Impact of Non-Performing Loans on Bank Profitability and Lending Behavior in Nepalese Commercial Banks

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Abstract

This study examines the impact of non-performing loans on bank profitability and lending behavior in Nepalese commercial banks. Return on assets and loan and advances are selected as the dependent variables. Similarly, capital adequacy ratio, credit to deposit ratio, non-performing loan, equity to total assets, bank size, gross domestic product growth and inflation rate are selected as the independent variables. This study is based on secondary data of 16 commercial banks with 112 observations for the study period from 2016/17 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 annual reports of respective banks. The correlation coefficients and regression models are estimated to test the impact of non-performing loans on bank profitability and lending behavior of Nepalese commercial banks.

The study showed that 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. Likewise, non-performing loan has a negative impact on return on assets. It means that increase in non-performing loan leads to decrease in return on assets. On the other hand, the result showed that credit to deposit ratio has a positive impact on loans and advances. It shows that higher the credit to deposit ratio, higher would be the loans and advances. Further, this study showed that equity to total assets has a positive impact on return on assets. It means that increase in equity to total assets leads to increase in return on assets. Moreover, inflation rate also has a negative impact on return on assets which means that increase in inflation rate leads to decrease in return on assets. Furthermore, bank size has a positive impact on loans and advances. It indicates that increase in bank size leads to increase in loans and advances. Similarly, GDP growth rate has a positive impact on loans and advances. It means that increase in GDP growth rate leads to increase in loans and advances.

Keywords: return on assets, loan and advances, capital adequacy ratio, credit to deposit ratio, non-performing loan, equity to total assets, bank size, gross domestic product, inflation rate

1. Introduction

Financial institutions are very important in the economic growth of a nation as it helps in the easy flow of credit which leads to the investment opportunities in productive sectors. Therefore, the soundness of banking

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institutions is an essential consideration for financial system stability. The efficient and effective performance of the banking industry over time guarantees the financial stability of any nation. Despite the operating costs of holding a large portfolio of loans, bank profitability should increase with a higher ratio of loans to assets as long as interest rates on loans are liberalized and the bank applies markup pricing. Among the different types of risk which are faced by banks, credit risk seems to have more impact on a bank's profitability because a bank's revenue is generated from loans from which interest is derived (Laryea et al., 2016). The banking industry is undergoing a radical shift, one driven by new competition from changing business models, mounting regulation and compliance pressures, and disruptive technologies. Banks still have to generate profit for their shareholders and perform their baking role in the market. Basically, non-performing loan (NPL) reflects the performance standard of the banks. Banks are required by law to report their ratio of non-performing loans to total loans as a measure of the bank's level of credit risk and quality of outstanding loans. A high ratio means that the bank is at a greater risk of loss if it does not recover the owed loan amounts, whereas a small ratio means that the outstanding loans present a low risk to the bank. The NPL growth involves the necessity of provisions because it decreases the overall profits. If there is a high proportion of bank credit there will be a higher probability that the banks can suffer from the financial crisis and vice versa. Breuer (2006) found that problem bank loans are the outcome of decisions made by banks in the dual role they serve as financial intermediaries. This dual role necessarily introduces conflicts of interest that can lead to bank mismanagement and consequently problem bank loans. Better control of corruption, a sound regulatory quality, better enforcement of rule of law, and a free voice and accountability play an important role in reducing NPL (Boudriga et al., 2010).

The efficiency of the bank's performance is a function of how they are able to satisfy their customers at a minimum risk level and maximize profit as well. Commercial banks are the dominant financial institutions in most developing and emerging economies and well-functioning commercial banks accelerate the rate of economic growth while poorly functioning commercial banks are an impediment to economic progress (Richard, 2010). Loans are part of the assets of a commercial institution since they are meant to earn interest in the course of time. According to Waweru and Kalani (2008), the causes of bank failures was asset quality which is a statistically significant predictor of insolvency, and that failing bank institutions always have high level of non-performing loans prior to failure. Financial institutions closely monitor and

manage non-performing loans, employing various strategies to mitigate risks and address the underlying issues contributing to the non-performance. Non-performing loans are a key indicator used in assessing the health of a financial institution's loan portfolio and overall financial soundness. Regulatory authorities establish capital safety limits with the purpose of reducing bank riskiness, especially preventing bank collapses after crises. The Basel Accords propose capital standards which are increasingly becoming tighter. However, there have been many concerns about the effectiveness of new guidelines for ensuring the bank safety and soundness (Khan et al., 2017). Regulations to enhance capital strength create heterogeneous effects for the banks' benefits. A high capital ratio tends to be costly, implying a decline in profitability but at the same time it could also reduce bank risk, as many arguments suggest. As profit-driven businesses, banks could determine an optimal capital ratio to maximize their value. However, the regulators govern the banks' operations by strict requirements to maintain capital beyond their optimal levels. As a result, banks tend to finance with equity passively without considering the role of the capital buffer (Sorokina et al., 2017).

One of the main things that has been prompting the banks to be reluctant to give credit has been the non-performing loan. Banks tend to tighten lending standards in reaction to a decline in credit quality when there is a significant non-performing loan condition (Berger and Udell, 2004). Furthermore, due to the high percentage of non-performing loans (NPLs), banks must increase their provisions for loan loss, which lowers their revenue and lowers the amount of money available for new loans. The equity to assets ratio is an important metric since it sheds light on the financial standing of the business. A company that has a high equity to assets ratio is probably more stable financially and doesn't need as much loan funding. The company can therefore absorb financial shocks better. Conversely, a low equity to assets ratio indicates a company's worse financial position and increased reliance on debt funding. This raises the possibility of default and leaves the company more susceptible to financial shocks. According to Van Dang (2019), banks take fewer risks when their equity ratio is higher, which lowers their profit margin. The macroeconomic factor that determines bank profitability is the growth in economic activity, which is represented by the annual GDP growth rate. As per Demirguc-Kunt and Huizinga (1999), there is a positive correlation between GDP growth and banks' profitability, which could be attributed to a rise in lending rates. The degree to which bank profitability is impacted by inflation is dependent on whether or not future moves in the flat market are fully predicted. While an unforeseen shift could boost expenses owing

to imperfect interest rate adjustment and reduce profits, a fully anticipated inflation rate increases profits since banks can adjust interest rates correctly to increase revenues. According to Naceur and Kandil (2009), a greater inflation rate raises a given quantity and causes more money to be invested in it. This is how they explain the negative coefficient. A positive correlation between inflation and profitability is confirmed by several studies (Claeys and Vander Vennet, 2008; Pasiouras and Kosmidou, 2007).

Commercial banks maximize the net interest margin by charging more interests to the borrowers and offering lower interests to the depositors. Their aggressive lending strategies can sometimes result in credit risk, moral hazard and non-performing loans (Do et al., 2020). Performance in terms of profitability is a benchmark for any business enterprise including commercial banks. However, increasing non-performing loans have a direct impact on profitability of banks by diluting returns on assets. Non-performing assets therefore have negative effect on return on assets, a measurement of profitability. Non-performing loans erode banks' profitability in that banks could incur heavy disposal expenses. Nonperforming loans assets have opportunity costs, in that the non interest earning assets (mainly in form of money) could have been invested elsewhere and provide earns. Beside this, Banks are also required to make provisions for losses on non-performing assets which in turn affect profitability and there is cost associated to attempts to recover bad loans. Gabriel et al. (2019) examined the effect of non-performing loans on the financial performance of commercial banks in Nigeria between the periods of 1985 to 2016. The result of the study showed that non-performing loans to total loans ratio and cash reserve ratio had statistically negative significant effect on return on asset. The result showed that a high level of non-performing loans would reduce the financial performance of commercial banks in Nigeria.

In the context of Nepal, Pandey (2023) showed that loan to deposit ratio and capital adequacy ratio have a positive impact on return on assets. However, asset growth, non-performing loans, loan loss provision and bank size have a negative impact on return on assets. Similarly, capital adequacy ratio, loan to deposit ratio and non-performing loans and loan loss provision have a positive impact on net interest margin. Adhikari *et al*. (2020) examined the impact of bank capital, liquidity, and credit risk on the profitability of Nepalese commercial banks. The study found that liquidity ratio and non-performing loan have negative impact on profitability measured by return on assets (ROA). The study also revealed that bank capital has a significant

impact on profitability of Nepalese commercial banks. Moreover, Khadka and Pradhan (2023) showed that firm size, liquidity rate, inflation and money supply have negative impact on return on assets (ROA). However, tangibility, dividend per share, premium growth and gross domestic product has positive impact on return on assets (ROA).

The above discussion shows that empirical evidences vary greatly across the studies concerning on the effect of non-performing loans on the profitability and lending behavior 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 main purpose of the study is to analyze the effect of non-performing loans on the profitability and lending behavior of Nepalese commercial banks. Specifically, it examines the relationship of capital adequacy ratio, credit to deposit ratio, bank size, equity on total assets, non-performing loan ratio, inflation rate and GDP growth with loan and advances and return on assets in the context 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 the conclusion.

2. Methodological aspects

The study is based on the secondary data which were gathered from 16 Nepalese commercial banks for the study period from 2016/17 to 2022/23, leading to a total of 112 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	Nabil Bank Limited	2016/17-2022/23	7
2	Nepal Investment Bank Limited	2016/17-2022/23	7
3	NMB Bank Limited	2016/17-2022/23	7
4	Citizens Bank International Limited	2016/17-2022/23	7
5	Kumari Bank Limited	2016/17-2022/23	7
6	Siddhartha Bank Limited	2016/17-2022/23	7
7	NIC Asia Bank Limited	2016/17-2022/23	7
8	Himalayan Bank Limited	2016/17-2022/23	7
9	Prime Commercial Bank Limited	2016/17-2022/23	7
10	Machhapuchchhre Bank Limited	2016/17-2022/23	7
11	Prabhu Bank Limited	2016/17-2022/23	7
12	Standard Chartered Bank Nepal Limited	2016/17-2022/23	7
13	Rastriya Banjiya Bank Limited	2016/17-2022/23	7
14	Nepal SBI Bank Limited	2016/17-2022/23	7
15	Sanima Bank Limited	2016/17-2022/23	7
16	Everest Bank Limited	2016/17-2022/23	7
Total number of observations			**112**

Thus, the study is based on 112 observations.

The model

The model estimated in this study assumes the multiple regression technique to measure the impact of non-performing loans on bank profitability and lending behavior in Nepalese commercial banks. The dependent variables selected for the study are return on assets and loan and advances. Similarly, the selected independent variables are capital adequacy ratio, credit to deposit ratio, bank size, equity on total assets, non-performing loan ratio, inflation rate and GDP growth. Therefore, the model can be expressed in the following form:

$$ROA = \beta_0 + \beta_1\,CAR + \beta_2\,CD + \beta_3\,BS + \beta_4\,EA + \beta_5\,NPL + \beta_6\,IR + \beta_7\,GDP + e_{it}$$

$$L/A = \beta_0 + \beta_1\,CAR + \beta_2\,CD + \beta_3\,BS + \beta_4\,EA + \beta_5\,NPL + \beta_6\,IR + \beta_7\,GDP + e_{it}$$

Where,

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

L/A = Loan and advances as measured by the amount of loan disbursed by the bank, Rs in billion.

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

CD = Credit to deposit ratio as measured by the ratio of total loans to total bank's deposits, in percent.

BS = Bank size as measured by the total assets, Rs in million.

EA = Equity on total assets ratio as measured by the ratio of equity to total assets, in percent.

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

IR = Inflation as measured by the increase in consumer price index, in percent.

GDP = GDP growth rate as measured by the annual growth rate of gross domestic product, in percent.

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

Capital adequacy ratio

Nyabaga and Wepukhulu (2020) revealed that capital adequacy ratio has a significant positive effect on financial performance of listed commercial banks in Kenya. Barus et al. (2017) examined the impact of capital requirement on bank's performance in Kenya and found that capital requirement is major determinant of bank performance and loans and advances. Further, Jensen and Meckling (1976) showed a positive and significant relationship between capital adequacy ratio and banks financial performance. Olarewaju and Akande (2016) found that there is a significant positive relationship between ROA and capital level. According to Kamande et al. (2016), CAR ratio has a positive relationship with ROA and a negative relationship with ROE. Based on it, this study develops the following hypothesis:

H_1: Capital adequacy ratio has a positive relationship with bank performance and loans and advances.

Credit to deposit ratio

Credit to deposit ratio is the ratio of total credit provided by the banks out of the deposits collected. Mehta and Bhavani (2017) concluded that credit to deposit ratio is negatively related to return on assets and return on equity. Similarly, Ullah et al. (2020) examined the impact of bank-specific internal factors on the profitability of state-owned commercial banks in Bangladesh. The study found that credit to deposit ratio has negative

relationship with profitability of bank. Likewise, Supriyono and Herdhayinta (2019) found that credit to deposit ratio has negative relationships with the profitability of commercial bank. Likewise, Yuksel et al. (2018) showed that loan to deposit ratio has a negative effect on profitability and loan advances. Based on it, this study develops the following hypothesis:

H$_2$: Credit to deposit ratio has a negative relationship with bank performance and loans and advances.

Bank size

One of the key factors influencing the performance of commercial banks is bank size. The size of a bank is one of the major determinants of bank profitability (Musah *et al.*, 2018). Furthermore, Parvin *et al.* (2019) assessed the effect of liquidity and bank size on the profitability of commercial banks in Bangladesh. The study found that bank size has a positive relation with return on asset (ROA) which was the indicator of profitability. Moreover, Jamal *et al.* (2012) also found that there is a positive relationship between bank size and profitability. Similarly, Anggari and Dana (2020) found that bank size has a positive and significant effect on profitability. Likewise, Lohano and Kashif (2019) concluded that bank size is positively related to return on assets and return on equity. Based on it, this study develops the following hypothesis:

H$_3$: Bank size has a positive relationship with bank performance and loans and advances.

Equity to total assets

Prabowo et al. (2018) assessed the effect of equity to assets ratio, size, and loan to assets ratio (LAR) on bank performance. The study found a negative effect of equity to assets ratio on bank performance. Similarly, Ruziqa (2013) examined the impact of credit and liquidity risk on bank financial performance in Indonesian Conventional Bank with total asset above 10 trillion Rupiah. The study found a negative association between equity to assets ratio, and bank financial performance in Indonesian Conventional Bank. Taani (2013) stated that equity ratio is negatively correlated to return on equity in the context of Jordan's firms. Ongore and Kusa (2013) analyzed the determinants of financial performance of commercial banks in Kenya and found negative correlation between credit risk, equity ratio and bank performance. Based on it, this study develops the following hypothesis:

H$_4$: Equity to total assets has a negative relationship with bank performance and loans and advances.

Non-performing loan ratio

Non-performing loan is measured as the percentage of non-performing loans to total loans. The level of a credit crunch is usually proxies by the ratio of bank's non - performing loans. Anggriani and Muniarty (2020) stressed that banks should lower the level of non-performing loan to increase return on assets suggesting a negative relationship between non-performing loan and profitability. Brastama and Yadnya (2020) assessed the effect of capital adequacy ratio and non-performing loan on banking stock prices with profitability as intervening variable. The study concluded that non-performing loan is negatively related to bank profitability. Similarly, Collaku and Aliu (2021) showed a significant negative relationship between non-performing loan and profitability as measured by return on assets of commercial banks in Kosovo. Moreover, Dewi and Badjra (2020) revealed that non-performing loan is negatively related to profitability. Based on it, this study develops the following hypothesis:

H_5: *Non-performing loan ratio has a negative relationship with bank performance and loans and advances.*

Inflation rate

Inflation has a significant impact on the performance of banks, influencing various aspects of their operations and financial health. Moyo and Tursoy (2020) examined the impact of inflation and exchange rate on the financial performance of commercial banks in South Africa. The findings showed that there is a significant inverse relationship between inflation and the bank performance. Horobet *et al.* (2021) assessed the determinants of bank profitability in CEE countries using the evidence from GMM panel data estimates. The study showed that inflation has a negative effect on bank profitability in CEE countries. Additionally, Singh and Padmakumari (2020) found an inverse relationship between stock market returns and inflation in India from 2012 to 2018. Based on it, this study develops the following hypothesis:

H_6: *Inflation rate has a negative relationship with bank performance and loans and advances.*

GDP growth

GDP growth is the annual average rate of change in the gross domestic product of a national economy at market prices based on constant local currency during a specified time. Samad (2015) examined the impact of bank specific characteristics and macroeconomic variables in determining the

banks' profitability of Bangladesh. The study revealed that economic growth and inflation have a significantly positive effect on bank's performance. Rosyadi and Muz'an Sulaiman (2023) showed that the gross domestic product has a positive sign which implies that the relationship between banks' loan advances and gross domestic product is positive and statistically significant. Likewise, Bikker and Vervliet (2018) concluded that GDP growth has a positive relationship with return on assets and return on equity. Based on it, this study develops the following hypothesis:

H₇: GDP growth has a positive relationship with bank performance and loans and advances.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2016/17-2022/23.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 16 Nepalese commercial banks for the study period of 2016/17 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percent) and L/A (Loan and advances as measured by the amount of loan disbursed by the bank, Rs in billion). The independent variables are CD (Credit to deposit ratio as measured by the ratio of total loans to total bank's deposits, in percent), BS (Bank size as measured by the total assets, Rs in million), EA (Equity on total assets ratio as measured by the ratio of equity to total assets, in percent), NPL (Non-performing loan ratio as measured by the ratio of non-performing loans to total loans, in percent), IR (Inflation as measured by the increase in consumer price index, in percent) and GDP (GDP growth rate as measured by the annual growth rate of gross domestic product, in percent).

Variables	Minimum	Maximum	Mean	Std. Deviation
ROA	0.24	3.23	1.52	0.50
LA	39.26	340.98	127.46	62.75
CAR	8.55	22.99	13.62	2.01
CD	57.45	92.75	78.12	7.34
NPL	0.01	4.75	1.26	1.10
EA	6.04	16.57	11.16	2.19
BS	60.99	4830.01	219.62	447.12
GDP	28.97	46.10	36.22	5.28
IR	3.63	7.69	5.27	1.41

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 16 Nepalese commercial banks for the study period from 2016/17 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percent) and L/A (Loan and advances as measured by the amount of loan disbursed by the bank, Rs in billion). The independent variables are CD (Credit to deposit ratio as measured by the ratio of total loans to total bank's deposits, in percent), BS (Bank size as measured by the total assets, Rs in million), EA (Equity on total assets ratio as measured by the ratio of equity to total assets, in percent), NPL (Non-performing loan ratio as measured by the ratio of non-performing loans to total loans, in percent), IR (Inflation as measured by the increase in consumer price index, in percent) and GDP (GDP growth rate as measured by the annual growth rate of gross domestic product, in percent).

Variables	ROA	LA	CAR	CD	NPL	EA	BS	GDP	IR
ROA	1								
LA	-0.283**	1							
CAR	0.312**	-0.277**	1						
CD	-0.247**	0.374**	-0.137	1					
NPL	-0.112	0.338**	-0.218*	0.013	1				
EA	0.487**	-0.392**	0.590**	-0.006	-0.023	1			
BS	-0.040	0.488**	-0.093	0.166	0.076	-0.033	1		
GDP	-0.298**	0.718**	-0.137	0.449**	0.288**	-0.251**	0.305**	1	
IR	-0.206*	0.559**	-0.137	0.444**	0.179	-0.217*	0.207*	0.796**	1

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

Table 3 shows that 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. Credit to deposit ratio has a negative relationship with return on assets. It shows that higher the CD ratio, lower would be the return on assets. Likewise, 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. Further, this study shows that there is a positive relationship between equity to total assets and return on assets. It means that increase in equity to total assets leads to increase in return on assets. Moreover, there is a negative relationship between bank size and return on assets. It indicates that increase in bank size leads to decrease in return on assets. Similarly, GDP growth rate has a negative relationship with return on assets. It means that

increase in GDP growth rate leads to decrease in return on assets. Likewise, inflation rate also has a negative relationship with return on assets which means that increase in inflation rate leads to decrease in return on assets.

On the other hand, the result also shows that capital adequacy ratio has a negative relationship with loans and advances. It means that increase in capital adequacy ratio leads to decrease in loans and advances. Credit to deposit ratio has a positive relationship with loans and advances. It shows that higher the CD ratio, higher would be the loans and advances. Likewise, non-performing loan has a positive relationship with loans and advances. It means that increase in non-performing loan leads to increase in loans and advances. Further, this study shows that there is a negative relationship between equity to total assets and loans and advances. It means that increase in equity to total assets leads to decrease in loans and advances. Furthermore, there is a positive relationship between bank size and loans and advances. It indicates that increase in bank size leads to increase in loans and advances. Similarly, GDP growth rate has a positive relationship with loans and advances. It means that increase in GDP growth rate leads to increase in loans and advances. Likewise, inflation rate also has positive relationship with loans and advances which means that increase in inflation rate leads to increase in loans and advances.

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, credit to deposit ratio, non-performing loan ratio, and equity to total assets ratio, bank size, GDP growth rate and inflation rate on return on assets in Nepalese commercial banks.

Table 4

Estimated regression results of capital adequacy ratio, credit to deposit ratio, non-performing loan, and equity to total assets, bank size, GDP growth rate and inflation rate on return on assets

The results are based on panel data of 16 Nepalese commercial banks with 112 observations for period 2016/17-2022/23 by using linear regression model. The model is $ROA = \beta_o + \beta_1 CAR + \beta_2 CD + \beta_3 BS + \beta_4 EA + \beta_5 NPL + \beta_6 IR + \beta_7 GDP + \varepsilon_t$ where the dependent variables is ROA (Return on assets as measured by the ratio of net income to total assets, in percent). The independent variables are CD (Credit to deposit ratio as measured by the ratio of total loans to total bank's deposits, in percent), BS (Bank size as measured by the total assets, Rs in million), EA (Equity on total assets ratio as measured by the ratio of equity to total assets, in percent), NPL (Non-performing loan ratio as measured by the ratio of non-performing

loans to total loans, in percent), IR (Inflation as measured by the increase in consumer price index, in percent) and GDP (GDP growth rate as measured by the annual growth rate of gross domestic product, in percent).

Model	Intercept	Regression coefficients of							Adj. R_bar²	SEE	F-value
		CAR	CD	NPL	EA	BS	GDP	IR			
1	0.0465 (1.483)	0.078 (3.443)**							0.090	0.482	11.854
2	2.608 (4.879)**		-0.013 (0.191)						0.027	0.487	3.781
3	1.594 (21.617)**			-0.050 (1.115)					0.002	0.505	1.243
4	0.271 (1.243)				0.113 (5.903)**				0.023	0.442	34.844
5	1.541 (28.738)**					-4.356 (0.404)			0.008	0.507	0.163
6	2.570 (7.941)**						-0.029 (3.242)**		0.080	0.485	10.512
7	1.594 (10.502)**							-0.050 (1.115)	0.002	0.505	1.243
8	1.320 (2.012)*	0.073 (0.300)	-0.010 (0.007)						0.106	0.466	6.984
9	1.388 (2.051)*	0.070 (2.926)**	-0.010 (1.453)	-0.019 (0.440)					0.099	0.468	4.683
10	1.581 (2.601)*	0.014 (0.524)	-0.014 (2.260)*	-0.045 (1.154)	0.117 (5.002)**				0.276	0.420	10.627
11	1.588 (2.592)*	0.014 (0.511)	-0.014 (2.244)*	-0.045 (1.155)	0.117 (4.974)**	-1.473 (0.160)			0.269	0.429	8.421
12	1.798 (2.770)*	0.010 (0.055)	-0.013 (1.725)	-0.035 (0.84)	0.112 (4.409)**	-3.515 (0.367)	-0.015 (1.018)	0.042 (0.841)	0.262	0.424	6.110

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 asset is the dependent variable.

Table 4 shows that the beta coefficients for capital adequacy ratio are positive with return on assets. It means that capital adequacy ratio has a positive impact on return on assets. This finding is similar to the findings of Nyabaga and Wepukhulu (2020). Further, the beta coefficients for credit to deposit ratio are negative with return on assets. It indicates that credit to deposit ratio has a negative impact on return on assets. This finding is consistent with the findings of Supriyono and Herdhayinta (2019). Similarly, the beta coefficients for non-performing loan ratio are negative with return on assets. It indicates that the non-performing loan ratio has a negative impact on return on assets. This finding is similar to the findings of Brastama and Yadnya (2020). Further, this study shows that the beta coefficients for equity to total assets are positive with return on assets. It indicates that the equity to total assets has a positive impact on return on assets. This finding is inconsistent with the findings of Ongore and Kusa (2013). Likewise, the beta coefficients for inflation rate are also negative with return on assets. It indicates that the inflation rate has negative impact on return on assets. This

finding is consistent with the findings of Singh and Padmakumari (2020).

Table 5 shows the estimated regression results of capital adequacy ratio, credit to deposit ratio, non-performing loan ratio, equity to total assets ratio, bank size, GDP growth rate and inflation rate on loans and advances in Nepalese commercial banks.

Table 5

Estimated regression results of capital adequacy ratio, credit to deposit ratio, non-performing loan, equity to total assets, bank size, GDP growth rate and inflation rate on loans and advances

The results are based on panel data of 16 Nepalese commercial banks with 112 observations for period 2015/2016-2021/2022 by using linear regression model. The model is $L/A = \beta_o + \beta_1 CAR + \beta_2 CD + \beta_3 BS + \beta_4 EA + \beta_5 NPL + \beta_6 IR + \beta_7 GDP + \varepsilon_t$ where the dependent variables is L/A (Loan and advances as measured by the amount of loan disbursed by the bank, Rs in billion). The independent variables are CD (Credit to deposit ratio as measured by the ratio of total loans to total bank's deposits, in percent), BS (Bank size as measured by the total assets, Rs in million), EA (Equity on total assets ratio as measured by the ratio of equity to total assets, in percent), NPL (Non-performing loan ratio as measured by the ratio of non-performing loans to total loans, in percent), IR (Inflation as measured by the increase in consumer price index, in percent) and GDP (GDP growth rate as measured by the annual growth rate of gross domestic product, in percent).

Model	Intercept	Regression coefficients of							Adj. R_bar²	SEE	F-value
		CAR	CD	NPL	EA	BS	GDP	IR			
1	245.171 (6.237)**	-8.638 (3.027)**							0.068	60.569	9.162
2	-148.622 (2.374)*		3.565 (4.440)**						0.155	57.228	19.715
3	103.038 (12.029)**			19.267 (3.771)**					0.106	59.324	14.219
4	252.242 (8.854)**				-11.177 (4.332)**				0.146	58.008	19.92
5	112.428 (19.388)**					0.068 (5.860)**			0.231	55.035	34.335
6	-181.43 (6.280)**						8.528 (10.805)**		0.510	43.909	116.744
7	-2.897 (0.152)							24.716 (7.070)**	0.306	52.274	49.985
8	-53.831 (0.723)	-6.253 (2.355)*	3.182 (4.289)**	16.331 (3.541)**					0.301	52.072	15.601
9	-74.707 (1.092)	-2.318 (0.746)	3.592 (5.230)**	19.151 (4.477)**	-11.796 (4.440)**				0.412	47.754	18.84
10	-48.888 (0.833)	-3.228 (1.213)	2.984 (5.011)**	17.948 (4.900)**	-11.953 (5.262)**	0.054 (6.087)**			0.57	40.831	28.026
11	-85.686 (1.557)	-0.444 (0.182)	1.321 (2.099)*	11.107 (3.145)**	-7.909 (3.641)**	0.043 (5.265)**	4.714 (3.755)**	0.188 (0.044)	0.658	36.426	28.994

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. Loan and advances is the dependent variable.

Table 5 shows that the beta coefficients for credit to deposit ratio are positive with loans and advances. It indicates that credit to deposit ratio has a positive impact on loans and advances. This finding is inconsistent with Ullah et al. (2020). Similarly, the beta coefficients for equity to total assets are negative with loans and advances. It indicates that the equity to total assets has a negative impact on loans and advances. This finding is consistent with the findings of Ruziqa (2013). Furthermore, the beta coefficients for bank size are positive with loans and advances. It indicates that bank size has a positive impact on loans and advances. This finding is similar to the findings of Jamal *et al.* (2012). Similarly, the beta coefficients for GDP growth rate are positive with loans and advances. It means that the GDP growth rate has positive impact on loans and advances. This finding is similar to the findings of Samad (2015).

4. Summary and conclusion

The main goal of every banking institution is to operate profitably to maintain stability and sustainable growth. However, the existence of high levels of non-performing loans (NPLs) in the banking industry negatively affects the level of private investment, impair a bank's ability to settle its liabilities when they fall due and constrain the scope of bank credit to borrowers. External and internal economic environments are viewed as critical drivers for nonperforming loans

This study attempts to analyze the impact of non-performing loans on bank profitability and lending behavior in Nepalese commercial banks. The study is based on secondary data of 16 commercial banks with 112 observations for the period from 2016/17-2022/23.

The study showed that capital adequacy ratio and equity to total asset have positive impact on return on assets. However, credit to deposit ratio, non-performing loan, bank size, GDP growth rate and inflation rate have negative impact on return on asset. The study also showed that credit to deposit ratio, non-performing loan, GDP growth rate and inflation rate have positive impact on loan and advances. However, capital adequacy ratio, bank size and equity to total asset have negative impact on loan and advances. Thus, the study contributes valuable insights into the financial dynamics of Nepalese commercial banks. The positive association between capital adequacy ratio and return on assets suggests the importance of maintaining a robust capital base. Conversely, the negative impact of credit to deposit ratio and non-performing loan ratio on return on assets underscores the challenges associated with risk management and asset quality. The study concluded that the intricate balance

banks must maintain, with credit to deposit ratio, non-performing loan ratio, bank size, GDP growth rate, and inflation rate all playing significant roles. The study also concluded that GDP growth rate followed by equity to total asset ratio is the most significant factor that determines the changes in bank profitability and lending behavior in Nepalese commercial banks.

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