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EFFECT OF CREDIT RISK MANAGEMENT ON FINANCIAL PERFORMANCE OF NEPALESE COMMERCIAL BANKS

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ABSTRACT

The study aims to investigate the effect of credit risk management on the financial performance of Nepalese commercial banks. For this study, secondary data and descriptive and causal-comparative research methodologies were employed. The E-view-12 student version was used to evaluate the 210 observations of balanced panel data from 15 commercial banks from FY 2010–11 to FY 2022–23. The capital adequacy ratio and credit-to-deposit ratio were shown to have statistically significant and positive coefficients. Both the capital adequacy ratio and the credit-to-deposit ratio have a substantially beneficial effect on the profitability of Nepal's commercial banks, according to the considerable positive coefficients. Therefore, banks should maintain an appropriate capital reserve to absorb a reasonable amount of losses and prioritize improvements in efficiency for expanding their lending and investment activities to enhance the bank's financial stability and performance.

KEYWORDS: *Credit to Deposit ratio, Capital Adequacy Ratio, Non-performing Loan Ratio, Bank Size, Return on Assets.*

1. INTRODUCTION

In recent times, commercial banks have held the largest market share of Nepal's Banking and Financial Institutions. As of mid-July 2023, they accounted for 18.59 percent of the nation's GDP. The proportion of commercial banks in BFIs' total assets and liabilities dropped from 88.73 percent in mid-July 2022 to 88.68 percent in mid-July 2023 (NRB, 2023). Although, commercial banks are also known as the biggest banks in terms of total asset size, number of branches, and scale of activities among all categories of Banking and Financial Institutions (BFIs) of Nepal. The modern banking system in the Nepalese context started in 1937 after the establishment of Nepal Bank Limited (NBL). Commercial banks have a similar purpose as banks in other nations: to extend credit facilities so that banks can boost their earnings. However, it is crucial to remember that banks vary from one another in a variety of ways, including their objectives or goals and the products and services they offer (Paudel, 2018). Credit is one of the biggest dangers that commercial banks confront, but it is also one of their main sources of income and bank profitability. Credit risk management has the potential to impact it. The financial performance of banks can be affected by a variety of risk factors (Aryal 2023). Banks are exposed to a variety of risks that influence their operations and overall performance. Bank managers must evaluate cash flows and the risks associated with distributing financial resources across different areas of use, as maximizing shareholder value is the primary goal of banking management (Alshatti, 2015). Nepalese commercial banks must improve their loan management and credit analysis procedures, safeguard their assets, and implement systematic credit risk management procedures. They can lessen the negative impacts on financial performance and lower the frequency of non-performing loans by doing this (Bhattarai, 2019). The Banking Stability Indicator (SBI) under Nepal Rastra Bank examines an overall assessment of banking stability in Nepal by combining multiple financial metrics into a single composite score. Metrics including asset quality (Non-Performing Loan), liquidity (Net Liquid Assets Ratio), soundness (Capital Adequacy Ratio), efficiency, and profitability (Return on Assets) are frequently included in this index. By contrasting the current state of the Nepalese banking system with its recent history, it is possible to evaluate and analyze the system's overall health while taking into account various risk areas (NRB, 2023). Credit risk management is the process of identifying, assessing, and reducing risks associated with lending activities that are taken by financial institutions, particularly banks. Effective and appropriate risk management is essential for the survival of a bank, and it enables management to manage resources for risk and return potential. Therefore, banks and financial institutions should be very careful about the maintenance of

appropriate asset portfolios. Otherwise, these types of loans could quickly get into problems and eventually impact the bank through a rise in non-performing loans (Bhattarai, 2019). The Banking Stability Indicator constantly declined from mid-July 2022 to mid-January 2024 which was driven by a decrease in asset quality. This has led to a decline in profitability and a weakened capital adequacy position. This situation is further affected by the increasing number of bad loans and restructured assets. The bank's risk profile has worsened due to an increase in risk-weighted assets. Commercial banks' Capital Adequacy Ratio (CAR) dropped from 13.53 percent in mid-July 2022 to 13.37 percent by mid-July 2023. From 1.20 percent in mid-July 2022 to 2.98 percent in mid-July 2023, the non-performing loan ratio for commercial banks grew by 1.78 percent. In mid-July 2023, the overall credit growth of banking and financial institutions fell from 12.91 percent in mid-July 2022 to 3.48 percent. Banking and financial institutions' (BFIs') net profit dropped 7.73 percent to Rs. 76.99 billion in FY 2022–2023 from Rs. 83.44 billion in FY 2021–2022. In the banking industry, return on equity (ROE) and return on assets (ROA) both somewhat declined. With commercial banks experiencing a reduction in Return on Equity from 13.51 percent to 11.46 percent and Return on Assets from 1.24 percent to 1.08 percent, the Return on Assets of Banking and Financial Institutions fell to 1.06 percent in 2022/23 from 1.23 percent in 2021/22 (NRB, 2023). The existing body of research on the connection between credit risk and the financial performance of commercial banks has provided valuable insights. However, there is a methodology gap in research. While numerous studies (Aryal, 2023; Chhetri, 2021; Pantha, 2019; Poudel, 2018; and Bhattarai, 2016) have investigated the impact of credit risk management on the financial performance of Nepalese Commercial Banks, there is a lack of a particular methodology about the evaluation of the credit risk variables over a long period. This is the gap that this study seeks to fill through the use of 14 years of data from 15 commercial banks in 210 observations. With such longer observations and various factors of credit risk being considered, the relationship between credit risk and bank financial performance can be better understood through this research, which can also assist interested parties in determining the most important risk factors, creating plans to reduce the highest credit risks, and modifying credit risk management procedures as necessary.

Objectives of the study

The study attempts to achieve the following objectives:

- To measure the relationship between capital adequacy ratio, credit-to-deposit ratio, non-performing loan ratio, bank size, and return on assets.
- To examine the effect of capital adequacy ratio, credit-to-deposit ratio, non-performing loan ratio, and bank size on return on assets.

2. LITERATURE REVIEW

Theoretical Review

The credit risk theory suggests that various factors can directly impact the probability of loan default within the banking sector. According to this theory, credit risk refers to the possibility that a borrower may delay or fail to make principal or interest payments (Dimitrios et al., 2012). This risk arises when the lender faces financial difficulties and is unable to return deposits to depositors or fulfill other obligations due to a loss of capital and interest. Furthermore, it encompasses the significant losses lenders face when borrowers do not repay their debts, known as non-performing loans. The non-performing loan ratio measures the proportion of loans not being repaid, reflecting a bank's exposure to credit risk. Consequently, a higher non-performing loan ratio indicates greater credit risk, prompting lenders to charge higher interest rates to compensate for the perceived risk (Owojori et al., 2011). Bank size is also considered a crucial factor in determining credit risk. Larger banks generally have more diverse portfolios and greater resources to manage risk, resulting in lower credit risk.

Liability management theory emphasizes matching the maturity and interest rate characteristics of a bank's assets and liabilities to mitigate risks. According to this theory, banks can obtain money from the capital market through short-term debt instruments to cover reserve gaps as they occur, making standard debt and liquidity management procedures less applicable. Maintaining or growing the amount of assets is one of the key objectives of bank management. Liability management provides more flexibility in doing this. Banks have always maintained liquid assets to meet reserve needs and to adjust for deposit inflows and outflows. Of necessity, these liquid investments have not been the most profitable alternatives to the bank.

Empirical Review

Hamza (2017) examined how Pakistani commercial banks' financial performance was affected by credit risk management. Secondary data was gathered from KSE, government websites, and publications from the SBP Banking Sector Survey to support the adoption of the primary research approach. The study employed pooled regression analysis to evaluate how credit risk management affects two distinct performance measures (ROA and

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ROE). The results show a relationship between bank performance and credit risk management. The study demonstrates that Non Performing Loan Ratio (NPLR) negatively and capital sufficiency (CAR) positively and significantly impacts the return on assets.

Poudel (2018) looked into how credit risk affected Nepal's commercial banks' financial results. A sample of fifteen commercial banks provided the data. The panel data analysis is conducted using a one-way fixed effect model. The findings showed that while the capital adequacy ratio, total assets, and GDP growth have a favorable impact on the profitability of Nepalese commercial banks, the solvency ratio, interest spread, and inflation had no negative impacts.

Bhattarai (2019) investigated the impact of credit risk on the profitability of commercial banks in Nepal, concentrating on the period 2001 to 2016. The study used balanced panel data from ten commercial banks, which totaled 160 observations. The study discovered a strong relationship between banks' financial performance (ROA), the capital sufficiency ratio (CAR), and the number of non-performing loans. Nonetheless, it was demonstrated that neither the credit-to-deposit ratio (CDR) nor risk sensitivity (RS) affected bank financial performance (ROA). This demonstrates that credit risk components such as CAR, NPLR, and MQR can have a significant impact on profitability in Nepalese banks.

Khanal (2023) examined how Nepalese commercial banks' financial performance was affected by credit risk management. Pooled ordinary least squares estimation was used in the study to analyze data from 10 commercial banks. The study employed the following credit risk indicators: bank size (BS), loan-to-deposit ratio (CDR), non-performing loan ratio (NPLR), capital adequacy ratio (CAR), and management quality ratio (MQR). According to the study, CDR has a negative and negligible impact on ROA, whereas CAR, NPLR, and BS have a positive and negligible influence. Thus, the study's conclusions demonstrate that credit risk management significantly affects Nepal's commercial banks' financial performance.

Aryal (2023) explored how credit risk affects the financial performance of Nepalese commercial banks. The research designs employed in the study were descriptive and causal-comparative. A regression model was employed to assess the data gathered from 14 commercial banks. The regression findings suggest that bank size and credit-to-deposit ratio have a negative influence on the bank’s financial performance.

Conceptual Framework

The Conceptual framework of the study is outlined below:

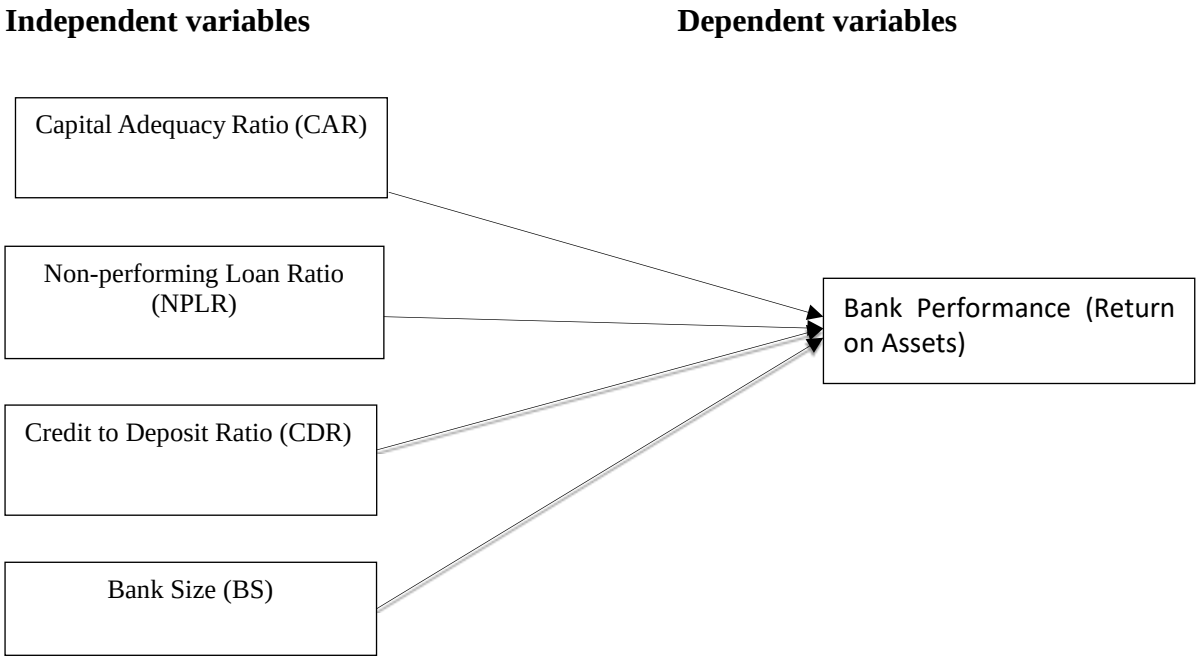


Figure 1 Conceptual Frameworks

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Hypotheses

The research framework and reviews serve as the foundation for the following hypotheses that are developed for the study:

H_1: The capital adequacy ratio significantly affects financial performance (ROA).
H_2: The non-performing loan ratio significantly affects Return on Assets (ROA).
H_3: The credit-to-deposit ratio significantly affects Return on Assets (ROA).
H_4: The bank size significantly affects Return on Assets (ROA).

3. RESEARCH METHODOLOGY

Research Design

In this study, the chosen research designs are Descriptive research and Casual Comparative research. Descriptive research is appropriate for the investigation as it allows the existing situation to be presented without altering any factors. Furthermore, a causal-comparative research design is employed to establish relationships between independent and dependent variables. This research adopts both descriptive and causal-comparative designs to investigate the associations between variables and the impact of one variable on another. Thus, the chosen research designs provide a comprehensive framework for conducting the study.

Population and Sample Size

Twenty Nepalese commercial banks are considered as the population of this study. The banks for the research were selected using the random sampling technique. A total of fifteen commercial banks that operate in Nepal are included in the study. The study covered the 210 observations of mid-July from fiscal year 2010/11 to 2022/23. Due to the numerous developments that have occurred in the banking sector at this time, banks are fast undergoing mergers and acquisitions. Nepal Bank Ltd., Rastriya Banijya Bank Ltd., Agriculture Dev. Bank Ltd., Nabil Bank Ltd., Nepal Investment Megha Bank Ltd., Standard Chartered Bank Nepal Ltd., Himalayan Bank Ltd., Nepal SBI Bank Ltd., Everest Bank Ltd., Kumari Bank Ltd., Laxmi Bank Ltd., Siddhartha Bank Ltd., Citizens Bank Int'l Ltd., Prime Commercial Bank Ltd., and NMB Bank Ltd. have been selected as sample banks.

Nature and sources of data and Instrument for data collection

The study employed secondary data that was collected from a variety of sources, including websites of commercial banks, banking and monetary statistics, and the Nepal Rastra Bank's major financial indicators.

Tools for Data Analysis

The study employed various statistical tools based on the appropriateness of the data. Descriptive statistics, including mean, median, and standard deviation (SD), were computed. The study also employed cross-sectional data and panel data regression, to look at banks' credit risk.

Model Specification

The study's econometric model, which was based on credit risk control, was utilized to estimate the banks' performance and bank-specific characteristics. The model is provided as follows:

Regression Model

$$Y = \beta_0 + \beta Fit + eit \quad \ldots\ldots\ldots\

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4. RESULT AND ANALYSIS

Descriptive Statistics

Descriptive statistics contain mean, median, standard deviation, minimum, and maximum values for 15 commercial banks for the 2010–2023 research period, for a total of 210 observations. In this table, profitability (Return on Assets) is the dependent variable, and Capital adequacy ratio, Credit-to-deposit ratio, Non-performing Loan Ratio, and Bank size are independent variables.

Table 1 Descriptive data summary of variables

	ROA	NPLR	CD Ratio	CAR	Size
Mean	1.63	1.91	82.21	12.79	11.43
Median	1.54	1.42	83.02	13.20	11.51
Max	3.99	10.92	121.29	23.68	13.08
Mini	0.12	0.00	44.27	-24.08	9.49
Std. Dev.	0.66	1.75	12.45	5.46	0.79
Observations	210	210	210	210	210

Source: Author's calculation from E-views 12 Student Version, 2024

Table 1 presents a descriptive summary of five financial variables across 210 observations. Each column corresponds to a variable: Return on Assets (ROA), Non-Performing Loan Ratio (NPLR), Credit-to-Deposit Ratio (CD Ratio), Capital Adequacy Ratio (CAR), and Size. For the fiscal year 2009/10-2022/23, the sample commercial banks had a positive average return on assets (ROA) of 1.63 having a standard deviation of 0.66. In addition, the ROA values vary very little, from a minimum of 0.12 to a high of 3.99. The standard deviations of the explanatory variables CAR and CDR show a wider range of variance from their respective averages. It is important to note that the dataset shows a great deal of variance in CDR, with lowest and max values of 44.27 and 121.29, respectively, and high and low values of -24.08 and 23.68, respectively, for CAR. Other explanatory variables, such as bank size and NPLR, have minimum standard deviations of 0.79 and 1.75, respectively, indicating relatively low variation of these variables within a close range around their mean values between the minimum and maximum.

Correlation Analysis

To learn more about the link between two distinct or disparate variables, strong correlation research is conducted. The value of the correlation coefficient ranges from -1 to +1.

Table 2 Correlation Analysis

	ROA	NPLR	CD_RATIO	CAR	SIZE
ROA	1				
NPLR	0.10650321	1			
CD_RATIO	0.03779049	-0.2896244	1		
CAR	0.16539811	-0.4904783	0.54568255	1	
BANK_SIZE	-0.0586359	0.13844997	0.27010916	0.07782311	1

Source. Author's calculation from E-views 12 Student Version, 2024

This table presents a correlation analysis among five variables: Return on Assets (ROA), Non-Performing Loan Ratio (NPLR), Credit-to-Deposit Ratio (CD Ratio), Capital Adequacy Ratio (CAR), and Bank Size (Size). The correlation coefficient value of 0.10650321 indicates a positive linear relationship between the non-performing loan ratio and return on assets. This positive correlation serves as another evidence that Nepal's commercial banks are more profitable when they take on greater credit risk. Likewise, a positive linear link between the credit-to-deposit ratio and return on assets is indicated by the correlation coefficient value of 0.037789049. This implies that profitability increases with the credit-to-deposit ratio. Additionally, the correlation between the capital adequacy ratio and the return on assets is 0.16539811, suggesting a positive linear relationship between them. This suggests that Nepal's commercial banks are more profitable when their capital adequacy ratio is greater. Moreover, the correlation coefficient is -0.0586359 between bank size and return on assets, indicating a negative linear relationship between bank size and return on assets. Therefore, an increase in bank assets results in

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decreased profitability among commercial banks in Nepal. If the absolute value of the Pearson correlation coefficient is less than 0.8, it shows multicollinearity is very less likely to exist (Shrestha, 2020). Thus, there is no presence of multicollinearity due to a value of r <0.6.

Regression Analysis

Regression analysis has been conducted to examine the effect of independent variables on dependent variables. Capital adequacy ratio, Nonperforming loan ratio, Credit-to-deposit ratio, and Bank size are used as an independent variable. Return on assets is used as the dependent variable. For panel data analysis, normality of data is not required, as it can handle dependently non-identically distributed measurement errors (Bechtel, 2021). The regression result is presented as follows:

Breusch Pagan test

In this study, regression is used to apply the Breusch-Pagan test to identify the best approach depending on the properties of the data. Predicting and estimating the influence of the independent factors on the dependent variable is the aim of regression analysis.

Table 3 Breusch-Pagan Test

	Test Hypothesis		
	Cross-section	**Time**	**Both**
Breusch-Pagan	114.9826	13.20525	128.1879
	(0.0000)	(0.0003)	(0.0000)

Source. Author's calculation from E-views 12 Student Version, 2024

To choose an appropriate model for Panel data analysis, the Breusch-Pagan test is employed. The following hypothesis underlies the test:

H_0: The Pooled Ordinary Least Squares Approach is better than the Random Effect Model and Fixed Effect Model.

H_1: The Pooled Ordinary Least Squares Approach is not better than the Random Effect Model and Fixed Effect Model.

The p-value in this case is 0.0000, which is below 0.05. The null hypothesis (H0) is thus invalidated. This indicates that the Fixed Effect and Random Effect Models are superior than the Pooled Ordinary Least Squares Approach. For this panel data study, the Fixed Effect and Random Effect Models are suitable.

Housman Test

This serves as a test to identify which of the fixed and random effects models is best. Assuming identical slopes and constant variance for each person (group and entity), a fixed group effect model analyzes individual variations in intercepts. A fixed effect model estimates error variance specific to groups based on the assumption that individual effects (heterogeneity) are uncorrelated with any regressor (Adefemi, 2017). The following hypothesis underlies the test:

Null hypothesis (H_0): The Random Effect Model is better than the Fixed Effect Model.

Alternative hypothesis (H_1): The Random Effect Model is not better than the Fixed Effect Model.

Table 4 Housman Test

Dependent Variable ROA		
Chi. Sq. Statistic	**Chi- Sq. d.f.**	**P-Value**
46.121722	4	0.0000

Source. Author's calculation from E-views 12 SV, 2024

Table 4 displays the outcome of the Housman Test. The purpose of this test is to evaluate the relative merits of fixed-effect and random-effect models. The study has enough statistical evidence to reject the null hypothesis since the model's cross-section random P-value is less than 0.05. As a result, the null hypothesis is rejected, indicating that the study is not appropriate for the random effect model.

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Regression Analysis Using Fixed Effect Model

Table 5 Regression Analysis using Fixed Effect Model

Variables	Coefficient	Std. Error	t- Statistic	Prob.
NPLR	0.067675	0.035218	1.921594	0.0561
CD_RATIO	0.008213	0.004028	2.039089	0.0428
CAR	0.020771	0.009990	2.079297	0.0389
BANK_SIZE	-0.284676	0.056749	-5.016415	0.0000
C	3.811760	0.571632	6.668212	0.0000

R-square=0.446115	Adjusted R^2 = 0.393917	S.E of regression = 0.511028
F-statistics = 8.546499	Prob(F-statistic)= 0.0000	

Source. Author's calculation from E-views 12 Student Version, 2024

Table No. 5 represents the outcomes of the fixed effect model. At the 5% level of significance, NPLR has an insignificant relationship with ROA, but the dependent variable in the model (ROA) is significantly described by the CD Ratio, CAR, and Bank Size. The Non-performing Loan Ratio's positive coefficient (0.0677) suggests a positive relationship between the non-performing loan ratio and the dependent variable. However, the p-value (0.0561) is slightly above 0.05, indicating insignificance at the 5% level. The Credit to Deposit Ratio's positive coefficient (0.0082) suggests a positive relationship between the credit-to-deposit ratio and the dependent variable. The p-value (0.0428) is less than 0.05, indicating a statistically significant relationship at the 5% level.

The Capital Adequacy Ratio has a positive coefficient (0.0208) suggesting a positive relationship between the capital adequacy ratio and the dependent variable. The p-value (0.0389) is less than 0.05, indicating a statistically significant relationship at the 5% level. Bank Size has a negative coefficient (-0.2847) suggesting a negative relationship between the bank size and the dependent variable. The p-value (0.0000) is less than 0.05, indicating a highly statistically significant relationship at the 5% level. In this research, the value of R squared is 0.446116, which explains the independent variables predicting 44.61% of the dependent variable. The value of adjusted R squared is 0.393917, which means the independent variables cumulatively determine 39.39% of the dependent variables. The value of prob (F-statistic) is 0.000000 which is less than 5 %, which means this model is fit and the independent variables collectively explain the significant part of the variance in the Return on Assets (dependent variable).

Summary of Hypotheses

The findings of hypothesis testing have been established, and the impact of independent factors on the dependent variable has been examined. The table below provides an overview and examples of them:

Table 6 Summary of Hypotheses

Hypothesis	P-Value	Remarks
H_1: The Capital Adequacy Ratio significantly affects financial performance (ROA).	0.0389	Accept
H_2: The Non-Performing Loan Ratio significantly affects Return on Assets (ROA).	0.0561	Reject
H_3: The Credit-to-Deposit Ratio significantly affects Return on Assets (ROA).	0.0428	Accept
H_4: The Bank Size significantly affects Return on Assets (ROA).	0.0000	Accept

5. DISCUSSION

In this study, the credit-to-deposit ratio and the capital adequacy ratio have been determined to have positive and statistically significant coefficients. The credit-to-deposit ratio and capital adequacy ratio significantly improve the profitability of Nepal's commercial banks, according to the strong positive coefficients. This suggests that the

return on assets would increase in proportion to the capital adequacy ratio. The results of Odekina et al. (2019) and Shabani et al. (2019) are in agreement with the current finding. Thus, the research hypothesis that the capital adequacy ratio significantly improves the financial performance of commercial banks is well supported by the available data.

Similarly, Goet (2022) found that the credit-to-deposit ratio significantly improves commercial banks' return on assets (ROA). However, the results of two separate studies on the impact of credit risk on Nigerian banks' performance (Marshal & Onyekachi, 2014; Kolapo et al., 2012) found that the ratio of credit to total deposits has a positive impact on the bank's financial performance, which is in line with the results of this study. The findings of (Zaidanin, 2020), who examined the financial performance of Jordanian commercial banks and came to the conclusion that there is no meaningful correlation between profitability and the loan-to-customer deposit ratio, contradict the outcome. Additionally, the current analysis demonstrates that the financial performance of the banking industry in Nepal is significantly impacted negatively by bank size. This outcome, however, contradicts the findings of Bhattarai (2016) and Abubakar et al. (2016), who looked into how credit risk management affected banks' financial performance and came to the conclusion that bank size significantly improved the banks' financial performance.

6. CONCLUSION AND IMPLICATIONS

Conclusion

The study's findings showed a significant positive relationship between Nepalese commercial banks' return on assets and their capital adequacy and credit-to-deposits ratios. This suggests that the return on assets would increase in proportion to the capital adequacy ratio. Therefore, banks should regularly assess and maintain appropriate capital buffers to absorb potential losses and support growth because a bank with strong capital adequacy can absorb possible loan losses and avoid bank insolvency and failure. And also banks should prioritize improvement in efficiency for expanding their lending and investment activities. This will enhance the bank's financial performance and investor confidence. By implementing these suggestions and focusing on the key factors identified in this study, Nepalese commercial banks can work towards improving their financial performance and achieving sustainable and long-term growth.

Implication

By providing insight into the connection between credit risk and the financial health of Nepalese commercial banks, the study adds to the body of knowledge on the factors that influence credit risk in the country's banking sector. Using this information, policymakers may create and execute laws and rules that reduce credit risk and strengthen the banking industry's stability. They may, for example, think about requiring banks to uphold greater capital adequacy ratios, impose more stringent lending guidelines, or implement risk management techniques that might assist in identifying and reducing credit risk. The study's conclusions can also be applied by the banks to improve their decision-making and risk-management procedures. They may use the data, for example, to identify the elements in their portfolios that contribute to credit risk and put mitigation strategies in place. With this information, businesses can also improve profitability and improve their loan procedures. To better understand the connection between credit risk management and banks' financial performance, future research might conduct comparative analyses by taking into account the findings of this study and other commercial banks. Additionally, studies might look at ways to better quantify and evaluate credit risk management and how this could be applied to identify and reduce credit risk.

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