International Journal of Finance and Commerce
www.commercejournals.com
Online ISSN: 2664-715X, Print ISSN: 2664-7141
Received: 20-04-2023, Accepted: 07-05-2023, Published: 22-05-2023
Volume 5, Issue 2, 2023, Page No. 76-82

Effects of non-performing loan on profitability of commercial banks in Nepal

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Abstract
Credit default is one of the major issues in banking industry. This study investigates the effects of non-performing loan on profitability of commercial banks in Nepal. The study has collected data from 10 commercial banks for the period of 10 years that is from fiscal year 2011/12 to 2020/21. The profitability measure by return on assets (ROA) and return on equity (ROE) taken as dependent variable whereas non-performing loan (NPL), capital adequacy ratio (CAR), liquidity (LIQ) and bank size (SIZE) were taken as independent variable. This study is based on quantitative analysis collected from secondary sources that is annual reports published in NRB and individual banks' website. Pooled Ordinary Least Square model is used to explain regression result of the secondary data. The results indicated that non-performing loans, liquidity, and bank size have a significant impact on ROA and ROE, while the capital adequacy ratio was found to be insignificant. The study suggests that commercial banks should focus on these factors to improve financial performance. Therefore the study recommends that commercial banks should strive to reduce non-performing loans by enhancing their credit risk management practices. Additionally, they should maintain adequate liquidity levels to ensure that they can meet their obligation as they fall due. Finally, commercial banks should consider the optimal size of their operations, which can positively impact their profitability by reducing cost and enhancing efficiency

Keywords: non-performing loan, capital adequacy, liquidity, bank size, return on assets, return on equity

Introduction

There is no universally accepted definition of non-performing loans. The classification scheme, the scope, and the contents may vary depending on the country. The Nepal Rastra Bank, the country's central bank, has divided loans primarily into four categories: pass loan, sub-standard loan, doubtful loan and loss or bad loan. A pass loan is one whose interest or principle payments are more than three months behind schedule but less than that. Sub-standard loans whose interest or principal payments are longer than three months in arrears of lending conditions are eased. Doubtful refers to the fact that the liquidation of outstanding debts appears to be in doubt and that the accounts indicate a loss, the precise amount of which is unknown. Loss loans, which are typically loans to businesses that have requested legal resolution and protection under bankruptcy laws, are considered to be uncollectable. Pass loans fall into the performing loan category, whilst sub-standard loan, doubtful loan and loss loan fall into the non-performing loan category (NRB, 2013) [35].

The banking system plays an important role in the modern economic world. If the borrower stops making the agreed-upon principle and interest payments on a loan, the debt will be considered non-performing. Loans and advances that have a markup or principal balance that is 90 days or more past due from the due date are considered non-performing loans (NPLs). NPLs are a significant concern in the banking sector, and reducing them is essential for the growth of the sector and, by extension, for the country's economy (Jaffery, 2015). Banking system play an important role in capital formation, which is essential for the economic development of a country. They mobilize the small savings of the people scattered over a wide area through their network of branches all over the country and make it available for productive purposes. Thus, the banks play an important role in the creation of new capital (or capital formation) in a country and thus help the growth process. A series of corporate failures and financial crises have raised attention to organizational governance issues, especially for financial institutions. The purpose of corporate governance in the banking sector without any doubt build and strengthen accountability, credibility, trust, transparency, and integrity. The corporate governance of banks is an essential element of a country's governance architecture. It can have systemic financial stability implications and shape the pattern of credit distribution and the overall supply of financial services. Hence the necessity and importance of enforcing effective corporate governance in the banking sector (Khanifah *et al*., 2020) [13] 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 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 (Gnawali, 2018) [8]. 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) [32]. Nonperforming assets (NPAs) are widely considered as a critical measure of the banking industry's health, as they indicate the ability of banks to manage their credit risk and loan portfolios effectively. According to a study by Stuti &

Bansal (2013) [42], a decline in the ratio of Nonperforming loans indicates improvement in the asset quality of both public and private sector banks, while an increase in this ratio should be a cause for concern. The study also found that the gross NPAs to gross advances ratio reflects the improvement in the credit portfolios of both sector banks, and the gross NPAs to total assets ratio has a direct impact on a bank's return on assets and liquidity-risk management. Nonperforming assets can pose a significant threat to the stability and profitability of banks by causing a loss of interest income and write-off of the principal loan amount itself.

In this context, this research investigates the non-performing loan and its impact on profitability of commercial banks in Nepal. The findings of this research can be helpful for bankers, investors and policymakers.

The objectives of this research are:

- To measure the relationship between non-performing loan, capital adequacy ratio, liquidity, bank size and ROA and ROE.
- To examine the effect of non-performing loan, capital adequacy ratio, liquidity and bank size on profitability of commercial banks in Nepal.

Review of Literature

Empirical Review

Bhattarai (2017) [4] revealed that the NPL, CAR, LIQ have significant and negatively associated with ROE. Similarly, size has a significant and positive association with ROE. The INF has a positive but insignificant result with ROE. The study concluded that among study variables NPL, CAR, LIQ, and SIZE have a major role to determine profitability. The INF does not significantly affect profitability. However, the effect of non-performing loans on profitability is very strong.

For Indian banks, non-performing assets have long been a major issue. It affects the economy as well as the banks, unfortunately. The money trapped in non-performing assets (NPAs) directly affects the bank's profitability because Indian banks are heavily dependent on interest income from loans (Singh, 2016) [41].

In the study conducted by Matin (2017) [34] on 47 commercial banks in Bangladesh, the researcher utilized the Feasible Generalized Least Squares (FGLS) model for panel data analysis to explore the factors that impact the banks' Return on Assets (ROA) during the period of 2010-15. The study found that Non-Performing Loans (NPL), loan loss provisions, bank size, cost efficiency, and liquidity had a significant negative effect on ROA.

Islam and Rana (2017) [10] analyzed the impact of Non-Performing Loans (NPL) and operating expenses on Return on Assets (ROA) using panel data regression analysis for the period of 2005-2010. The results of the study showed that NPL and operating expenses had a significant effect on ROA. In particular, the study found that elevated NPL may lead to less profit due to the provision of classified loans.

The study conducted by Kavata in Kenya investigated the impact of non-performing loans (NPLs) on the profitability of commercial banks. The study used the NPL ratio as the independent variable and the return on equity (ROE) as the dependent variable. The findings of the study revealed that NPLs had a negative effect on the profitability of commercial banks in Kenya. This suggests that when NPLs increase, the profitability of commercial banks decreases, as measured by ROE. The study highlights the importance of managing NPLs effectively in order to maintain profitability in commercial banks (Kavata, 2016) [12].

Louzis *et al*. (2012) [33] and Cheng *et al*. (2016) [6] found that CAR has an insignificant impact on NPL.

Increased gross non-performing loan levels pose a significant risk to banks, the financial industry, and the economy as a whole. Additionally, failing to gradually manage down non-performing loans over time has an impact on the profitability of commercial banks. (Pastory, 2013) [37].

Ozili (2019) [36] revealed among the factors that influence non-performing loans, bank efficiency, loan loss coverage ratio, competition, and the stability of the banking system all have a negative relationship with NPLs, while banking crises and bank concentration have a positive relationship with NPLs. NPLs are found to be negatively correlated with regulatory capital and bank liquidity in the regional analysis, suggesting that NPLs are less common in banking sectors with higher regulatory capital and liquidity.

Kingu, Macha, and Gwahula (2018) [14] conducted a study to investigate the impact of non-performing loans on the profitability of commercial banks in Tanzania using panel data from 16 banks between 2007 and 2015. The study found a negative association between non-performing loans and profitability, providing support for the information asymmetry theory and bad management hypothesis. The study highlights the importance of effective management of non-performing loans in maintaining profitability in commercial banks.

Felix and Claudine (2008) [7] have investigated the relationship between bank performance and credit risk management. It could be inferred from their findings that return on equity (ROE) and return on assets (ROA) both measuring profitability were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability.

Research gap

Despite the extensive literature available on the impact of non-performing loans on bank profitability in various countries, there is a lack of empirical evidence on the specific context of Nepal. Therefore, a research gap exists in understanding the unique characteristics of the Nepalese banking system and how non-performing loans affect the profitability of commercial banks in Nepal. Additionally, there is a need to investigate the strategies implemented by commercial banks in Nepal to mitigate the negative effects of non-performing loans on profitability, as well as the effectiveness of these strategies. Such research can provide valuable insights for policymakers and stakeholders to improve the financial stability and sustainability of the banking sector in Nepal.

Research Methodology

Research Design

This study is based on descriptive research design and casual comparative research design to deals with the fundamental issues associated with the effects of non-performing loan on profitability of Nepalese commercial banks. Descriptive research design has been used to analyze the nature and characteristics of sample banks, and causal comparative research design has been used to establish the relationship between the dependent and independent variables.

Population and sample, and sampling design

As of 24 February, 2023 (Licensed by NRB) there are 21 commercial banks operating in Nepal. So, all the commercial banks operating in Nepal are considered as the population. Here all 21 commercial banks are population.

Out of 21 commercial banks, ten banks have been chosen as sample by following simple random sampling method. Those ten banks are NMB bank Ltd, Everest bank Ltd, Himalayan bank Ltd, Sanima bank Ltd, NIC Asia bank Ltd, Global IME bank Ltd, Prabhu bank Ltd, Nabil bank Ltd, Sunrise bank Ltd and Laxmi bank Ltd.

Data collection

Quantitative nature of secondary data has be used and secondary data has been collected through the respective commercial banks annual reports especially from profit and loss accounts, balance sheet and other publications made by banks. Likewise some other related information, are gathered from related banks and related agencies like Nepal Rastra Bank, Nepal Stock Exchange Limited. Various data and information are also collected from the journals, magazines, internet, published and unpublished thesis and dissertations, and websites.

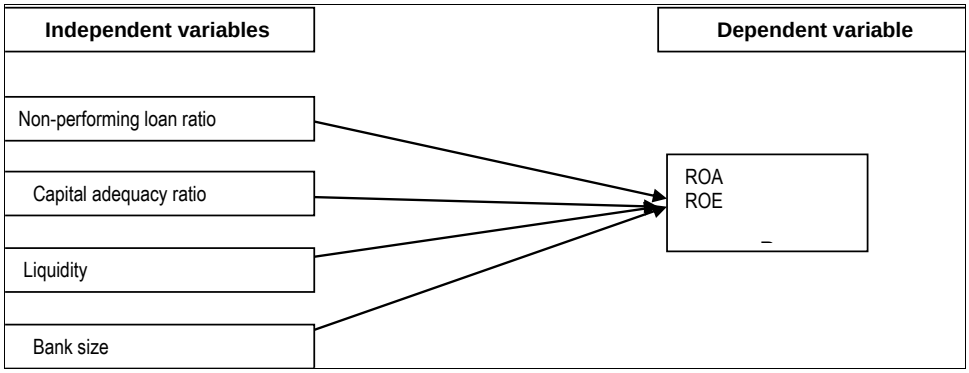
Data analysis

Descriptive methods such as table, percentage, mean, standard deviation, and correlation, are utilized to summarize and analyze data. Additionally, causal comparative research design is implemented to identify causal relationships between variables. Inferential analysis is performed using correlation and regression analysis to make predictions about future observations and determine the strength of the relationship between variables based on a sample of data. Regression analysis is done to check the model's fit, and uses p-values to test hypotheses regarding the relationship between variables.

The following are the hypotheses of the study:

- H1: There is a significant relationship between Non-performing loan ratio and profitability
- H2: There is a significant relationship between Capital adequacy ratio and profitability
- H3: There is a significant relationship between Liquidity and profitability
- H4: There is a significant relationship between Bank size and profitability.
- H5: There is a significant effect of Non-performing loan on profitability
- H6: There is a significant effect of Capital adequacy ratio on profitability
- H7: There is a significant effect of Liquidity on profitability
- H8: There is a significant effect of Bank size on profitability

Theoretical Framework



Note: Adopted from Bhattarai B. (2020)

Fig 1

The model in the study is:

Model 1: ROA = β0 + β1NPLR+ β2CAR+ β3LIQ+ β4SIZE+∈..... (i)

Model 2: ROE = β0 + β1NPLR+ β2CAR+ β3LIQ+ β4SIZE+∈..... (ii)

Where, ROA= Return on Assets, ROE= Return on Equity, β_0 = Constant. β_1, β_2, β_3, and $\beta_4$are the regression coefficients for Non-performing loan ratio, Capital adequacy ratio, Liquidity and Bank size, respectively, and e = error term in the model.

Results and Analysis

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	SD
Non -performing loan ratio (%)	100	0.01	24.29	1.9029	2.878235
Capital adequacy ratio (%)	100	8.41	20.79	12.5245	1.601042
Liquidity (%)	100	64.43	95.90	82.392	6.710481
Bank size (%)	100	23.34	26.57	25.12232	0.734501
Return on Assets (%)	100	-3.43	3.25	1.4718	0.821108
Return on Equity (%)	100	-55.92	32.78	15.2061	9.664049

Table 1 shows that average of the Non-performing loan ratio is 1.9029% which ranges from minimum 0.01% to maximum 24.29% with standard deviation 2.878%. Similarly average of the Capital adequacy ratio is 12.52% which ranges from minimum 8.41% to maximum 20.79% with standard deviation 1.601%. In the same way the average of Liquidity is 82.392% which ranges from minimum 64.43% to maximum 95.90% with standard

deviation 6.71. In addition average of Bank size is 25.122% which ranges from minimum 23.34% to maximum 26.57% with standard deviation 0.734%. Average of the Return on Assets is 1.4718% which ranges from minimum -3.43% to maximum 3.25% with standard deviation 0.821%. Similarly average of the Return on Equity is 15.2061% which ranges from minimum -55.92% to maximum 32.78% with standard deviation 9.66%.

Table 2: Pearson's correlation test

Variable	NPL	CAR	LIQ	SIZE	ROA	ROE
NPL	1					
CAR	-0.4153*	1				
LIQ	-0.2899*	0.4072*	1			
SIZE	-0.3417*	0.2054**	0.3952*	1		
ROA	-0.5073*	0.0956	-0.0089	0.3277*	1	
ROE	-0.0120	-0.2340*	-0.2414*	0.1663	0.7558*	1

**. Correlation is significant at the 0.05 level.
*. Correlation is significant at the 0.01 level.

The above table shows that the correlation coefficient between NPL and ROA indicates a negative and significant relationship whereas the correlation coefficient between NPL and ROE indicates negatively insignificant relationship. Conversely, there is a positive but insignificant relationship between CAR and ROA, but a negatively significant relationship between CAR and ROE. Additionally, there are negative and insignificant relationship between LIQ and ROA but a negatively significant relationship between LIQ and ROE. Finally, the correlation coefficient between SIZE and both ROA and ROE indicates a positive relationship.

Table 3: Regression result of pooled ordinary least square for independent effect of NPLR, CAR, LIQ, SIZE on ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Model summary
C	-2.652	2.541	-1.043	0.299	R^2 = 0.3419
NPLR	-0.148	0.027	-5.423	0.000	Adjusted R^2 = 0.3142
CAR	-0.040	0.049	-0.820	0.414	F-value =12.34
LIQ	-0.027	0.011	-2.348	0.021	P-value = 0.00
SIZE	0.287	0.104	2.739		0.007

From the above finding there is a positive relationship between dependent variable (ROA) and independent variable (SIZE) and there is negative relationship between ROA and NPLR, CAR and LIQ. The study further revealed that the p-value was less than 5% is NPLR, LIQ, SIZE which shows that NPLR, LIQ, SIZE has a statistically significant for this study at 95% confidence level. It means that NPLR, LIQ, SIZE significantly influences on ROA. The beta for non-performing loan ratio indicates that -0.148% variation in return on assets is explained by non-performing loan ratio and is followed by capital adequacy ratio whose coefficient is -0.040. Similarly, the beta coefficients of Liquidity and bank size are -0.027 and 0.287 respectively. In the model summary section of the table, the value of R^2 is 0.3419, which suggests that the independent variables explain a 34.19% variation in the dependent variable in the model. The F-value for the model is 12.34 and is significant, as shown by the p-value below 0.05, confirming that the relationship between dependent and independent variables is statistically significant and that the model is a good fit for the data.

Table 3: Regression result of pooled ordinary least square for independent effect of NPLR, CAR, LIQ, SIZE on ROE

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Model summary
C	-31.85	33.56	-0.949	0.3450	R^2 = 0.1716
NPLR	-0.278	0.360	-0.773	0.4410	Adjusted R^2 = 0.1367
CAR	-1.256	0.656	-1.913	0.0587	F-value = 4.92
LIQ	-0.430	0.157	-2.736	0.0074	P-value = 0.0011
SIZE	3.932	1.385	2.838		0.0055

From the above finding there is a positive relationship between dependent variable (ROE) and independent variable (SIZE) and there is negative relationship between ROE and NPLR, CAR and LIQ. The study further revealed that the p-value was less than 5% is LIQ and SIZE which shows that LIQ and SIZE has a statistically significant for this study at 95% confidence level. It means that LIQ and SIZE significantly influences on ROE. The beta for non-performing loan ratio indicates that -0.278% variation in return on equity is explained by non-performing loan ratio and is followed by capital adequacy ratio whose coefficient is -1.256. Similarly, the beta coefficients of Liquidity and bank size are -0.430 and 3.932 respectively. In the model summary section of the table, the value of R^2 is 0.1716, which suggests that the independent variables explain a 17.16% variation in the dependent variable in the model. The F-value for the model is 4.92 and is significant, as shown by the p-value below 0.05, confirming that the relationship between dependent and independent variables is statistically significant and that the model is a good fit for the data.

Table 4: Hypothesis Testing

Independent variables	Dependent variable	P-values	Hypothesis support
Non-performing loan ratio	Return on Assets	0.000	H_3 accepted
Capital adequacy ratio	Return on Assets	0.414	H_4 rejected
Liquidity	Return on Assets	0.021	H_5 accepted
Bank size	Return on Assets	0.007	H_6 accepted
Non-performing loan ratio	Return on Equity	0.441	H_7 rejected
Capital adequacy ratio	Return on Equity	0.0587	H_8 rejected
Liquidity	Return on Equity	0.0074	H_9 accepted
Bank size	Return on Equity	0.0055	H_{10} accepted

From the above table, we can see that in relation to ROA, there was significant impact of Non-Performing loan ratio, Liquidity, and Bank size on ROA, as suggested by p-values less than 0.05. On contrary, there was insignificant impact of Capital Adequacy ratio, on ROA, as suggested by p-values which were greater than 0.05.

Now, in relation to ROE, significant impact of Bank size and Liquidity was seen on ROE, as suggested by p-values that were less than 0.05. On the contrary, insignificant impact of Non-performing loan ratio and Capital adequacy ratio was seen on ROE, as suggested by p-values which were greater than 0.05.

Discussion

Bivariate correlation coefficient result shows that there is negative relationship between NPL and ROA. This results is consistent to the findings of (Bhattarai, 2016), (Linh, Xuan

&phung, 2020), and (Kirui, 2014). However this result is contradicts to the findings of (Dr. Gautam, 2020), (Pokharel, 2020), (Dr. Radha, Pradhan &pandey, 2016). Similarly, there is negative relationship between NPL, and ROE. This result is consistent to the result of (Dr. Gautam, 2018) and (Bhattarai, 2020). However, this result is contradicts to the findings of (Bhattarai, 2016) and (Tamang, 2019).

Likewise, there is a positive relationship between CAR and ROA. This result is consistent to the result of (Kirui, 2013). However, this result is contradicts to the findings of (Panta, 2018).Similarly, there is a negative relationship between CAR and ROE. This result is similar to the result of (Bhattarai, 2020). However, the result is contradicts to the findings of (Poudel, 2018)

Similarly, there is a negative relationship between LIQ and ROA. This result is consistent to the result of (Budhathoki, Rai, Lamichhane, Bhattarai & Rai, 2020). However, this result is contradicts to the findings of (Pokharel, 2020), (Khati, 2020), (Kirui, 2013), (Dr. Gautam, 2018). Also LIQ is negatively correlated with ROE. The result is consistent to the findings of (Khati, 2020) and (Bhattarai, 2020). However, this result is contradicts to the findings of (Jha & Hui, 2012) and (Dr. Gautam, 2018)

Furthermore, there is a positive relationship between SIZE and ROA. The result is consistent to the findings of (Bhattarai, 2016). However, this result is contradicts to the findings of (Velnampy, &Nimalathasan, 2010). Likewise is also a positive relationship between SIZE and ROE. The result is consistent to the findings of (Bhattarai, 2016) and (Bhattarai, 2020). However, this result is contradicts to the findings of (Aladwan, 2015).

The regression results show that the NPL is statistically significant and negatively related to both measures of bank profitability (ROA and ROE). The outcome shows that when the volume of non-performing loans rises, Nepali commercial banks' profitability declines. Because conceptually, NPL was anticipated to have a negative association with bank profitability, the outcome is as anticipated. The outcome is comparable to that observed by (Felix and Claudine, 2008) [7], (Kargi, 2011), (Kodithuwakku, 2015), and (Gizaw, Kebede, & Selvaraj 2015), who discovered that NPL has a detrimental impact on bank profitability. The outcome, however, contradicts (Li & Zou,2014) and (Alshatti, 2015), who found that the nonperforming loans ratio had a favorable impact on the financial performance of banks.

Similarly, the result shows that LIQ has significant negative effect on profitability. These finding is similar with the findings of(Kingu, Macha & Gwahula, 2018) [14]. However, this result is contradicts to the findings of (Khati, 2020).

As anticipated, there is a significant correlation between the bank size and both indicators of the bank's profitability (ROA and ROE). It suggests that large banks are more likely to benefit from greater economies of scale and, as a result, be able to deliver services more affordably and effectively than small banks, which would positively affect the profitability of Nepalese commercial banks. The findings are consistent with those of (Bhattarai, 2016), (Smaoui and Ben Salah, 2012), who discovered that a greater bank's size increases profitability. The results, however, go against the claims made by (Linh, Xuan & Phung, 2020) and (Smaoui& Salah, 2012) that large size is typically linked to lower bank profitability.

Conclusion and Implications

The study of the effects of non- performing loan on profitability of commercial banks in Nepal found that there is a negative relationship between non-performing loans (NPL) and both return on assets (ROA) and return on equity (ROE). Additionally, there is a positive relationship between capital adequacy ratio (CAR) and ROA, but a negative relationship between CAR and ROE. Liquidity (LIQ) was found to have a negative relationship with both ROA and ROE. Bank size (SIZE) was found to have a positive relationship with both ROA and ROE. The study also found that NPL, LIQ, and SIZE significantly affect ROA, while only LIQ and SIZE significantly affect ROE. Finally, the regression model explains 34.19% of the variation in ROA and 17.16% of the variation in ROE based on the factors examined in this study. The results of this study provide evidence of the importance of these factors in determining the financial performance of banks. Specifically, the findings suggest that non-performing loans, liquidity, and bank size have a significant impact on Return on Assets and Return on Equity. However, the Capital Adequacy Ratio was found to have an insignificant impact on bank profitability. It can be concluded based on the result that NPL is major explanatory variable of bank profitability. Therefore bank and financial institution should pay more emphasis on loan recovery.

The thesis suggests that non-performing loans have a negative impact on bank profitability, highlighting the need for effective credit risk management to minimize NPLs. Furthermore, while maintaining adequate capital levels is important for financial stability, the study shows that it may not necessarily lead to higher profitability. Therefore, banks should balance capital levels and profitability. Additionally, liquidity should be maintained at an appropriate level to minimize negative impacts on profitability. The study also found that bank size positively impacts profitability, indicating economies of scale, which may require smaller banks to explore alternative strategies. Overall, the thesis provides valuable insights for bank managers and regulators to improve the financial performance of banks in Nepal.

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