

# **CREDIT RISK MANAGEMENT AND ITS IMPACT ON PROFITABILITY OF NEPALESE COMMERCIAL BANKS**

A dissertation submitted to the Office of the Dean, Faculty of Management in partial  
fulfillment of the requirements for the Master's Degree

by

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## **Certification of Authorship**

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled “Credit Risk Management and Its Impact on Profitability of Nepalese Commercial Banks”. The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor it has been proposed and presented as part of requirements for any other academic purposes.

The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation.

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## REPORT OF RESEARCH COMMITTEE

Mr. Kumar Karki has defended research proposal entitled “**Credit Risk Management and Its Impact on Profitability of Nepalese Commercial Banks**” successfully. The research committee has registered the dissertation for further progress. It is recommended to carry out the work as per suggestions and guidance of supervisor Madhusudan Gautam and submit the dissertation for evaluation and viva voce examination.

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## APPROVAL SHEET

We, the undersigned, have examined the dissertation entitled “**Credit Risk Management and Its Impact on Profitability of Nepalese Commercial Banks**” presented by Kumar Karki a candidate for the degree of Master of Business Studies (MBS Semester) and conducted the Viva voce examination of the candidate. We hereby certify that the dissertation is worthy of acceptance.

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## **Acknowledgements**

This study entitled “Credit Risk Management and Its Impact on Profitability of Nepalese Commercial Banks” has been prepared in partial fulfillment of the requirement of Master’s Degree of Business Studies (MBS) under the Faculty of Management, Tribhuvan University is based on research models involving the use of quantitative aspect of credit risk and its effect on profitability of development banks.

I have great satisfaction and pleasure to express my appreciation and sincerity to my thesis supervisor Prof. Madhusudan Gautam of Shanker Dev Campus, TU for his excellent and effective guidance and supervision. I will remain thankful for his valuable direction useful suggestion and comments during the course of preparing this thesis without his help this work would not have come in this form. I also would like to extend my debt of gratitude Asso. Prof. Dr. Sajeeb Kumar Shrestha, Head of Research Department and I owe a deep debt of gratitude to Asso. Prof. Dr. Krishna Prasad Acharya, Campus Chief of Shanker Dev Campus who provided me an opportunity to undertake this research work.

I highly appreciate to all the colleagues, seniors, family members, Shanker Dev Campus Library and TU Central Library for their valuable advices and support in collecting and presenting the necessary data. I would also like to express my thankfulness to all known people who supported as well as inspired me directly to complete this thesis. With help and support, I have been able to complete this work. I would like to take the responsibility of any possible mistakes that may have occurred in the report. I would be delighted to welcome readers for their suggestion and recommendation to improve the report.

Kumar Karki

July 2024

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## Abbreviations

AGR	Assets Growth Ratio
BS	Bank Size
CAR	Capital Adequacy Ratio
CDR	Credit Deposit Ratio
CRR	Cash Reserve Ratio
F/Y	Fiscal Year
LDR	Loan to Deposit Ratio
LLP	Loan Loss Provision
NIM	Net Interest Margin
NP	Net Profit
NPLR	Non-Performing Loan Ratio
NRB	Nepal Rastra Bank
OLS	Ordinary Least Square
ROA	Return on Assets
ROE	Return on Equity
ROI	Return on Interest
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
TATL	Total Assets to Total Loan

## Abstract

This study aimed to investigate the impact of credit risk on profitability of commercial banks in Nepal for the period of 2012/13 to 2021/22. Panel data set collected from ten commercial banks has been used in this study. In this study, credit risk indicators are taken as NPL, CAR, CRR, BS and AGR. Similarly, the indicators for the profitability used for this study are ROA and ROE. This study employed descriptive summary, correlation and regression analysis tools to analyze the credit risk and profitability. The finding shows that the non-performing loan ratio and cash reserve ratio have significantly positive relation with profitability. Similarly, CAR has significant positive relation with ROA whereas the significant negative impact on ROE. In addition, AGR also has significant negative relation with ROE. Furthermore, AGR exhibits a significant negative relationship with ROE. Conversely, AGR and bank size have a negative but insignificant impact on ROA. Therefore, there is significant impact of credit risk on profitability of Nepalese commercial banks. The results of the study could help bankers and policy makers to take an effective action in order to improve the profitability. Hence, the study recommends in support of each variables for commercial banks of Nepal should enhance their capacity in credit analysis and loan administration as well as the different policies of NRB.

*Keywords: Non-performing loan ratio, Capital Adequacy Ratio, Cash Reserve Ratio, Assets Growth Rate and Profitability.*

## CHAPTER I

### INTRODUCTION

#### 1.1 Background of the Study

Banking and financial institutions are susceptible to numerous risks due to their role in managing depositors' funds and circulating money in the market. These risks are influenced by various factors, such as interest rates, foreign exchange rates, and more. However, credit risk has a more significant impact on the bank's profitability and performance (Nepal Rastra Bank, 2018). Credit risk is the potential for incurring a loss if a business counterparty fails to repay a loan or fulfill other financial obligations when due. This default can result from insolvency or temporary financial difficulties. For example, consider a commercial bank that lends \$1 million to a car dealer with a five-year repayment term. If the dealer goes out of business after six months and the bank cannot recover any funds through legal action, it may incur credit losses (Codjia, 2017).

As per the study made by Poudel (2012), credit risk management is very important to banks as it is an integral part of the loan process. It maximizes bank risk, adjusted risk rate of return by maintaining credit risk exposure with a view to shielding the bank from the adverse effects of credit risk. This study aims to examine the effect of credit risk management on the financial performance of banks in Nepal. The primary objective is to determine how credit risk management influences bank performance. The findings indicate that the default rate (NPLR) is the most significant factor affecting the financial performance of banks in Nepal, with cost per loan being a predictor of bank performance. The study concludes a positive relationship between the debt-to-equity ratio and efficiency, as well as between capital adequacy and efficiency.

Efficient capital allocation in the economy is facilitated by banks' effective management of credit risks, which also enhances their own stability and profitability. Currently, managing bank credit risk is a topic of great interest among academics and professionals. The best mix of credit policy factors might be challenging to come across, making it challenging to design an ideal credit policy. Economic conditions have a significant impact on a company's credit policy (Pandey, 2008). Credit policy may change in response to shifts in the economy. The unpredictable nature of macroeconomic factors, combined with various microeconomic variables unique to the banking sector or individual banks, makes credit

risk management in the financial industry a highly challenging and complex task (Garr, 2013). Effective credit risk management by banks not only supports their own company's liability and profitability.

Shrestha (2015) showed that all assets, including fixed assets, mainly loans and advances as well as other assets affect profitability positively, while all liabilities, mainly deposits, and other liabilities have negative effect on commercial banks profitability. Gyawali et al. (2017) concluded that capital adequacy ratio (CAR), firm loan loss provision and total loan to total deposit ratio of government bank have positive relationship with firm's profitability. Similarly, non-performing loan, non-performing loan to total loan, loan loss provision has negative impact on firm profitability.

The primary aim of this study is to examine the relationship between credit risk management practices, credit risk mitigation measures, and the challenges faced by banks with clients' loan repayment behavior. This research offers valuable insights into the policies and practices of credit risk management employed by commercial banks in Nepal. It helps in understanding the cyclical and interrelated impacts of credit risks on both customers and banks (Nepal Rastra Bank, 2018). Consequently, the study provides a comprehensive analysis of credit risk management in the banking sector and highlights the complexities involved in managing credit risks.

The level of potential risk in the banking sector is a significant concern for the various stakeholders, including bank management, depositors, and regulatory bodies. Therefore, Nepalese commercial banks as well as other financial institutions have encountered difficulties in recent years due to several factors. According to Bhattarai (2016), a significant reason for concern is the relaxation of credit standards and inadequate portfolio risk management practices. Many commercial banks in Nepal have been observed to approve loans without thorough examination, resulting in an uptick in loan defaults and non-performing loans. Furthermore, there is criticism that the current credit risk management procedures are insufficient to effectively address the prevailing credit risk challenges in Nepal.

However, in recent years, the central bank of Nepal has implemented policies aimed at enhancing bank performance and mitigating the adverse impacts of lending. This includes raising capital requirements for banks and facilitating the merger of financial institutions, all with the goal of establishing a resilient and robust financial system. In countries where

the financial sector is predominantly dominated by commercial banks, any failure within this sector carries significant implications for the country's economic growth. Bankruptcies can have contagious effects, potentially triggering bank runs, crises, and broader financial instability, leading to economic tribulations overall (Ongore & Kusa, 2013). The credit risk management of Nepalese commercial banks is also studied using default rate, cost per loan assets and capital adequacy ratio. The study recommends an effective credit risk management for commercial banks of Nepal that maintains an optimum level of capital adequacy ratio, controls and monitors cost per loan assets and balances default rate to enhance financial performance (Pandey & Joshi, 2023).

In the present context, commercial banks are the predominant financial institutions in our country, facing significant credit risk due to the nature of their operations. Effective credit risk management is crucial as it not only sustains and enhances banks' profitability but also promotes systemic stability and efficient capital allocation within the economy. The relationship between various credit risk management indicators and bank profitability metrics should be theoretically examined along with analyzing the stability of this relationship over time (Veizi & Zhuli, 2023).

Furthermore, the study aimed to assess how effective credit risk management practices could enhance the financial stability and performance of commercial banks in Nepal. By understanding the dynamics of credit risk and its implications on profitability, the findings could provide valuable insights for policymakers, bank managers, and stakeholders in devising strategies to strengthen the resilience of the banking sector against economic uncertainties. This research contributes to the ongoing discourse on enhancing risk management frameworks within the Nepalese banking industry to ensure sustainable growth and stability in the financial system.

## **1.2 Problem Statement**

Malhotra et al. (2009) showed that bank profitability was negatively affected by maximizing disbursement of loan and advances, non-performing loans, and deposits, which exposed banks to the risk of illiquidity and distress. Dhungana and Upadhyaya (2011) set up that the sound lending policies and optimum portfolio management of financial institutions as well as effective regulation and supervision of financial institution ensure the significant reduction in non-performing loan and enhance banking efficiency.

Jha and Hui (2012) found negative relationship of nonperforming loan and capital adequacy ratio (CAR) with of return on assets (ROA). Boahene et al. (2012) revealed that there was a strong and positive relationship between credit risk indicators and bank profitability. The credit risk indicators used for the study are non-performing loan rate and the pre-provision profit as a percentage of net total loans and advance.

Abdelrahim (2013) examined the factors affecting credit risk management in Saudi Banks using descriptive and analytical methods and found that liquidity had a significant positive impact on effectiveness, while bank size had a negative impact. However, the other variables such as capital adequacy, assets quality, management soundness, and earnings had no significant impact on the profitability in Saudi Arabian banks.

Kurawa and Gabra (2014) investigated the impact of credit risk management on Nigerian banks' profitability, focusing on variables such as default rate, cost per loan asset, and capital adequacy ratio. They found that effective credit risk management, as measured by these factors, significantly enhances the profitability of Nigerian banks. On the other hand, Li & Zou (2014) observed a negative relationship between indicators of credit risk management, such as capital adequacy ratio and non-performing loan ratio, and profitability proxies like ROE (Return on Equity) and ROA (Return on Assets). Their analysis also indicated that these relationships are not stable and can fluctuate over time.

Bhattarai (2016) exhibited inadequate credit risk management, evidenced by the adverse effect of the non-performing loan ratio on bank performance and the favorable impact of cost per loan assets on bank performance. In contrast to earlier studies, the research indicated that neither the capital adequacy ratio nor cash reserves had a significant impact on bank performance.

Tuladhar (2017) showed that coverage ratio, capital adequacy ratio, and bank size have a positive impact on bank performance, while leverage ratio, non-performing loan ratio, and female board members have a negative impact. However, liquidity ratio, asset quality ratio, and cash reserve ratio were not significant variables in determining bank performance. Shrestha (2018) utilized correlation and regression models to determine that both cash reserve ratio and book value per share exerted a positive and statistically significant influence on bank performance. In contrast, the capital adequacy ratio was not found to be a significant factor affecting bank performance in their study.

Pradhan and Shah (2019) conducted a study using primary survey data and correlation analysis, revealing that effective credit risk management practices and mitigation measures positively influenced loan repayment. However, they found that obstacles encountered by borrowers did not significantly affect loan repayment outcomes. Ali and Dhiman (2019) found that profitability was positively related to capital adequacy ratio, management quality, and earnings ability, while it was negatively related to asset quality ratio and liquidity.

Ekinci and Poyraz (2019) found that there was a significant negative relationship between credit risk and profitability. Additionally, the authors found that the capital adequacy ratio (CAR) moderated the relationship between credit risk and profitability. Alshatti (2015) found that there is a positive effect of the credit risk indicators of Non-performing loans/Gross loans ratio on financial performance and no effect of the Capital adequacy ratio on banks' financial performance when measured by ROA.

Chhetri (2021) indicated that non-performing loans, capital adequacy ratio, and bank size negatively influenced financial performance (ROA), while Credit to Deposit Ratio (CDR) showed a positive but statistically insignificant relationship with financial performance (ROA). On the other hand, Bhattarai (2019) found significant relationships between capital adequacy ratio (CAR), non-performing loan ratio (NPLR), and management quality ratio (MQR) with financial performance, while Credit to Deposit Ratio (CDR) and risk sensitivity (RS) did not significantly impact the financial performance of commercial banks in Nepal.

Yousef, Taha, and Muhmad (2022) uncovered a notable negative correlation between credit risk and profitability in MENA (Middle East and North Africa) countries. Their study further identified that the capital adequacy ratio and liquidity positively influenced bank profitability within the MENA region. In contrast, My and Quoc (2022) noted a positive relationship between the Non-Performing Loan (NPL) ratio and the profitability of commercial banks in Vietnam. They also found no significant impact of bank profitability on bank credit risk in their analysis.

The empirical evidence has demonstrated that a mixed relationship between credit risk and financial performance of firms. This study is therefore directed towards establishing the

effects of credit risk on the profitability of commercial banks in Nepal. Specifically, this study is connected to search answer of the following questions related to the selected banks.

1. What is the status of credit risk management and profitability of Nepalese commercial banks?
2. What is the relationship between credit risk indicators and profitability of Nepalese commercial banks?
3. What are the impacts of credit risk on profitability of Nepalese commercial banks?

### **1.3 Objectives of the Study**

The main objectives of the study are to present the credit risk management and its impact on profitability of Nepalese commercial banks.

1. To assess credit risk management and profitability of Nepalese commercial banks.
2. To analyze the relationship between credit risk indicators and profitability of Nepalese commercial banks.
3. To investigate the impacts of credit risk on profitability of Nepalese commercial banks.

### **1.4 Research Hypothesis**

A hypothesis is a proposed explanation for a phenomenon. The objective of setting hypothesis is to test the significant differences regarding the parameters of the population on the basis of sample drawn from population. In this study indicators of profitability are taken as dependent variables and indicators of credit risk are taken as independent variables.

H1: There is negative significant relationship between non-performing loan ratio and profitability.

H2: There is significant relationship between capital adequacy ratio and profitability.

H3: There is negative significant relationship between cash reserve ratio and profitability.

H4: There is significant relationship between assets growth ratio and profitability.

H5: There is significant relationship between bank size and profitability.

### **1.5 Rationale of the Study**

The success and prosperity of a bank depend significantly on the effective deployment of accumulated resources, thereby fostering economic development in the country. A robust investment policy implemented by banks positively influences national economic growth, creating a reciprocal relationship between banking performance and economic prosperity. Investing of such funds is done by providing various credit facilities to an individual or corporate with the intention of receiving a positive return, but it comes with some degree of risk. The recent profitability of many commercial banks has decreased due to the increment of non-performing loans.

The study primarily focuses on analyzing the impacts of credit risk indicators on the profitability. Assessing credit performance is essential for understanding the financial health and potential challenges faced by an organization, highlighting the significance of this study in analyzing credit performance across the banking sector. This study will provide valuable information to shareholders and regulatory bodies, allowing them to make informed decisions. Additionally, it can be useful to government bodies, investors, and competitors who want to gain insights into the financial performance of selected sample banks.

### **1.6 Limitations of the Study**

This study is based on well-known or already estimated analytical methods. The basic limitations of study are:

1. The study focuses solely on the impact of credit risk, without addressing other types of risks in its research scope.
2. The study is based on the secondary data taken from the annual financial report of the respective banks.
3. The study is limited to only ten commercial banks of Nepal.
4. The study covers only ten years' period from 2012/13 to 2021/22.
5. This study does not include macro-level credit risk indicators like inflation and GDP in its analysis.

## CHAPTER II

### LITERATURE REVIEW

This chapter deals with the theoretical aspect of credit risk and profitability. It provides the foundation for developing a comprehensive theoretical framework. This chapter has been broadly classified into two sections. The first section is theoretical review and the second section is empirical review.

#### 2.1 Theoretical Review

##### 2.1.1 Theories of Credit Risk

In this section, examining the general theories of credit risk can offer insights into how banks manage their credit risk, acknowledging variations in specific approaches among banks. The theories of credit risk are as follows.

###### 2.1.1.1 Commercial Loan Theory

The commercial loan theory, also known as the real bills doctrine, is the oldest theory in banking and was introduced by scholars like Adam Smith in his book "Wealth of Nations" in 1776. According to the commercial loan theory, commercial banks should exclusively provide short-term self-liquidating productive loans to businesses. The primary goal of commercial loan theory is to impact both bank lending practices and overall economic activities. Its rigorous implementation implies that it can act as a monetary tool to adjust to fluctuations in aggregate economic activity.

However, Kargi (2011) argues that the close association with this theory is somewhat orthodox, considering that during the time of its prominence, there were scarce secondary reserve assets to serve as a buffer for banks' liquidity needs. Furthermore, the theory does not adequately cater to the credit requirements of Nigeria's growing economy, as it does not incentivize banks to fund long-term investments in assets like plants, equipment, land, and residential properties.

###### 2.1.1.2 The Anticipated Income Theory

The Anticipated Income Theory is formulated by Prochnow in 1944. According to this theory, regardless of the nature and character of a borrower's business, the bank should

plan the liquidation of the term-loan (loan between one to five years) from the anticipated income of the borrower. This theory places emphasizes on the ability of the bank to advance loan base on the income that the borrower expects both in the short-term and long-term.

Afriyie and Akotey (2011) revealed that banks consistently planned to repay term loans solely from the anticipated earnings of the borrower, irrespective of the borrower's business nature or character. This approach to liquidation differs from the traditional commercial theory, where assets of the borrower are sold for liquidity, or the shiftability theory, where loans are transferred to other lenders. Instead, it assumes that banks should extend loans based on the borrower's projected future income rather than their current value.

### **2.1.1.3 The Credit Risk Theory**

Credit risk theory originated in 1974 through Robert Merton's default or structural model, which forms the foundational theory of credit risk. Merton proposed a model to assess a company's credit risk by framing its equity as a call option on its assets. Two main approaches to modeling credit risk include the structural approach and the intensity-based approach, also known as the reduced-form approach.

According to Salas and Saurina (2002), credit risk refers to the possibility that a borrower may default on any type of debt by failing to make required payments. This risk primarily affects the lender and encompasses potential losses in principal and interest, which can be total or partial and can occur in various scenarios, such as when an insolvent bank cannot repay funds to depositors. Lenders mitigate this risk by conducting credit checks on prospective borrowers, requiring insurance like mortgage insurance, or seeking security or guarantees from third parties. Generally, higher risks lead to higher interest rates that lenders charge borrowers on their debt.

### **2.1.1.4 Merton's Structural Model**

This model is developed by economist Robert C. Merton, is a widely recognized framework for assessing credit risk and estimating the probability of default for a firm or borrower. The model is based on the idea that a firm's creditworthiness can be evaluated by analyzing its underlying asset value and the uncertainty surrounding that value.

This model allows banks to assess the creditworthiness of borrowers by estimating the probability of default based on the firm's asset value. Banks can use this information to

make informed lending decisions and price loans according to the level of credit risk. The model also assists in managing credit portfolios by evaluating the overall credit risk profile, identifying concentrations, and diversifying risk. It helps banks determine the appropriate level of capital reserves and supports capital adequacy assessment. Additionally, the model can be used in stress testing exercises to evaluate the resilience of loan portfolios under adverse scenarios. Overall, Merton's Structural Model provides banks with tools to assess, price, and manage credit risk effectively.

### **2.1.2 Theories of Profitability**

The theory of profitability examines the factors and conditions that influence a firm's capacity to generate profit. The reviewed theories include stakeholder theory, market power theory, balanced portfolio theory, and bankruptcy cost theory.

#### **2.1.2.1 The Stakeholder Theory**

In the 1980s, R. Edward Freeman introduced the stakeholder theory, which has now gained widespread acceptance in the management and business sectors. The theory advocates that companies should not solely aim to maximize profits for shareholders but also take into account the impact of their actions on all stakeholders.

According to the stakeholder theory, companies must adopt a long-term perspective when building relationships with stakeholders, acknowledging that positive relationships can enhance the company's long-term success. For instance, companies that prioritize their employees by creating a secure and supportive work environment tend to have a more motivated and engaged workforce, which can increase productivity and profitability.

#### **2.1.2.2 The Market Power Theory**

The market power theory was initially proposed by Joan Robinson, a British economist, who highlighted its key features in her book "The Economics of Imperfect Competition" in 1933. Robinson argued that company's profitability is influenced by market power, which could charge higher prices than those operating in a perfectly competitive market. In addition, she introduced the concept of "monopsony power," which refers to a firm's capability to pay lower prices for inputs due to limited competition among suppliers.

As noted in Tregena (2009) applied in banking the market power hypothesis posits that the performance of bank is influenced by the market structure of the industry. There are two

distinct approaches within the market power theory; the Structure Conduct Performance (SCP) and the Relative Market Power (RMP) hypotheses. According to the SCP approach, the level of concentration in the banking market gives rise to potential market power by banks, which may raise their profitability. Banks in more concentrated markets are most likely to make abnormal profits by their ability to lower deposits rates and to charge higher loan rates as a results of collusive (explicit or tacit) or monopolistic reasons, than firms operating in less concentrated markets, irrespective of their efficiency (Tregenna 2009).

### **2.1.2.3 The Balanced Portfolio Theory**

The balanced portfolio theory also knowns as modern portfolio theory was established by Harry Markowitz, an economist and mathematician, in the 1950s. Markowitz's main contribution was the proposition that investors should not merely concentrate on individual securities or assets when making investment decisions, but should also analyze how those assets can interrelate within a portfolio. He advocated that investors should aim to develop a portfolio that optimizes expected returns for a particular level of risk, while also considering the relationships between various assets.

Olweny and Shipo (2011) suggest that the portfolio theory is highly significant and holds a prominent role in bank performance research. This model indicates that commercial banks' diversification of their portfolios and desired portfolio composition is a result of the management's decision-making. Moreover, the bank's ability to achieve maximum profits is subject to the feasible set of assets and liabilities determined by the management, along with the unit costs incurred by the bank in generating each component of the assets.

### **2.1.2.4 Bankruptcy Cost Theory**

The bankruptcy cost theory was developed by a number of economists and scholars over time. However, the most prominent early work on this theory was done by Edward Altman, a professor of finance at New York University's Stern School of Business, in the late 1960s and early 1970s. Altman researched the factors leading to corporate bankruptcy, developing the Altman Z-score model to predict it based on factors like debt, liquidity, and profitability. He emphasized understanding bankruptcy costs and factors, paving the way for corporate bankruptcy prediction studies in finance and accounting.

Aremu, Ekpo & Mustapha (2013) suggest that “Bankruptcy Cost Theory” explain the positive link between capital adequacy and profitability. If the bankruptcy costs are

unexpectedly high due to the environmental changes, banks will need to hold more equity and increase their capital ratio in order to reduce the expected value of bankruptcy cost and avoid financial distress.

## **2.2 Empirical Review**

### **2.2.1 Review of International Studies**

Yousef, Taha and Muhmad (2022) conducted a study on the relationship between credit risk and profitability of commercial banks in the Middle East and North Africa (MENA) region from 2015 to 2019. The study aimed to investigate how credit risk affects the profitability of banks in the MENA countries. The authors used a panel data set of 135 commercial banks from the MENA region, which was collected from the World Bank's Global Development Finance Database. They used a two-stage least squares (2SLS) regression to analyze the data. The study's findings indicated a significant negative relationship between credit risk and profitability in MENA countries. Additionally, it was discovered that the capital adequacy ratio and liquidity positively influenced the profitability of banks in the MENA region. This study concludes that credit risk has a negative effect on the profitability of banks in the MENA region and suggested that banks should focus on risk management strategies to improve their profitability. The authors discussed the implications of their findings for both policy makers and banks in the MENA region, highlighting the need for policy makers to introduce regulations and incentives to encourage banks to take adequate measures to manage their credit risk.

My and Quoc (2022) studied the relationship between credit risk and the profitability of commercial banks in Vietnam. The primary aim was to explore the correlation between credit risk, measured by the NPL ratio, and the profitability of these banks. Their methodology involved panel data analysis of four commercial banks in Vietnam from 2005 to 2019, utilizing fixed-effects and random-effects models, as well as OLS regression. They used the NPL ratio to gauge credit risk and various profitability indicators, including ROA, ROE, and ROI, to assess profitability. The findings of the study revealed that there was a positive correlation between the NPL ratio and the profitability of commercial banks in Vietnam. The authors also found that bank profitability does not affect the bank credit risk. Moreover, the authors also found that the non-performing loan positively impact current bank financial stability. However, the results were not statistically significant. The authors concluded that credit risk does have an effect on profitability, but that the effect is not as

strong as initially suspected. The authors also suggested that banks should focus on managing their credit risk rather than solely focusing on profitability in order to ensure that they are able to remain profitable in the long run.

Rasa (2021) analyzed the impact of credit risk and profitability of banks in Afghanistan in a study of 6 commercial banks. The objective of this study was to determine the interaction between credit risk and profitability of banks and to identify which factors have the greatest impact on the profitability of banks in Afghanistan. The authors used Fixed Effects estimator model to analyze the data. The sample included six commercial banks in Bangladesh, with data collected from their websites and financial statements. The study utilized variables such as Loan Loss Reserve to Total Loan (LLRTL), Total Loan to Total Assets (TLTA), and Total Loan to Total Deposits (TLTD) as credit risk indicators, size as a bank-specific determinant, and Return on Average Assets (ROAA), Return on Average Equity (ROAE), and Net Interest Margin (NIM) as profitability indicators. The findings revealed a strong negative and significant effect of LLRTL on ROAA and ROAE, but a positive and insignificant impact on NIM. Additionally, TLTA had a significant positive effect on NIM, while its impact was insignificant and negative on ROAA and insignificant and positive on ROAE. The study also found that TLTD negatively affected ROAA, ROAE, and NIM, with significance only for NIM. Moreover, bank size showed a robust negative and significant effect on all profitability indicators. The mean comparison indicated that NIM was in a better position than other profitability indicators, a positive sign for the Afghan banking sector. The study suggested that enhancing credit management, improving asset management efficiency, and optimizing the business model could boost the profitability of commercial banks in Afghanistan.

Bandara, Jameel and Athambawa (2021) evaluated the effect of credit risk on the profitability of banks in Sri Lanka. The purpose of the study was to explore the impact of credit risk on the profitability of banks in Sri Lanka. The study adopted a quantitative research design and data was collected from the financial statements of eight commercial banks in Sri Lanka for the period of 2010 to 2017. The study employed multiple linear regression analysis to assess the effect of credit risk on the profitability of the banks. The sample for the study comprised of financial data collected from the five commercial banks in Sri Lanka. The findings revealed that credit risk had a significant negative effect on the profitability of the banks in Sri Lanka. The study concluded that credit risk significantly impacts the profitability of banks in Sri Lanka. It emphasized the need for banks to develop

effective credit risk management strategies to maintain and enhance their profitability. The discussions highlighted the importance of credit risk management in ensuring profitability and the need for banks to implement credit risk management techniques to reduce the potential risks associated with credit. Recommendations included the need for banks to develop appropriate credit risk management techniques that are tailored to the specific risk profiles of the banks in order to ensure profitability.

Munangi and Sibindi (2020) conducted a study to examine the relationship between credit risk and bank profitability in the South African banking sector. The study aimed to determine the impact of credit risk on bank profitability and identify the factors influencing credit risk. The researchers utilized a panel data regression analysis using secondary data from 18 South African banks over the period 2014-2018. The findings revealed a negative effect of credit risk on bank profitability. Additionally, capital adequacy, liquidity, and loan portfolio size were identified as significant factors influencing credit risk. The authors concluded that credit risk does affect the profitability of South African banks, emphasizing the importance of implementing sound credit risk management practices.

Ekinc and Poyraz (2019) provided the insight the relationship between credit risk and the profitability of Turkish banks. Their study aimed to examine the impact of credit risk on bank profitability and to identify the moderating effect of the capital adequacy ratio (CAR) on this relationship. The authors used a dataset consisting of data from two hundred and nine European banks in eighteen countries over the period of 2005-2017. The sample was collected from the Bank scope database and used ordinary least squares (OLS) regression analysis. The findings of the study revealed that there was a significant negative relationship between credit risk and profitability. Additionally, the authors found that the capital adequacy ratio (CAR) moderated the relationship between credit risk and profitability. The authors conclude that the findings of this study suggest that credit risk has a significant negative effect on bank profitability. Furthermore, the authors point out that the capital adequacy ratio (CAR) moderates the relationship between credit risk and profitability. The discussion section of the article highlights the implications of the findings for both banks and regulators. The authors state that the findings suggest that banks should take credit risk into consideration when making decisions about their operations.

Kotsakis and Veloutsou (2019) investigated the impact of credit risk management on bank profitability in Greece. The primary goal was to analyze how credit risk management

affects bank profitability. Using a quantitative approach, the researchers collected data from a sample of six Greek banks through a structured questionnaire and conducted regression analysis. The results showed that credit risk management has a significant and positive effect on bank profitability in Greece. The study concluded that effective credit risk management is crucial for enhancing bank profitability in Greece. The discussion section highlighted the importance of credit risk management for the overall performance of banks in Greece. The study recommended that banks should focus on credit risk management in order to improve their profitability.

Alshatti (2015) conducted a study to investigate the impact of credit risk on the financial performance of Jordanian commercial banks. The study used a panel data regression model to analyze the relationship between credit risk and bank profitability. The sample comprised data from 13 Jordanian commercial banks over the period of 2005-2013. The credit risk of the banks was measured by the non-performing loan (NPL) ratio, while the bank profitability was measured by the return on assets (ROA). The study found a positive relationship between credit risk and profitability of the banks. The study has also used CAR as the independent variable which shows that there is no effect on the financial performance of the bank. However, the study also found that the effect of credit risk on bank profitability was more pronounced in large banks than in small banks. The study concluded that credit risk management is crucial for the financial performance of Jordanian commercial banks. The study's findings suggest that banks need to take proactive measures to effectively manage their credit risk in order to remain profitable. It recommended that banks implement robust strategies to control credit risk and prevent it from becoming excessive. Additionally, banks should develop effective approaches to minimize the impact of credit risk on profitability and regularly monitor credit risk to ensure it stays within acceptable levels.

Kurawa and Garba (2014) investigated the effect of credit risk management on the profitability of banks in Nigeria. The objective of the study was to evaluate the influence of credit risk management on the profitability of Nigerian banks. The research employed a quantitative approach with the use of secondary data. Data were collected from the Central Bank of Nigeria's Statistical Bulletin. The sample consisted of 8 commercial banks observed from 2002 to 2011. Analyzing the data involved descriptive and inferential statistics. The findings highlighted a significant positive correlation between credit risk management and the profitability of Nigerian banks. The study concluded that effective

credit risk management positively impacts the profitability of Nigerian banks and recommended that banks prioritize proper credit risk management to ensure sustained profitability.

Abiola and Olausi (2014) aimed to investigate the relationship between credit risk and the profitability of commercial banks in Nigeria. Their objective was to ascertain the significance of credit risk as a factor influencing profitability. The research adopted a quantitative methodology, utilizing a secondary dataset for analysis. OLS regression was employed to analyze the data and examine the relationship between credit risk and profitability. The study employed a sample size of 7 commercial banks in Nigeria between the period of 2005-2011. The findings revealed a significant negative relationship between credit risk and profitability. The conclusion was that there is a significant negative relationship between credit risk and profitability of commercial banks in Nigeria. The discussion highlighted the importance of proper credit risk management in order to ensure profitability. The recommendation was for commercial banks to ensure proper credit risk management in order to ensure profitability.

### **2.2.2 Review of Nepalese Studies**

Chhetri (2021) conducted research on the impact of credit risk on the financial performance of commercial banks in Nepal. The study analyzed panel data from seventeen commercial banks, encompassing 85 observations over the period from 2015 to 2020. The regression analysis indicated that non-performing loans (NPLR) had a negative and statistically significant effect on financial performance (ROA). However, both capital adequacy ratio (CAR) and bank size (BS) showed negative impacts on financial performance (ROA) that were not statistically significant. Credit to deposit ratio (CDR) exhibited a positive but statistically insignificant relationship with financial performance (ROA). The study also found that the management quality ratio (MQR) had a positive and significant association with financial performance (ROA) of commercial banks in Nepal. The study recommended that Nepalese commercial banks adopt rigorous credit risk management practices, enhance their effectiveness in credit analysis and loan management to safeguard their assets, and mitigate the adverse impacts of high non-performing loan rates on financial performance.

Pantha (2019) examined the impact of credit risk management on bank performance using panel data from nine selected commercial banks in the Nepalese economy, covering 72 observations from 2009/10 to 2016/17. The study assessed return on assets as the measure

of bank performance, with default rate, cost per loan asset, and capital adequacy ratio as independent variables. Secondary data was utilized for the study, and empirical results were derived using fixed effect and random effects models for balanced panel data. The findings indicated that default rate and cost per loan asset were significant variables explaining bank performance. However, the capital adequacy ratio showed no significant impact on bank performance.

Pradhan and Shah (2019) researched on credit risk assessment practices in commercial banks. They focused on internal efficiency, asset assessment, and borrower evaluation. The study model analyzed the link between credit risk management practices, risk mitigation measures, obstacles, and loan repayment. Using a descriptive research approach, the study collected primary data through surveys and conducted correlation analysis. The results indicated a positive relationship between credit risk management practices, risk mitigation measures, and loan repayment. However, obstacles faced by borrowers did not show a significant impact on loan repayment. These findings offer valuable insights for commercial bank managers to improve their credit risk management systems. It emphasizes the importance of setting a risk tolerance level and effectively managing credit risks amidst market competition to ensure profitability and sustainability in the long run.

Shah and Vongbusin (2019) investigated the impact of credit risk management on bank profitability in Nepalese commercial banks. Non-performing loan ratio, Leverage ratio, Capital adequacy ratio, Loan loss provision, Credit interest to credit facilities were independent variable whereas return on assets was dependent variable. Data were collected from the Annual Reports of selected commercial banks, Banking and Financial Statistics and Bank Supervision Report published by Nepal Rastra Bank. The study was based on 25 samples making 250 observations. The independent study is completed using a blend of independent t-test, Pearson's Correlation, Analysis of Variance (ANOVA), Multiple Regression Analysis. The result showed that, capital adequacy ratio, leverage ratio, non-performing loan ratio, loan loss provision ratio had negative relationship to dependent variable return on assets. Likewise, credit interest to credit facilities was positively related to return on assets.

Bhattarai (2019) conducted an analysis on how credit risk impacts the financial performance of commercial banks in Nepal. They used balance panel data from ten commercial banks, totaling 160 observations spanning from 2001 to 2016. Through

regression analysis, it was discovered that the capital adequacy ratio (CAR), non-performing loan ratio (NPLR) and management quality ratio (MQR) showed a significant relationship with the financial performance (ROA) of these banks in Nepal. On the other hand, the credit to deposit ratio (CDR) and risk sensitivity (RS) did not exhibit a significant impact on financial performance.

Shrestha (2018) investigated the relationship between credit risk management and profitability in joint venture commercial banks in Nepal like NABIL, NIBL, SCB, EBL, NSBI, and HBL. This study aimed for a thorough examination of the Nepalese banking sector by considering both investment and commercial banks to evaluate this relationship. The research design included descriptive and causal methods to explore the casual effect relationship between research variables. Quantitative findings were collected through a regression model, while qualitative data was obtained through structured interviews with bank managers. Secondary data from annual reports of joint venture commercial banks were used as part of a six-bank sample study analyzing the bank's performance from 2012 to 2016. As per the regression model results, there seemed to be no direct impact of credit risk on the profitability of joint venture banks in Nepal.

Shrestha (2017) researched how credit risk management influences profits in Nepalese commercial banks by focusing on return on assets and return on equity as dependent variables. Various independent variables such as capital adequacy ratio, non-performing loan ratio, cost per loan assets, cash reserve ratio, assets growth ratio, and leverage ratio were analyzed to gather insights. Data came from Nepal Rastra Bank's supervision reports and annual reports of selected commercial banks with a total of 126 observations from 18 commercial banks in Nepal. Descriptive statistics along with correlation analysis were presented with some diagnostic tests for linear regression model assumption validation. Regression models indicated positive relationships between capital adequacy ratio, cost per loan assets, assets growth ratio with return on assets and return on equity. Conversely, negative relationships were found between non-performing loan ratio, cash reserve ratio, leverage ratio with returns indicating that higher values lead to lower returns in Nepalese commercial banks' profitability.

Bhattarai (2016) researched the impact of credit risk on Nepalese commercial banks' performance using a descriptive and causal comparative research design. Analyzing data from 14 commercial banks from 2010 to 2015, the study found that the 'non-performing

loan ratio' negatively affects bank performance, while 'cost per loan assets' has a positive impact. Bank size was also identified as a factor positively influencing bank performance. However, factors like capital adequacy ratio and cash reserves did not show significant influence on bank performance. In conclusion, there is a notable correlation between bank performance and credit risk indicators in this study.

Kattel (2016) aimed to study the risk measurement practices of commercial banks in Nepal. The paper attempted to ascertain the perceptions of Nepalese bankers about the importance of credit risk measurement and the practice of various tools to measure the risk level of specific borrowers. The result of the study indicated that the Nepalese bankers are aware of the importance of various techniques to effectively identify the risk level. Furthermore, the Nepalese commercial banks have used various techniques like matrix method, internal rating approach, standard approach, judgment, causal model linear probability, and linear discriminate analysis during the credit appraisal process. In addition, there was the significant difference between all two categories of the bank, namely Private Bank with Joint Venture Bank in terms of tools and techniques practices for credit risk measurement. Moreover, there was a positive relationship between credit risk assessment and risk measuring tools using in banks.

Prakash and Poudel (2012) delved into the realm of credit risk management impact on banks' financial performance. The study focused on key parameters like default rate, cost per loan assets, and capital adequacy ratio. Data from financial reports of 31 banks over eleven years (2001-2011) was scrutinized. The profitability ratio was compared to default rate, cost of per loan assets, and capital adequacy ratio using descriptive, correlation, and regression analyses. Results pointed towards an inverse relationship between these parameters and banks' financial performance. Surprisingly, the default rate emerged as the most significant predictor of bank financial performance. The recommendation provided is for banks to strategize ways to minimize credit risk exposure while boosting profitability.

### **2.2.3 Review of Previous Theses**

Khadka (2021) studied the impact of credit risk management on profitability of banks in Nepal. Secondary data was gathered from commercial banks of Nepal for ten year periods (2010/11-2019/20). This study used multiple regression analysis. The finding showed that

all the sample banks have managed loans as well as the nonperforming loans. The correlation analysis showed that loan and advance (LA) has significant relation with non-performing loan (NPL) in 1 percent level of significance with correlation coefficients 0.466 which means that there is moderate degree of positive correlation between loan and advance and non-performing loan. At the same time, loan and advance (LA) had significant relation with loan loss provision (LLP) and net profit (NP) in 1 percent level of significance. However, there was insignificant positive correlation between non-performing loan and net profit. Moreover, the result found that there is significant impact of loan and advance, non-performing loan and loan loss provision on profitability of sample banks. This study recommends that Nepalese commercial banks should work in collaboration with credit reference bureau in the country to thoroughly investigate the past credit worthiness records of loan applicants so as to reduce the rate of default.

Sharma (2021) conducted research on the credit risk of commercial banks in Nepal, employing a descriptive research design. The study utilized secondary data from three commercial banks, from the annual reports and Nepal Rastra Bank's annual supervision reports. The pooled data from 2010/11 to 2019/20 were analyzed using various financial ratios and statistical tools. Return on assets (ROA) and return on equity (ROE) were used as profitability indicators, while determinants of risk included capital adequacy ratio, debt equity ratio, assets growth ratio, government security investment ratio, and non-performing loan ratio. The study aimed to evaluate overall banking risk. Based on the findings, the study recommended that banks should focus on secure investments, enhance collateral quality, and improve portfolio management to mitigate risks, thereby ensuring the long-term sustainability of the institutions.

Shrestha (2018) assessed credit risk management and its impact on the profitability of commercial banks in Nepal. Convenience sampling method was used to select five commercial banks as a sample from 28 commercial banks. Data from the five commercial banks for the period 2012-13 to 2016-17 was collected and analyzed using mean, coefficient of variation, correlation and regression analysis. For the variables, non-performing loan ratio (NPLR), capital adequacy ratio (CAR), loan to advance ratio (LTDR) were used as indicators of credit risk management, while return on total assets (ROA) and return on equity (ROE) were used as indicators of profitability. The results showed that credit risk management has a significant impact on the profitability of commercial banks in Nepal. The results revealed that capital adequacy ratio has a positive impact on bank

profitability. On the other hand, non-performing loan ratio and loans and advances to deposits ratio had a significant negative impact on profitability. Hence, the study concludes that credit risk management is an important indicator of bank profitability. Hence, a bank's success in terms of profitability depends on its credit risk management.

Kafle (2018) focused on non-performing loans (NPLs) in Nepalese commercial banks. The study aimed to achieve two main objectives: a) to identify the problems associated with NPLs and their impact on the return on assets (ROA) and return on equity (ROE) of Nepalese commercial banks, and b) to determine whether these banks were adhering to the loan loss provision directives issued by the Nepal Rastra Bank (NRB) for NPLs. The research findings revealed that none of the banks examined were complying with the NRB's directives regarding loan loss provisions. The study also concluded that the ROA and ROE of the banks were significantly affected by NPLs. There was a strong negative correlation observed between NPLs and both ROA and ROE, indicating an inverse relationship between them. Based on these findings, the study recommended several measures for the effective operation of commercial banks. Firstly, controlling NPLs was crucial, and the banks should provide necessary training on loan management to their staff. Additionally, banks should secure sufficient collateral to ensure loan recovery and comply with the NRB's directives for loan loss provision in order to reduce NPLs. Effective bank management and monitoring by the NRB were emphasized as essential components in achieving these goals.

Yadav (2018) conducted the study on non-performing assets (NPAs) in Nepal Bank Limited (NBL) and Rastriya Banijya Bank Limited (RBB). The objectives of the study were to examine the reasons behind assets becoming NPAs in these banks, assess the level of NPAs after the financial sector reform program, and identify the problems faced by the banks due to NPAs. The findings of the study indicated that NBL and RBB accounted for approximately 50 percent of the assets and liabilities in the banking sector. Despite being managed by international financial experts, the performance of these banks in reducing NPAs was found to be unsatisfactory. The management teams were expected to bring the NPA level down to 5 percent, but the NPA total credit ratios of both banks showed an increasing trend over the years. The net profit trend of NBL and RBB was highly negative in the first three fiscal years due to more than 60 percent of non-performing assets. However, in recent years, both banks have started earning profits. The study also highlighted the poor situation of deposit mobilization in NBL and RBB, which was not

correlated with their loan and advance portfolios. This resulted in over liquidity, raising concerns about the quality of loan portfolios. The credit-related financial indicators in NBL and RBB were found to be irrelevant compared to the specified standards set by the Nepal Rastra Bank (NRB). Overall, the study revealed that NBL and RBB faced challenges with NPAs, deposit mobilization, and maintaining credit quality. The findings emphasized the need for these banks to address these issues and align their practices with the standards set by the NRB.

Tuladhar (2017) conducted a study on how credit risk management impacts the profitability of Nepalese commercial banks. They gathered and analyzed data from 28 banks between 2011 and 2015 using pooled regression analysis and panel data analysis. In the model, they used return on asset (ROA) and return on equity (ROE) as indicators of bank profitability, while factors like capital adequacy ratio (CAR), liquidity ratio (LR), bank size (BS), asset quality (AQ), leverage ratio (LER), nonperforming loan ratio (NPLR), cash reserve ratio (CRR), coverage ratio (CR), and the number of female board members (FBM) were used as indicators of credit risk management. The findings revealed a significant impact of credit risk management on the profitability of Nepalese commercial banks. Interestingly, factors like coverage ratio, capital adequacy ratio, and bank size positively influenced bank performance. On the flip side, factors like leverage ratio, nonperforming loan ratio, and female board members had a negative impact on bank performance. Surprisingly, liquidity ratio, asset quality, and cash reserve ratio were not significant in determining bank performance. The study recommends effective credit risk management strategies for Nepalese commercial banks focusing on maintaining optimal capital adequacy ratios, controlling nonperforming loans, enhancing coverage ratios, balancing leverage ratios, empowering female board members, and expanding bank sizes to improve financial performance.

Sapkota (2017) delved into credit risk management in joint venture commercial banks in Nepal. The author selected six joint venture commercial banks as samples and analyzed data from 2008 to 2015 using a quantitative approach focusing on SPSS output descriptions. The study also employed regression models for empirical analysis. The independent variables included credit ratios against deposits, fixed deposits, total assets, performing assets against total assets ratios along with loan provisions. Return analysis served as the dependent variable. The study concluded that banks significantly influence credit risk management in joint venture commercial banks in Nepal with financial

performance primarily driven by specific factors like capital adequacy. The trend of combined credit ratios in commercial banks is on the rise leading to an increase in nonperforming assets over time.

Poudyal (2014) aimed to study the influence of credit risk management on the financial performance of commercial banks in Nepal. The research investigated various aspects of credit risk management and their effects on the financial performance of banks. It analyzed parameters such as default rates, cost per loan assets, and capital adequacy ratios using financial reports from 31 banks over an eleven-year period spanning from 2003 to 2013. The profitability ratio was compared to the default rate, cost per loan assets, and capital adequacy ratio using descriptive, correlation, and regression analysis. The findings of the study indicated that all of these parameters had a negative effect on banks' financial performance. Among them, the default rate was identified as the most significant predictor of bank financial performance. Based on these results, the study recommends that banks should develop and implement strategies that not only minimize their exposure to credit risk but also enhance profitability.

#### 2.2.4 Summary of Empirical Studies

The table below provides a summary of the various research papers which support or contradict the hypothesis of this research paper.

Table 2.1

*Summary of Empirical Studies*

<b>Authors and Date</b>	<b>Methodology ,Dependent and Independent Variables</b>	<b>Findings</b>
Yousef, Taha and Muhmad (2022)	Panel data (135 banks, 2015-2019), 2SLS. Dependent: Profitability. Independent: Credit risk, capital adequacy ratio, liquidity	Significant negative relationship between credit risk and profitability; positive effect of capital adequacy ratio and liquidity on profitability.
My and Quoc (2022)	Panel data (4 banks, 2005-2019), OLS. Dependent: Profitability (ROA, ROE, ROI). Independent: NPL ratio	Positive correlation between NPL ratio and profitability; profitability does not significantly affect credit risk.

Rasa (2021)	Fixed Effects estimator (6 banks). Dependent: Profitability (ROAA, ROAE, NIM). Independent: LLRTL, TLTA, TLTD, Size	Negative effect of LLRTL on ROAA and ROAE; TLTA has a positive effect on NIM; size negatively affects all profitability indicators.
Bandara, Jameel and Athambawa (2021)	Multiple linear regression (8 banks, 2010-2017). Dependent: Profitability. Independent: Credit risk	Significant negative effect of credit risk on profitability; need for credit risk management strategies.
Munangi, and Sibindi (2020)	Panel data regression (18 banks, 2014-2018). Dependent: Profitability. Independent: Credit risk, capital adequacy, liquidity, loan portfolio size	Negative effect of credit risk on profitability; capital adequacy, liquidity, and loan portfolio size are significant factors influencing credit risk.
Ekinci and Poyraz (2019)	OLS regression (209 banks, 2005-2017). Dependent: Profitability. Independent: Credit risk, CAR	Significant negative relationship between credit risk and profitability; CAR moderates this relationship.
Kotsakis and Veloutsou (2019)	Regression analysis (6 banks). Dependent: Profitability. Independent: Credit risk management	Credit risk management has a significant and positive effect on profitability.
Alshatti (2015)	Panel data regression (13 banks, 2005-2013). Dependent: Profitability (ROA). Independent: Credit risk (NPL ratio), CAR	Positive relationship between credit risk and profitability; effect more pronounced in large banks.
Kurawa and Garba (2014)	Quantitative approach (8 banks, 2002-2011). Dependent: Profitability. Independent: Credit risk management	Significant positive relationship between credit risk management and profitability.
Abiola, and Olausi (2014)	OLS regression (7 banks, 2005-2011). Dependent: Profitability. Independent: Credit risk	Significant negative relationship between credit risk and profitability.
Chhetri (2021)	Panel data (17 banks, 85 observations, 2015-2020). Dependent: ROA.	NPLR negatively impacts ROA significantly. CAR and BS have negative but not significant impact on ROA. CDR has a positive but not significant relationship with ROA.

	Independent: NPLR, CAR, BS, CDR, MQR	MQR has a positive and significant relationship with ROA.
Pantha (2019)	Panel data (9 banks, 72 observations, 2009/10-2016/17). Dependent: ROA. Independent: Default rate, cost per loan asset, CAR	Default rate and cost per loan asset significantly impact ROA. CAR is insignificant for bank performance.
Pradhan and Shah (2019)	Descriptive research approach, survey-based primary data. Dependent: Loan repayment. Independent: Credit risk management practices, credit risk mitigation measures, obstacles.	Credit risk management practices and credit risk mitigation measures positively impact loan repayment.
Shah and Vongbusin (2019)	Panel data (25 samples, 250 observations). Dependent: ROA. Independent: NPLR, leverage ratio, CAR, loan loss provision, credit interest to credit facilities	NPLR, leverage ratio, CAR, and loan loss provision negatively impact ROA. Credit interest to credit facilities positively impacts ROA.
Bhattacharai (2019)	Panel data (10 banks, 160 observations, 2001-2016). Dependent: ROA. Independent: CAR, NPLR, MQR, CDR, RS.	CAR, NPLR, and MQR significantly impact ROA. CDR and RS have no significant impact on ROA.
Shrestha (2018)	Descriptive and causal research design, panel data (6 joint venture banks, 2012-2016). Dependent: Profitability. Independent: Credit risk management variables	Insignificant impact of credit risk on profitability.
Shrestha (2017)	Panel data (18 banks, 126 observations). Dependent: ROA, ROE. Independent: CAR, NPLR, cost per loan assets, cash reserve ratio, assets growth ratio, leverage ratio	CAR, cost per loan assets, and assets growth ratio positively impact ROA and ROE. NPLR, cash reserve ratio, and leverage ratio negatively impact ROA and ROE.
Bhattacharai (2016)	Panel data (14 banks, 2010-2015). Dependent: Bank performance. Independent: NPLR, cost per loan assets, bank size, CAR, cash reserve	NPLR negatively impacts bank performance. Cost per loan assets and bank size positively impact bank performance. CAR and cash reserve are not significant factors.

Kattel (2016)	Descriptive research approach, survey-based data. Dependent: Risk measurement practices. Independent: Various tools and techniques	Positive relationship between credit risk assessment and risk measuring tools. Significant difference in tool usage between private and joint venture banks.
Prakash and Poudel (2012)	Panel data (31 banks, 2001-2011). Dependent: Bank financial performance. Independent: Default rate, cost per loan assets, CAR	Default rate, cost per loan assets, and CAR negatively impact bank financial performance. Default rate is the most significant predictor.
Khadka (2021)	Multiple regression analysis. Dependent Variables: Net profit (NP). Independent Variables: Loan and advance (LA), Non-performing loan (NPL), Loan loss provision (LLP).	Significant impact of LA, NPL, and LLP on profitability. Moderate positive correlation between LA and NPL ( $r=0.466$ ). Significant relation between LA with LLP and NP at 1% significance. Insignificant positive correlation between NPL and NP.
Sharma (2021)	Descriptive research design, financial ratios. Dependent: ROA, ROE. Independent: Capital adequacy ratio, Assets growth ratio, NPL ratio.	Evaluation of banking risk, significant impact of risk determinants on profitability. Emphasized safe investment, better collateral, and portfolio investment to mitigate risk.
Shrestha (2018)	Mean, coefficient of variation, correlation and regression analysis. Dependent: Return on assets (ROA), Return on equity (ROE). Independent: Non-performing loan ratio (NPLR), Capital adequacy ratio (CAR), Loan and advance to deposit ratio (LTDR).	CAR positively impacts profitability, whereas NPLR and LTDR negatively impact profitability.
Kafle (2018)	Descriptive and correlation analysis. Dependent: Return on assets (ROA), Return on equity (ROE). Independent: Non-performing loans (NPLs).	None of the banks complied with NRB's directives on loan loss provisions. NPLs had a strong negative correlation with ROA and ROE, significantly affecting profitability.
Yadav (2018)	Descriptive analysis. Dependent: Net profit (NP). Independent: Non-performing assets (NPAs).	Despite management by international experts, NPA levels were unsatisfactory. Increasing NPA to total credit ratios. Poor deposit mobilization.

Tuladhar (2017)	<p>Pooled regression and panel data analysis.          Dependent: Return on assets (ROA), Return on equity (ROE).          Independent: Capital adequacy ratio CAR, CR, and BS positively affect (CAR), Liquidity ratio (LR), Bank performance, while LER, NPLR, and size (BS), Asset quality (AQ), FBM negatively affect performance. Leverage ratio (LER), Non-LR, AQ, and CRR are not significant. performing loan ratio (NPLR), Cash reserve ratio (CRR), Coverage ratio (CR), Number of female board members (FBM).</p>
Sapkota (2017)	<p>Regression analysis.          Dependent: Return analysis.          Independent: Credit and advance to total deposit ratio, Credit and advance to fixed deposit ratio, Credit and advance to total assets ratio, Performing assets to total assets ratio, Loan loss provision.</p> <p>Banks significantly affect credit risk management. Financial performance driven by capital adequacy. Increasing credit ratio correlates with increasing non-performing assets.</p>
Poudyal (2014)	<p>Descriptive, correlation, and regression analysis.          Dependent: Profitability ratio.          Independent: Default rate, Cost per loan assets, Capital adequacy ratio.</p> <p>Default rate, cost per loan assets, and capital adequacy ratio negatively affect financial performance. Default rate is the most significant predictor.</p>

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### 2.3 Research Gap

According to the fiscal year 2079/80 report of Nepalese commercial banks, seven banks experienced reduced profits attributed to rising NPLR, indicating that the increase in non-performing loans significantly impacts bank profitability. The increase in non-performing loans are caused due to inability to pay the interest and principal by borrowers. The past studies hint that at the pressure of persistent levels of high inflation on nominal interest rates, and as these interest rates follow inflation rates, increasing cost of borrowed funds put pressure on the financial health of the borrowers and ultimately, they start to surrender which in turn leads to rising NPLs. Post Covid-19 impact, economic downturn, political instability, poor credit risk assessment etc., are the major factors to increase NPL.

Since the above-mentioned studies offer limited findings, more extensive testing and adjustment of necessary variables are needed in order to be more conclusive about credit

risk management. Previous studies were unable to present the exact condition of credit risk management in Nepalese banking sector Nepal. Poudel (2012), Bhattarai (2014), Pantha (2019) and Chhetri (2021) considered limited number of sample banks and variables. All the studies recommended further research incorporating more explanatory variables. This current study aims to address these recommendations by incorporating additional variables identified through a literature review and increasing the sample size of commercial banks studied. Additionally, this research will include data after the implementation of policies related to credit standards in Nepalese commercial banks. The recent experiences during the global financial crisis in developed countries and subsequent bailouts serve as motivation to conduct this study as a precautionary and mitigating measure. Understanding bank performance and its determinants is crucial for the future development of the sector and the economy, as it allows stakeholders to make informed decisions, implement effective policies, and ensure sustainable growth.

## CHAPTER III

### RESEARCH METHODOLOGY

This chapter comprises of six sections. It begins with the research design, outlining the study's overall strategy and structure. Following this, the population and sample section discusses the target population, sampling methods, and sample size. The nature and sources of data section identifies the data types and their sources. The method of analysis section, with subsections on descriptive analysis, correlation analysis and multiple regression analysis, details the data analysis techniques used. The model section describes the conceptual model used for study. Lastly, the research framework and variables section specifies the key variables, their definitions and expected relationships.

#### 3.1 Research Design

Research design outlines the framework and approach for conducting an investigation to address specific questions and manage variability. This study employs a descriptive and causal-comparative research design tailored to its objectives. It focuses on both describing and analyzing data from profit and loss accounts and balance sheets (i.e., financial statements) over a specified period. The descriptive design is utilized to examine the patterns and current status of credit risk management and profitability, while the causal research design investigates the influence of credit risk management on the profitability of commercial banks in Nepal.

#### 3.2 Population and Sample

The study focuses on the population consisting of all licensed commercial banks in the country, as listed by NRB (2081). There are a total of 20 commercial banks in this population. Ten banks were purposively selected for the study based on their profitability. The sample includes three joint venture banks, two government-owned public banks, and five private sector banks.

The population data is derived from publications by the relevant authority or institution for conducting both descriptive and analytical studies. For the analytical phase, a sample dataset spanning the last ten fiscal years (2012/13 to 2021/22) was utilized for analysis and evaluation.

Table 3.1

*List of Sample Banks*

<b>S.no</b>	<b>Name of Banks</b>	<b>Code Used</b>	<b>Time Period</b>	<b>No of Observations</b>
1	Agriculture Development Bank Limited	ADBL	2012/13-2021/22	10
2	Himalayan Bank Limited	HBL	2012/13-2021/22	10
3	Nabil Bank Limited	NABIL	2012/13-2021/22	10
4	Nepal Investment Bank Limited	NIBL	2012/13-2021/22	10
5	Rastriya Banijya Bank Limited	RBBL	2012/13-2021/22	10
6	Siddhartha Bank Limited	SBL	2012/13-2021/22	10
7	Laxmi Bank Limited	LAXMI	2012/13-2021/22	10
8	Everest Bank Limited	EBL	2012/13-2021/22	10
9	Machhapuchchhre Bank Limited	MBL	2012/13-2021/22	10
10	Citizens Bank International Limited	CBIL	2012/13-2021/22	10

### 3.3 Nature and Sources of Data

The study relies on secondary sources of data, gathered primarily from annual reports of commercial banks, specifically from their profit and loss accounts, balance sheets, and other published materials. This secondary data also includes information obtained from related banks and agencies such as Nepal Rastra Bank and the Nepal Stock Exchange Limited. Additionally, additional relevant data and information were sourced from journals, periodicals, magazines, and various online resources.

### 3.4 Method of Analysis

This study employs descriptive analysis, correlation analysis, and regression analysis to investigate how credit risk, as indicated by credit risk variables, influences the profitability of commercial banks in Nepal.

#### 3.4.1 Descriptive Analysis

Descriptive analysis involves organizing, describing, and interpreting the collected data to provide a clear and comprehensive snapshot of the research variables or phenomena under investigation. The primary objective of descriptive analysis is to uncover patterns, trends, and relationships within the data without making any causal inferences or drawing

conclusions about the underlying population. Descriptive analysis often includes statistical measures and techniques to summarize and present data. These measures include measures of central tendency such as mean, median, and mode. In addition, it also includes the measures of variability such as standard deviation and range as well as other measures like frequency distributions, percentages, charts, graphs, and tables.

In descriptive analysis, the measures of minimum and maximum are commonly used to provide additional information about the range of values observed in the data set. These measures help to identify the smallest and largest values, respectively. The minimum value represents the smallest observation in the data set, while the maximum value represents the largest observation. These measures are useful for understanding the boundaries or extremes of the data and can provide insights into the variability and spread of the data points. Including the minimum and maximum values alongside other descriptive statistics provides a more complete picture of the data distribution and helps researchers understand the full range of values in their analysis.

### **3.4.2 Correlation Analysis**

Correlation analysis examines the relationship between at least one independent variable and one dependent variable. When changes in one variable coincide with changes in another, they are considered correlated. For instance, an increase in monthly income often leads to higher monthly expenditure, indicating a positive correlation between income (independent) and expenditure (dependent).

Thus, correlation is a statistical tool used to ascertain whether two or more variables are related. If a relationship exists, correlation measures both the degree (extent) and direction of this relationship. The correlation coefficient ( $r$ ) ranges from -1 to +1, where a positive  $r$  signifies variables moving in the same direction, while a negative  $r$  indicates opposite movements. In this study, correlation analysis explored relationships among variables including ROA, ROE NPLR, CAR, CRR, AGR, and BS.

### **3.4.3 Multiple Regression Analysis**

Regression analysis is a statistical technique used to examine the relationship between one or more independent variables (predictors) and a dependent variable (outcome). It helps in understanding how changes in the independent variables are associated with changes in the dependent variable. By fitting a regression model to the data, the analyst can estimate the

average effect of each independent variable on the dependent variable, while controlling for other variables in the model. This method is widely used in various fields, from economics and finance to social sciences and healthcare, to make predictions, test hypotheses, and uncover underlying relationships in data.

### 3.5 The Model

Multiple regression analysis model aims to explore how several independent or predictor variables are related to a dependent criterion variable. In this study, the dependent variables are ROE and ROA, while the independent variables consist of Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPLR), Cash Reserve Ratio (CRR), Assets Growth Ratio (AGR), and Bank Size (BS).

Therefore, the following model has been employed for the study of relationship and effect of the study variables.

$$\text{Model 1: } ROA_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 CAR_{it} + \beta_3 CRR_{it} + \beta_4 AGR_{it} + \beta_5 BS_{it} + e_{it}$$

.....(1a)

$$\text{Model 2: } ROE_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 CAR_{it} + \beta_3 CRR_{it} + \beta_4 AGR_{it} + \beta_5 BS_{it} + e_{it}$$

.....(1b)

Where:

$ROA_{it}$  = Return on assets of bank  $i^{th}$  for the time period  $t$

$ROE_{it}$  = Return on equity of bank  $i^{th}$  for the time period  $t$

$NPLR_{it}$  = Non performing loan ratio of bank  $i^{th}$  for the time period  $t$

$CAR_{it}$  = Capital adequacy ratio of bank  $i^{th}$  for the time period  $t$

$CRR_{it}$  = Cash reserve ratio of bank  $i^{th}$  for the time period  $t$

$AGR_{it}$  = Assets growth ratio of bank  $i^{th}$  for the time period  $t$

$BS_{it}$  = Bank size of bank  $i^{th}$  for the time period  $t$

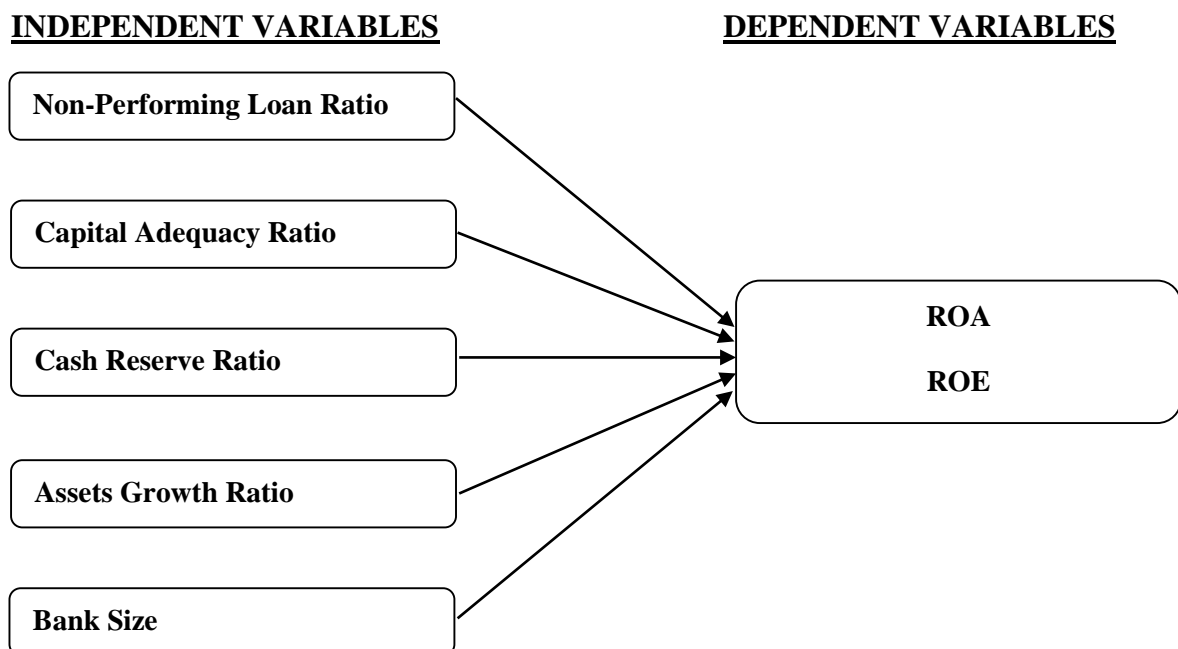
$\beta_0$  = The intercept (constant)

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$  = The slope which represents the degree with which bank profitability changes as the independent variable changes by one unit variable.

$e$  = error component

### 3.6 Research Framework and Variables

A conceptual framework serves as a theoretical structure that shows the connections among variables or concepts under study. It offers a basis for comprehending and analyzing data by defining fundamental concepts and their interconnections. Conceptual frameworks assist researchers in conceptualizing the scope, objectives, and the types of relationships they seek to investigate or establish in their research. The dependent and independent variables based on the literature review are as follows:



*Figure 1* Conceptual Framework

#### **Non-Performing Loan Ratio (NPLR)**

The Non-Performing Loans Ratio (NPLR) is a crucial measure for assessing credit risk in banks. It indicates the percentage of loans that are overdue or in default. As a reflection of a bank's credit quality, NPLR is a key indicator of how well credit risk is being managed. Specifically, it shows the proportion of loan losses relative to the total loan amount. By including NPLR as an independent variable, this study aims to evaluate how credit risk

affects the profitability of commercial banks. A higher NPLR suggests greater credit risk, which can result in financial losses and potentially decrease profitability.

### **Capital Adequacy Ratio (CAR)**

The Capital Adequacy Ratio (CAR) evaluates a bank's capital relative to its risk-weighted assets, serving as an indicator of financial strength and stability. This metric shows the bank's capacity to absorb potential losses and safeguard depositors and other creditors. CAR is determined by dividing the bank's capital by its risk-weighted assets and is presented as a percentage. Regulatory bodies set minimum CAR standards to ensure banks maintain adequate capital to cover risks and remain operational during financial difficulties. By including CAR as an independent variable, the study aims to investigate the impact of capital adequacy on bank profitability. A higher CAR indicates a robust capital base, which can offer protection against credit losses and potentially boost profitability. Theoretically, banks with a strong capital adequacy ratio tend to be more profitable. Additionally, a bank with solid capital adequacy can absorb potential loan losses, thereby preventing bank runs, insolvency, and failure.

### **Cash Reserve Ratio (CRR)**

Cash Reserve Ratio is the portion of a bank's total deposits that must be held as reserves with the central bank. This regulation ensures liquidity and stability within the banking system. By requiring banks to maintain a certain level of reserves, the central bank can regulate the money supply available for lending, thereby influencing inflation and economic activity. CRR acts as a monetary policy tool and supports financial stability, enabling banks to meet withdrawal demands and maintain depositor confidence. Including CRR as an independent variable allows the study to assess the impact of liquidity management on bank profitability. Higher CRR requirements may limit a bank's lending capacity and potentially affect profitability.

### **Assets Growth Ratio (AGR)**

The Assets Growth Ratio (AGR) quantifies the pace at which a bank's overall assets, encompassing loans, investments, and cash holdings, are growing over a specified period. It gauges the effectiveness of a bank's expansion efforts and identifies potential efficiencies gained through increased scale, which could enhance operational effectiveness and profitability. Monitoring AGR enables banks and analysts to evaluate growth strategies,

gauge financial robustness, and forecast future performance and stability. Higher asset growth may indicate expanding lending activities and business opportunities. However, rapid asset growth can also increase credit risk, operational costs, and potentially affect profitability.

$$\text{Assets growth ratio} = \frac{\text{Current year assets} - \text{Previous year assets}}{\text{Previous year assets}}$$

### **Bank Size**

Bank size is usually measured either through total assets or total deposits. In this study, bank size is determined on the basis of total assets of the banks. Bank size is often considered a significant factor in determining a bank's profitability. Larger banks may benefit from economies of scale, broader market reach, and potential advantages in risk management. Including bank size as an independent variable allows the study to examine whether larger banks in Nepal have better profitability due to their size advantage.

$$\text{Bank Size} = \text{Natural logarithm that is Ln of (Total Assets)}$$

### **Return on Assets (ROA)**

Return on Assets (ROA) is selected as the dependent variable in this study to evaluate how credit risk management impacts a bank's profitability. ROA is a commonly used measure that assesses a bank's efficiency in generating profits relative to its total assets. By focusing on ROA as the dependent variable, the study aims to understand how various independent variables representing credit risk management practices influence a bank's profit generation from its assets. ROA serves as a comprehensive indicator of overall profitability and is crucial for assessing a bank's financial health. Examining the relationship between credit risk management and ROA provides insights into the effectiveness of risk mitigation strategies and their impact on a bank's profitability. Higher ROA indicates better profitability and efficient asset utilization, while lower ROA suggests poorer financial performance, reflecting the bank's ability to convert assets into profits.

$$\text{ROA} = \frac{\text{Net profit after tax}}{\text{Total assets}}$$

**Return on Equity (ROE)**

Return on Equity (ROE) measures the return earned by shareholders' equity and indicates the efficiency of a bank in generating profits from the capital invested by its shareholders. By choosing ROE as the dependent variable, the study aims to examine how credit risk management practices, represented by the independent variables, affect the profitability and value creation for shareholders. ROE is a key metric for evaluating a bank's financial performance and attractiveness to investors. Analyzing the relationship between credit risk management and ROE can provide valuable insights into the strategies and measures employed by banks to ensure sustainable profitability and deliver returns to their shareholders.

$$\text{ROE} = \frac{\text{Net profit after tax}}{\text{Total equity}}$$

## CHAPTER IV

### RESULTS AND DISCUSSION

The primary goal of this study, as discussed by the researcher in previous chapters, is to examine how credit risk affects the profitability of commercial banks in Nepal. Thus, this chapter focuses on presenting the results and analysis of the findings, which is divided into three sections. The first section outlines the structure of the different variables, including profitability, and provides descriptive and correlation analysis of the study variables. The second section evaluates the fulfillment of assumptions for the linear regression model. The third section provides a detailed discussion.

#### 4.1 Structure of Variables

Table 4.1

*Structure and Pattern of Non -Performing Loan to Total Loan Ratio of Sample Banks*

Banks	2012 /13	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22	Mean NPLs	St. Dev.
NABIL	2.13	2.23	1.82	1.14	0.80	0.55	0.74	0.98	0.84	1.57	1.28	0.61
EBL	0.64	0.99	0.67	0.39	0.26	0.20	0.16	0.22	0.12	0.12	0.38	0.29
HBL	2.89	1.96	3.22	1.23	0.85	1.40	1.12	1.01	0.48	2.31	1.65	0.91
ADBL	5.85	5.46	5.35	4.36	4.60	3.50	3.29	2.84	1.88	1.68	3.88	1.48
RBBL	5.32	6.38	5.35	4.25	3.77	4.75	4.59	4.08	3.23	2.00	4.37	1.22
NIBL	1.91	1.77	1.25	0.68	0.83	1.36	2.78	2.91	2.46	1.47	1.74	0.78
SBL	2.39	2.75	1.80	1.47	1.30	1.09	0.75	1.38	1.00	1.07	1.50	0.64
CBIL	2.01	3.40	1.53	1.38	2.02	1.48	1.13	1.55	1.64	2.22	1.84	0.64
MBL	2.90	1.81	0.65	0.55	0.38	0.44	0.37	0.52	0.62	1.04	0.93	0.82
LAXMI	1.51	1.15	1.30	0.80	0.93	1.29	1.11	1.04	0.75	0.89	1.08	0.24
Mean NPLs	2.76	2.79	2.29	1.63	1.57	1.61	1.60	1.65	1.30	1.44	1.87	0.76
St. Dev.	1.63	1.81	1.76	1.46	1.47	1.43	1.45	1.23	0.98	0.67	1.27	

*Source: Appendix-I*

Table 4.1 presents the year wise and bank wise NPLR, its mean and standard deviation from fiscal year 2012/13 to fiscal year 2021/22. Sample banks reveal differences in terms of individual bank wise NPLR, average NPLR and variability in terms of standard deviation over the study period. In an individual bank level, the NPLR of RBBL was highest in fiscal year 2013/14 whereas the NPLR of EBL was the lowest in fiscal year 2020/21 and 2021/22. Based on the comparative analysis, NPL ratios for NABIL Bank have generally decreased over the years, from 2.13 percent in 2012/13 to 1.57 percent in 2021/22, with a mean NPL of 1.28 percent and a standard deviation of 0.61 percent. Everest Bank Limited (EBL) has maintained relatively low NPL ratios over the years, ranging from 0.12 percent in 2021/22

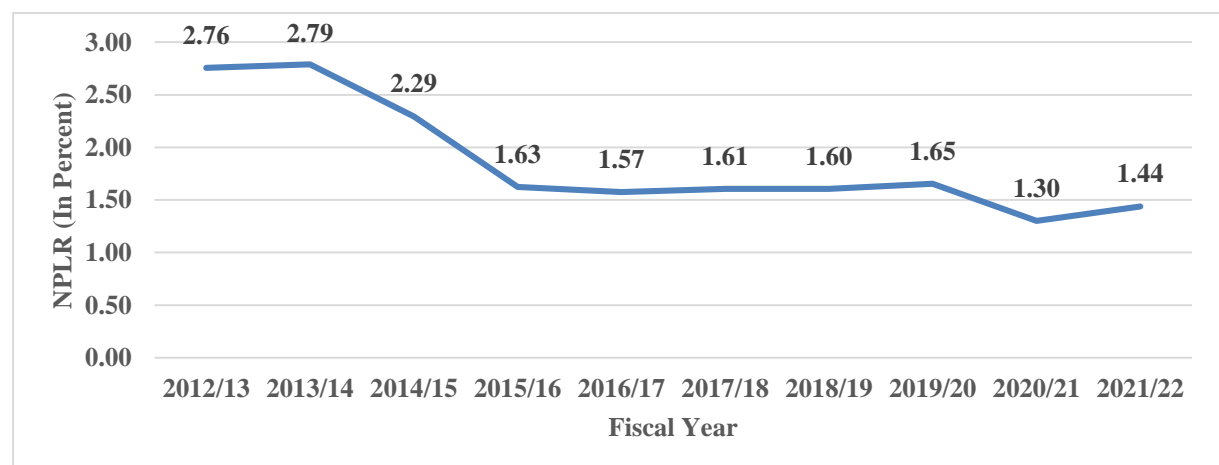
to 0.99 percent in 2013/14, with a mean NPL of 0.38 percent and a standard deviation of 0.29 percent. Himalayan Bank Limited (HBL) has shown some fluctuations in NPL ratios, with the highest ratio of 3.22 percent in 2014/15 and the lowest ratio of 0.48 percent in 2020/21. The mean NPL for HBL is 1.58 percent with a standard deviation of 0.88 percent. Agricultural Development Bank Limited (ADBL) has experienced a decreasing trend in NPL ratios over the years, from 5.85 percent in 2012/13 to 1.68 percent in 2021/22. The mean NPL for ADBL is 3.88 percent with a standard deviation of 1.48 percent. Likewise, Rastriya Banijya Bank Limited (RBBL) has also shown decreasing trend in NPL ratios, with the highest ratio of 6.38 percent in 2013/14 and the lowest ratio of 2.00 percent in 2021/22. The mean NPL for RBBL is 4.37 percent with a standard deviation of 1.22 percent. Nepal Investment Bank Limited (NIBL) has shown fluctuation NPL ratios over the years, ranging from 0.68 percent in 2015/16 to 2.91 percent in 2019/20. The mean NPL for NIBL is 1.74 percent with a standard deviation of 0.78 percent. Similarly, Siddhartha Bank Limited (SBL) has also shown some fluctuations in NPL ratios, with the highest ratio of 2.75 percent in 2013/14 and the lowest ratio of 0.75 percent in 2018/19. The mean NPL for SBL is 1.50 percent with a standard deviation of 0.64 percent. Machhapuchchhre Bank Limited (MBL) has also shown fluctuations in NPL ratios, with the highest ratio of 2.90 percent in 2012/13 and the lowest ratio of 0.37 percent in 2018/19. The mean NPL for MBL is 0.93 percent with a standard deviation of 0.82 percent. Likewise, Citizens Bank International Limited (CBIL) has also shown some fluctuations in NPL ratios, with the highest ratio of 3.40 percent in 2013/14 and the lowest ratio of 1.13 percent in 2018/19. The mean NPL for CBIL is 1.84 percent with a standard deviation of 0.64 percent. Laxmi Bank Limited (LAXMI) has maintained relatively low NPL ratios over the years, ranging from 1.51 percent in 2012/13 to 0.89 percent in 2021/22 with the mean of 1.08 percent and standard deviation of 0.24 percent indicating less variability that is stable NPLs.

The mean NPLs ranged from minimum of 0.38 percent for Everest Bank Limited to maximum of 4.37 percent for Rastriya Banijya Bank which was followed by Agricultural Development Bank Limited (3.88 percent) and Citizens Bank International Limited (1.84 percent) respectively. The result of Table 4.1 suggests that NPLs of government banks are higher than joint venture banks and private banks, indicating that government banks have higher loan portfolio risk. In terms of variability, the minimum standard deviation of 0.24 percent was realized for Laxmi Bank Limited and the maximum standard deviation of 1.48 percent was realized by Agricultural Development Bank Limited which was followed by

Rastriya Banijya Bank (1.22 percent) and Himalayan Bank Limited (0.91 percent) respectively. As a result, Laxmi Bank Limited was considered as the least variation in terms of NPLs and Agricultural Development Bank Limited was considered as highest variation in terms of NPLs.

Table 4.1 also outlines the trends and variations in the non-performing loan to total loan ratio from fiscal year 2012/13 to fiscal year 2021/22. The mean NPLR ratios ranged from maximum of 2.79 percent in fiscal year 2013/14 to minimum of 1.30 percent in fiscal year 2020/21 which slightly increased to 1.44 percent in fiscal year 2021/22. As regards variability, the minimum standard deviation is 0.67 percent in fiscal year 2021/22 and the maximum standard deviation is 1.81 percent in fiscal year 2013/14. Overall, the data shows that NPL levels for all banks combined have generally declined over the 10-year period, with some fluctuations in between. This result indicates that the overall credit risk management and asset quality of the banks have improved over the years, with lower NPL levels and reduced variability in NPL levels among the banks in recent years. However, it is important to conduct further analysis and consider other factors to have a comprehensive understanding of the banks' performance and risk profile.

Figure 2 also depicts the pattern of NPLR of Nepalese commercial banks over the period from fiscal year 2012/12 to fiscal year 2021/22.



*Figure 2* Patterns of Non-performing loan to Total Loan Ratio of Sample Banks

Figure 2 shows the year wise mean NPLR of Nepalese commercial banks for the study period from fiscal year 2012/13 to fiscal year 2021/22 where downward sloping line shows decrease in NPLR and upward sloping line indicates increase in NPLR. Initially, the mean NPLR was 2.76 percent in fiscal year 2012/13 which slightly increased to 2.79 percent in fiscal year 2013/14 and started the declining trend from fiscal year 2014/15 reached to 1.57 percent in fiscal year 2016/17. After that, the NPLR had slightly increased to 1.61 percent in fiscal year 2017/18 and reached to 1.65 percent in fiscal year 2019/20. Then the NPLR slightly decreased to 1.30 percent in fiscal year 2020/21. However, NPLR again increased to 1.44 percent in fiscal year 2021/22. The declining trend of NPLR from the fiscal year 2013/14 to 2016/17 showed that Nepalese commercial banks were able to minimize non-performing loan ratio to total loan ratios which ultimately increased the profitability of bank. However, the trend of the NPLR in the period of 2017/18 to 2021/22 show the fluctuating trend due to the various macroeconomic factors. Thus, it can be concluded that Nepalese commercial banks are becoming financially stable year by year over the sample period from fiscal year 2011/12 to fiscal year 2020/21.

Table 4.2

*Structure and Pattern of Return on Assets of Sample Banks*

Banks	2012 /13	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22	Mean ROA	St. Dev.
NABIL	3.03	2.66	1.81	2.21	2.57	2.47	2.11	1.46	1.56	1.01	2.09	0.63
EBL	2.24	2.20	1.59	1.52	1.72	1.78	1.80	1.36	0.84	1.10	1.61	0.44
HBL	1.54	1.30	1.34	1.94	2.03	1.61	2.08	1.66	1.68	1.09	1.63	0.32
ADBL	2.75	1.65	1.88	2.25	2.32	2.54	2.77	1.86	1.59	0.90	2.05	0.59
RBBL	1.24	1.50	3.33	1.42	1.60	1.85	2.31	1.64	1.10	1.30	1.73	0.66
NIBL	2.62	2.25	1.88	1.90	2.57	2.13	1.79	1.19	1.56	1.55	1.94	0.46
SBL	1.43	1.74	1.51	1.69	1.54	1.59	1.60	1.26	1.25	1.10	1.47	0.21
CBIL	1.59	1.55	1.74	1.96	1.65	1.59	1.62	1.08	1.07	1.03	1.49	0.32
MBL	0.49	1.12	1.26	1.51	1.89	1.47	1.61	1.02	1.02	0.94	1.23	0.40
LAXMI	1.42	1.36	0.92	1.24	1.35	1.46	1.49	1.10	1.04	0.87	1.22	0.23
Mean ROA	1.83	1.73	1.73	1.76	1.93	1.85	1.92	1.36	1.27	1.09	1.65	0.42
St. Dev.	0.79	0.49	0.64	0.34	0.43	0.40	0.40	0.28	0.30	0.20		

*Source: Appendix-I*

Table 4.2 presents the year wise and bank wise ROA, its mean and standard deviation from fiscal year 2012/13 to fiscal year 2021/22. Sample banks reveal differences in terms of individual bank wise ROA, average ROA and variability in terms of standard deviation over the study period. In an individual bank level, the ROA of Rastriya Banijya Bank

Limited was highest in fiscal year 2014/15 with 3.33 percent whereas the ROA of Machhapuchchhre Bank Limited was the lowest in fiscal year 2012/13 with 0.49 percent. The ROA of Nabil Bank Limited shows a fluctuating trend with a peak in 2012/13 and 2013/14 at 3.03 percent and 2.66 percent, respectively. However, it decreased significantly in the following years, with the lowest ROA in 2021/22 at 1.01 percent. The mean ROA for Nabil Bank is 2.09 percent with a standard deviation of 0.63 percent. The ROA of Everest Bank Limited was 2.24 percent in fiscal year 2012/13 and it decreased to 1.10 percent in fiscal year 2021/22 with mean value of 1.61 percent and standard deviation of 0.44 percent. However, Himalayan Bank Limited shows fluctuating trend with ROA of 1.54 percent in 2012/13 which experienced a slight decline in the following years before reaching its highest point in 2018/19 with an ROA of 2.08 percent and again declined to 1.09 percent in 2021/22. The mean ROA for HBL over the entire period is 1.63, with a relatively lower standard deviation of 0.32, suggesting that the bank's performance showed relatively stable profitability. Likewise, Agricultural Development Bank Limited achieved its highest ROA of 2.77 percent in 2018/19 and maintained a mean ROA of 2.05 percent and standard deviation of 0.59 percent over the entire duration. However, it faced some challenges in recent years, with its ROA declining to 0.90 in 2021/22. The ROA of Rastriya Banijya Bank Limited experienced fluctuating trend which experience the lowest ROA at 1.10 percent in 2020/21 with the mean ROA of 1.73 percent and relatively higher variability at 0.66 percent. Likewise, Machhapuchchhre Bank Limited also experienced the fluctuations in its ROA values with a relatively low ROA in 2012 that is 0.49 percent which increased in subsequent years, reaching its highest ROA of 1.89 in 2016/17 with mean ROA 1.23 percent, with a standard deviation of 0.40 percent. Nepal Investment Bank Limited, Siddhartha Bank Limited and Citizens Bank International Limited have maintained relatively stable ROA during the period. Likewise, Laxmi Bank Limited started with a relatively moderate ROA of 1.42 percent in 2012/13 and achieved its highest ROA of 1.49 in 2018/19 and maintained a mean ROA of 1.22 percent and showed low variability of 0.23 percent during the period.

The mean ranged from minimum of 1.22 percent for Laxmi Bank Limited to maximum of 2.09 percent for Nabil Bank and which was followed by Agriculture Development Bank Limited (2.05 percent), Nepal Investment Bank Limited (1.94 percent), Rastriya Banijya Bank Limited (1.73 percent), Himalayan Bank Limited (1.63 percent), Everest Bank International Limited (1.61 percent), Citizens Bank International Limited (1.49 percent),

Siddhartha Bank Limited (1.47percent) and Machhapuchhtre Bank Limited (1.23 percent). The average ROA of the sample banks during the period stands at 1.65 percent.

In terms of variability, the minimum standard deviation of 0.21 percent was realized for Siddhartha Bank Limited and the maximum standard deviation of 0.66 percent was realized by Rastriya Banijya Bank Limited which was followed by Nabil Bank Limited (0.63 percent), Agriculture Development Bank Limited (0.59 percent), Nepal Investment Bank Limited (0.46 percent), Everest Bank Limited (0.44 percent), Machhapuchchhre Bank Limited (0.40 percent), Himalayan Bank Limited (0.32 percent), Citizens Bank International Limited (0.32 percent) and Laxmi Bank Limited (0.23 percent). As a result, Siddhartha Bank Limited was considered as the least variation in terms of ROA and Rastriya Banijya Bank Limited was considered as highest variation in terms of ROA. However, ROA of sample banks have been decreasing since last couple of years which shows that the profitability of the banks in recent years are not increasing.

Table 4.2 also provides the structure and pattern of year wise return on assets over the period from fiscal year 2012/13 to fiscal year 2021/22. The mean ROA ratios ranged from minimum of 1.09 percent in fiscal year 2021/22 to maximum of 1.93 percent in fiscal year 2016/17. As regards variability, the minimum standard deviation is 0.20 percent in fiscal year 2021/22 and the maximum standard deviation is 0.79 percent in fiscal year 2012/13.

Figure 3 also depicts the pattern of ROA of Nepalese commercial banks over the period from fiscal year 2012/13 to fiscal year 2021/22.

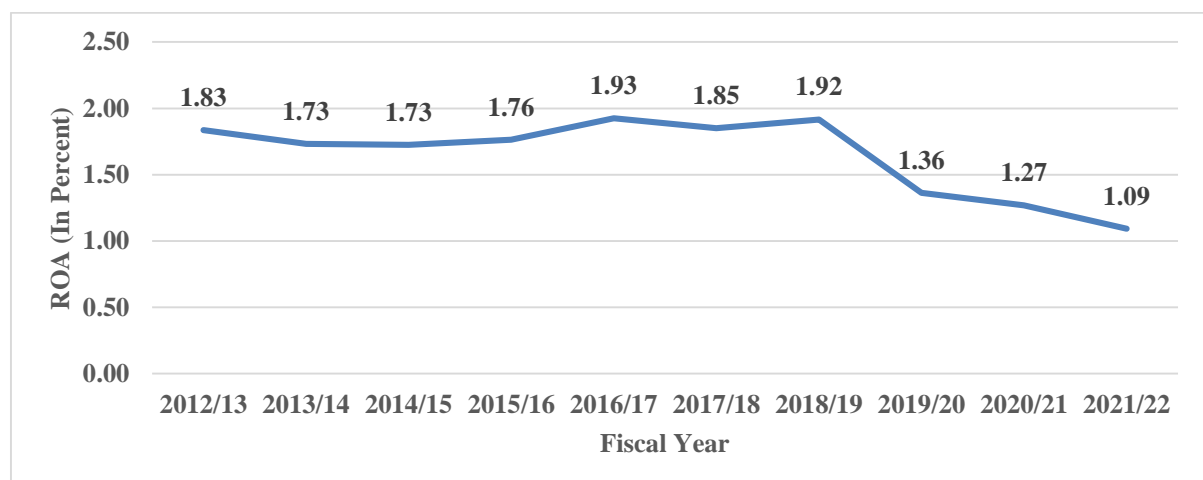


Figure 3 Patterns of Return on Assets of Sample Banks

Figure 3 shows the year wise mean ROA of Nepalese commercial banks for the study period from fiscal year 2012/13 to fiscal year 2021/22 where upward sloping line shows increase in ROA and downward sloping line indicates decrease in ROA. Initially, the mean ROA was 1.83 percent in fiscal year 2012/13 which decreased to 1.73 percent in fiscal year 2014/15. Then ROA slightly inclined to 1.93 percent in fiscal year 2016/17. After that the fluctuating trend of ROA is observed in fiscal year 2017/18 and 2019/19. In the last three fiscal years, the ROA of the commercial banks is in decreasing trend. So, this figure concludes that the assets quality of the Nepalese commercial banks that is loans had made the significant impact on profitability and ROA.

Table 4.3

*Structure and Pattern of Return on Equity of Sample Banks*

Banks	2012 /13	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22	Mean ROE	St. Dev.
NABIL	33.17	30.36	22.07	19.50	21.64	19.34	18.28	13.39	13.37	8.03	19.92	7.62
EBL	30.47	28.40	22.85	20.32	17.38	16.00	17.33	13.50	8.49	10.88	18.56	7.12
HBL	17.81	15.77	15.98	22.48	17.68	13.27	17.28	14.71	14.89	10.76	16.06	3.12
ADBL	14.68	9.59	12.65	12.52	23.75	24.70	14.78	11.70	11.20	6.67	14.22	5.78
RBBL	102.96	76.96	69.56	20.12	21.97	19.19	22.63	19.01	11.94	13.14	37.75	32.59
NIBL	27.28	24.47	20.00	12.10	16.53	14.71	13.00	8.92	11.04	11.17	15.92	6.14
SBL	19.26	23.35	20.48	20.11	12.46	13.90	15.30	13.39	13.99	13.44	16.57	3.85
CBIL	17.35	18.09	19.25	20.34	10.99	11.20	11.71	6.43	9.55	9.83	13.48	4.83
MBL	5.31	14.05	15.44	16.82	15.03	12.07	15.10	10.92	12.50	11.64	12.89	3.27
LAXMI	15.51	14.96	10.04	11.99	9.20	10.59	12.57	10.10	9.33	8.93	11.32	2.37
Mean ROE	28.38	25.60	22.83	17.63	16.66	15.50	15.80	12.21	11.63	10.45	17.67	
St. Dev.	27.47	19.24	16.93	3.99	4.86	4.42	3.23	3.46	2.11	2.14		

*Source: Appendix-I*

Table 4.3 presents the year wise and bank wise ROE, its mean and standard deviation from fiscal year 2012/13 to fiscal year 2021/22. Sample banks reveal differences in terms of individual bank wise ROE, average ROE and variability in terms of standard deviation over the study period. In an individual bank level, the ROE of Rastriya Banijya Bank Limited was highest ROE in fiscal year 2012/13 whereas the ROE of Machhapuchchhre Bank Limited was the lowest ROE in fiscal year 2012/13. Based on the table, the highest mean ROE for the period was observed for Rastriya Banijya Bank Limited (37.75 percent), followed by Nabil Bank Limited (19.92 percent), Everest Bank Limited (18.56 percent), Siddhartha Bank Limited (16.57 percent), Himalayan Bank Limited (16.06 percent), Nepal Investment Bank Limited (15.92 percent), Agricultural Development Bank Limited (14.22 percent), Citizens Bank International Limited (13.48 percent), Machhapuchchhre Bank Limited (12.89 percent), and Laxmi Bank Limited (11.32 percent). The average ROE of

the sample banks during the period is 17.67 percent. The maximum standard deviation was observed for RBBL (32.59 percent) with high variations and minimum standard deviation was observed for Laxmi Bank Limited (2.37 percent) with least variation. The standard deviation of other sample banks is observed as Nabil Bank Limited (7.62 percent), Everest Bank Limited (7.12 percent), Himalayan Bank Limited (3.12 percent), Agricultural Development Bank Limited (5.78 percent), Nepal Investment Bank Limited (6.14 percent), Siddhartha Bank Limited (3.85 percent), Citizens Bank International Limited (4.83 percent) and Machhapuchhre Bank Limited (3.27 percent).

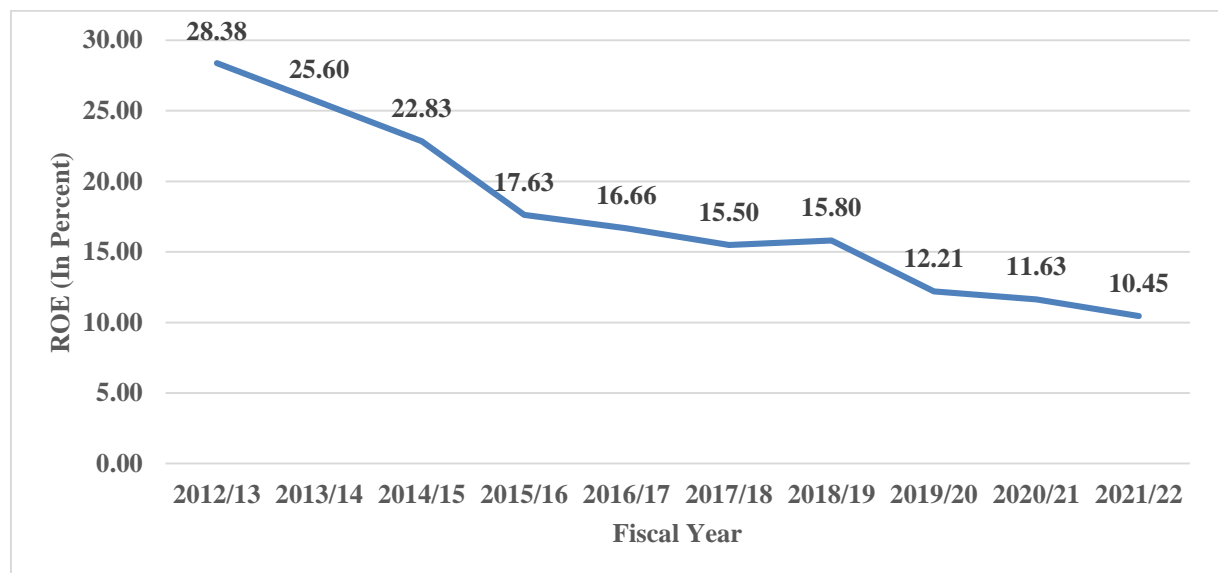
Table 4.3 also depicts the highest mean ROE of 37.75 percent was observed for Rastriya Banijya Bank Limited which is significantly higher than the overall mean ROE that is 17.67 percent. RBBL's high ROE could be attributed to various factors such as strong loan growth, efficient cost management, and increased net interest margin. Nabil Bank Limited had the second-highest mean ROE of 19.92 percent, which is also higher than the overall mean ROE. NABIL consistently maintained a relatively high ROE throughout the period, indicating its stable profitability. Similarly, Everest Bank Limited had a mean ROE of 18.56 percent, which is also higher than the overall mean ROE. EBL's ROE was relatively stable over the years, indicating a consistent performance. On the other hand, some banks had relatively low mean ROE, such as Laxmi Bank Limited (11.32 percent), Citizens Bank International Limited (13.48 percent), and Machhapuchhre Bank Limited (12.89 percent).

Structurally, table 4.3 also shows a declining trend in ROE over the years, with some fluctuations in between. In the first few years, most banks had a relatively high ROE, with Rastriya Banijya Bank Limited recording an exceptionally high ROE of 102.96 percent in 2012/13. However, ROE started to decline significantly in the following years. Similarly, Nabil Bank Limited, Everest Bank Limited and Himalayan Bank Limited recorded relatively high ROE in the early years, but their ROE declined in the subsequent years. In contrast, other sample banks like Nepal Investment Bank Limited, Siddhartha Bank Limited, Citizens Bank International Limited, Laxmi Bank Limited had fluctuating ROE over the period which started to decline in the following years.

Table 4.3 also provides the ROE of the sample banks varied significantly year-wise during the period of 2012/13 to 2021/22. The mean ROE ratios ranged from minimum of 10.45 percent in fiscal year 2021/22 to maximum of 28.38 percent in fiscal year 2012/13. As regards variability, the minimum standard deviation is 2.11 percent in 2020/21 and the

maximum standard deviation is 27.47 percent in fiscal year 2012/13. The results also indicated that ROE in Nepalese commercial banks have maintained mean ROE up to fiscal year 2015/16 then started declining trend. In overall, most banks have fluctuating trend of ROE over the study period which provides the evidence of moderate profitability position. It is important to note that the ROE of a bank can be influenced by various factors, such as the bank's assets, liabilities, financial leverage, operational efficiency, and market conditions. Therefore, a high ROE may not necessarily indicate better performance, and a low ROE may not necessarily indicate worse performance, without taking into account the underlying factors that contributed to the ratio.

Figure 4 also depicts the pattern of ROE of Nepalese commercial banks over the period from fiscal year 2012/13 to fiscal year 2021/22.



*Figure 4* Patterns of Return on Equity of Sample Banks

Figure 4 shows the year wise mean ROE of Nepalese commercial banks for the study period from fiscal year 2012/13 to fiscal year 2021/22 where upward sloping line shows increase in ROE and downward sloping line indicates decrease in ROE. Initially, the mean ROE was 28.38 percent in fiscal year 2012/13 which started declining to 17.63 percent in fiscal year 2015/16 and continuously decreased to 15.50 percent in fiscal year 2017/18. After that, the ROE had slightly inclined to 15.80 percent in fiscal year 2018/19 and again started declining and reached to minimum ROE of 10.45 percent in fiscal year 2021/22. The declining trend of ROE showed that Nepalese commercial banks are becoming less

efficient at creating profits and increasing shareholder value year by year over the sample period from fiscal year 2012/13 to fiscal year 2021/22.

## 4.2 Descriptive Analysis

Table 4.4 provides summary statistics of variables used in this study for the period 2012/13 to 2021/22. The dependent variables include the profitability indicators return on assets (ROA) and return on equity (ROE) and independent variables include non-performing loan ratio (NPLR), capital adequacy ratio (CAR), cash reserve ratio (CRR), assets growth ratio (AGR) and bank size (BS).

Table 4.4

### *Descriptive Statistics of Variable of Sample Banks*

	Min	Max	Mean	St. Dev.	N
<i>Dependent variables:</i>					
ROA	0.49	3.33	1.65	0.52	100
ROE	5.31	102.96	17.67	13.04	100
<i>Independent variables:</i>					
NPLR	0.12	6.38	1.86	1.46	100
CAR	3.33	23.31	13.19	2.53	100
CRR	3.10	24.85	8.97	4.70	100
AGR	2.31	52.26	18.58	9.18	100
BS	10.17	12.95	11.64	0.60	100

*Source: Appendix –II*

Table 4.4 shows the descriptive statistics of dependent and independent variables used in the study. The summary of ROA shows that the average return on assets over the study period is 1.65 percent and standard deviation of 0.52, the maximum return on assets is 3.33 percent and the minimum of 0.49 percent. The return on assets shows how efficient the banks are using its assets to generate profit measured by profit before interest and tax divided by total assets. The average ROE over the study period is 17.67 percent and standard deviation is 13.04 percent. The ROE ranges from minimum of 5.31 percent to maximum 102.96 percent. The equity capital of RBBL during the period of the 2012/13 to 2014/15 are transferred to reserve and surplus in order to maintain stability. Therefore, ROE displays a wide range, indicating significant fluctuations in equity returns across the observations.

The first independent variable non-performing liquidity ratio which is the average non-performing loans to total loan is 1.86 percent and standard deviation of 1.46 over the study period with the maximum ratio at 6.38 percent and the minimum this ratio being 0.12

percent. Likewise, the capital adequacy ratio varies from a minimum of 3.33 percent to a maximum of 23.31 percent with an average of 13.19 percent and standard deviation of 2.53 percent. Similarly, the third independent variable cash reserve ratio shows that this ratio varies from a minimum of 3.10 percent to a maximum of 24.85 percent with an average of 8.97 percent and standard deviation of 4.70 percent. Assets growth ratio ranged from 2.31 percent to 52.26 percent respectively. Then, the average AGR is 18.58 percent with the standard deviation of 9.18 percent. Likewise, the independent variable bank size has ranged from 10.17 to 12.95 and mean and standard deviation being 11.64 percent and 0.60 percent respectively. This analysis highlights the diversity and dispersion of the independent variables, which may be crucial in understanding their potential relationships with the dependent variables, ROA and ROE.

### 4.3 Correlation Analysis

A correlation matrix is a tabular representation displaying correlation coefficients between variables, where each cell indicates the correlation between two respective variables. It serves as a summary of data, providing insight into the strength and significance of relationships between variables. The correlation coefficient ranges from +1 (indicating a perfect positive relationship) to -1 (indicating a perfect negative relationship), while a coefficient of zero signifies no linear relationship between the variables. Correlation matrix is presented as following in Table 4.5.

Table 4.5

#### *Pearson Correlation Coefficients of Study Variables*

S.No	Variables	1	2	3	4	5	6	7
1	NPLR	1						
2	CAR	-0.065	1					
3	CRR	0.058	-.268**	1				
4	AGR	-.232*	-0.062	-0.070	1			
5	BS	-0.003	.241*	.356**	-0.181	1		
6	ROA	.246*	.223**	.278**	-.233*	-0.053	1	
7	ROE	.444**	-.512**	.463**	-0.173	-0.096	.349**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

*Source: Appendix-III*

Table 4.5 reveals the correlation test between both dependent and independent variables using correlation coefficient matrix. The correlation test shows that non-performing loan to total loan ratio (NPLR) has significant relation with ROA in 5 percent level of

significance with correlation coefficients 0.246. Similarly, non-performing loan to total loan ratio (NPLR) also has significant positive relation with ROE at 1 percent level of significance with coefficient 0.444. Therefore, the correlation coefficient suggests that there is positive correlation between NPLR with both ROA and ROE. Moreover, there is also significant positive correlation between capital adequacy ratio and ROA at 5 percent level of significance whereas significant negative relationship between capital adequacy ratio and ROE at 1 percent level of significance. In addition, cash reserve ratio has significant positive relationship with ROA and ROE at 1 percent level. However, assets growth ratio has significant negative relation with ROA at 5 percent level of significance and insignificant negative relation with ROE. Finally, the correlation of bank size with ROA is -0.053 and bank size with ROE is -0.096 which means there is insignificant negative correlation between size of bank and both ROA and ROE.

#### 4.4 Regression Analysis/Causal Analysis

The relationship between dependent variables (ROA and ROE) and independent variables (non-performing loan ratio, capital adequacy ratio, cash reserve ratio, asset growth ratio and bank size) are analyzed in this section.

Table 4.6

*Regression Results of Study Variables on ROA*

Models	$\beta_0$	NPLR	CAR	CRR	AGR	BS	Adj.R <sup>2</sup>	F
I	1.483*** (0.000)	0.088** (0.014)					0.051	6.305**
II	1.041*** (0.000)		0.046** (0.026)				0.04	5.114**
III	1.371*** (0.000)			0.031*** (0.005)			0.068	8.211***
IV	1.893*** (0.000)				- 0.013** (0.020)		0.045	5.625**
V	2.181** (0.035)					-0.046 (0.601)	-0.007	0.276
VI	0.858 (0.424)	0.077** (0.022)	0.067*** (0.001)	0.036*** (0.001)	-0.008 (0.121)	-0.035 (0.683)	0.213	6.36***

*'\*' sign indicates statistically significant at 10 percent level, '\*\*' sign indicates statistically significant at 5 percent level, and '\*\*\*' indicates statistically significant at 1 percent level.*

*Source: Appendix-IV*

Table 4.6 presents the regression outcomes of both single-variable and multiple-variable models based on the earlier described equation 1a, illustrating how the credit risk indicators influence the profitability of Nepalese commercial banks, measured by ROA. Model I shows that the Non-Performing Loan Ratio (NPLR) has a positive and statistically significant impact on Return on Assets (ROA). Specifically, for every unit increase in NPLR, ROA increases by 0.088 units, significant level at the 5 percent. This result aligns with the findings of My and Quoc (2022) who also reported a positive but not necessarily strong relationship between NPLR and ROA. In Model II, the Capital Adequacy Ratio (CAR) has a positive and statistically significant impact on ROA at 5 percent level. Model III demonstrated that the Cash Reserve Ratio (CRR) has a positive and statistically significant effect at 1 percent level. Model IV shows that the Asset Growth Rate (AGR) has a negative and statistically significant impact on ROA, with a coefficient of -0.013 at 5 percent level of significance. Further, Model V indicated the Bank Size (BS) has a negative and statistically insignificant impact on ROA. Model VIII demonstrated the overall impact of all explanatory variables on ROA. The result indicated that NPLR has positive and statistically significant relation at 5 percent level and CAR and CRR has strong positive and statistically significant impact on ROA at 1 percent level. However, AGR and BS have negative but insignificant impact on ROA. The adjusted R<sup>2</sup> of 0.213 indicates that these variables collectively explain 21.3% of the variability in ROA. The F-statistic of 6.36, significant at the 1 percent level, suggests that the overall model is significant. These results highlight the importance of NPLR, CAR, and CRR in determining ROA, while AGR and BS are less influential in this context. These models provide a comprehensive understanding of how various factors influence the Return on Assets (ROA) of commercial banks in Nepal. NPLR, CAR, and CRR consistently show significant positive effects on profitability, while AGR and BS have less clear or insignificant impacts. The models collectively underscore the importance of maintaining strong capital adequacy and cash reserves to enhance bank profitability.

Based on the coefficients, the regression equation for ROA can be written as

$$\text{ROA} = 0.858 + 0.077\text{NPLR} + 0.067\text{CAR} + 0.036\text{CRR} - 0.008\text{AGR} - 0.035\text{BS}$$

Table 4.7

*Regression Results of Study Variables on ROE*

Models	$\beta_0$	NPLR	CAR	CRR	AGR	BS	Adj.R <sup>2</sup>	F
I	10.255*** (0.000)	3.978*** (0.000)					0.189	24.113***
II	52.501*** (0.000)		-2.641*** (0.000)				0.255	34.827***
III	6.162** (0.016)			1.283*** (0.000)			0.206	26.721***
IV	22.233*** (0.000)				-0.246 (0.085)		0.02	3.019
V	41.765 (0.103)					-2.069 (0.344)	-0.001	0.904
VI	0.252 (0.990)	3.417*** (0.000)	(-2.182)*** (0.000)	(1.022)*** (0.000)	-0.088 (0.400)	2.773* (0.097)	0.532	23.478***

*'\*' sign indicates statistically significant at 10 percent level, '\*\*' sign indicates statistically significant at 5 percent level, and '\*\*\*' indicates statistically significant at 1 percent level.*  
*Source: Appendix-V*

Table 4.7 presents the regression outcomes of both single-variable and multiple-variable models based on the earlier described equation 1b, illustrating how the credit risk indicators influence the profitability of Nepalese commercial banks, measured by ROE. Model I showed that the Non-Performing Loan Ratio (NPLR) has a positive and statistically significant impact on Return on Equity (ROE) at 1 percent level of significance. This indicates that higher non-performing loans are associated with higher profitability, potentially due to higher risk lending strategies yielding higher returns. This result aligns with the findings of Al-Husainy and Jadah (2021) and Alshatti (2015), who also observed a positive impact of NPLR on profitability, suggesting that banks with higher non-performing loans might be engaging in riskier yet more profitable ventures. Model II demonstrated the impact of the Capital Adequacy Ratio (CAR) on ROE, showing a negative and statistically significant impact at 1 percent. This finding is consistent with the results of Paul et al. (2021) and Menicuccl and Paolucci (2016), who also found that higher capital adequacy ratios tend to reduce profitability. Model III showed the effect of the Cash Reserve Ratio (CRR) on ROE, indicating a positive and statistically significant impact at 1 percent. This implies that higher cash reserves, which improve liquidity, are associated with higher profitability. However, Model IV showed the negative but statistically insignificant impact of the Asset Growth Rate (AGR) on ROE. This indicates that the growth rate of a

bank's assets does not significantly affect its profitability. Similarly, Model V also demonstrated the negative but statistically insignificant impact of Bank Size (BS) on ROE which implies that changes in bank size do not significantly affect profitability. Model VI illustrated the collective influence of all explanatory variables on ROE. The findings revealed that NPLR exhibited a positive and significant relationship, whereas CAR showed a negative and statistically significant impact on ROE. Additionally, CRR had a notably positive and statistically significant effect on ROE. Conversely, AGR displayed negative and statistically insignificant impact on ROE. Lastly, BS has positive and statistically significant at 10 percent level with ROE. With an Adjusted R<sup>2</sup> of 0.532, the explanatory variables accounted for 53.2% of the variations in profitability among commercial banks in Nepal measured by ROE, and the model was significant at the 1% level. Additionally, this model suggests that while some factors have significant impacts, others like bank size may require further contextual analysis to understand their effects fully.

Based on the coefficients, the regression equation for ROE can be written as

$$\text{ROE} = 0.252 + 3.417\text{NPLR} - 2.182\text{CAR} + 1.022\text{CRR} - 0.088\text{AGR} + 2.773\text{BS}$$

#### **4.5 Discussion**

The main goal of this study is to examine the impact of credit risk on profitability of commercial banks in Nepal. The credit risk indicators have a direct impact on assets and returns on equity, the two main parameters for measuring profitability of the commercial banks. Results obtained from the correlation analysis shows that the non-performing loan to total loan ratio (NPLR) has positive and significant relation with ROA. A positive and significant association between NPLR and ROA was found in the previous study of My and Quoc (2022) and Alshatti (2015). Similarly, non-performing loan to total loan ratio has significant positive relation with ROE and this is similar to the findings of Louzis, Vouldis, and Metaxas (2012). In addition, there is also significant positive correlation between capital adequacy ratio and ROA, supporting the findings of Bandara, Jameel and Athambawa (2021) and Munangi and Sibindi (2020) but significant negative relationship between capital adequacy ratio and ROE which is consistent with the findings of Flamini, McDonald, and Schumacher (2009). However, cash reserve ratio has significant positive relationship with ROA and ROE. This is consistent with Kotsakis and Veloutsou (2019) which also observed cash reserve ratio that is liquidity has significant and positive relationship with ROE. Similarly, assets growth ratio (AGR) has significant negative

relation with ROA but insignificant negative relation with ROE and this result is similar to the result of Foos, Norden, and Weber (2010). The correlation between size of banks and ROA and ROE is -0.053 and -0.096 respectively which mean there is insignificant negative correlations which in similar with the findings of Chhetri (2021).

Results obtained from regression analysis, NPLR has positive and statistically significant impact on ROA and this result is similar to the result of My and Quoc (2022), Kurawa and Garba (2014) and Alshatti (2015). Similarly, the capital adequacy ratio demonstrates a positive and significant impact on ROA, aligning with findings from Kotsakis and Veloutsou (2019), Bandara, Jameel, and Athambawa (2021), and Munangi and Sibindi (2020). Similarly, the cash reserve ratio also shows a positive and significant impact on ROA at the 1% significance level, consistent with empirical studies by Ekinici and Poyraz (2019), but contradicting the results of Tuladhar (2017). However, the assets growth ratio (AGR) exhibits a negative and statistically insignificant impact on ROA, in line with findings by Kotsakis and Veloutsou (2019), but not consistent with Shrestha (2018). Similarly, bank size (BS) shows a negative but statistically insignificant impact on ROA, which aligns with Rasa (2021) and Chhetri (2021), who found a negative effect of bank size on ROA, but differs from the results of Ekinici and Poyraz (2019) and Bhattarai (2016). Model I employed in this study offers a valuable framework for comprehending the factors influencing bank profitability in Nepal. The favorable effects of capital adequacy and cash reserves are in line with established beliefs regarding banking stability and profitability. However, the positive coefficient for NPLR is unusual and warrants further investigation, possibly indicating unique market conditions or aggressive lending practices in Nepalese banks. The negative impacts of asset growth and bank size highlight the challenges of managing expanding operations efficiently. Further research and inclusion of statistical significance tests are necessary to validate these findings.

As regards regression in ROE, Non-Performing Loan Ratio (NPLR) has a positive and statistically significant impact on Return on Equity (ROE). This result is consistent with the results identified by My and Quoc (2022), Munangi and Sibindi (2020) and Alshatti (2015). Then, capital adequacy ratio has negative and statistically significant impact on ROE and this is similar to the findings of Alshatti (2015), Paul et al. (2021) and Menicucci and Paolucci (2016). At the same time, cash reserve ratio has positive and significant impact on ROE at 1 percent level which is consistent with the findings of prior empirical studies of Alshatti (2015) but not consistent with the findings of Ekinici and Poyraz (2019).

Further, assets growth ratio has negative and statistically insignificant impact on ROE. This is consistent with Bandara, Jameel, and Athambawa (2021) which concluded that there is insignificant effect of interest rate on ROE of the banks. Finally, bank size also has positive and statistically significant effect on ROE, supporting the findings of Athanasoglou, Brissimis, and Delis (2008) but not consistent with the results of Ekinci and Poyraz (2019). The model used for ROE provides insights into the determinants for commercial banks. While the positive impact of NPLR and BS on ROE might reflect higher returns from riskier or larger-scale operations, the negative impact of CAR and AGR suggests constraints on profitability from higher capital requirements and rapid growth. The positive impact of CRR highlights the importance of liquidity in maintaining profitability.

## CHAPTER V

### SUMMARY AND CONCLUSION

#### 5.1 Summary

Credit risk management involves the systematic identification, evaluation, and reduction of potential losses arising from borrowers' inability to repay debts, significantly influencing the financial stability and health of banks. Commercial banks play a crucial role in economic development by facilitating growth through their intermediation functions and the provision of essential financial services to communities and nations. In the context of commercial banks in Nepal, effective management of credit risk is crucial for sustaining profitability and fostering long-term growth. Among various risks in banking operations, credit risk stands out as a significant determinant of bank performance, particularly due to its impact on income-generating assets. Since a substantial portion of banks' revenue is derived from interest on loans, managing credit risk effectively is vital for the financial health and longevity of these institutions.

The primary goal of this study is to investigate the relationship between credit risk and the profitability of commercial banks operating in Nepal. It seeks to understand how effective credit risk management practices impact the financial performance of these banks. The study utilizes data extracted from the annual reports of all 20 listed commercial banks in Nepal over a period spanning from fiscal year 2012/13 to fiscal year 2021/22. Through descriptive analysis, the study examines the patterns and current status of various credit risk indicators and profitability measures among these banks. Additionally, causal comparative research is employed to assess how variations in credit risk indicators directly affect the profitability of Nepalese commercial banks. The sample consists of ten commercial banks namely ADBL, HBL, NABIL, NIBL, RBBL, SBL, LAXMI, EBL, MBL, and CBIL. These sample banks are comprised of government sector banks, private sector banks and joint venture banks.

This research study examines the combined impact of credit risk indicators on the Return on Assets (ROA) of commercial banks in Nepal. The correlation analysis of credit risk factors influencing Return on Assets (ROA) in commercial banks of Nepal reveals several notable relationships. Non-Performing Loan Ratio (NPLR) and Capital Adequacy Ratio (CAR) exhibit positive correlations with ROA. Similarly, the Cash Reserve Ratio (CRR)

shows a stronger positive correlation with ROA. Conversely, Asset Growth Rate (AGR) displays a negative correlation with ROA. However, bank size (BS) does not show a significant correlation with ROA. The regression analysis reveals that non-performing loan ratio (NPLR), capital adequacy ratio (CAR), and cash reserve ratio (CRR) significantly and positively influence ROA. This indicates that effective management of these areas enhances bank profitability. Conversely, asset growth rate (AGR) and bank size (BS) have negative and statistically insignificant impact on ROA which means these variables do not significantly affect ROA.

The correlation analysis reveals several key relationships between various factors and Return on Equity (ROE) for commercial banks in Nepal. Non-Performing Loan Ratio (NPLR) and Cash Reserve Ratio (CRR) both have strong positive correlations with ROE. On the other hand, Capital Adequacy Ratio (CAR) shows a significant negative correlation with ROE. However, Asset Growth Rate (AGR) and Bank Size (BS) do not show significant correlations with ROE, indicating that these factors do not have a clear impact on equity returns in this analysis. The regression shows Non-Performing Loan Ratio (NPLR) and Cash Reserve Ratio (CRR) has a significant positive impact on ROE. Conversely, Capital Adequacy Ratio (CAR) show a significant negative relationship with ROE which exhibit a significant negative effect on ROE whereas Asset Growth Rate (AGR) shows negative but insignificant relationship on ROE. Lastly, Bank Size (BS) has a positive coefficient and statistically significant at 10 percent level, indicating that the size of the bank also has a reliable impact on ROE in this model. Overall, these findings highlight the importance of balancing risk and growth strategies to optimize equity returns for commercial banks in Nepal.

## **5.2 Conclusion**

This study can be concluded that EBL has maintained lowest average non-performing loan ratio over the period comparative to the other banks which demonstrates the effective credit risk management practices, high asset quality, and strong profitability due to reduced costs from bad debts. However, average ROA of the NABIL bank is maximum highlighting the strong profitability by efficient assets utilization. So NABIL stands out as the most profitable bank from the study. The study also concluded that highest ROE of RBBL is attributed to various factors such as strong loan growth, efficient cost management, and increased net interest margin. In addition, the highest ROE of RBBL is due to the equity

capital during the period of the 2012/13 to 2014/15 are transferred to reserve and surplus in order to maintain stability. The highest ROE is followed by NABIL bank highlighting its strong profitability which shows the outstanding profitability of NABIL bank.

The regression analysis results indicated several key factors influencing the profitability of commercial banks in Nepal. A higher CAR and CRR are associated with increased profitability, underscoring the importance of financial stability and liquidity management in enhancing bank performance. Interestingly, NPLR also shows a positive and significant relationship with ROA unlike the other studies, suggesting that riskier lending practices that yield higher interest rates and charging higher risk premium and the aggressive growth strategies which fosters both the increase in profit as well as NPL which can be highlighted from the data. Conversely, the Assets Growth Ratio (AGR) and Bank Size (BS) show negative but statistically insignificant relationships with ROA, indicating that rapid asset growth and larger size do not necessarily translate into higher profitability. These findings highlight the need for bank managers to balance capital adequacy, liquidity, and risk management to optimize profitability while ensuring financial stability.

This study also concluded that the Non-Performing Loan Ratio (NPLR) shows a significant positive relationship with ROE, suggesting that riskier lending practices, despite higher default risks, can lead to higher profitability due to increased interest income. Conversely, the higher Capital Adequacy Ratio (CAR) significantly reduces ROE, indicating that while maintaining higher capital enhances stability, it limits the potential returns for shareholders. However, Cash Reserve Ratio (CRR) also positively impacts ROE, highlighting the importance of maintaining adequate liquidity for enhancing profitability and stability. The effects of the Assets Growth Ratio (AGR) on ROE are insignificantly negative indicating that rapid asset growth does not substantially influence profitability in this model. However, the Bank Size (BS) has positively significant impact on ROE highlighting the importance of the size of the bank on its profitability. In conclusion, these results indicate that it is crucial for bank management to prioritize the equilibrium of capital adequacy and other risk management to enhance profitability and secure financial stability. By focusing on these factors, banks can navigate economic challenges more effectively and sustain long-term growth in a competitive financial environment.

### 5.3 Implications

Based on the findings of the research the following recommendations were given:

- This study draws some conclusions and identifies the effect of credit risk indicators on profitability insignificantly. Thus, it gives signal to the management of the banks and policy makers or regulators to take remedial action.
- The study also highlights that the banks need to strengthen their credit risk governance to lower the loan loss provision ratio and prioritize lending to reduce non-performing loans, rather than extending credit to consumers with weak financial stability.
- The study indicates that to meet targets and standards, banks must develop and enhance their risk management systems, with a focus on early identification of risk indicators. Continuous and consistent improvement in credit risk identification and forecasting is essential.
- The findings could help the different participants to take their financial decision with respect to investment in the commercial banks as the study shows the profitability of the banks. This could also help to know whether banks are able to increase the wealth of their investors by providing the dividend.
- The study shows that effectively managing various factors influencing banks' credit risk impacts their profitability. Efficient credit risk management benefits not only the banks but also individuals, businesses, and the broader economy. This contributes to the overall health of the financial sector and society.
- The importance of this study is that it shows the distinctive results than the other research which study can provide insights to policy and decision makers in financial sector in Nepal toward managing aforementioned risks.
- The study encourages commercial banks' management to evaluate their past actions and provides direction for future strategies and programs. It addresses current issues and offers up-to-date information on credit risk management, making it valuable for bankers, shareholders, depositors, as well as researchers and students.

- For future studies, increasing the sample size, study time frame and other proxies of credit risk such as CD ratio, leverage ratio, loan loss provision, etc. may produce more robust results. Similarly, the researcher can use primary data as well for studying the profitability of commercial bank.

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## Appendix-I

## Extraction of required variables

(NRS In Million)

Banks	Variables	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ADBBL	TA	71,394.80	82,160.30	91,376.54	99,696.35	113,911.66	128,290.19	135,419.61	151,457.73	179,320.86	222,440.35	246,184.24
	TE		15,395.09	15,732.37	14,834.94	20,454.77	12,520.39	13,937.93	28,352.73	28,471.22	31,505.12	33,357.03
	NPAT		2,259.95	1,509.46	1,876.19	2,560.00	2,973.28	3,442.32	4,191.59	3,331.74	3,527.54	2,225.77
HBL	TA	54,364.43	61,152.96	73,589.85	82,801.55	99,863.00	107,255	116,462.30	133,151.14	155,884.92	178,490.93	216,286.27
	TE		5,299.71	6,083.41	6,958.90	8,606.25	12,318.14	14,138.90	15,994.80	17,589.25	20,132.71	22,112.18
	NPAT		943.69	959.11	1,112.29	1,935.00	2,178	1,875.61	2,763.85	2,586.72	2,998.62	2,367.54
NABIL	TA	63,200.29	73,241.26	87,274.62	115,985.70	127,300	140,332	160,978.07	201,138.82	237,680.03	291,066.22	419,818.10
	TE		6,689.14	7,641.06	9,485.59	14,457.94	16,699.18	20,586.36	23,188.61	25,855.66	33,858.11	52,583.69
	NPAT		2,218.76	2,319.63	2,093.81	2,819.30	3,613	3,981.89	4,238.85	3,463.24	4,527.55	4,256.02
NIBL	TA	65,756.23	73,152.15	86,173.93	104,345.44	134,516.97	155,361.35	171,893.55	185,841.99	203,023.90	227,930.13	244,448.79
	TE		7,020.65	7,925.48	9,806.95	21,081.51	24,156.97	24,871.02	25,579.20	27,173.16	32,234.91	34,273.93
	NPAT		1,915.03	1,939.61	1,961.85	2,550.89	3,992.34	3,659.32	3,324.11	2,423.19	3,558.61	3,797.60
RBBL	TA	100,560.02	105,714.51	122,557.92	139,560.80	166,432	173,545	197,332.01	230,517.62	266,766.26	309,987.46	330,242.80
	TE		1,272.49	2,386.57	6,675.77	11,707.29	12,637.13	19,070.77	23,542.49	23,029.54	28,674.30	33,483.28
	NPAT		1,310.12	1,836.70	4,643.80	2,355.28	2,776	3,659.27	5,328.37	4,377.32	3,423.65	4,292.80
	TA	29,579.20	33,691.22	40,277.75	50,647.30	74,402.91	89,902.00	119,869.22	144,479.76	170,585.16	228,941.96	264,327.02
SBL	TE		2,499.98	3,000.38	3,746.07	6,241.79	11,119.18	13,702.84	15,088.18	16,011.27	20,401.81	21,597.87

<b>Banks</b>	<b>Variables</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
	<b>NPAT</b>		481.42	700.54	767.08	1254.92	1386.00	1904.06	2308.85	2143.61	2854.83	2902.46
	<b>TA</b>	26028.53	29807.67	34919.16	45340.16	54663.16	71594.23	80960.28	106995.72	128898.57	152240.86	173383.95
<b>LAXMI</b>	<b>TE</b>		2728.38	3175.03	4146.54	5649.47	10518.14	11158.01	12650.04	13975.06	16896.76	16941.02
	<b>NPAT</b>		423.27	474.86	416.20	677.13	967.70	1181.09	1590.07	1411.55	1575.76	1513.45
	<b>TA</b>	55813.13	65741.15	70445.08	99167.29	113885.05	116510.45	144811.15	170077.53	185023.19	211,650.25	225381.32
<b>EBL</b>	<b>TE</b>		4827.84	5457.15	6890.38	8514.09	11544.58	16134.51	17625.06	18637.36	20,870.67	22794.55
	<b>NPAT</b>		1471.12	1549.70	1574.35	1730.21	2006.25	2581.68	3054.12	2516.24	1,770.94	2479.40
	<b>TA</b>	24357.25	30296.20	40723.96	48753.50	59455.47	68925.74	84787.65	105246.05	124519.57	158,213.55	178727.30
<b>MBL</b>	<b>TE</b>		2796.68	3235.71	3990.98	5340.20	8663.76	10356.87	11236.87	11584.70	12,864.13	14485.77
	<b>NPAT</b>		148.60	454.69	616.37	898.22	1302.48	1249.69	1697.09	1265.15	1,607.47	1686.65
	<b>TA</b>	20,069.00	25,980.00	32,222.00	41,493.00	55,062.00	65405	77709.95	90,121.36	110,550.68	168,329.05	194,412.65
<b>CBIL</b>	<b>TE</b>		2380.00	2753.00	3740.00	5305.00	9843.18	11,013.91	12,494.62	18,637.36	18,888.02	20,409.28
	<b>NPAT</b>		413	498	720	1079.00	1082	1234.1	1,463.22	1,198.50	1,804.34	2005.61

(Source: Nepal Rastra Bank)

**Extraction of required ratios**

S.NO	YEAR	BANK	ROA	ROE	CAR	NPLR	CRR	AGR	BS
1	2013	ADBL	2.75	14.68	17.89	5.85	11.36	15.08	11.32
2	2014	ADBL	1.65	9.59	15.17	5.46	6.33	11.22	11.42
3	2015	ADBL	1.88	12.65	12.55	5.35	7.64	9.10	11.51
4	2016	ADBL	2.25	12.52	12.84	4.36	5.38	14.26	11.64
5	2017	ADBL	2.32	23.75	17.47	4.60	9.94	12.62	11.76
6	2018	ADBL	2.54	24.70	20.83	3.50	7.93	5.56	11.82
7	2019	ADBL	2.77	14.78	20.31	3.29	4.20	11.84	11.93
8	2020	ADBL	1.86	11.70	20.46	2.84	8.74	18.40	12.10
9	2021	ADBL	1.59	11.20	23.31	1.88	5.98	24.05	12.31
10	2022	ADBL	0.90	6.67	16.34	1.68	3.72	10.67	12.41
11	2013	HBL	1.54	17.81	12.15	2.89	6.08	12.49	11.02
12	2014	HBL	1.30	15.77	11.65	1.96	8.72	20.34	11.21
13	2015	HBL	1.34	15.98	11.45	3.22	8.32	12.52	11.32
14	2016	HBL	1.94	22.48	10.91	1.23	6.27	20.61	11.51
15	2017	HBL	2.03	17.68	12.23	0.85	6.65	7.40	11.58
16	2018	HBL	1.61	13.27	12.44	1.4	5.21	8.58	11.67
17	2019	HBL	2.08	17.28	12.73	1.12	4.46	14.33	11.80
18	2020	HBL	1.66	14.71	14.89	1.01	9.9	17.07	11.96
19	2021	HBL	1.68	14.89	13.85	0.48	5.34	14.50	12.09
20	2022	HBL	1.09	10.76	12.67	2.31	4.23	21.17	12.28
21	2013	NABIL	3.03	33.17	13.17	2.13	24.85	15.89	11.20
22	2014	NABIL	2.66	30.36	13.18	2.23	11.32	19.16	11.38
23	2015	NABIL	1.81	22.07	11.86	1.82	14.15	32.90	11.66
24	2016	NABIL	2.21	19.50	12.55	1.14	6.77	9.75	11.75
25	2017	NABIL	2.57	21.64	13.34	0.8	10.02	10.24	11.85
26	2018	NABIL	2.47	19.34	13.02	0.55	10.05	14.71	11.99
27	2019	NABIL	2.11	18.28	12.71	0.74	4.78	24.95	12.21
28	2020	NABIL	1.46	13.39	12.81	0.98	11.2	18.17	12.38
29	2021	NABIL	1.56	13.37	12.69	0.84	3.66	22.46	12.58
30	2022	NABIL	1.01	8.03	13.44	1.54	4.13	44.23	12.95
31	2013	NIBL	2.62	27.28	12.99	1.91	16	11.25	11.20
32	2014	NIBL	2.25	24.47	12.69	1.77	19.2	17.80	11.36
33	2015	NIBL	1.88	20.00	11.99	1.25	12	21.09	11.56
34	2016	NIBL	1.90	12.10	16.17	0.68	7.2	28.92	11.81
35	2017	NIBL	2.57	16.53	14.48	0.83	10.5	15.50	11.95
36	2018	NIBL	2.13	14.71	13.25	1.36	8.2	10.64	12.05
37	2019	NIBL	1.79	13.00	13.65	2.78	5.5	8.11	12.13
38	2020	NIBL	1.19	8.92	13.23	2.91	8.7	9.25	12.22

S.NO	YEAR	BANK	ROA	ROE	CAR	NPLR	CRR	AGR	BS
39	2021	NIBL	1.56	11.04	14.64	2.46	4.4	12.27	12.34
40	2022	NIBL	1.55	11.17	15.99	1.47	3.1	7.25	12.41
41	2013	RBBL	1.24	102.96	3.33	5.32	15.78	5.13	11.57
42	2014	RBBL	1.50	76.96	5.6	6.38	19.38	15.93	11.72
43	2015	RBBL	3.33	69.56	10.34	5.35	14.48	13.87	11.85
44	2016	RBBL	1.42	20.12	11.21	4.25	14.09	19.25	12.02
45	2017	RBBL	1.60	21.97	11.83	3.77	9.6	4.27	12.06
46	2018	RBBL	1.85	19.19	12.34	4.75	5.29	13.71	12.19
47	2019	RBBL	2.31	22.63	13.19	4.59	6.44	16.82	12.35
48	2020	RBBL	1.64	19.01	12.68	4.08	7.32	15.72	12.49
49	2021	RBBL	1.10	11.94	14.31	3.23	3.54	16.20	12.64
50	2022	RBBL	1.30	13.14	13.97	2	7.32	6.53	12.71
51	2013	SBL	1.43	19.26	11.7	2.39	9.6	13.90	10.42
52	2014	SBL	1.74	23.35	11.39	2.75	17.22	19.55	10.60
53	2015	SBL	1.51	20.48	11.1	1.80	8.63	25.75	10.83
54	2016	SBL	1.69	20.11	11.25	1.47	6	46.90	11.22
55	2017	SBL	1.54	12.46	12.73	1.30	8.86	20.83	11.41
56	2018	SBL	1.59	13.90	12.12	1.09	6.37	33.33	11.69
57	2019	SBL	1.60	15.30	12.77	0.75	4.56	20.53	11.88
58	2020	SBL	1.26	13.39	13.17	1.38	5.03	18.07	12.05
59	2021	SBL	1.25	13.99	13.45	1.00	3.54	34.21	12.34
60	2022	SBL	1.10	13.44	13.09	1.07	3.23	15.46	12.48
61	2013	LAXMI	1.42	15.51	11.76	1.51	12.33	14.52	10.30
62	2014	LAXMI	1.36	14.96	11.91	1.15	18.28	17.15	10.46
63	2015	LAXMI	0.92	10.04	10.81	1.3	12.59	29.84	10.72
64	2016	LAXMI	1.24	11.99	10.79	0.8	7.17	20.56	10.91
65	2017	LAXMI	1.35	9.20	13.99	0.93	7.32	30.97	11.18
66	2018	LAXMI	1.46	10.59	12.42	1.29	6.57	13.08	11.30
67	2019	LAXMI	1.49	12.57	11.83	1.11	5.59	32.16	11.58
68	2020	LAXMI	1.10	10.10	11.83	1.04	8.29	20.47	11.77
69	2021	LAXMI	1.04	9.33	11.85	0.75	8.29	18.11	11.93
70	2022	LAXMI	0.87	8.93	12.76	0.89	4.65	13.89	12.06
71	2013	EBL	2.24	30.47	11.59	0.64	14.22	17.79	11.09
72	2014	EBL	2.20	28.40	11.15	0.99	15.21	7.16	11.16
73	2015	EBL	1.59	22.85	13.33	0.67	20.61	40.77	11.50
74	2016	EBL	1.52	20.32	12.66	0.39	14.57	14.84	11.64
75	2017	EBL	1.72	17.38	14.69	0.26	15.49	2.31	11.67
76	2018	EBL	1.78	16.00	14.2	0.2	17.75	24.29	11.88
77	2019	EBL	1.80	17.33	13.74	0.16	18.56	17.45	12.04
78	2020	EBL	1.36	13.50	13.38	0.22	14.43	8.79	12.13

S.NO	YEAR	BANK	ROA	ROE	CAR	NPLR	CRR	AGR	BS
79	2021	EBL	0.84	8.49	12.51	0.12	18.15	14.39	12.26
80	2022	EBL	1.10	10.88	11.95	0.12	6.5	6.49	12.33
81	2013	MBL	0.49	5.31	12.54	2.9	11.36	24.38	10.32
82	2014	MBL	1.12	14.05	10.63	1.81	8.61	34.42	10.61
83	2015	MBL	1.26	15.44	12.24	0.65	9.34	19.72	10.79
84	2016	MBL	1.51	16.82	12.36	0.55	7.28	21.95	10.99
85	2017	MBL	1.89	15.03	16.82	0.38	9.53	15.93	11.14
86	2018	MBL	1.47	12.07	15.36	0.44	9.98	23.01	11.35
87	2019	MBL	1.61	15.10	12.79	0.37	3.79	24.13	11.56
88	2020	MBL	1.02	10.92	13.02	0.52	4.37	18.31	11.73
89	2021	MBL	1.02	12.50	12	0.62	6.41	27.06	11.97
90	2022	MBL	0.94	11.64	13.47	1.04	3.71	12.97	12.09
91	2013	CBIL	1.59	17.35	11.89	2.01	13.24	29.45	10.17
92	2014	CBIL	1.55	18.09	12.99	3.4	11.48	24.03	10.38
93	2015	CBIL	1.74	19.25	13.27	1.53	8.2	28.77	10.63
94	2016	CBIL	1.96	20.34	12.40	1.38	6.74	32.70	10.92
95	2017	CBIL	1.65	10.99	16.88	2.02	6.34	18.78	11.09
96	2018	CBIL	1.59	11.20	13.84	1.48	6.34	18.81	11.26
97	2019	CBIL	1.62	11.71	14.37	1.13	4.16	15.97	11.41
98	2020	CBIL	1.08	6.43	15.14	1.55	4.22	22.67	11.61
99	2021	CBIL	1.07	9.55	13.70	1.64	3.71	52.26	12.03
100	2022	CBIL	1.03	9.83	12.69	2.22	3.29	15.50	12.18

(Source: Annual Reports of Respective Banks)

## Appendix-II

### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	100	.49	3.33	1.6470	.52146
ROE	100	5.31	102.96	17.6684	13.04096
NPLR	100	.12	6.38	1.8637	1.45690
CAR	100	3.33	23.31	13.1911	2.52882
CRR	100	3.10	24.85	8.9708	4.70626
AGR	100	2.31	52.26	18.5816	9.17625
BS	100	10.17	12.95	11.6437	.60250
Valid N (listwise)	100				

### Appendix-III

#### Correlations

		NPLR	CAR	CRR	AGR	BS	ROA	ROE
NPLR	Pearson Correlation	1	-.065	.058	-.232*	-.003	.246*	.444**
	Sig. (2-tailed)		.520	.569	.020	.973	.014	.000
	N	100	100	100	100	100	100	100
CAR	Pearson Correlation	-.065	1	-.268**	-.062	.241*	.223*	-.512**
	Sig. (2-tailed)	.520		.007	.540	.016	.026	.000
	N	100	100	100	100	100	100	100
CRR	Pearson Correlation	.058	-.268**	1	-.070	-.356**	.278**	.463**
	Sig. (2-tailed)	.569	.007		.488	.000	.005	.000
	N	100	100	100	100	100	100	100
AGR	Pearson Correlation	-.232*	-.062	-.070	1	-.181	-.233*	-.173
	Sig. (2-tailed)	.020	.540	.488		.071	.020	.085
	N	100	100	100	100	100	100	100
BS	Pearson Correlation	-.003	.241*	-.356**	-.181	1	-.053	-.096
	Sig. (2-tailed)	.973	.016	.000	.071		.601	.344
	N	100	100	100	100	100	100	100
ROA	Pearson Correlation	.246*	.223*	.278**	-.233*	-.053	1	.349**
	Sig. (2-tailed)	.014	.026	.005	.020	.601		.000
	N	100	100	100	100	100	100	100
ROE	Pearson Correlation	.444**	-.512**	.463**	-.173	-.096	.349**	1
	Sig. (2-tailed)	.000	.000	.000	.085	.344	.000	
	N	100	100	100	100	100	100	100

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

### Appendix-IV

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.503 <sup>a</sup>	.253	.213	.462589163719

a. Predictors: (Constant), BS, NPLR, CAR, AGR, CRR

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.805	5	1.361	6.360	.000 <sup>b</sup>
	Residual	20.115	94	.214		
	Total	26.920	99			

a. Dependent Variable: ROA

b. Predictors: (Constant), BS, NPLR, CAR, AGR, CRR

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.858	1.069		.802	.424
	NPLR	.077	.033	.214	2.323	.022
	CAR	.067	.019	.325	3.456	.001
	CRR	.036	.011	.328	3.329	.001
	AGR	-.008	.005	-.148	-1.564	.121
	BS	-.035	.086	-.041	-.409	.683

a. Dependent Variable: ROA

**Appendix-V****Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.745 <sup>a</sup>	.555	.532	8.92454169298 2526

a. Predictors: (Constant), BS, NPLR, CAR, AGR, CRR

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9349.747	5	1869.949	23.478	.000 <sup>b</sup>
	Residual	7486.860	94	79.647		
	Total	16836.606	99			

a. Dependent Variable: ROE

b. Predictors: (Constant), BS, NPLR, CAR, AGR, CRR

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	.252	20.620		.012	.990
	NPLR	3.417	.635	.382	5.378	.000
	CAR	-2.182	.374	-.423	-5.826	.000
	CRR	1.022	.211	.369	4.848	.000
	AGR	-.088	.103	-.062	-.846	.400
	BS	2.773	1.652	.128	1.678	.097

a. Dependent Variable: ROE

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**Abstract** This study aimed to investigate the impact of credit risk on profitability of commercial banks in Nepal for the period of 2012/13 to 2021/22. Panel data set collected from ten commercial banks has been used in this study. In this study, credit risk indicators are taken as NPL, CAR, CRR, BS and AGR. Similarly, the indicators for the profitability used for this study are ROA and ROE.