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Effects of Credit Risk Management on the Financial Performance of Commercial Banks in Nepal

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Abstract

Purpose: *The main purpose of the study is to investigate the effect of non-performing loan ratio (NPLR), loan to deposit ratio (LDR), interest income to loan and advance ratio (ILAR), and capital adequacy ratio (CAR) on the return on assets (ROA) of commercial banks in Nepal.*

Methods: *The balance panel data of eighteen commercial banks based on data availability with 180 observations covering 2013/14 to 2022/23 have been used for analysis. Descriptive methods used to summarize data, correlation method used to examine relationships between variables, and the random effect regression model used to predict outcomes and assesses variable influence.*

Results: *The results show that the NPLR and LDR have a negative and significant effect on the financial performance (ROA) of commercial banks in Nepal. ILAR has a positive and insignificant effect and CAR has a positive and significant effect on the financial performance (ROA) of commercial banks in Nepal.*

Conclusion: *Banks should focus on reducing non-performing loan ratio, loan supply to the productive sector, and maintaining an optimal level of capital adequacy ratio to improve their financial performance.*

Keywords: Return on assets, Non-performing loan ratio, Loan to deposit ratio, Interest income to loan and advance ratio, Capital adequacy ratio.

I. Introduction

The examination of credit risk management and financial performance become relevant in various studies, especially among emerging economies like that of Nepal. Risk can be understood as the likelihood or peril of damage, injury, liability, loss, or any other undesirable occurrence that arises from external or internal vulnerabilities and that can be avoided by anticipatory measures (Bizuayehu, 2015). Similarly, credit risk is the king of all kinds of risks (Asfaw & Veni, 2015). Credit risk is amongst the most vital risks faced by banks. Credit risk occurs due to non-performance by the borrower. It may be caused due to either inability or unwillingness to perform in the pre-commitment contracted manner (Bizuayehu, 2015). A

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business without any type of risk is not a business. Risk accompanies the banking business or any type of business. Banks and financial institutions are exposed to a variety of risks out of which credit risk is more serious in comparison to other risks. The banks are inherently exposed to credit risk as they are engaged in providing credit facilities as they accept deposits (Muriithi et al., 2016).

Credit risk is the likelihood that the actual return on an investment or loan extended will be other than that, which was expected (Conford, 2000). Coyle (2000) defines credit risk as losses due to the inability or refusal of credit customers to pay what is owed in full and on time. The main sources of credit risk are, low institutional capacity, inappropriate credit policies, volatile interest rates, mismanagement, inappropriate laws, weak capital and liquidity, directed lending, widespread banking licensing, unsound underwriting of loans, irresponsible lending, inefficient credit appraisal, lack of non-executive directors, unsound underwriting of loans, laxity in credit appraisal, unsound lending practices government intervention and inadequate supervision by the central bank. To minimize such risks, the financial system must possess; well-capitalized banks, servicing large numbers of customers, disclosure of borrower information, interest rate smoothing, reduction in non-performing loans, increased bank deposits, and increased lending to the lenders. Non-performing loans and default loans must decline (BCBS, 2006).

Good credit management is a prerequisite for any stability and long-term profitability of financial institutions, but declining credit quality is the most frequent cause of poor financial performance of the financial institutions (Gatuhu, 2013). Bank credit risk can also arise as a result of internal weaknesses in any financial institution such as inefficiency in management. Management deficiency affects liquidity resulting in a rise in non-performing loans (Mwaurah, 2013). Apart from this, the non-performing loan (NPL) in a bank's balance sheet is the ratio of total non-performing loans and overall gross loans. The performance of banks with regard to credit risk is dependent upon various internal and external determinants. The determinants specific to the bank are the internal factors and the economic environment determinants are the external factors Naceur and Omran, (2011). The health of the financial sector is a top policy priority, more so in emerging economies where the failure of financial intermediation hampers the economic growth process and thwarts the development process (Das & Ghosh, 2013). Moreover, it has been observed that the major economic turbulences are the result of a banking crisis. The economic development and financial progress of a country largely depend upon the financial performance and the strength of its banking sector (Shukla, 2015). The banking sector are the backbone of the economic development of any country (Ahsan, 2016). The financial stability and growth of the nation depend on the financial health of its banking system. Sound financial health of banks is the guarantee not only to their depositors but also necessary for the shareholders, employees, and the economy as a whole (Mohiuddin, 2014).

Banks are exposed to various types of risks, which affect their activity and performance. As the central purpose of banking the need to maximize shareholder wealth, bank managers are required to consider the cash flows and the risk involved due to channel their financial capital to other usage sectors (Alshatti, 2015). Credit risk management is important in banks because its impact on the banks' financial performance, survival, and growth. Credit risk is among the most significant risk commercial banks' concerns, since credit is among the major sources of their revenue. Hence, bank profitability is determined by the management of the credit risk of that credit (Li & Zou, 2014). Earlier studies in Nepal by Bhattarai (2019) and Chhetri (2021) have managed to identify major credit risk drivers such as NPLR and CAR that affect financial performance, but they are limited by the use of outdated data, short time frames, smaller sample sizes, and not considering crucial variables such as ILAR. Additionally, they fail to differentiate between high- and low-performing banks, and hence there is lost information about how credit risk affects banks differently based on profitability. This is indicative of the need for broader and comparative examination with a broader dataset and more universal credit risk indicators. There exists possibilities of value addition in this research as it presents recent, decade-long data on the effect of credit risk indicators on financial performance

for 90% commercial banks in Nepal. By integrating lesser-studied variables like ILAR and presenting open, statistically proven connections like the considerable negative effect of NPLR and LDR on ROA this research responds to methodological and situational lacunas in the existing body of work and provides rich contributions towards augmenting credit risk management strategies in banking. One of the key limitations is the lack of a uniform credit risk measurement technique among Nepalese commercial banks, thus hampering easy comparison. The second is uneven implementation of rules by Nepal Rastra Bank (NRB), which leads to differing risk management among practices. Also, openness and quality of data are major concerns as there might be underestimation of non-performing loans (NPLs) in order to showcase good financial performance. Nepal's dominance by collateral-based lending may further distort the proper assessment of the effectiveness of credit risk management. Finally, unforeseen external economic shocks such as political unrest and global crises may shock financial performance at any time, and so it is challenging to evaluate credit risk management's direct effects. Hence, this study intend to examine the impact of credit risk management factors: non-performing loan ratio, loan to deposit ratio, interest income to loan and advance ratio, and capital adequacy ratio on financial performance.

II. Reviews

Financial distress occurs when a firm is unable to meet its financial obligations, such as debt repayment or operational expenses, which may lead to bankruptcy or insolvency. Highly leveraged firms, according to Financial Distress Theory (Altman, 1968), are particularly vulnerable. Financial distress is not only a legal cost but also a reputation loss, inefficiency in operations, and bad managerial decisions, all of which reduce firm value. Among the most serious financial stressors is liquidity risk, which results from a company not being able to convert assets rapidly into cash in order to clear short-term commitments without making severe losses. Liquidity Risk Theory (Diamond & Dybvig, 1983) places greater emphasis on maturity mismatching between liabilities and assets, illiquidity of markets, or sudden withdrawal of creditors. As a means to counteract the risk, corporations must have sufficient liquid assets that will sustain business continuity.

Effective cash management is crucial in managing profitability and liquidity. Cash Management Theory provides such models as Baumol's (1952) deterministic model, which optimizes cash holdings through minimizing transaction costs, and Miller and Orr's (1966) stochastic model, which provides upper and lower bounds of cash balances to manage uncertainty. Such models allow companies to maintain liquidity while minimizing idle cash. For banks, Capital Buffer Theory (Diamond & Rajan, 2000; BCBS, 2010) focuses on maintaining reserves in excess of regulatory requirements to absorb losses in times of economic downturn. Basel III capital adequacy requirements, for example, require buffers to increase stability, lower insolvency risk, and provide resilience against credit losses and market risk. Bhattarai (2019) analyzed balanced panel data of ten commercial banks (2001–2016) and concluded that CAR, NPLR, and quality of management exert meaningful influences on financial performance. However, statistically irrelevant were CDR and risk sensitivity. It identifies the importance of managerial efficiency and capital buffers in managing credit risk.

Carrying this further, Chhetri (2021) analyzed 17 "A"-rated banks (2015–2020) and established that NPLR had a negative and significant impact on return on assets (ROA), strengthening the negative effect of bad loans. Although CAR and size were not significant in their negative impacts, management quality was once again a primary determinant of performance in the positive direction. Interestingly, CDR had a positive but not significant relationship, which is contrary to that found by Bhattarai. The study justifies scientific credit risk management based on rigorous loan appraisal and monitoring for the purpose of reducing NPLs. More recently, Aryal (2023) examined 14 commercial banks (2017–2022) and determined that bank size positively contributes to a significant reduction in performance, possibly due to inefficiencies at scale. Conversely, CAR contributed a statistically insignificant positive contribution, while NPLR's negative contribution was statistically weak, suggesting shifting risk dynamics. Contrary to earlier studies, CDR was found to be a significant influential variable but the

exact impact is uncertain.

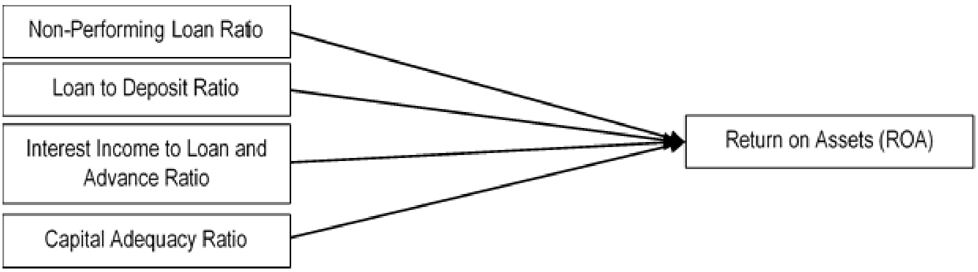
While these studies emphasize the negative impact of NPLs and unclear impact of CAR and CDR on the Nepalese banks' performance, their findings are inconsistent due to varying sample sizes, time periods, and omitted variables (e.g., macroeconomic variables). Methodological limitations such as reliance on ROA alone, potential endogeneity, and lack of theoretical foundation in financial distress or liquidity risk theories compromise generalizability. Conflicting results (e.g., the function of CAR) indicate context-dependent dynamics, stressing the need for standardized samples, advanced econometrics, and inclusion of broader risk indicators to allow usable implications for banks and regulators.

Theoretical Framework

This study check the framework of credit risk management variables effects on financial performance in commercial banks.

Figure 1

Research Framework



Note. Adopted from Chhetri (2021)

III. Methodology

This study adopted descriptive and causal research design. Out of 20 existing commercial banks operating in Nepal, 18 commercial banks have been randomly chosen as per data availability. Data of 2013/14 to 2022/23 are taken from the website and annual report of individual banks. Date is subjected to different types of statistical tests before panel regression test is run. A random effect least squire regression technique is used in the regression to analyze the relationship between credit risk management and financial performance.

The research uses return on assets as a proxy for credit risk and four performance indicators in finance: non-performing loan ratio, loan to deposit ratio, interest income to loan and advance ratio, and capital adequacy ratio.

The relationship between dependent and independent variables are shows in this following equation

$ROA= \alpha+\beta_1 \cdot NPLR+\beta_2 \cdot LDR+\beta_3 \cdot ILAR+\beta_4 \cdot CAR+\epsilon$………………….........(i)

Dependent variable, Return on Assets (ROA), to measures bank profitability using the ratio of net income to total assets. Critical independent variables are: the Non-Performing Loan Ratio (NPLR), to measures credit risk using the ratio of non-performing loan to total loan and advance; the Loan-to-Deposit Ratio (LDR), measure liquidity risk as total loans over total deposits; The Interest Income to Loan & Advance Ratio (ILAR), measures reflect lending yield as interest income over total loans; and the Capital Adequacy Ratio (CAR), show solvency as regulatory capital (Tier 1 + Tier 2) over risk-weighted assets. For regression equations ($ROA = \alpha + \beta_1 NPLR + \beta_2 LDR + \beta_3 ILAR + \beta_4 CAR + \epsilon$), β_1–β_4 measure the contribution of each variable with α as intercept and ϵ for unexplained variations. All ratio values are obtained from

banks' statements of accounts normally as percentages.

IV. Result and Discussion

Descriptive Analysis

Table 1 presents the descriptive statistics associated with ROA, NPLR, LDR, ILAR, and CAR over the period 2013-14 to 2022-23, including 180 observation of the cross-section of 18 sampled banks.

Table 1

Descriptive Data Summary of Variables

Variables	ROA	NPLR	LDR	ILAR	CAR
Minimum	-1.44	0.01	48.92	0.12	4.55
Maximum	3.22	24.29	107.01	14.42	22.99
Mean	1.5279	1.8643	82.6664	10.2409	13.3057
Median	1.5100	1.3050	84.9700	10.1800	13.0000
Std. Dev.	0.5791	2.3190	9.2230	1.9289	2.4090
Skewness	-0.3522	5.4412	-1.0389	-0.6272	0.6453
Kurtosis	6.5951	50.1990	4.3505	5.9013	6.5397
Observation	180	180	180	180	180

Note. Author's computation from EViews 12 Student Version Lite

Table 1 contains descriptive statistics of the variables in the Return on Assets, Non-Performing Loan Ratio, Loan to Deposit Ratio, Interest Income to Loan and Advance Ratio, and Capital Adequacy Ratio of the sample consisting of 180 observations. The mean for ROA is 1.5279 with a standard deviation of 0.5791; hence, it has moderate variation around its mean. It is negatively skewed -0.3522 that means longer tail on the left side and kurtosis id 6.5951 that means much heavier tails than normal distribution. The average NPLR is 1.8643, with a high standard deviation of 2.3190, indicating great dispersion. It is positively skewed 5.4412 and also leptokurtic 50.1990. The LDR has a mean of 82.6664 and the highest standard deviation 9.2230, showing variability in loan and deposit management. It is negatively skewed -1.0389 and kurtosis is 4.3505. ILAR has a mean of 10.2409 and a standard deviation of 1.9289, with slightly negative skewness of -0.6272 and kurtosis at 5.9013. Last but not least, CAR averages at 13.3057 with a standard deviation of 2.4090, slight positive skewness of 0.6453, and notable kurtosis at 6.5397 indicating sharper peaks in distribution.

Correlation Analysis

The findings of the Pearson bivariate correlation analysis of ROA with various pairs of independent variables throughout the study period are displayed in Table 3 in order to investigate the strength and direction of the apparent link between them. Table 3 reports the observed correlation coefficients between various ROAs and other independent factors.

Table 2

Correlation Matrix of Variables

Correlation	ROA	NPLR	LDR	ILAR	CAR
ROA	1				
NPLR	-0.3089*	1			
LDR	-0.1791*	-0.1860*	1		
ILAR	-0.0638	0.1922*	0.2484*	1	
CAR	0.2818*	-0.2542*	0.2429*	0.1545*	1

*. Correlation is significant at 5% level.

Note. Author's computation from EViews 12 Student Version Lite

Table 2 shows the relation of ROA against its four independent variables: NPLR, LDR, ILAR, and CAR. ROA has an significant negative correlation with NPLR at -0.3089, with a t-statistic of -4.3332 and p-value of 0. Its correlation to LDR is also negative, -0.1791, with a t-statistic of -2.4290 and a p-value of 0.0161; hence, it is also significant. With ILAR, ROA has a weak negative correlation of -0.0638, a t-statistic of -0.8532, and a p-value of 0.3947; thus, no significant relation exists. Finally, the correlation between ROA and CAR is 0.2818, with a t-statistic of 3.9184 and a p-value of 0.0001, thus significant at all levels. It would therefore mean that NPLR, LDR and, CAR shows meaningful correlation with ROA out of the independent variables.

Breusch-Pagan LM Test

Table 3

Output of Breusch-Pagan LM Test

Test	Statistic	d. f.	Prob.
Breusch-Pagan LM	434.6299	153	0.0000

Note. Author's computation from EViews 12 Student Version Lite

Table 3 presents the Breusch-Pagan Lagrange Multiplier (LM) test also yielded a p-value of less than 1% level of significance, which indicates that the pooled OLS model is inappropriate because there is a high variance across entities, thereby suggesting the presence of individual effects. Since the Nepalese banking sector is heterogeneous and banks differ based on management approaches, risk profiles, and operating strategies, the assumption of common intercept for all the banks in the pooled model does not apply. Therefore, it is necessary to consider either the Fixed Effect Model (FEM) or the Random Effect Model (REM). In deciding between the two, the Hausman test is employed, which helps in testing if unique errors (unobserved effects) are correlated with the regressors. Based on the result, the preferable model either FEM or REM can be selected for accurate estimation.

Hausman Test

Table 4

Output of Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d. f.	Prob.
Cross-section random	3.4640	4	0.4834

Note. Author's computation from EViews 12 Student Version Lite

In table 4, the Hausman test result showed that the p-value from a chi-squared test statistic is 0.4834, which is greater than the normally accepted significance of the 0.05 level. Under

the Hausman test, the null hypothesis is that the random effects model is adequate. What this really means is just that the individual-specific effects are uncorrelated with the independent variables of the model. Since the p-value is greater than 0.05, research does not reject the null hypothesis; the random effects model thus will be more suitable in light of our data since one assumes that the unobserved individual effects things like bank-specific characteristics are uncorrelated with the regressors. With these results, authors can confidently move to the random effects model for analysis since it is more efficient and provides more reliable estimates once the assumption of uncorrelation holds. Therefore, based on the Hausman test conducted, the study proceed with the random effects model for the final analysis of the relationship between credit risk management variables and the financial performance of banks.

Random Effect Model

Table 5

Output of Random Effect Model Regression

Independent variables	Coefficient	Std. error	t-stat	p-value
NPLR	-0.0914	0.0200	-4.5668	0.0000
LDR	-0.0220	0.0053	-4.1693	0.0000
ILAR	0.0044	0.0206	0.2142	0.8306
CAR	0.0579	0.0194	2.9889	0.0032
C	2.6989	0.4533	5.9543	0.0000
R-square		0.2016		
F-statistic		11.0501		
Prob(F-statistic)		0.0000		
Durbin-Watson stat		1.2109		

Note. Author's computation from EViews 12 Student Version Lite

Table 5 shows the regression analysis of panel data using the EGLS (cross-section random effects) technique. The dependent variable is ROA. There are 180 balanced panel observations from 18 cross-sections and 10 periods. The independent variables include the Capital Adequacy Ratio, CAR; Interest Income to Loan and Advance Ratio, ILAR; Loan to Deposit Ratio, LDR; and Non-Performing Loan Ratio, NPLR. The study obtain an NPLR coefficient of -0.0914, thus showing a negative association with ROA. However, the p-value of 0.0000 suggests that this is statistically significant at conventional levels. In essence, within the sample of banks analyzed, changes in NPLR have a statistically meaningful effect on ROA during the study period. The LDR's coefficient is -0.0220, reflecting a negative significant relationship with ROA, since the p-value is 0.0000. This finding simply suggests that the higher the LDR, meaning the greater the tendency for loan disbursement to be more aggressive relative to deposits, the lesser the financial performance will be which is proxied by ROA. ILAR has a coefficient of 0.0044, which implies that it is positively related to ROA. However, its p-value is 0.8306, which means it is not statistically significant. That therefore means that, in this analysis, the proportion of interest income derived from loans and advances does not significantly influence the financial performance of banks.

Also, CAR with a coefficient of 0.0579 shows a strong positive relationship with ROA. The p-value of 0.0032 depicts that this relationship is statistically significant, which therefore proves that the more CAR a bank is, the better it sustains financial performance. This states the importance of capital adequacy to support profitability.The constant term is 2.6989 with a t-statistically significant p-value of 0.0000. That means other unobservable factors contribute to bank profitability at baseline when independent variables do not, which shows the good ROA of it. The model has an R-squared of 0.2016, which means that independent variables jointly explain 20.16% of ROA variation. The F-statistic is 11.0501,

significant with the p-value of 0.0000; therefore, the model is statistically significant on the whole.

Discussion

The findings are in concern with the financial theories that form a theoretical basis for these relationships. NPLR has a negative and significant effect on ROA, representing the financial distress theory by Altman (1968); high levels of non-performing loans are injurious to profitability. The negative and significant effect that LDR has on ROA represents liquidity risk theory by Diamond and Dybvig (1983); excessive lending increases liquidity risk and reduces return. At last, a positive significant impact of CAR on ROA justifies Capital Buffer Theory by BCBS (2010), which indicates that greater capital adequacy leads to profitability along with stability. These results point out that the credit risk, liquidity, and capital management provide significant improvement regarding the financial performances of Nepalese commercial banks.

This finding is in line with the existing literature while providing unique insights into how credit risk management influences the financial performance of Nepalese commercial banks. NPLR has negative relationship with ROA and significant, which is consistent with studies like Aryal (2023), Bhattarai (2019), and Chhetri (2021). However, studies like Aryal (2023) found that NPLR insignificantly affects ROA, probably due to differences in study periods and sample size. LDR has a negative and significant effect on ROA, supporting Aryal (2023) and Bhattarai (2019), who found that the higher the loans, the lower the profitability because of liquidity risks. However, studies like Bhattarai (2019) found that LDR insignificantly affects ROA. But Chhetri (2021) found that LDR has positive and insignificant impact of Financial Performance. Our result implies that an optimal balance between loans and deposits should be maintained to ensure profitability and avoid liquidity constraints. Capital adequacy ratio positively and significantly influences ROA, therefore supporting the studies of Aryal(2023) that relate strong capital to profitability and stability. However Aryal (2023) found that CAR insignificantly affects ROA. But Bhattarai (2019) found that CAR negative and significantly affects ROA and Chhetri (2021) found that CAR negative also but insignificantly affects ROA, probably due to different study period and sample size.

V. Conclusion and Implication

This study concludes that credit risk management is a significant determinant of Nepalese commercial banks' financial performance, measured in terms of Return on Assets (ROA). The findings are that Loan to Deposit Ratio (LDR) and Non-Performing Loan Ratio (NPLR) are negatively and significantly correlated with ROA, i.e., more non-performing loans and lending above deposits adversely affect bank profitability. On the other hand, Interest Income to Loan and Advance Ratio (ILAR) is largely but positively correlated with ROA, showing that interest income leads to profitability though statistically insignificant. Curiously enough, Capital Adequacy Ratio (CAR) positively and significantly impacts ROA, where there is adequate capital that leads to improved expected financial performance. These results underscore the significance of sound credit risk management in maximizing the profitability and stability of Nepalese commercial banks. Policymakers and bank managers must take note of reducing non-performing loans, controlling loan-to-deposit ratios, and maintaining proper capital cushions to ensure stable financial performance.

A high non-performing loan ratio reduces profitability. The impact is significant, banks are supposed to be very concerned with the reduction of the NPLR to manage credit risk. The high levels of loan to deposit ratios harm profitability through liquidity risks. Banks should maintain optimal LDR that balance between lending and deposit stability. Interest income to loan and advance ratio increases profitability; however, the impact is insignificant. Banks need to diversify their income sources other than interest earnings. Higher capital adequacy ratios enhance the profitability along with financial stability. Banks should maintain a strong CAR. Longer study period, and more credit risk indicator could provide more strong insights into the relationship of credit risk management and financial performance.

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