercial banks of Nigeria using employed fixed effect model. The study reported that bank capital, size, interest income and expense management efficiency and favorable economic conditions contribute to higher bank performance and growth. However, debt ratio and nonperforming loans have negative influence on bank growth.

In the context of Nepal, Mathema et al. (2023) analyzed the impact of capital structure and growth on the profitability of Nepalese commercial banks. The study showed that debt-to-equity ratio, asset growth and deposit growth, have negative impact on return on assets. Similarly, debt to asset ratio, loan to deposit ratio and capital adequacy ratio have a positive impact on return on assets. The study showed that asset growth, deposit growth, loan to deposit ratio and capital adequacy ratio have negative impact on return on equity. Similarly, debt-to-equity ratio and debt to asset ratio have a positive impact on return on equity. Likewise, the study concluded that loan to deposit ratio is the most influencing factor that explains the changes in the return on asset of Nepalese commercial banks. Similarly, the study also concluded that loan to deposit ratio followed by capital adequacy ratio is the most influencing factor that explains the changes in return on equity in context of Nepalese commercial banks. In addition, Shahi (2023) concluded that loan ratio followed by capital adequacy ratio and GDP growth rate is the most influencing factor that explains the changes in the profitability in terms of return on assets. Mahaseth et al. (2023) showed that real estate loan, capital

adequacy ratio and non-performing loan have positive impact on return on assets. Similarly, term loan, deprived sector loan, capital adequacy ratio, and non-performing loan have positive impact on return on equity. Likewise, real estate loan, overdraft loan and loan to deposit ratio have negative impact on return on equity. Likewise, Darlami (2023) showed that non-performing loan, loan loss provision, leverage ratio, loan to deposit ratio and cost to income ratio have negative impact on return on assets. However, capital adequacy ratio has positive impact on return on assets. Likewise, capital adequacy ratio, non-performing loan, loan loss provision, leverage ratio, loan to deposit ratio and cost to income ratio have negative impact on return on equity.

The above discussion shows that empirical evidences vary greatly across the studies on the impact of institutional ownership, profitability, liquidity, dividend policy, and debt policy on firm value. 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 main purpose of the study is to analyze the measurements of performance of Nepalese commercial banks. Specifically, it examines the relationship of capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth and inflation 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 15 Nepalese commercial banks from 2014/15 to 2022/23, leading to a total of 135 observations. The study employed convenience sampling method. The main sources of data include Banking and Financial Statistics published by Nepal Rastra Bank, reports published by Ministry of Finance and annual report of respective 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 commercial banks	Study period	Observations
1	Nepal Bank Limited	2014/15 - 2022/23	9
2	Rastriya Banijya Bank Limited	2014/15 - 2022/23	9
3	Agricultural Development Bank Limited	2014/15 - 2022/23	9
4	Standard Chartered Bank Nepal Limited	2014/15 - 2022/23	9
5	Himalayan Bank Limited	2014/15 - 2022/23	9
6	Nepal SBI Bank Limited	2014/15 - 2022/23	9
7	Everest Bank Limited	2014/15 - 2022/23	9
8	NICA Asia Bank Limited	2014/15 - 2022/23	9
9	Machhapuchchhre Bank Limited	2014/15 - 2022/23	9
10	Siddharth Bank Limited	2014/15 - 2022/23	9
11	Citizens Bank International Limited	2014/15 - 2022/23	9
12	Prime Commercial Bank Limited	2014/15 - 2022/23	9
13	NMB Bank Limited	2014/15 - 2022/23	9
14	Prabhu Bank Limited	2014/15 - 2022/23	9
15	Sanima Bank Limited	2014/15 - 2022/23	9
Total number of observations			135

Thus, the study is based on the 135 observations.

The model

The model used in this study assumes that bank performance depends on various financial ratios and indicators. The dependent variables selected for the study are return on assets and return on equity. Similarly, the selected independent variables in this study are capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth and inflation. Therefore, the models take the following forms:

$$ROA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LIQ_{it} + \beta_3 LEV_{it} + \beta_4 BSIZE_{it} + \beta_5 NPL_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + e_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LIQ_{it} + \beta_3 LEV_{it} + \beta_4 BSIZE_{it} + \beta_5 NPL_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + e_{it}$$

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 shareholders' equity, in percentage.

NPL= Nonperforming 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.

LIQ= Bank liquidity as measured by the ratio of total loans to total deposits, in percentage.

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

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

GDP= Gross domestic product growth as measured by the growth rate of total market value of goods and services produced within a country's borders in one year, in percentage.

INF= Inflation as measured by the change in consumer price index, in percentage.

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

Capital adequacy ratio

Capital adequacy ratio stands as a pivotal measure of a bank's financial robustness and resilience. As defined operationally, CAR is computed by dividing a bank's regulatory capital comprising Tier 1 and Tier 2 capital by its risk-weighted assets (Mathuva, 2009). This metric offers a quantitative assessment of the bank's capacity to cover potential losses and meet its financial obligations. A higher CAR percentage signifies a more substantial financial cushion, indicating the bank's ability to absorb losses and navigate economic uncertainties effectively (Kochhar, 2009). Conversely, a lower CAR suggests a potential vulnerability to financial stress. Margono et al. (2020) showed that capital adequacy has a positive impact on bank performance. Agbeja et al. (2015) showed that there is a significant positive relationship between the capital adequacy ratio and bank profitability in Nigeria. Likewise, Anggari and Dana (2020) showed that capital adequacy ratio has a positive and insignificant effect on the bank profitability listed in the Indonesia stock exchange during the 2016–2018 periods. Based on it, this study develops the

following hypothesis:

H_1: There is a positive relationship between capital adequacy ratio and bank profitability.

Liquidity

Liquidity ratios measure the liquidity position of the bank. Hongli et al. (2019) revealed that liquidity measured by current assets to current liabilities has a positive significant effect on return on equity ROE. Likewise, Marozva (2015) found that there is a positive relationship between liquidity and return on assets. Charmler et al. (2018) found that there is a positive relationship between the profitability and liquidity of the firms. Similarly, Awulo et al. (2019) found that liquidity ratio significantly and positively affects the return on asset. In addition, Lartey et al. (2013) found a positive relationship between liquidity and profitability of listed banks in Ghana. Mahdi and Abbes (2018) found that profitability of the bank (measured by ROA) is positively related to capital and bank liquidity. In addition, Lukorito et al. (2014) found that liquidity has a statistically significant and positive relationship with banks' profitability. Based on it, this study develops the following hypothesis:

H_2: There is a positive relationship between liquidity and bank profitability.

Leverage

Leverage is the ratio that is used to measure how much the company is financed with debt. Myers and Majluf (1984) stated that firms use debt only when the internal financing is not available and argued against the existence of target capital structure. Frank and Goyal (2009) examined the capital structure decisions and found that there is a negative relationship between the leverage and the profitability of firms. Abbadi and Abu-Rub (2012) found that that leverage negatively and significantly affects banks' profitability. Bunyaminu et al. (2021) also concluded that there is a negative relationship between profitability and leverage ratio. Similarly, Chechet and Olayiwola (2014) found a negative relationship between the debt ratio and profitability. Moreover, Akinlo and Asaolu (2012) revealed that leverage has a negative effect on profitability. Rehman (2013) showed that there is statistically significant relationship between financial leverage and return on equity of listed sugar companies of Pakistan. Based on it, this study develops the following hypothesis:

H_3: There is a negative relationship between leverage and bank profitability.

Bank size

Total asset is used as a proxy of bank size which influence the efficiency and profitability of the bank. Hernandez et al. (2019) confirmed that there is a positive and significant relationship between bank size and profitability. Similarly, Lardic and Terraza (2019) revealed that there is a positive and significant relationship between profitability and medium sized banks. In addition, Alfadli and Rjoub (2020) investigated the impacts of bank-specific, industry-specific and macroeconomic variables on commercial bank financial performance. The study found that bank size has a positive and significant relationship on return on assets and return on equity. Similarly, Lohano and Kashif (2019) concluded that bank size is positively related to return on assets and return on equity. Likewise, Bogale (2019) found that bank size is significant and positively related to the profitability of Ethiopian private commercial banks. Kassem and Sakr (2018) investigated the relationship between bank-specific factors and the profitability of banks in Egypt. The study showed a positive relationship between bank size and profitability measured by return on assets and return on equity. Based on it, this study develops the following hypothesis:

H_4: There is a positive relationship between bank size and bank profitability.

Non-performing loan

Non-performing loan assumes significance as a critical indicator of a lending institution's asset quality and financial stability. The level of NPLs in a bank's portfolio is closely monitored, as it serves as a key metric reflecting the quality of loans and has implications for the overall financial health of the institution (Akter and Roy, 2017). Brastama and Yadnya (2020) found that NPL has a negative impact bank profitability. Uddin (2022) also revealed that non-performing loan has a negative impact on return on assets. Moreover, Jolevski (2017) examined the level of NPLs of Republic of Macednia commercial banks over the period from 2005 to 2015. The results showed that an increase of NPL can lead banks to reduce their profitability. Imtiaz et al. (2019) revealed that non-performing loan ratio has a negative association with bank profitability. Likewise, Adebisi and Matthew (2015) showed that there was a negative impact of non-performing loans on capital adequacy ratio. Do et al. (2020) found that NPL has a negative impact on return on assets in the context of Vietnam. Based on it, this study develops the following hypothesis:

H_5: There is a negative relationship between non-performing loan and bank

profitability.

GDP growth

Petria *et al.* (2015) assessed the main determinants of banks' profitability. The study revealed that credit and liquidity risk, management efficiency, the diversification of business, the market concentration/competition and the economic growth have significant influence on bank profitability. Gyamerah and Amoah (2015) found that banks profits in the region are significantly affected by GDP growth in Ghana. Moreover, Zarrouk *et al*. (2016) found that unstable financial sector negatively affects sustainable economic growth. Central banks often adjust interest rates in response to changes in GDP to manage inflation and stimulate or cool down economic activity. When GDP is growing, central banks may increase interest rates to prevent overheating, leading to higher net interest margins for banks. In addition, Akbas (2012) concluded that gross domestic product has a significant impact on increase in bank profitability. Furthermore, Wasiuzzaman and Tarmizi (2010) investigated the determinants of bank profitability in Malaysia. The results suggested a positive and significant relationship between real gross domestic product growth rate and bank profitability. Based on it, this study develops the following hypothesis:

H_6: There is a positive relationship between GDP growth and bank profitability.

Inflation

Consumer Price Index (CPI) uses consumer items' weight in overall spending to calculate how much they cost. Inflation has an impact on bank performance. Banks can modify interest rates in response to anticipated inflation, thereby improving profitability by accelerating revenue growth relative to cost growth. Sayilgan and Yildirim (2009) stated that the profitability of the banking sector seems to have increased along with declining inflation rate. Antonios (2010) found that inflation has a negative effect on credit market development in the long run. Similarly, Guru *et al*. (2002) found that inflation has a negative relationship with bank profitability. Moreover, Tan and Floros (2012) showed a negative relationship between inflation and profitability in Chinese banking sector which reflects the fact that the inflation in China can be fully anticipated and the interest rates are adjusted accordingly. Furthermore, Rahman (2015) concluded that inflation has a negative and significant impact on ROA and ROE. Based on it, this study develops the following hypothesis:

H_7: There is a negative relationship between the inflation and bank profitability.

3.Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of the selected dependent and independent variables during the period 2014/15 to 2022/23.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 15 Nepalese commercial banks for the study period from 2014/15 to 2022/23. 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 income to total shareholders' equity, in percentage). The independent variables are 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), LIQ (Bank liquidity as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage ratio as measured by the ratio of total debt to total assets, in percentage), GDP (Gross domestic product growth as measured by the growth rate of total market value of goods and services produced within a country's borders in one year, in percentage), BSIZE (Bank size as measured by total assets, Rs. in billion) and INF (Inflation as measured by the change in consumer price index, in percentage).

Variables	Minimum	Maximum	Mean	Std. Deviation
ROA	0.55	3.22	1.58	0.48
ROE	6.26	44.22	14.97	5.3
BSIZE	40.3	827.81	190.38	162.51
CAR	7.8	23.31	13.92	2.46
LIQ	56.47	107.01	85.55	9.57
LEV	0.32	2.06	0.85	0.34
NPL	0.01	8.38	1.58	1.43
GDP	-2.37	8.98	4.64	3.38
INF	4.19	9.9	6.08	2.01

Source: SPSS output

Correlation analysis

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and 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 from 2014/15 to 2022/23. 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 income to total shareholders' equity, in percentage). The independent variables are 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), LIQ (Bank liquidity as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage ratio as measured by the ratio of total debt to total assets, in percentage), GDP (Gross domestic product growth as measured by the growth rate of total market value of goods and services produced within a country's borders in one year, in percentage), BSIZE (Bank size as measured by total assets, Rs. in billion) and INF (Inflation as measured by the change in consumer price index, in percentage).

Variables	ROA	ROE	BSIZE	CAR	LIQ	LEV	NPL	GDP	INF
ROA	1								
ROE	0.551**	1							
BSIZE	0.067	-0.091	1						
CAR	0.309**	-0.279**	0.421**	1					
LIQ	-0.287**	-0.452**	-0.302**	-0.036	1				
LEV	-0.054	0.152	-0.368**	-0.234**	0.082	1			
NPL	-0.054	-0.020	-0.13	-0.119	-0.045	-0.172*	1		
GDP	0.121	0.110	-0.052	-0.073	0.030	0.055	0.064	1	
INF	-0.034	0.219*	-0.001	-0.373**	-0.115	0.348**	0.127	0.085	1

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

Table 3 shows that bank size has a positive relationship with return on assets. It means that increase in bank size leads to increase in return on assets. Similarly, capital adequacy ratio has a positive relationship with return on assets. It means that increase in capital adequacy ratio leads to increase in return on assets. In contrast, there is a negative relationship between liquidity and return on assets. It means that increase in liquidity ratio leads to decrease in return on assets. Likewise, leverage has a negative relationship with return on assets. It shows that higher the leverage ratio, lower would be the return on assets. Moreover, there is a negative relationship between non-performing loan and return on assets. It means that increase in non-performing loan leads to decrease in return on assets. In addition, inflation has a negative relationship with return on assets. It indicates that increase in inflation leads to decrease in return on assets. Similarly, there is a positive relationship between GDP growth and return on assets. It means that higher the GDP growth rate, higher would be the return on assets.

Likewise, the result also shows that bank size has a negative relationship

with return on equity. It means that increase in bank size leads to decrease in return on equity. Similarly, capital adequacy ratio has a negative relationship with return on equity. It means that increase in capital adequacy ratio leads to decrease in return on equity. In contrast, there is a negative relationship between liquidity and return on equity. It means that increase in liquidity ratio leads to decrease in return on equity. Likewise, leverage has a positive relationship with return on equity. It shows that higher the leverage ratio, higher would be the return on equity. Moreover, there is a negative relationship between non-performing loan and return on equity. It means that increase in non-performing loan leads to decrease in return on equity. In addition, inflation has a positive relationship with return on equity. It indicates that increase in inflation leads to increase in return on equity. Similarly, there is a positive relationship between GDP growth and return on equity. It means that higher the GDP growth rate, higher would be the return on equity.

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 capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth and inflation on return on assets.

Table 4

Estimated regression results of capital adequacy ratio, leverage, liquidity, non-performing loan, bank size, GDP growth and inflation on return on assets

The results are based on panel data of 15 commercial banks with 135 observations for the period of 2014/15 to 2022/23 by using linear regression model. The model is $ROA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LIQ_{it} + \beta_3 LEV_{it} + \beta_4 BSIZE_{it} + \beta_5 NPL_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + e_{it}$ 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 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), LIQ (Bank liquidity as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage ratio as measured by the ratio of total debt to total assets, in percentage), GDP (Gross domestic product growth as measured by the growth rate of total market value of goods and services produced within a country's borders in one year, in percentage), BSIZE (Bank size as measured by total assets, Rs. in billion) and INF (Inflation as measured by the change in consumer price index, in percentage).

Model	Intercept	Regression coefficients of							Adj. R_bar^2	SEE	F-value
		BSIZE	CAR	LIQ	LEV	NPL	GDP	INF			
1	1.57 (24.16)**	0.067 (0.77)							0.03	0.47	0.60
2	0.73 (3.26)**		0.06 (3.74)**						0.089	0.45	14.03
3	0.28 (7.75)**			-0.014 (3.43)**					0.076	0.46	11.78
4	1.64 (14.71)**				-0.07 (0.62)				0.005	0.47	0.39
5	1.54 (25.14)**					-0.018 (0.62)			0.005	0.47	0.38
6	1.49 (28.40)**						0.01 (1.41)		0.007	0.47	1.98
7	1.62 (12.26)**							-0.08 (0.38)	0.006	0.47	0.15
8	0.695 (2.98)**	0.076 (0.83)	0.06 (3.74)**						0.08	0.45	7.35
9	2.08 (5.04)**		0.07 (4.31)**	0.01 (3.98)**					0.18	0.43	10.66
10	2.10 (4.77)**		0.07 (4.27)**	0.01 (3.97)**	0.01 0.12				0.17	0.43	7.94
11	1.91 (4.16)**		0.07 (4.44)**	-0.01 (3.96)**	0.01 (0.028)	-0.018 (0.64)	0.02 (1.88)		0.18	0.43	6.06
12	1.74 (3.51)**		0.08 (4.83)**	-0.01 (3.89)**	0.05 (0.39)	-0.01 (0.43)	0.02 (1.83)	0.02 (0.90)	0.18	0.43	5.30

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 that 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 Lardic and Terraza (2019). Likewise, beta coefficients for capital adequacy ratios are positive with return on assets. It indicates that capital adequacy ratio has a positive impact on return on assets. This finding is consistent with the findings of Anggari and Dana (2020). However, the beta coefficients for liquidity ratio are negative with return on assets. It indicates that liquidity has a negative impact on return on assets. This finding is similar to the findings of Charmler et al. (2018). Similarly, the beta coefficients for leverage ratio are negative with return on assets. It indicates that leverage has a negative impact on return on assets. This finding is consistent with the findings of Abbadi and Abu-Rub (2012). In addition, 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 Brastama and Yadnya (2020).

Table 5 shows the regression results of capital adequacy ratio, liquidity, leverage, bank size, non-performing loan, GDP growth and inflation on return

on equity of Nepalese commercial banks.

Table 5

Estimated regression results of capital adequacy ratio, liquidity, leverage, bank size, non-performing loan, GDP growth and inflation on return on assets of Nepalese commercial banks

The results are based on panel data of 15 commercial banks with 135 observations for the period of 2014/15 to 2022/23 by using linear regression model. The model is $ROE_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LIQ_{it} + \beta_3 LEV_{it} + \beta_4 BSIZE_{it} + \beta_5 NPL_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + e_{it}$ where, the dependent variable is ROE (Return on equity as measured by the ratio of net income to total shareholders' equity, in percentage). The independent variables are 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), LIQ (Bank liquidity as measured by the ratio of total loans to total deposits, in percentage), LEV (Leverage ratio as measured by the ratio of total debt to total assets, in percentage), GDP (Gross domestic product growth as measured by the growth rate of total market value of goods and services produced within a country's borders in one year, in percentage), BSIZE (Bank size as measured by total assets, Rs. in billion) and INF (Inflation as measured by the change in consumer price index, in percentage).

Model	Intercept	Regression coefficients of							Adj. R_bar^2	SEE	F-value
		BSIZE	CAR	LIQ	LEV	NPL	GDP	INF			
1	15.53 (22.09)**	-0.003 (0.05)							0.01	5.29	1.10
2	23.30 (9.20)**		-0.59 (3.34)**						0.07	5.10	11.18
3	39.49 (9.76)**			-0.25 (5.80)**					0.19	4.77	33.66
4	12.95 (10.60)**				2.39 (1.77)				0.016	5.28	3.16
5	15.08 (22.12)**					-0.07 (0.22)			0.007	5.31	0.05
6	14.16 (18.30)**						0.17 (1.28)		0.05	5.28	1.64
7	11.44 (8.01)**							0.57 (2.59)**	0.01	5.28	6.71
8	23.51 (9.01)**		-0.62 (3.17)**						0.06	5.11	5.61
9	46.91 (10.99)**	-0.005 (1.64)	-0.51 (2.92)**	-0.28 (6.58)**					0.29	4.49	18.94
10	45.00 (9.96)**	-0.003 (1.20)	-0.48 (2.80)**	-0.27 (6.48)**	1.57 (1.27)				0.23	4.48	14.67
11	45.57 (9.62)**	-0.004 (1.36)	-0.49 (2.81)**	-0.28 (6.6)**	1.18 (0.93)	-0.28 (1.01)	0.16 (1.44)		0.29	4.46	10.34
12	43.86 (8.57)**	-0.005 (1.56)	-0.42 (2.23)*	-0.28 (6.52)**	0.68 0.48	-0.34 (1.17)	0.16 (1.39)	0.21 (0.88)	0.29	4.46	8.96

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 that the beta coefficients for GDP growth are positive

with return on equity. It indicates that GDP growth has a positive impact on return on equity. This finding is similar to the findings of Wasiuzzaman and Tarmizi (2010). Likewise, beta coefficients for capital adequacy ratios are negative with return on equity. It indicates that capital adequacy ratio has a negative impact on return on equity. This finding is consistent with the findings of Margono et al. (2020). However, the beta coefficients for liquidity ratio are negative with return on equity. It indicates that liquidity has a negative impact on return on equity. This finding is similar to the findings of Lukorito et al. (2014). Similarly, the beta coefficients for leverage ratio are positive with return on equity. It indicates that leverage has a positive impact on return on equity. This finding is consistent with the findings of Bunyaminu et al. (2021). In addition, 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 Adebisi and Matthew (2015).

4. Summary and conclusion

The financial performance of a financial institution is evaluated by determining the profitability. The stability of the banking system is a prerequisite for an effective financial system and achieving economic growth. In particular, profitability is one of the key factors to ensure the stability of the banking system. With good profitability, the bank can benefit its own shareholders and continue to be a channel of capital to support other investments of individuals and organizations, thereby promoting the development of the whole economy. A strong financial system plays a critical role in enabling growth and reducing vulnerability to crises among commercial banks.

This study attempts to analyze the measurements of performance of Nepalese commercial banks. The study is based on secondary data of 15 commercial banks with 135 observations for the study period from 2014/15 to 2022/23.

The study showed that capital adequacy ratio, bank size and GDP growth have positive effect on return on assets of Nepalese commercial banks. However, liquidity, leverage, non-performing loan and inflation have negative effect on return on assets. Larger banks may have greater market power, allowing them to negotiate better terms with customers and suppliers, as well as command higher fees for their services. This can contribute to higher revenues and ultimately higher returns on assets. The study concluded that capital adequacy ratio followed by liquidity ratio is the most influencing factor

that explains the changes in the return on assets of Nepalese commercial banks. Similarly, the study also concluded that liquidity followed by capital adequacy ratio is the most influencing factor that explains the changes in the return on equity of Nepalese commercial banks.

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