Impact of Credit Risk on Profitability of Commercial Banks of Nepal

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

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CERTIFICATE OF AUTHORSHIP

I hereby corroborate that have researched and submitted the final draft of dissertation entitled **"Impact of Credit Risk on Profitability of Commercial Banks of Nepal".** 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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Anita Subedi

July, 2024

REPORT OF RESEARCH COMMITTEE

Ms. Anita Subedi has defended research proposal entitled **"Impact of Credit Risk on Profitability of Commercial Banks of Nepal".** successfully. The research committee has registered the dissertation for further progress. It is recommended to carry out the work as per suggestion and guidelines of supervisor Ramesh Kumar Paudel and submit the dissertation for evaluation and viva-voce examination.

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APPROVAL SHEET

We, the undersigned, have examined the dissertation entitled **"Impact of Credit Risk on Profitability of Commercial Banks of Nepal".** presented by Anita Subedi 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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ABBREVIATIONS

BS	:	Bikram Sambat
C&BB	:	Cash and Bank Balance
CRR	:	Cash Reserve Ratio
CS	:	Common Stock
CV	:	Coefficient of Variation
d.f.	:	Degree of Freedom
F/Y	:	Fiscal Year
GDP	:	Gross Domestic Product
LATD	:	Loan and Advance to Total Deposit
No.	:	Number
NPL	:	Non-Performing Loan
NRB	:	Nepal Rastra Bank
r	:	Coefficient of correlation
R&D	:	Research and Development
r^2	:	Coefficient of determination
ROE	:	Return on Equity
S.D.	:	Standard Deviation
SEBO	:	Security Board
TA	:	Total Assets
TITD	:	Total Investment to Total Deposit
TU	:	Tribhuvan University

ABSTRACT

Credit risk management is crucial for banks to avoid financial difficulties and enhance profitability. Strong financial performance incentivizes stakeholders like shareholders and employees to invest and contribute more effectively. This study investigates how factors like Total Investment to Total Deposit Ratio (TITD), Non-Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR) and Loan Loss Provision Ratio (LLPR) influence the profitability of commercial banks in Nepal. The analysis also explores the relationships between these ratios and performance metrics like Return on Equity (ROE) and Return on Assets (ROA) for commercial banks in Nepal. Standard financial analysis techniques and statistical methods were applied to evaluate secondary data obtained from published annual reports of sample commercial banks namely Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from fiscal years 2013/14 to 2022/23. Multiple regression analysis was employed to assess the impact of credit risk on the profitability of Nepalese commercial banks. The results reveal a significant negative impact of TITD, NPLR, CDR and CAR on ROE. The analysis confirms a negative correlation of TITD, NPLR and CDR on ROA. This indicates that a higher proportion of non-performing loans leads to a decrease in profitability. The coefficient of determination (R-squared) for the ROE model is 0.666, implying that 66.60% of the variation in ROE can be explained by the independent variables considered. To improve financial performance and mitigate future risks associated with non-performing loans, banks are recommended to closely monitor loan performance and meticulously evaluate borrowers' creditworthiness and repayment capacity before loan approvals. Additionally, continuous improvement in asset utilization, liquidity management, and cost control practices are crucial. Further research is encouraged to explore the influence of loans on banks' financial performance using a broader range of independent variables and longer study periods (e.g., 15-20 years) to achieve greater precision. This research offers valuable insights for financial analysts, investors, regulators, economists, and other stakeholders involved in making critical decisions within the financial sector.

Keywords: Credit Risk, Profitability, ROE, ROA, NPLR, CDR

CHAPTER-I
INTRODUCTION

1.1 Background of the Study

Effective credit risk management helps banks perform financially better by averting major problems. Profitable operations provide incentives for owners and employees to invest and work in the company. One key indicator of the bank's profitability is its handling of credit risk. Thus, the bank's profitability is significantly impacted by credit risk management. Credit risk is a type of misfortune brought on by a bank loan failure. The simplest definition of credit risk is the possibility that a bank may fail to fulfill its loan commitments according to the terms that were agreed upon. Nonetheless, a loan is considered performing if both principle and interest payments are made within the agreed-upon term and at the agreed-upon time; otherwise, it is considered non-performing (Naili and Lanrichi, 2022).

Banks are financial organizations created in accordance with the rules and regulations of a particular nation to lend, borrow, issue, exchange, accept deposits, safeguard, or handle money. Banks' primary revenue-generating activity is lending, which they offer to prospective business owners as their main product. Since credit management is essential to banks' survival, it is a crucial component of bank management. By tightening credit criteria, the primary goals of credit risk management are to maximize the risk-adjusted return rate and limit credit exposure. Due to the fact that banks' credit risk and profitability originate from their credit exposure. Banks must consider credit exposure in both individual and credit portfolio credit while practicing prudent credit management. Furthermore, it is necessary to take into account how it relates to other categories of risk exposures like market, operational, and liquidity risk. In fact, the efficacy and efficiency of the cautious application of credit management determines the total risk management system of the banks (Abu Hussain and Al-Aimi, 2012).

The process of determining a company's or organization's creditworthiness is known as credit analysis. When a significant firm offers bonds or has issued bonds, its audited financial accounts may be examined. Alternatively, prior to granting or extending a commercial loan, a bank might examine the financial records of a small company.

Regardless of the size of the company, the phrase applies to both situations (Gul and Goodwin, 2010).

One of the most important and difficult tasks performed by the Commercial Bank is credit management. This is due to the fact that they are required to pay consumer deposits upon demand because they receive them. No customer will accept justifications that his money account must be paid on demand since it was borrowed out to another customer. Thus, it is imperative that commercial banks manage loans properly. The success or failure of any credit institution is largely dependent on credit management. A methodical loan study, which addresses the process of investing those elements that lead to non-payment of loans, is essential to successful business lending. All parameters for the effectiveness of a loan decision must rely on the officer's or managers excellent judgment (Misganaw, 2020).

The process of granting a loan, ensuring that it is repaid on schedule, and managing credit is all part of credit management. Controlling lending practices that will increase income and lower financial risks is this department's responsibility within a bank or business. The credit management policy's goal is to lay forth guidelines for any action that could potentially expose the company to risk by allocating funds. This is done in an effort to control and reduce the danger. A risk that is well managed can turn into an opportunity (Asante, 2015).

Credit management refers to the entire loan process, from identifying possible borrowers to collecting the funds disbursed. Credit management in the banking industry refers to tasks such loan approval, appraisal, monitoring, recovery of non-performing loans, and application acceptance. Thus, in light of current credit management methods in financial institutions, the goal of this study is to evaluate the performance of credit management issues and strengths of commercial banks from various angles (Twinomugisha, 2020).

The bank must control both the risk associated with each individual credit or transaction and the credit risk present in the overall portfolio. In order to reduce the total complexity of an investment portfolio, the banking industry must engage in proper credit administrative procedures.

Effective credit risk management helps banks avoid major problems and improves their financial performance. Strong financial results provide incentives for shareholders and employees to invest and work together, respectively. This will stimulate shareholders' and employees' motivation to make more contributions that support economic progress. Consequently, a key element of the banking organization's long-term success is the efficient control of credit risk (Tuladhar, 2017).

Profit is a widely acknowledged and accepted indicator of how efficiently a business is operating. Therefore, the bank is considered to be more efficient and lucrative the higher the earnings. The main benefit of this criterion is that it offers a uniform benchmark for evaluating the effectiveness of various banks. The desire for profit continues to be an enterprise's primary motivator and encourages efficiency. The pursuit of more profitable procedures, lower unit costs, improved organization, and higher turnover is undoubtedly motivated by the need to earn a profit (Vranceanu, 2014).

The terms "profit" and "ability" combine to form the word profitability. The definition of profit was previously discussed, and ability refers to a company's capacity to turn a profit. An organization's ability also indicates its profitability or operational effectiveness. The profitability of an investment can be characterized as its capacity to generate income from its utilization. While profit is an absolute notion, profitability is a relative idea. Profit and profitability are two distinct ideas, notwithstanding their close relationship and mutual dependence. Put differently, each of them plays a unique role in business despite being generic (Young, 2013).

Profitability is a phrase that deviates from "profit" and refers to the capacity to turn a profit as the primary indicator of a business enterprise's performance. It is merely describing the fundamental test performance of any firm. Profit is defined as the excess of sales revenue over expenses, yet the term "profit" is highly contested and has multiple meanings (Otley, 2002).

Enterprise resource planning includes a component called profitability analysis, which enables managers to predict a proposal's profitability or maximize the profitability of an ongoing project. Sales and profit possibilities that are unique to a market, such as client

age groups, geographical areas, or product categories, can be predicted by profitability analysis. Profitability analysis, as used in cost accounting, examines the output profitability of an organization. An organization's output can be categorized by channels, goods, customers, locations, or transactions (Kaplan, 1990).

Size, capital, risk management, expense management, marketable securities, and non-performing loans are all factors that affect profitability; on the other hand, inflation, interest rates, GDP growth, and tax rates are considered macro variables. The study considers bank-specific factors of profitability (i.e., ROA and ROE) of the banks, including bank size, capital adequacy ratio, liquidity ratio, credit deposit ratio, and non-performing loan ratio.

The study's primary goal is to examine the connections between credit risk management strategies and profitability, as well as the barriers that banks confront in addressing customer loan repayment behavior. This study can help understand scenarios related to credit risks faced by customers and commercial banks with cyclical and vicious impact by providing useful information on the policies and practices related to credit risk management that these banks in Nepal follow (Pradhan and Shah, 2019).

Banks would be at risk for credit concentration if they concentrated their lending in certain industries. In order to assist the economy, NRB has mandated that lending to a few designated sectors be provided. As a result, BFIs have been actively lending into these sectors and gradually broadening their portfolios. Based on the product portfolio, BFIs have lent the most on term loans (22.0%), then working capital and demand loans (21.50%), and overdrafts (14.96%). As of mid-July 2020, the real estate loan has fallen short of the 10 percent regulation minimum, standing at 5.01 percent. According to NRB guidelines, BFIs must provide a specific percentage of their entire loan portfolio to the underprivileged sector. The NRB set the loan requirement rate for BFIs at 5% in order to gradually increase financial access to the underprivileged sections of the economy (Adhikari, 2022).

For the purpose of assessing the risk associated with all credit exposures, the majority of banks have created and put into use the Internal Credit Risk Grading (ICRG). Credit risk grading ratings, however, are uncorrelated with the likelihood of a customer defaulting

and, consequently, with the cost (interest rate) of the credit facilities offered. Furthermore, as this system is purely subjective, such risk ratings have no bearing on the customer's approval and monitoring level (frequency) following disbursement. Banks are merely using customer grades to map it with the regulatory loan categorization; they have not identified the number of customers who have been assigned the same grades in accordance with the ICRG and have defaulted on the credit facilities granted. Numerous times, the borrower's credit has been evaluated based on shaky financial records. Banks seldom look at differences in sales and income figures between the audited, provisional, and projected financial statements. Some banks were found to have inadequate loan monitoring systems in place. For example, loan provisioning is determined by the age of the loans rather than the actual credit quality and company performance (Cavallo and Majnoni, 2002).

Financial Stability Report, Fiscal year 2022/23, Issue 15, NRB states that in contrast to 26 in mid-July 2022, there were 20 A-class banks in Nepal in mid-July 2023. In terms of both assets and liabilities as well as balance sheet items, commercial banks continue to dominate the entire banking industry. Mid-July, 2023 saw a sum of Rs 6465.9 billion in bank assets. With the exception of NEPSE market capitalization, the 6465.9 billion rupees represent 66.19% of all assets available with the Nepalese financial sectors. The size of banks' and financial institutions' (BFIs') assets have increased in Nepal, but at a slower rate. By mid-July 2023, BFI assets had climbed by 7.45% to Rs 7,290.99 billion. This increase is due to a number of factors, including rising levels of remittance inflows, digital banking usage, financial access, and financial literacy. From 11.80% in mid-July 2022 to 7.45% in mid-July 2023, the assets growth rate has decreased. This reduction is thought to be mostly the result of the global recession (Financial Stability Report, 2022).

Three categories comprise BFIs' Financial Soundness Indicators. These three types of indicators are related to capital adequacy, assets quality, and credit and deposits. Under the category of credit and deposit related metrics is total credit/total deposit, often known as the Credit Deposit Ratio (CDR). Total LLP/Total loan, also known as Loan Loss Provision Ratio (LLPR), and NPL/Total loan, also known as Non-Performing Loan Ratio (NPLR), are measures linked to asset quality, while Total capital/RWA (percent), also known as Capital Adequacy Ratio (CAR), is an indicator associated to capital adequacy. It was noted during the examination that the general quality of the assets had declined. During the time under review, Nepal's banking sector has a healthy capitalization level.

Mid-July 2023 saw an overall CAR of 13.42%, down from 13.58% in the same period in 2022. From 13.53% in mid-July 2022 to 13.37% in mid-July 2023, the CAR of commercial banks has decreased. The capital adequacy ratio was significantly higher than the required minimum, despite a downward trend in the ratio (Financial Stability Report, 2022).

Over 89% of the total income received by BFIs came from interest on loans and advances. The fiscal year 2022–2023 had a meagre 3.48 percent increase in BFI credit growth, while loans placed on watch lists climbed by 66.59%, indicating a decline in the quality of these loans. The banking industry has also rearranged and restructured loans. In mid-July 2023, banks rescheduled and restructured 1.52% of loans, whereas in mid-July 2022, they did the same for 3.24% of loans. Furthermore, throughout this fiscal year, the percentage of doubtful loans has more than doubled. 38.20% of all non-performing loans (NPL) in the banking industry fall into the loss category. The percentage of Non-Performing Loans (NPLs) to all BFI loans rose from 1.31% in mid-July, 2022 to 3.02% in mid-July, 2023. Thus, during the course of a year, there was an increase of 1.71%. BFIs' NPL levels rose from Rs. 61.87 billion in mid-July 2022 to Rs. 147.43 billion in mid-July 2023. As a measure of the quality of commercial banks' assets, the ratio of non-performing loans to total loans is 2.98% as of mid-July 2023 (compared to 1.20 in the same period in 2022). The total NPL ratio for BFIs is 3.02%. According to the Financial Stability Report (2022), the ratio of total credit to total deposit, or credit deposit ratio (CDR), decreased from 92.14% in F/Y 2021/22 to 84.80% in F/Y 2022/23. (Financial Stability Report, 2022).

The banking industry's profitability fell in fiscal year 2022–2023 compared to the year before. The BFIs' net profit decreased by 7.73 percent to Rs. 76.99 billion in the review year from Rs. 83.44 billion in the preceding fiscal year. In F/Y 2022–2023, BFIs' Return on Equity (ROE) and Return on Assets (ROA) decreased. In the year of the survey, which was 1.23 a year ago, the ROA of BFIs was registered at 1.06%. Commercial banks saw a decline in ROA from 1.24% in F/Y 2021/22 to 1.08% in F/Y 2022–2023.Additionally, for BFIs, ROE dropped from 13.51% in F/Y 2021/22 to 11.46% in F/Y 2022/23. According to the Financial Stability Report (2022), the ROE for commercial banks dropped from 13.67% in F/Y 2021/22 to 11.46% in F/Y 2022/23. (Financial Stability Report, 2022).

Therefore this study examines the relationship of total investment to total deposit ratio, non-performing loan ratio, credit deposit ratio, capital adequacy ratio, loan loss provision ratio, ROE and ROA. Also analyze the impact of relationship of total investment to total deposit ratio, non-performing loan ratio, credit deposit ratio, capital adequacy ratio and loan loss provision ratio on ROE and ROA.

1.2 Problem Statement

Adamu, Asongo, and Nyor (2014) claim that the trend in bank interest rates for both loans and savings is declining as a result of intense competition. For commercial banks, non-performing assets have grown to be a significant issue. Commercial banks are required by NRB regulations to set aside a specific percentage of their profits as provisions for non-performing assets and bad loans. Lending in the productive and industrial sectors is a very dangerous endeavor. Often, the institution will use sound business procedures to avoid or reduce the financial risk involved in a transaction; in other cases, it will transfer the risk to other parties by combining product design and price. The banking sector understands that an organization shouldn't conduct business in a way that places it in unnecessary danger or take on risk that may be effectively transferred to other parties. Instead, it should only handle risks at the business level that are better handled there than by their owners in their personal portfolios or by the market as a whole (Stulz, 2008).

Does practical credit risk management matter to commercial banks? Should that occur, it ought to make a substantial contribution to earnings since substantial profits are anticipated to augment shareholder value. In a similar vein, credit policies lack structure and a definitive policy framework on credit-related issues. It has been discovered that credit choices and loan approvals are made flexibly in Nepal to favor personal networks as well. According to Nigusse, 2018, a new client discovers that the credit-providing process is extremely difficult and that occasionally the documents supplied for loan sanctioning are fake and merely for formalities.

It has been shown that the majority of Nepal's commercial banks approve loans without doing enough examinations, which could increase the amount of loan defaults and non-performing loans. Furthermore, it is argued that Nepal's current credit risk concerns

cannot be adequately addressed by the credit risk management processes now in place (Bhatt et al., 2023).

According to Nyong'o, 2014, credit risk is the decline in credit advances units that leads to credit losses, a high percentage of non-performing loans, and management expenses. Regretfully, Nyong'o, 2014, asserts that non-traditional banks, of which financial institutions are no exception, are mostly responsible for these incidents.

Although credit risk has become a hot topic in policy discussions because of its effects on the operations of financial institutions, as noted by Lekhelebana, 2022, there appears to be a dearth of research on this subject, most of it in developing nations. Although some previous studies have attempted to fill this vacuum in the literature by measuring credit risk management in developing economies—for example, Bhatore, 2020 measured credit risk management of Financial companies, and Poudel, 2012, similarly assessed credit risk management impact on Financial companies performance. Nevertheless, the majority of these studies either focused exclusively on financial firms or on financial institutions in rural areas without mentioning financial institutions at all. As a result, there is a void in the literature about financial institutions' credit risk management. The primary claims to be scrutinized in this research will undoubtedly be the credit management strategies employed by commercial banks.

This study gave the following claims a lot of attention.

- What is the situation of credit position of Nepalese commercial banks?
- Is there any relationship of total investment to total deposit ratio, non-performing loan ratio, credit deposit ratio, capital adequacy ratio, loan loss provision ratio, ROE and ROA of Nepalese commercial banks?
- How does total investment to total deposit ratio, non-performing loan ratio, credit deposit ratio, capital adequacy ratio and loan loss provision ratio impact ROE and ROA of Nepalese commercial banks?

1.3 Objectives of the Study

This study's general goal is to assess how credit risk affects Nepal's commercial banks' profitability.

- To compare credit risk position and profitability of selected Nepalese commercial banks.

- To examine the relationship among the total investment to total deposit ratio, non-performing loan ratio, credit deposit ratio, capital adequacy ratio, loan loss provision ratio, ROE and ROA of Nepalese commercial banks.
- To analyze the impact of total investment to total deposit ratio, non-performing loan ratio, credit deposit ratio, capital adequacy ratio and loan loss provision ratio on ROE and ROA of Nepalese commercial banks.

1.4 Rationale of the Study

In emerging nations such as Nepal, commercial banks bear the primary responsibility for the nation's economic growth. The organization's primary goal is to maximize surplus by making effective use of its funds and resources. As a bank, it also bears a duty to contribute to the socioeconomic development of the nation by giving loans and advances to underprivileged group's particular consideration. There are several noteworthy findings in the study. The study will help banks since it would educate them on how credit risk management affects financial institutions' performance.

A wide range of techniques that numerous financial institutions in the sector can use will be presented in the study. The government, acting through the regulatory body, will find tremendous value in the study since it will aid in the creation of national policy regarding the lending of deposit-taking BFIs. Lastly, the research would advance both academic and corporate research in a larger sense. The study's recommendations would benefit firms by improving service quality and credit management procedures. The investigations will lay the groundwork for further research in the field of credit risk management methods and will be important to academic research in general.

1.5 Limitations of the Study

The study has certain restrictions. The following are the study's primary limitations:

- There are 20 commercial banks operating in Nepal (mid-July, 2023), but only three banks i.e. Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL). are taken for the proposed study.
- This study concentrates only on non-performing loan related and profitability of commercial banks and ignores the other financial aspects.
- The period of the study is limited from fiscal year 2013/14 to 2022/23.

- The study is basically based on secondary data, articles, publication and journals of the respective banks.

CHAPTER- II

LITERATURE REVIEW

Review of pertinent literature on the subject of "Impact of credit risk on profitability of commercial banks of Nepal" is the focus of this study. Examining existing literature can help one become more knowledgeable in their field, identify any new contributions, and generate ideas for new study designs. Since earlier research served as the basis for this one, it is therefore impossible to disregard them. This chapter summarizes the material that is currently available on the subject, based on my knowledge, research, and pertinent studies on this subject. It also includes reviews of journals, publications, and previously completed theses. The following topics are examined under this heading.

- Conceptual Review
- Theoretical Review
- Empirical Review

2.1 Conceptual Review

2.1.1 Credit Risk Management Practices

The primary credit risk management practices used in the banking industry have been identified by authors such as Sabeza et al., 2015, Dowel et al. (2008), and Lindergren (1987). These practices include having a clear risk policy and reporting structure, assigning responsibility and accountability, underwriting authority and loan limits, prioritizing the lending process and systems, and promptly informing top management of risk information. On the other hand, some credit risk management practices have also been advocated for, including effective organizational structure, credit risk identification, assessment, monitoring, and control over credit administration (see, for instance, Basel (1999); Greuning and Bratanovic (2003); IAIS (2003)).

Nonetheless, a close examination of the methods used by the latter researchers and the earlier author appears to be supporting one another. Practices like credit administration control, underwriting power, and loan limit, for example, all appear to refer to the same process. Effective reporting structures and organizational structures also frequently discuss the same practices. Credit risk identification, according to Richard, Chijoriga and Kaijage, Peterson and Bohman (2008), is a method of determining the probable risk elements connected to a borrower or investment choice. By using this credit risk

management technique, financial institutions can determine potential hazards related to their customer group in comparison to their corporate or individual consumers. The Basel II Accord confirms that the bank must identify all risks associated with the goods and services their company offers. Since this assumes that financial institutions' services and operations are not at all similar, each one should work to identify the risks unique to its particular markets and offerings. Furthermore, before a bank chooses to launch new products or add them to its package list, the Basel II Accord requires financial institutions to evaluate and identify any potential risks related to those new endeavors. Credit evaluation is an additional method of credit risk management.

According to Brown and Moles (2014), the focus of credit evaluation is whether a borrower may partially or completely default on their commitment

2.1.2 Credit Risk Management Policy

Credit policies, according to Peterson, 2000, are policy documents that outline the procedures and processes that control how an institution's credit operates. These include the terms of credit, the steps involved in opening new accounts, processing applications, conducting credit investigations, creating and disseminating credit reports, establishing credit lines, and all other aspects of the credit management process. No two organizations will have the same set of credit risk management policies, as the author suggests; however, since the goal of this study is to evaluate the credit risk management of a few chosen commercial banks of Nepal, it will address the regulator's credit risk policy and explain how the policies of the banks are. Credit is generally understood in Nepal as a facility where a lender chooses to lend specified amounts within a specified period or at specified intervals agreed upon with the borrower, on the borrower's behalf, or at the borrower's direction; and to either bill the borrower periodically for the amount stipulated in paragraph, whether or not a charge, fee, or interest is payable to the lender in respect of the arrangements; or to postpone the borrower's obligation to repay the lender with the borrowed funds. It's interesting to note that the Act explicitly supported every principle contained in the concept of credit—a certain quantity or resource that a lender chooses to offer to a borrower, with the understanding that the loan will be repaid within a predetermined window of time agreed upon by the lender and the borrower. The definition offered by Sullivan and Ollikainen, 2018, is congruent with the term supplied under the related Act. Therefore, a credit is a trust that enables a creditor to provide an

asset to the credit, with the latter party agreeing to return or refund the resource at a later time rather than having to pay the former immediately.

2.1.3 Sources of Credit Risk

As was previously said, credit risk arises when a borrower doesn't fulfill his responsibilities on time, which eventually results in a loan default. Numerous academics have found a number of characteristics that eventually lead to credit risk in the literature.

An author such as Mukhtarov et al., 2018, has identified various factors that contribute to credit risk. These factors include inadequate management control, inappropriate laws, limited institutional capacity, volatile interest rates, low capital and liquidity levels, government interference, and insufficient central bank supervision. According to the writers, the majority of these sources are connected; therefore one factor's causation may give rise to another. For example, inadequate management oversight may result in careless credit evaluation and bad lending practices by credit department staff. However, in their analysis, Ndwiga, 2010, found various sources of credit risks. According to them, the primary sources of credit risk in the operations of microfinance enterprises were things like commercial loans for corporations and small businesses, interbank transactions, trade financing, and foreign exchange transactions. It's interesting to note that Ndwiga, 2010, discovered sources of risks that varied significantly from those presented by the previous authors. One may argue, for example, that the sources used in Ndwiga, 2010,'s investigation were heavily influenced by the bank portfolios and the kind of businesses the banks handled on a daily basis. But what the preceding writers pointed out appears to highlight the behaviors or elements that might pose a risk to financial organizations' credit. All of the elements that have been found have a high likelihood of causing possible credit concerns; hence it makes little difference which approach one chooses to identify the causes of credit risk. Conversely, systemic risk was recognized by other writers such as Bisias et al., 2012, as one of the origins of credit risk. Systematic risk, as defined by Bisias et al., 2012, is the result of a borrower's failure to make required repayments, which has an impact on other borrowers in the economy.

As an illustration of this domino effect, consider the studies conducted by Kim et al., 2018. He found that the mortgage crisis of 2009 made it difficult for mortgage companies to fulfill their financial obligations, which in turn made it difficult for US banking

institutions to meet their liquidity needs. According to the author, this effectively expanded to other economic sectors and caused a liquidity lockdown, which prevented banks from extending loans out of concern that defaults may occur. Based on the listed studies, it appears that credit risk does not come from a single source. For example, what one bank may consider to be its source of credit risk could not be considered such by another bank. For instance, Tier 2 banks, or microfinance organizations, are prohibited from engaging in foreign exchange trading per the Bank of Ghana's regulations.

Therefore, Lamichhane, 2023,'s identification of foreign exchange risk rules out its use as a source of credit risk for microfinance institutions. Similar to how microfinance companies handle relatively modest loan portfolios, microfinance institutions deal with personal loans; hence, their sources of risk will differ. These opinions support the assertion that there are a variety of sources of credit risk, most of which are influenced by the sector in which a bank operates. Graham and Coyle, 2000, distinguished between three primary sources of credit risk in his groundbreaking paper: external sources, strategic sources, and business activities. Graham and Coyle, 2000, went on to list the additional credit risk elements that make up business activities, including target market, third-party originations, new product and distribution channels, portfolio and product mix, and new goods. It is evident that the elements listed under "business activities" align with the causes of credit risk that Ahmed, 2016, found in their investigation.

2.2 Theoretical Review

2.2.1 Portfolio Theory

The theory of portfolios commonly referred to as modern portfolio theory. Financial institutions have been dealing with credit defaults for a while now. The Modern Portfolio Theory was developed by Harry Markowitz in 1952 and is extensively utilized by MFIs and the banking industry. The value at risk and portfolio at risk are used by the majority of MFIs to manage exposure resulting from changes in interest rates and market conditions. With the use of this theory, investors can evaluate the projected risk and return on their investment holdings. (Kahihu et al., 2021) The 14 MPT is a sophisticated technique to investing that has shown to be successful in helping investors and financial institutions construct their asset portfolios. Markowitz measured exposure and provided mathematical evidence of how portfolio diversity lowers risk and boosts investors' return on investment. By adopting a statistical measure for their asset portfolios, investors can

use modern portfolio theory to predict both the expected return and their risk exposure. Koumou, 2020, provided examples of how to combine assets to create portfolios that are well diversified. According to this theory, the majority of investors failed to properly account for the high connection between security incomes. The theory posits that by pooling securities with diverging value actions, a portfolio's exposure can be reduced and its predicted rate of return can be increased. According to Koumou, 2020, diversity reduces vulnerability when securities are combined and their prices move at different times or in opposition to one another.

2.2.2 Value at Risk Theory

This theory is used to calculate the probability of portfolio losses based on mathematical analyses of historical price fluctuations and volatility. Since it can measure risk as it happens, banks and financial firms frequently employ it. It is a crucial factor for businesses to take into account when deciding how to trade and hedge. (Judge, 2006) Three variables—the total potential loss, the chance of that total loss, and the time period—can be used to calculate value at risk. This theory is relevant to the study because it helps measure credit risk associated with non-performing loans and portfolios that are at risk in relation to BFI's' financial health. This approach also helps in determining the pertinent risk elements influencing the different BFIs' portfolios.

2.2.3 Liquidity Risk Theory

One significant danger that comes before every unrelenting market disaster is liquidity risk. It is called the method that transforms isolated loss trades into widespread financial institution collapses, and it is contended to be the decisive indicator that causes credit risks to soar in addition to market risks. This is also true of the unparalleled catastrophe that the US mortgage industry experienced in 2007. According to Njue, 2020, every financial institution ought to be able to identify and group the many types of liquidity risk that it faces. BFIs' balance sheet composition, product portfolio, cash flow reports, and deals all play a significant role in determining their liquidity requirements and the sources of liquidity available to meet them. Therefore, in order to prevent a negative impact on its earnings and capital, any financial institution must assess its liquidity position. This theory is relevant to the study because it helps to quantify the liquidity risk associated with non-performing loans and portfolios that are at risk, which in turn affects the

financial stability and performance of BFIs. This theory also helps in determining the pertinent variations in capital and revenue that impact the BFIs' overall stability.

2.3 Empirical Review

Permata et al. (2024) researched on the influence of the level of credit risk and liquidity risk on profitability in banks listed on the Bei for the 2018-2021 periods. The study methodology is quantitative and descriptive in nature. Thirty-five banking companies that are listed on the Indonesia Stock Exchange comprise the research samples. The research period spans from 2018 to 2021. Return on Assets (ROA) is the dependent variable in the research, and Non-Performing Loans (NPL) and Loan to Deposit Ratio (LDR)—also known as Credit Deposit Ratio—are the independent variables. At a significance threshold of 0.05, the computed ROA F-value in this study is 28.309, which is higher than the crucial F-value of 3.24. In statistical terms, it indicates a statistically significant difference between the groups under comparison when the estimated F-value is larger than the critical F-value. This finding suggests that the alternative hypothesis is supported by evidence and that the null hypothesis can be rejected. Thus, it may be said that independent variables have a substantial simultaneous impact on ROA. The beta (β) coefficient for NPL is -0.432. This indicates that there will be a 0.432 unit drop in ROA for every unit increase in NPL. The beta (β) coefficient for LDR is 1.170. This demonstrates that a 1 unit increase in LDR will result in a 1.170 unit rise in ROA. ROA has a R value of 0.541. Thus, in this study, independent variables and ROA have a positive correlation. The ROA's R2 value is 0.292. Thus, independent variables have a 29.2% impact on bank profitability. Here, the critical t-value of 1.692 at the 5% level of significance is smaller than the observed t-value of -3.659, indicating a negative and substantial impact of NPL on ROA. Furthermore, the observed LDR t-value of 6.171 indicates an acceptable significant relationship between LDR and ROA, and this is larger than the crucial t-value of 1.692 at the 5% level of significance.

Kumari et al. (2024) examined the effect of credit risk on profitability of Indian commercial banks: a panel data approach in a post-Covid-19 scenario. Using secondary data from the 10-year annual report of each bank, spanning the years 2011–12 to 2020–21, a study on 24 banks in India was conducted. Return on Equity (ROE), Return on Assets (ROA), and Net Interest Margin are the dependent variables in this study. The

capital adequacy ratio (CAR), credit-deposit ratio (CDR), loan to total assets, and credit risk (NPL/TL or RNNTNA) are the independent variables in this study. The "Hansuman test" and unit analysis were the tests employed in the investigation. The F-values for ROE and ROA in this case are 13.365 and 12.311, respectively. As a result, all models' F-statistics values are significant at the 5% significance level. The coefficient of RNNTNA for ROA, as determined by the fixed effect model, is -0.143. This indicates that for every 1% rise in RNNTNA, ROA will decrease by 0.143 percent. Additionally, the ROA coefficients for CAR and CDR are 0.033 and 0.037. Additionally, the coefficients of RNNTNA, CAR, and CDR are -2.810, 0.589, and 0.652, respectively.

Bhuiya et al. (2023) examined the relationship between credit risk and profitability of some selected banks in Bangladesh. Bangladesh had sixty-one scheduled commercial banks. The researcher selected ten banks for the sample, three of which are state-owned, three of which are privately held Islamic banks, three of which are privately owned non-Islamic banks, and one of which is a specialty commercial bank. For the study, data from 2009 to 2018 were chosen. The researcher used return on equity (ROE) and return on assets (ROA) as the dependent variables to represent profitability. The study included eight independent variables in total: the credit risk management ratio (NPLR), the leverage ratio, GDP growth rate, bank size, PPT (pre provision profit to total loan and advance), LLP (loan loss provision to total non-performing loan), PPT (total loan and advance/total deposits), CAR, and LLP. The study used both a linear regression model and a multiple regression model to ascertain the correlation between independent variables and ROE and ROA, respectively. The link between ROE and the independent factors under investigation is shown in Table III, while the relationship between ROA and the independent variables under investigation is shown in Table IV. The beta (β) coefficient of NPLR for ROE is –0.419, meaning that for every unit rise in NPLR, ROE decreases by 0.419 units. This is a serious and harmful relationship. With a beta (β) coefficient of 0.036 for ROE, we may infer that a 0.036 unit rise in LATD corresponds to a 1 unit increase in ROE. Although small, this link is beneficial. For ROE, the CAR's beta (β) coefficient is 0.008. Furthermore, the NPLR, LATD, and CAR beta (β) coefficients for ROA are -0.025, 0.056, and 0.001, respectively. According to the 95% confidence level, the associated coefficient is statistically significant, as indicated by the t-value of NPLR for ROE of -2.456, which is less than -2. Furthermore, at the 95% confidence level, the corresponding coefficient is statistically significant according to the t-value of

LATD for ROA, which is 2.840, which is greater than +2. For ROE, the t-values of LATD and CAR are, respectively, 0.133 and 0.368. For ROA, the t-values of NPLR and CAR are, respectively, -2.046 and 0.560. At the 95% confidence level, a t-value larger than 2 or less than -2 indicates that the relevant coefficient is statistically significant. Therefore, none of the other t-values had statistical significance.

Kwashie et al. (2022) studied the impact of credit risk on the financial performance of commercial banks. The study was carried out on fifteen commercial banks in Ghana. The study period spanned from 2013 to 2018. The study's dependent variables were economic value added (EVA) and return on assets (ROA). The study included the following independent variables: size, age, GDP, inflation (INF), loans and advances ratio (LAR), capital adequacy ratio (CAR), non-performing loan ratio (NPL), and monetary policy rate (MPR). This study makes use of fixed effect and random effect estimators, Hausman specification test, multiple regressions with panel data analysis, and correlation analysis. The beta (β) coefficient of non-performing loans for ROA, as determined by the random effect estimator, is -0.0284, meaning that an increase of 1% in non-performing loans results in a 0.03% decrease in ROA. The relationship is therefore negative. Furthermore, the ROA beta (β) value of CAR is 0.0025, meaning that a 1% increase in CAR corresponds to a 0.0025% increase in ROA. Although positive, the relationship is not statistically significant. The ROA's R2 is 0.7557, meaning that 75.57% of ROA is attributed to the variables under investigation, while the remaining 24.43% is determined by other factors. The study is therefore statistically significant.

Siddique et al. (2022) analyzed the effect of credit risk management and bank specific factors on the financial performance of the South Asian commercial banks. Return on Equity (ROE) and Return on Assets (ROA) are the study's dependent variables. The non-performing loan ratio (NPL), capital adequacy ratio (CAR), average lending rate, cost-efficiency ratio, liquidity ratio (LR, also known as CDR), bank size, age, and inflation are the independent variables under investigation. Throughout the course of ten years, from 2009 to 2018, 19 commercial banks in the nation provided secondary data (10 from Pakistan and 9 from India). To counteract the impacts of some endogenous factors, the generalized method of moment (GMM) is utilized for the coefficient estimate. The GMM and pooled regression models' regression outcomes. R2 for ROE is 0.265 and R2 for ROA is 0.372, according to GMM. Additionally, the coefficients for NPL, CAR, and LR (also known as CDR) for ROA are, respectively, -0.032, 0.085, and -0.027. Additionally,

the coefficients for ROE for NPL, CAR, and LR (also known as CDR) are, respectively, -1.379, 1.315, and -0.463.

Jati (2021) researched the effect of Non-Performing Loans and Capital Adequacy Ratio on Return on Assets at PT. Bank Victoria International. The sample that was used was saturated (financial statements spanning a decade). The study period ran from 2009 to 2018. Explanatory research is the methodology employed. Regression testing, correlation, determination, and hypothesis testing are all used in the statistical analysis technique. Based on the model summary, the independent variables under investigation account for 60.8% of ROE, with an R2 of 0.608. The beta coefficient (β) between NPL and ROA is 0.777, meaning that a one unit rise in NPL corresponds to a 0.777 unit (positive and substantial) increase in ROA. Furthermore, the ROA beta (β) value of CAR is -0.166, meaning that a unit increase in CAR corresponds to a 0.166 unit (negative and substantial) decrease in ROA. The result is t count>t table, or (3.496>2.306), indicating a substantial relationship between NPL and ROA. Additionally, the t value<t table, or (-0.477<2.306), is found, indicating a small yet negative relationship between CAR and ROA.

Munangi and Sibindi (2020) researched the impact of credit risk on the financial performance of 18 South African banks for the period 2008 to 2018. Return on Equity (ROE) and Return on Assets (ROA) are the dependent variables in this study, while the independent factors under investigation are the Capital Adequacy Ratio (CAR), Size, Leverage, NPLs to Total Equity (NPLE), and Non-performing Loans Ratio (NPLR). The results indicated that ROE is higher than ROA in the majority of South African banks. To examine the association between the variables, three static panel data methodologies were used: the Random Effects Model (REM), the Fixed Effects Model (FEM), and the Pooled Regression Model Ordinary Least Squares (OLS). This study indicates that the FE model has a good fit and is well-specified. The FE model's R2 of ROA is 0.2064, meaning that the independent variables under investigation account for 20.64% of ROA (table 4). The independent factors under investigation decide 1.98% of ROA, as indicated by the R2 of ROE of 0.0198 (table The independent variables under investigation are relevant in explaining the variance in ROA, and the model provides a strong fit for the data, as indicated by the F-statistic value of 17.87, which is more than 1. Furthermore, the ROA variation is statistically significant at the 1% level of significance. Additionally, ROE's F-

statistic value is 2.45. The chosen model is better the higher the value of F. The NPLR for ROA has a beta (β) coefficient of -4.476, meaning that a 1% rise in NPLR results in a 447.6% decrease in ROA. There is a substantial and negative association. With a beta (β) coefficient of 6.300 for ROA, a 1% rise in CAR corresponds to a 630.0% increase in ROA. There is a strong and positive link. For ROE, the beta (β) coefficients of NPLR and CAR are, respectively, 1.040 and -0.481.

AI-Eitan and Bani-Khalid (2019) investigated the impact of credit risk (CR) on the financial performance of Jordanian commercial banks listed in Amman Stock Exchange, for the period 2008-2017. Jordan's thirteen commercial banks are included in the sample. This study's primary goal is to investigate how several credit risk factors, such as doubtful loans (DTL), non-performing loans (NPL), loan losses relative to total loans (LSL), bank size (SZ), and total deposits (TD), affect ROE and ROA. For the study, the GLS method and panel data analysis of fixed and random-effect models are used. Utilized were the unit root tests. The mean ROE is 6.8865, whereas the mean ROA is 1.0781. 0.00858 is the average ratio of non-performing loans. The average loan loss to the total amount of loans made by commercial banks in Jordan is 0.0314223, demonstrating the effectiveness of these banks' credit management and loan-granting practices. The independent variables do not exhibit any serial correlations. It is determined that the random effects model is suitable for examining how CR affects Jordanian banks' profitability. The Hausman test indicates that the Random Effect Model is superior. The F value of ROE, as determined by the random effects model, is 79.94155 (table 4). This number is more than 1, indicating that the model fits the data well and that the independent variables under investigation are statistically significant and significantly contribute to the explanation of variation in ROE. ROA's F value is 91.07416 (see table 5). The study is more significant the higher the F value. The beta (β) coefficient of NPL for ROE is -128.4, meaning that for every unit rise in NPL, ROE decreases by 128.4 units. There is a substantial and negative association. For ROE, the beta (β) coefficient of CR (also known as LLPR) is -681.569. Additionally, the beta (β) coefficients for ROA for NPL and CR (also known as LLPR) are -110.062 and -22.5429, respectively.

Ekinci and Poyraz (2019) examined the impact of credit risk on banks' profitability of the Turkish Banking Sector for the period 2005-2017. The study's data set includes 26 deposit banks that operated in Turkey's banking industry between 2005 and 2017—state-owned,

privately held, and international banks. In the study, return on equity (ROE) and return on assets (ROA), two distinct profitability metrics, are used. Credit Risk {Nonperforming loans to total loans (NPL/TL)}, Capitalization (TC/TA), Asset Quality (TL/TA), Bank size (SIZE), GDP growth rate (GDPG), and CPI inflation (INF) are the independent variables considered in the study. Regression analysis uses the degrees of correlation between the independent and dependent variables. The independent variables show a weak association with one another. The panel random effects model is utilized to derive the coefficient estimates since the Hausman test indicates that the random effects model best describes the data structure. 30.6% of state-owned banks' ROE is determined by independent variables under observation, according to the random effect model, which yields an R2 of 0.306 for state-owned banks (table 3). Additionally, the ROE of foreign banks and privately owned banks is 0.279 and 0.259, respectively. Additionally, according to Table 2, the R2 for international, privately, and state-owned banks' ROA is 0.284, 0.277, and 0.321, respectively. According to the researcher, the vector of regression coefficient (γ) of credit risk (NPL/TL) for ROE is -0.283; this means that for state-owned banks, when credit risk increases by one unit, ROE reduces by 0.283 units (negative and statistically significant). For state-owned banks, the vector regression coefficient (γ) of capitalization (TC/TA) for ROE is -0.165. The credit risk (NPL/TL) and capitalization (TC/TA) vector regression coefficients (γ) for privately owned banks are -0.288 and -0.169, respectively. The credit risk (NPL/TL) and capitalization (TC/TA) vector regression coefficients (γ) for international banks are -0.285 and -0.179, respectively. According to the researcher, the regression coefficient (γ) vector of capitalization (TC/TA) for ROA is 0.808. This means that for state-owned banks, ROA grows by 0.808 units (positive and statistically significant) for every unit increase in credit risk. For state-owned banks, the vector regression coefficient (γ) of credit risk (NPL/TL) for ROA is -0.284. The credit risk (NPL/TL) and capitalization (TC/TA) vector regression coefficients (γ) for privately held banks are -0.289 and 0.805, respectively. The credit risk (NPL/TL) and capitalization (TC/TA) vector regression coefficients (γ) for international banks are -0.286 and 0.796, respectively.

Shahid et al. (2019) examined the relationship between credit risk and financial performance measured by Return on Assets (ROA) and Return on Equity (ROE) of commercial banks of Pakistan. Independent variables under study are Capital adequacy ratio (CAR), Credit interests/Credit facilities, Provision for facilities loss/Net Facilities

(PFL/NF also called LLPR), Leverage ratio and Level of Non-performing loans (NPL/GL also called NPLR). The survey was conducted between 2010 and 2017. For this study, 24 Pakistani commercial banks were chosen. The F-values for ROE and ROA are also more than one, at 3.468 and 3.178, respectively. Because the F-statistic, which gauges how well the independent or explanatory variables fit the model, is statistically significant at the 5% level, it can be concluded that the chosen model is suitable. Additionally, the R2s for ROA and ROE are 0.244 and 0.174, respectively. Furthermore, the regression coefficients for ROE for CAR, PFL/NF (or LLPR), and NPL/GL (or NPLR) are, in that order, -0.129, -0.046, and -0.169. Furthermore, for ROA, the regression coefficients of CAR, PFL/NF (or LLPR), and NPL/GL (or NPLR) are, in that order, -0.185, -0.037, and -0.287.

Kutum (2017) assessed the impact of Credit Risk on the Profitability (measured by return on equity and return on assets) of Banks Listed on the Palestine Exchange. Six banks on the Palestine Exchange made up the study's population, however only five banks were included in the analysis. The study period ran from 2010 to 2015. The study's independent variables include bank size (measured in total assets), growth (measured in growth in net income year) (GRO), leverage (measured in total debt / total assets) (TDA), credit risk (= net charge off (impairments) / total loans and advances) (NCOTLA), credit risk (= non-performing loans / total loans and advances) (NPLTLA), and credit risk (= pre-provision profit / total loans and advances) (PPTLA). For the multicollinearity test, the Variance Inflation Factor (VIF) and the Tolerance test were used. To determine the correlation between the independent and dependent variables, a general linear model of regression test was used. The R2 of ROE in this investigation is 0.149, meaning that independent variables under observation or computation account for 14.9% of ROE. Additionally, the R2 of ROA is 0.775, meaning that independent variables under observation or computation account for 77.5% of ROA. The average return on assets (ROA) was found to be 3.19%, whereas the average (mean) return on equity (ROE) is 32.11%. With an average non-performing loan to total loan and advance ratio (NPLR) of 1.97%, credit risk is relatively minimal. Multicollinearity does not exist because the VIF values for both independent variables are greater than 10 and none of the tolerance values are less than 0.1. The negative and very significant beta (β) coefficient between NCOTLA and ROE is -41.056, meaning that every unit increase in NCOTLA results in a corresponding 41.056 unit drop in ROE. The positive and very significant beta (β) coefficient between NPLTLA and ROE is 15.554, meaning that every unit rise in NPLTLA results in a

corresponding 15.554 unit increase in ROE. The positive and substantial correlation between NPLTLA and ROA is indicated by the beta (β) coefficient of 0.196, meaning that a unit rise in NPLTLA corresponds to a 0.196 unit increase in ROA. In this case, the independent variables have a positive relationship with ROE, as indicated by the R of ROE of 0.386. Furthermore, ROA's R value of 0.880 shows that independent variables and ROA have a positive relationship. With a F value of less than 1, or 0.525, ROE indicates that the model does not fit well and that there may be no meaningful contribution from the independent variables to the variation in ROE. Additionally, ROA's F value is 10.318—a number greater than one—indicating that the model fits the data well and that the independent variables under investigation significantly contribute to the explanation of ROA variance. At the 95% confidence level, a t-value larger than 2 or less than -2 indicates that the relevant coefficient is statistically significant. The NPLTLA and ROE t-values in this case are 1.394. Additionally, the t-value for ROA and NPLTLA is 2.473. Therefore, the coefficient of NPLTLA with respect to. In this investigation, ROA is statistically significant at the 95% confidence level, whereas the other t-values are not.

Bhattarai (2016) analyzed the effect of credit risk on the performance of Nepalese commercial banks. For this study, the descriptive and causal comparative research designs have been used. Regression analysis has been performed on the pooled data of 14 commercial banks from 2010 to 2015. Return on Assets (ROA) is the dependent variable under investigation, and bank size, capital adequacy ratio (CAR), non-performing loan ratio (NPLR), cost per loan asset (CLA), and cash reserve ratio (LLPR) are the independent variables. The findings of the regression analysis showed that credit risk had an impact on bank performance, with an R2 value of 0.284. This suggests that variations in the explanatory factors account for 28.4% of the variation observed in bank performance. The descriptive result reveals that the average value of the bank performance (ROA) is 1.669%, meaning that the total assets of the sample commercial banks in Nepal produced an average return of 1.669% between 2010 and 2015. The ROA's standard deviation is 0.789%, indicating that there is little to no volatility. The regression coefficient of CAR for ROA is 0.015, meaning that for every unit rise in CAR, ROA increases by 0.015 units. As a result, this link is minor but beneficial. The NPLR for ROA regression coefficient is -0.105, meaning that for every unit rise in NPLR, ROA decreases by 0.105 units. As a result, this link is important and detrimental. At the 95% confidence level, a t-value larger than 2 or less than -2 indicates that the relevant

coefficient is statistically significant. The CAR and NPLR t-values in this study are 0.378 and -2.644, respectively. As a result, the NPLR coefficient is statistically significant, while the CAR coefficient is not. The F-value for this study is 5.635, which is more than 1, indicating that the independent variables under investigation are significant in explaining the variation in ROA and that the model used for research is a good match for the data.

Rathnasiri (2016) studied impact of credit risk on the profitability of commercial banks in Sir lanka. Return on Assets (ROA) is the profitability indicator. Non-performing loans / total loans (NPLR), Provision for loan losses / total loans (PPL or LLPR), Total Loans / Total assets, Total Loans / Total deposits (DEPO or CDR), Natural log of total assets, GDP growth rate, annual inflation rate, and Total assets of banking sector / GDP are the independent variables under investigation. The study spans the years 2005 through 2015. Given the F value of ROA of 11.906, the selected model is a satisfactory match for the investigation of the relationships between the variables. The ROA's R2 is 0.651. The beta coefficients for ROA for NPLR, PLL (also known as LLPR), and DEPO (also known as CDR) are -0.046, -0.082, and 0.019, in that order. Furthermore, the t-values for NPLR, PLL (also known as LLPR), and DEPO (also known as CDR) are, in that order, -4.948, -1.232, and 2.079.

Ebenezer and Omar (2015) investigated the effect of credit risk on the profitability of commercial banks in Nigeria. The researcher has chosen eight commercial banks for the study based on the Systematically Important Banks (SIBs) report. The data used for the study were from 2011 to 2014. Return on Equity (ROE) is the dependent variable under investigation in this study. The independent variables chosen for analysis are Total Debt to Total Assets (TDTA), Non-Performing Loan to Gross Loan and Advances (NPLGLA), and Total Debt to Total Equity (TDTE). Throughout the study, panel data analysis, fixed effect models, random effect regression models, and diagnostic tests were employed. Furthermore, the random effect regression model's panel data analysis reveals that the NPLGLA's beta (β) coefficient for ROE is -1.247. The ROE's R square is 0.6049, meaning that 39.51% of ROE is determined by other factors, while 60.49% of ROE is determined by the independent variables under observation. The independent variables under investigation are significant in explaining the variation in ROE, as evidenced by the model's good fit for the data and the F value of 13.93, which is more than 1, for ROE. In

this case, the NPLGLA t-value for ROE is -3.25, which is less than -2. As a result, the study's coefficient of NPLGLA for ROE is statistically significant at the 95% confidence level.

Noman et al. (2015) analyzed the panel data of 172 observations from 18 private commercial banks from the period of 2003 to 2013 to find the effect of credit risk on profitability of the banking sectors of Bangladesh. The study's dependent variables were Net Interest Margin (NIM), Return on Equity (ROAE), and Return on Assets (ROAA). The nonperforming loan ratio (NPLGL), the ratio of loan loss reserve to gross loan (LLRGL), the ratio of loan loss reserve to nonperforming loan (LLRNPL), and the capital adequacy ratio (CAR) were the independent variables. The study mostly makes use of ordinary least squares (OLS). Additionally, this study included panel data and two models: the OLS fixed effect model and the OLS random effect model. Other models were the Hansuman test, the Basic panel linear regression model, Generalized Least Square (GLS), and the system GMM (Generalized Methods of Moments).

ROAA and ROAE have respective means of 1.48 and 19.28. The mean for NPLGL is 4.63%. LLRGL and CAR have respective means of 3.06% and 11.14%. Given that the independent variables' correlation coefficients are less than0.7, the Pearson correlation coefficient matrix indicates that the variables are not substantially associated. The relationship between NPLGL and ROAE's beta (β) coefficient is -0.54, meaning that for every unit rise in NPLGL, there is a corresponding 0.54 unit (negative and significant) reduction in ROAE. The beta (β) coefficient between LLRGL and ROAE is -1.25, meaning that a unit rise in LLRGL corresponds to a 1.25 unit (negative and substantial) drop in ROAE. The beta (β) coefficient between CAR and ROAE is -0.75, meaning that a one unit rise in CAR corresponds to a 0.75 unit (negative and substantial) drop in ROAE. The negative beta coefficient (β) between NPLGL and ROAA is -0.05, meaning that every unit increase in NPLGL causes a 0.05 unit drop in ROAA. According to the beta (β) coefficient between LLRGL and ROAA, which is -0.10, a unit increase in LLRGL causes a 0.10 unit (negative) drop in ROAA. The positive correlation between CAR and ROAA is indicated by the beta (β) coefficient of 0.010, meaning that a unit increase in CAR corresponds to a 0.010 unit rise in ROAA. The analysis's R2 of ROAE is 0.21, meaning that the independent variables under investigation account for 21% of ROAE.

Furthermore, the R2 of ROAA is 0.22, meaning that the independent variables under investigation account for 22% of ROA.

Summary of empirical review

Year	Name	Title	Objectives	Methodology	Findings (not conclusion)
2024	Sri Utami Permata, Nur Halisa, Hendra Halim	The influence of the level of credit risk and liquidity risk on profitability in banking listed on the Bei for the 2018-2021 period	To research on the influence of the level of credit risk and liquidity risk on profitability measured by Return in Assets (ROA) in banks listed on the Bei.	Population: 47 Sample: 35 banking companies listed on the Indonesia Stock Exchange Time of Study:2018-2021 Dependent Variables: Return in Assets (ROA) Independent Variables: Non Performing Loan (NPL) and Loan to Deposit Ratio (LDR) (which can also be called Credit Deposit Ratio)	In this research, the calculated F-value of ROA is 28.309 which is greater than the critical F-value 3.24 at a significance level of 0.05. NPL has a beta (β) coefficient of -0.432. This shows that every 1 unit increase in NPL will cause a decrease in ROA by 0.432 units. LDR has a beta (β) coefficient of 1.170. R value of ROA is 0.541. Hence independent variables are positively correlated with ROA in this research. The value of R^2 of ROA is 0.292. Hence, the influence of independent variables on profitability of banks is 28.2%. Here, the observed t-value of NPL is -3.659 is less than critical t-value 1.692 at 5% level of significance which states that NPL has a negative and significant effect on ROA. Moreover, observed t-value of LDR is 6.171 which is higher than critical t-value 1.692 at 5% level of significance which states that there is a significant influence between LDR and ROA which is acceptable.
2024	Sheena Kumari, Gaurav Malpani, Smita Mehendale, Manish Dadhich	Effect of Credit Risk on Profitability of Commercia:A Data Approach in a Post-Covid Sc	Effect of Credit Risk on Profitability of Indian Commercial Banks: A Panel Data	Population: 48 Sample: 24 banks in India Time of Study: 2011/12 to 2021/22 Dependent Variables:	Here, F-value of ROA and ROE are 12.311 and 13.365 respectively. Hence, F-statistics values in all models are significant at a 5% significance level. According to fixed effect model, coefficient of RNNTNA for ROA is -0.143 this shows that every 1% increase in RNNTNA will cause a decrease of 0.143 % on ROA. Also,

		enario	Approach in a Post-Covid Scenario	Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin Independent Variables: Capital adequacy ratio (CAR), Credit–deposit ratio (CDR), Credit risk (NPL/TL or RNNTNA) and Loan to total assets The test used for the study was the "Hansuman test" and unit analysis.	coefficients of CAR and CDR on ROA are 0.033 and 0.037. Moreover coefficients of CAR, CDR and RNNTNA are 0.652, 0.589 and -2.810 respectively.
2023	Md. Monzur Morshed Bhuiya, Md. Mahabub Miah and Tasnim Uddin Chowdhury	The Impact of Credit Risk on the Profitability of Selected Commercial Banks of Bangladesh	To examine the relationship between credit risk and profitability of some selected banks in Bangladesh.	Population: 61 Sample:10 Commercial Banks Time of Study: 2009 to 2018. Dependent Variables: Return on equity (ROE) and Return on assets (ROA) Independent Variables: Credit risk management ratio	The beta (β) coefficient of NPLR for ROE is – 0.419 which indicate that 1 unit increase in NPLR leads to 0.419 units decrease in ROE (negative and significant). The beta (β) coefficient of LATD for ROE is 0.036 which indicate that 1 unit increase in NPLR leads to 0.036 units increase in ROE (positive but insignificant). The beta (β) coefficient of LLP and CAR for ROE are -0.502 and 0.008 respectively. Moreover, The beta (β) coefficient of NPLR, LATD, LLP and CAR for ROA are -0.025, 0.056, -0.029 and 0.001 respectively. The t-value of NPLR for ROE is -2.456, which is less than -2, which indicates that the corresponding

				(NPLR), LATD(total loan and advance/total deposits), PPT(Pre provision profit to total loan and advance), LLP (loan loss provision to total non-performing loan), CAR, Leverage ratio, GDP growth rate and Bank size. A linear regression model and multiple-regression model are used in the study.	coefficient is statistically significant at the 95% confidence level. The t-value of LATD, LLP and CAR for ROE are 0.133, -2.516 and 0.368 respectively. The t-value of NPLR, LATD, LLP and CAR for ROA is -2.046, 2.840, -2.03 and 0.560 respectively.
2022	Angela Akpemada Kwashie, Samuel Tawiah Baidoo and Enock Kojo Ayesu	Investigating the impact of credit risk on financial performance of commercial banks in Ghana	To investigate the impact of credit risk with focus on non-performing loans on the financial performance of commercial banks in Ghana	Population: 23 Sample: 15 commercial banks of Ghana Time of study: 2013 to 2018 Dependent variable: Return on Assets (ROA) and economic value added (EVA). Independent variable: Non	According to random effect estimator, the beta (β) coefficient of NPL for ROA is -0.0284 which indicates that a 1% rise (fall) in non-performing loans leads to 0.03% reduction (rise) in ROA. Also, the beta (β) coefficient of CAR for ROA is 0.0025 which indicates that a 1% rise in CAR leads to 0.0025% rise in ROA. R^2 of ROA is 0.7557; this implies 75.57% of ROA is determined by variables under study.

				performing loans ratio (NPL), capital adequacy ratio (CAR), loans and advances ratio (LAR), SIZE, AGE, GDP, Inflation (INF) and Monetary policy rate (MPR) Correlation analysis, Multiple regressions with the Panel data analysis, Hausman specification test, fixed effect and random effect estimators are used in this research.	
2022	Asima Siddique, Muhammad Asif Khan and Zeeshan Khan	The effect of credit risk management and bank-specific factors on the financial performance of the South	To capture the effect of credit risk management and bank-specific factors on South Asian commercial banks'	Sample: 19 commercial banks (10 commercial banks from Pakistan and 9 commercial banks from India) Time of Study: Dependent Variables:	The regression results of pooled regression and GMM models. According to GMM, R^2 of ROA is 0.372 and of ROE is 0.265. Moreover, coefficients of NPL, CAR and LR (also called CDR) for ROA are -0.032,0.085 and -0.027 respectively. Also, coefficients of NPL, CAR and LR (also called CDR) for ROE are -1.379, 1.315 and -0.463 respectively.

		Asian commercial banks	financial performance (FP)	Return on Assets (ROA) and Return on Equity (ROE) Independent Variables: Non Performing Loan Ratio (NPL), capital adequacy ratio (CAR), cost-efficiency ratio, average lending rate, liquidity ratio (LR also called CDR), Bank size, Inflation and age. The generalized method of moment (GMM) is used.	
2021	Waluyo Jati	The Effect of Non Performing Loan and Capital Adequacy Ratio on Return on Assets in Bank Victoria International, Tbk	To researh the effect of Non-Performing Loans and Capital Adequacy Ratio on Return on Assets at PT. Bank Victoria International.	Population: 10 years of PT Bank Sample: Saturated (i.e. financial statements for 10 years) Time of study: 2009 to 2018 Dependent variable: Return on Assets	According to model summary, R^2 of ROA is 0.608 which indicates that 60.8% of ROE is determined by independent variables under research. The beta (β) coefficient of NPL for ROA is 0.777 which indicates that 1 unit increase in NPL leads to 0.777 units increase in ROA (positive and significant). Moreover, the beta (β) coefficient of CAR for ROA is -0.166 which indicates that 1 unit increase in CAR leads to 0.166 units decrease in ROA (negative and significant). The value of t count>t table or

		Period 2009-2018		(ROA) Independent variable: Non-Performing Loan(NPL) and Capital Adequacy Ratio (CAR) The method used is explanatory research. The analysis technique uses statistical analysis with regression testing, correlation, determination, and hypothesis testing.	(3.496>2.306) is obtained, thus there is a significant influence between NPL and ROA. Moreover, the t value<t table or (-0.477<2.306) is obtained, thus there is a negative but insignificant effect between CAR and ROA.
2020	Ephias Munangi, Athenia Bongani Sibindi,	An Empirical Analysis of the Impact of Credit Risk on the Financial Performance of South African Banks	To examine the impact of credit risk on the financial performance of 18 South African banks for the period 2008 to 2018.	Sample: 18 South African banks Time of Study: 2008 to 2018 Dependent Variables: Return on Assets (ROA) and Return on Equity (ROE) Independent Variables: Non-performing Loans Ratio(NPLR), NPLs to Total Equity	According to FE model, R^2 of ROA is 0.2064 which indicates that independent variables under study determine 20.64% of ROA (table 4). R^2 of ROE is 0.0198 (table 5). The F-statistic value of ROA is 17.87, which is greater than 1, which indicates the model is good fit for the data and the independent variables under study are significant in explaining the variation in ROA and is statistically significant at the 1% level of significance. Moreover, the F-statistic value of ROE is 2.45. The beta (β) coefficient of NPLR for ROA is -4.476 which indicate that 1% increase in NPLR leads to 447.6% decrease in ROA (negative and significant). The beta (β) coefficient of CAR for

				(NPLE), $Growth$, Size, Leverage, Capital Adequacy Ratio(CAR). Static panel data techniques, namely the pooled regression model (Ordinary Least Squares [OLS]), Fixed Effects Model (FEM) and Random Effects Model (REM) were employed to test the relationship between variables.	ROA is 6.300. The beta (β) coefficient of NPLR and CAR for ROE are 1.040 and -0.481 respectively.
2019	Ghaith N. Al-Eitan, Tareq Bani-Khalid	Credit Risk and Financial Performance of the Jordanian Commercial Banks: A Panel Data Analysis	To study the impact of credit risk (CR) on the financial performance of Jordanian commercial banks listed in Amman Stock Exchange, for the period	Population: Sample: 13 Jordanian listed banks Time of Study: 2008-2017 Dependent Variables: Return on Assets (ROA) and Return on Equity(ROE) Independent Variables: Credit Risk	According to the random effects model, F value of ROE is 79.94155 (table 4) which is greater than 1, which indicates the model is a good fit, the independent variables under study are significant in explaining the variation in ROE and are statistically significant. F value of ROA is 91.07416 (table 5). The beta (β) coefficient of NPL for ROE is -128.4 which indicate that 1 unit increase in NPL leads to 128.4 units decrease in ROE(negative and significant) and the beta (β) coefficient of CR for ROE is -681.569 . Moreover, beta (β)

			2008-2017	(CR), Doubtful Loans (DTL), Non Performing Loan (NPL), Loan Loss to Total Loan (LSL), Size of Bank (SZ) and Total Deposits(TD). A panel data analysis of both fixed and random-effect models and GLS method are employed for the study. The unit root tests were also used.	coefficients of NPL and CR for ROA are -22.5429 and -110.062.
2019	Ramazan Ekinci, Gulden Poyraz	The effect of Credit Risk on Financial Performance of Deposit Banks In Turkey	The purpose of this study is to examine the impact of credit risk on banks' profitability of the Turkish Banking Sector for the period 2005-2017.	Sample: 26 commercial Banks (state-owned banks, privately-owned banks and foreign banks) Operating in Turkey Time of Study: 2005-2017 Dependent Variables: Return on Assets (ROA) and	According to random effect model, R^2 of state owned bank for ROE is 0.306 which indicates that independent variables under observation determine 30.6% of ROE of state owned banks (table 3). Also R^2 of Privately Owned Banks and Foreign Banks are 0.259 and 0.279 respectively for ROE. Moreover, R^2 of State owned bank, Privately owned bank and foreign banks for ROA are 0.321, 0.277 and 0.284 respectively (table2). The vector of regression coefficient (γ) of credit risk (NPL/TL) for ROE is -0.283, this indicates when credit risk increases by 1 unit ROE decreases by 0.283 units for state-owned banks

				Return on Equity(ROE) Independent Variables: Credit Risk {Nonperforming loans to total loans (NPL/TL)}, Capitalization (TC/TA), Asset Quality (TL/TA), Bank size (SIZE), GDP growth rate (GDPG) and CPI inflation (INF) The Hausman test, the random effects model and regression analysis were used to determine relationship between variables.	(negative and statistically significant). The vector regression coefficient (γ) of capitalization (TC/TA) and Asset quality (TL/TA) for ROE are -0.165 and -0.353 respectively for state owned banks.
2019	Muhammad Sadiq Shahid, Faid Gul and Khawar Naheed	Credit Risk and Financial Performance of Banks: Evidence from Pakistan	To examine the relationship between credit risk and financial performance measured by Return	Population: Sample: 24 Pakistani commercial banks Time of Study: 2010-2017 Dependent Variables: Return on Assets (ROA) and	The F-values for ROE and ROA are also more than one, at 3.468 and 3.178, respectively. Because the F-statistic, which gauges how well the independent or explanatory variables fit the model, is statistically significant at the 5% level, it can be concluded that the chosen model is suitable. Additionally, the R2s for ROA and ROE are 0.244 and 0.174, respectively.

			on Assets (ROA) and Return on Equity (ROE) of commercial banks of Pakistan.	Return on Equity (ROE) Independent Variables: Capital adequacy ratio (CAR), Credit interests/Credit facilities, Provision for facilities loss/Net Facilities (PFL/NF also called LLPR), Leverage ratio and Level of Non-performing loans (NPL/GL also called NPLR)	Furthermore, the regression coefficients for ROE for CAR, PFL/NF (or LLPR), and NPL/GL (or NPLR) are, in that order, -0.129, -0.046, and -0.169. Furthermore, for ROA, the regression coefficients of CAR, PFL/NF (or LLPR), and NPL/GL (or NPLR) are, in that order, -0.185, -0.037, and -0.287.
2017	Dr. Imad Kutum	The Impact of Credit Risk on the Profitability of Banks Listed on the Palestine Exchange	To assess the impact of credit risk (measured by various non performing loan ratios and other independent variables) on the profitability (measured by return on equity	Population: 6 Sample: 5 banks on the Palestine Exchange Time of Study: 2010 to 2015 Dependent Variables: Return on Assets (ROA) and Return on Equity(ROE) Independent Variables: Net Charge Off (Impairments) / Total	In this analysis, R^2 of ROE is 0.149 which indicates that 14.9% of ROE is determined by independent variables under observation/calculation. Moreover, R^2 of ROA is 0.775. The beta (β) coefficient between NCOTLA and ROE is -41.056, which indicates that 1 unit increase in NCOTLA leads to 41.056 units decrease in ROE (negative and highly significant). The beta (β) coefficient between NPLTLA and ROE is 15.554. The beta (β) coefficient between NCOTLA and ROA is 0.457. The beta (β) coefficient between NPLTLA and ROA is 0.196. Here, R of ROE is 0.386 and R of ROA is 0.880. F value of ROE is 0.525 and F value of ROA is 10.318. Here, t-value

			and return on assets) of Banks Listed on the Palestine Exchange.	Loans and Advances (NCOTLA), Non-Performing Loans / Total Loans and Advances(NPLTLA), Pre-Provision Profit / Total Loans and Advances (PPTLA), Bank Size (SIZE), Growth (GRO), Leverage (TDA); Variance Inflation Factor (VIF) and the Tolerance test were conducted. A general linear model of regression test was conducted to study the relationship between the variables.	between of NCOTLA and ROE is -0.573, t-value between of NPLTLA and ROE is 1.394. Moreover, t-value between of NCOTLA and ROA is -0.898, t-value between of NPLTLA and ROA is 2.473.
2016	Yuga Raj Bhattarai	Effect of Credit Risk on the Performance of Nepalese Commercial Banks	To analyzed the effect of credit risk on the performance of Nepalese commerc	Population: Sample: 14 commercial banks Time of Study: 2010 to 2015 Dependent Variables: Return on	The regression results revealed, R^2 of ROA is 0.284. This indicates that 28.4% of the variation in bank performance can be explained by the variation in the explanatory variables. The descriptive result shows that the average value of the bank performance (ROA) is 1.669%. Regression coefficient

			ial banks by taking Return on assets (ROA) as performance indicator	Assets (ROA) Independent Variables: Capital adequacy ratio (CAR), Non-performing loan ratio (NPLR), Cost per loan assets, Cash reserve ratio and Bank size The descriptive and causal comparative research designs have been adopted for the study	of CAR for ROA is 0.015 which indicates, 1 unit increase in CAR leads to 0.015 units increase in ROA. Regression coefficient of NPLR for ROA is -0.105 which indicates, 1 unit increase in NPLR leads to 0.105 units decrease in ROA. A t-value when greater than 2 or less than -2 indicates that the corresponding coefficient is statistically significant at the 95% confidence level. In this research t-value of CAR is 0.378 and that of NPLR is -2.644. Hence coefficient of NPLR is statistically significant, while that of CAR is not significant. This study has F-value of 5.635 which is greater than 1, which indicates the model taken for research is good fit for the data and the independent variables under study are significant in explaining the variation in ROA.
2016	R. A. Rathnasiri	The Impact of Credit Risk on the Profitability of Commercial Banks in Sri Lanka	To study impact of credit risk on the profitability of commercial banks in Sir lanka, with Return on Assets (ROA) as the profitability indicator.	Population: Sample: Time of Study: 2005-2015 Dependent Variables: Return on Assets (ROA) Independent Variables: Non-performing loans / total loans (NPLR), Provision for loan losses / total loans (PPL or LLPR), Total Loans	Given the F value of ROA of 11.906, the selected model is a satisfactory match for the investigation of the relationships between the variables. The ROA's R2 is 0.651. The beta coefficients for ROA for NPLR, PLL (also known as LLPR), and DEPO (also known as CDR) are -0.046, -0.082, and 0.019, in that order. Furthermore, the t-values for NPLR, PLL (also known as LLPR), and DEPO (also known as CDR) are, in that order, -4.948, -1.232, and 2.079.

				/ Total assets, Total Loans / Total deposits (DEPO or CDR), Natural log of total assets, GDP growth rate, annual inflation rate, and Total assets of banking sector / GDP	
2015	Olalere Oluwaseyi Ebenezer and Wan Ahmad Wan Omar	The Empirical Effects of Credit Risk on Profitability of Commercial Banks: Evidence from Nigeria	To investigate the effect of credit risk on profitability of commercial banks in Nigeria.	Population: Sample: 8 commercial banks (SIBs) Time of Study: 2011 to 2014 Dependent Variables: Return on Equity (ROE) Independent Variables: TDTA (Total debt to total assets), NPLGLA (Non-performing loan to gross loan and advances) and TDTE (Total debt to total equity) Panel data	Panel data analysis (random effect regression model) shows that the beta (β) coefficient of NPLGLA for ROE is -1.247 which indicates that 1 unit increase in NPLGLA leads to 1.247 unit decrease in ROE (negative and significant). R square of ROE is 0.6049, this implies 60.49% of ROE is determined by variables under study.The value of F-stat is 13.93, which is greater than 1, which indicates model is good fit, independent variables under study are play significant role in explaining the variables and variables are statistically significant. A t-value of NPLGLA for ROE is -3.25, which is less than -2 which indicates that the coefficient of NPLGLA for ROE is statistically significant at the 95% confidence level.

				analysis, Random effect regression model, Fixed effect model and Diagnostic test were used during the study.	
2015	Abu Hanifa Md. Noman, Sajeda Pervin, Mustafa Manir Chowdhury and Hasanul Banna	The Effect of Credit Risk on the Banking Profitability: A Case on Bangladesh	To study the effect of credit risk on profitability of the banking sectors of Bangladesh.	Population: 56 Sample: 18 private commercial banks Time of Study: 2003 to 2013 Dependent Variables: Return on Assets (ROAA), Return on Equity (ROAE) and Net Interest Margin(NIM) Independent Variables: NPLGL (nonperforming loan Ratio), LLRGL (ratio of loan loss reserve to gross loan), LLRNPL (the ratio of loan loss reserve to nonperforming	The beta (β) coefficient between NPLGL and ROAE is -0.54. The beta (β) coefficient between LLRGL and ROAE is -1.25. The beta (β) coefficient between NPLGL and ROAE is -0.54. The beta (β) coefficient between CAR and ROAE is -0.75. The beta (β) coefficient between NPLGL and ROAA is -0.05. The beta (β) coefficient between LLRGL and ROAA is -0.10. The beta (β) coefficient between CAR and ROAA is 0.010. In this analysis, R^2 of ROAE is 0.21 which indicates that 21% of ROAE is determined by independent variables under study. Moreover, R^2 of ROAA is 0.22.

				Loan) and CAR (capital adequacy ratio) ; Ordinary least square (OLS) is primarily used in the study. Moreover, panel data involves two models which are OLS fixed effect model and OLS random effect model, Hansuman test, Basic panel linear regression model, Generalized Least Square (GLS) and system GMM (Generalized Methods of Moments) were used in this study.

2.4 Research Gap

The difference between the current research and earlier work is known as the research gap. Numerous investigations and studies have been carried out on the subject of how credit risk affects commercial banks' profitability. The goal of this study is to close the

gap and discuss how crucial credit risk is to both surviving in fierce competition and generating the desired return. While Munangi and Sibindi (2020) had chosen only two banks with ten years of data, this research study will assess the ten years of data gathered from secondary sources and has picked a sample size of three commercial banks.

In contrast to the research conducted by Ekinci and Poyraz (2019) and Noman et al. (2015), which examined a variety of independent variables, including non-performing loans and deposits, this study examined a number of independent variables, including the ratios of total investment to total deposit, loan and advance to total deposit, non-performing loan ratio, loan loss provision ratio, and capital adequacy. For this reason, this study differs from Bhuiya, Miah, and Chowdhury's (2023) research. The analysis of how credit risk affects the profitability of three commercial banks is the main goal of this study. This study is an extension of previous credit risk research that offers comprehensive and up-to-date data regarding the effect of credit risk on sample banks' profitability. It will be a source of information for related fields in the future.

CHAPTER - III
RESEARCH METHODOLOGY

Research procedure alludes to the different successive strides (alongside a normal of each moves toward) be taken on by a specialist in concentrating on an issue with specific goals in view. Hence the general way to deal with the exploration is introduced in this section. This part comprises of examination configuration, test size and choice interaction, information assortment system and information handling methods and instruments.

3.1 Research Design

The research design specifies the procedure and methods for acquiring the required data. This review utilizes a spellbinding and easygoing examination plan, in which the qualities of the free factors that is, the bank's reliant factors — that impact productivity are estimated, looked at, and characterized. Similar to this, casual comparative study design aims to find correlations between independent and dependent variables after an event or task is completed.

3.2 Population and Sample

The population of this study contains all recorded 20 A-class banks, which are at present operating in Nepal (mid-July, 2024 or Ashadh end, 2081). The sample of the study comprises three A-class banks namely Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL). Purposive and Random Sampling Method is involved while choosing sample organization for this research.

3.3 Sources of Data

Data taken for this research are secondary of nature. The secondary data from fiscal years 2013/14 to 2022/23 taken were all published data of banks. Following are the sources of data:

- Yearly report of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) which were easily available in websites of related banks.

- Other different wellsprings of gathering of information like; booklets, diaries, different books, research studies, articles etc.

3.4 Data Collection and Analysis

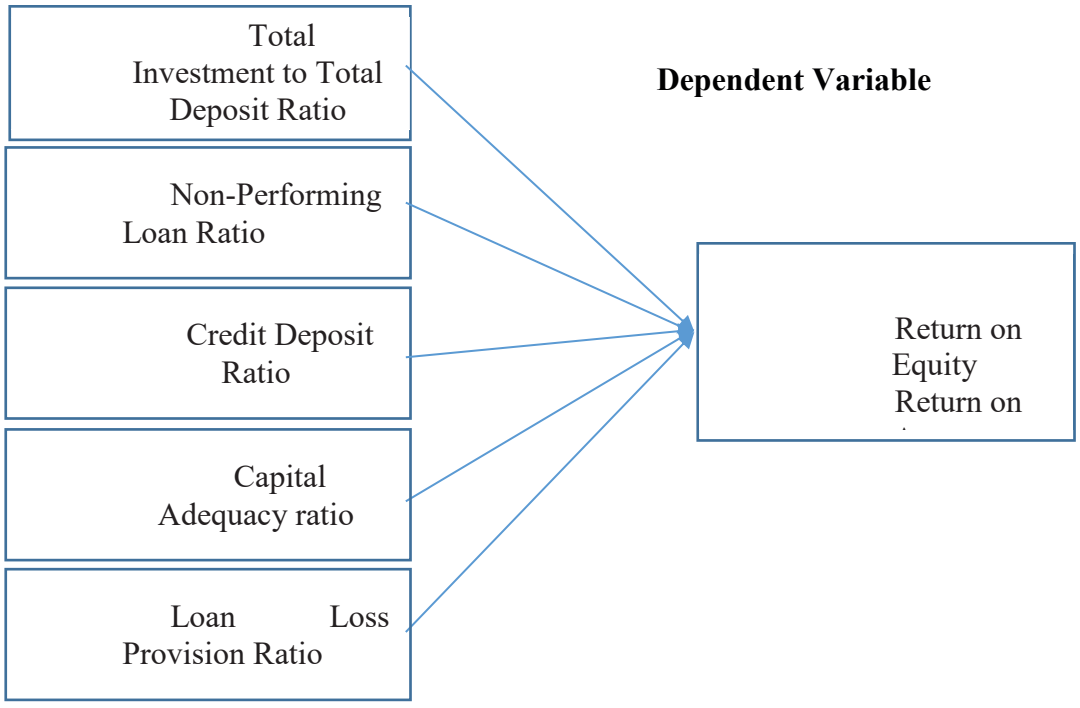
After assortment of examination information, an investigation of information and understanding outcome are important. Applying different monetary and factual apparatus made information investigation. Further to address the information in straightforward structure graphical presentation of data has been done with the help of line charts.

3.5 Research Framework and Definition of Variables

From the hypothetical and observational writing surveys, the accompanying applied system of the review is created by the specialist.

Figure 1

Research Framework



Source: Bhattarai (2016), Kumari et al. (2024), Noman et al. (2015)

Description of Variables

In this review, ROA and ROE have been utilized as profitability factors and TITD, NPLR, CDR, CAR and LLPR are independent variables/factors.

Return on Equity (ROE)

Return on equity is a metric that shows how profitable equity funds invested in a bank are. It shows how much money is made for every birr (rupee) of capital invested. ROE is viewed as a vital measure since it mirrors the efficiency of the possession (or hazard) capital utilized in the bank (Damodaran, 2007).

Return on Assets (ROA)

This is likely the main single proportion in looking at the productivity and working execution of banks as it demonstrates the profits created from the resources that bank claims (Mutua, 2013).

Total Investment to Total Deposit Ratio (TITD)

This proportion suggests the usage of bank's fund on bonds issued by government and debentures of different organizations and banks. Divide the total investment by the total deposit to get this ratio. Subsequently, complete speculation comprise venture on government protections, venture on debenture and bonds, share in auxiliary organizations, share in different organizations and other venture (Karki, 2005).

Non-Performing Loan Ratio (NPLR)

Non-performing Loan Ratio (NPLR) also called Non-Performing Assets Ratio. It tends to be characterized as the non-useful resources of the banks. All in all, it is the credit or loan and advances or terrible obligation or suspicious obligations that don't reimburse interest or installment or both on time. The amount of non-performing assets in a loan and advances is shown by the ratio of NPL to total loan Advance. NRB has guided every one of the organizations to make credit misfortune arrangement against the suspicious and terrible obligations. This proportion helps in limiting the non-performing advances and assists with controlling the credit (Chhabra and Taneja, 1991).

Credit Deposit Ratio (CDR)

This proportion is determined to figure out what banks can using their complete stores borrowed and propels for benefit creating reason. This proportion can be gotten by partitioning credit and advances by all out stores (Pandya, 2022).

Capital Adequacy Ratio (CAR)

Capital Adequacy Ratio (CAR) is the proportion of a bank's capital comparable to its risk-weighted assets. It is chosen by national banks and bank controllers to keep organizations from taking abundance influence and becoming ruined simultaneously (Goldmann, 2010).

Loan Loss Provision Ratio (LLPR)

Credit misfortune arrangement is the impulse consider loaning rehearses and Non-Performing Advance is the malicious calculate banks. On the off chance that they are high, they will diminish how much benefit which the bank's objective to get? This proportion estimates the part of provisioned credit with non-performing Advance. This is the compulsion component because provision can only be made with all loans. Maybe the distinction part as contrast with Non-Performing credit isn't all that great to result a sound benefit (Borsuk, 2019).

3.6 Method of Data Analysis

Both measurable and monetary apparatuses are utilized in this review. The investigation of information will be finished by example of information accessible. Due to restricted time and sources, straightforward logical measurable apparatuses, for example, Pearson's co-effective of relationship and relapse examination are taken on in this review. Financial analysis has also made use of powerful tools like ratio analysis and t rend analysis. The different determined results got through monetary, and factual apparatuses organized under various headings. Then they are contrasted with one another with decipher the outcomes.

Descriptive Analysis

Elucidating measurements are brief educational coefficients that sum up a given informational collection, which can be either a portrayal of the whole populace or an example of a populace. Unmistakable insights are separated into proportions of focal

propensity and proportions of inconstancy (spread). Proportions of focal inclination incorporate the mean, middle and mode, while proportions of inconstancy incorporate standard deviation, difference, least and most extreme variable, kurtosis and skewness.

Arithmetic Mean

The math mean or basic mean of set of perceptions in the amount of all the perception isolated by the quantity of perceptions. It is the best worth, which Address to the entire gathering implies is the math normal of a variable. A series' arithmetic mean can be found by:

$$\text{Mean } (\bar{X}) = \sum X / N$$

Where,

$\sum X$ = Sum of the variables 'x'

N = No. of Observation

Standard Deviation

The standard deviation is the outright proportion of scattering where the downside present in other proportion of scattering as it fulfilled the majority of the essentials of a decent proportion of scattering. The positive square root of the mean divided by the square of the deviation from the arithmetic mean is the standard deviation. It demonstrates the reaches and size of abnormality from the center or mean. It estimates the outright scattering. Higher the standard deviation Higher will be the fluctuation as well as the other way around. The data's deviation from the mean is known as dispersion. As such, it assists with breaking down the nature of information in regards to its fluctuation. It is compute as:

$$\text{Standard Deviation (S.D.)} = \frac{\sum (X - \bar{X})^2}{N}$$

Coefficient of Variation (CV)

Standard deviation is the outright proportion of scattering. The overall proportion of scattering in view of the standard deviation is known as the estimation of coefficient of standard deviation. The level of proportion of co-proficient of so is called co-productive of variety. Less CV is the greater consistency and consistency as well as the other way around. Just standard deviation isn't suitable to think about two sets of factors yet in

addition CV is fit to analyze two factors autonomously concerning their fluctuation. It is determined as under:

Coefficient of Variation (C.V.) = SD× 100/Mean

Correlation Analysis

Connection coefficient is characterized as the relationship between the free Factor and ward variable. It is a strategy for deciding the connection between these two factors. Assuming the two factors are so related change in the worth of autonomous variable reason the adjustment of the worth of ward variable then having connection coefficient is said.

$$\text{Correlation Coefficient (r)} = \frac{n\Sigma xy - \Sigma x\Sigma y}{n\Sigma x^2 - (\Sigma x)^2 n\Sigma y^2 - (\Sigma y)^2}$$

Between - 1 and +1, the Karl-Pearson correlation coefficient always fails. The Worth of relationship of coefficient in - 1 connotes the negative connection and in +1 means the positive connection coefficient.

If, r = 0, there is no relationship between the variables

r < 0, there is negative relationship between the variables

r>0, there is positive relationship between the variables

r - 1, the relationship is perfectly negative between the variables

r +1, the relationship is perfectly positive between the variables

Coefficient of Determination

The coefficient of assurance is a proportion of the level of direct affiliation or connection between's two factors one of which is free and other being reliant variable (s). It estimates the rate absolute variety in subordinate factors made sense of by free factor (s) for example the degree of relationship between the two factors. The coefficient of assurance is characterized by

$$r^2 = \frac{\text{Explained Variation}}{\text{Total Variation}}$$

The value of coefficient of (multiple) determination ranges from zero to one.

t- Statistics

It was created by Grosset in 1908. Then, at that point, this appropriation is made sense of by R.A. Fisher. In the event that the registered worth of "t" surpasses the table worth, it is realized that the thing that matters is huge at 5% degree of importance yet on the off chance that t-values are not exactly the comparing condemning of the't' dissemination, the thing that matters isn't named as critical. Under H0, the t measurement is:

$t = \frac{r}{1 - r^2} \times n - 2$

Where,

t=calculated value of t

r= correlation of coefficient between the variables

n= number of sample

Regression Analysis

Relapse examination is a bunch of measurable strategies utilized for the assessment of connections between a reliant variable and at least one free factors. It very well may be used to evaluate the strength of the connection among factors and for demonstrating the future connection between them.

Baseline Model

Dependent variables are the two major profitability ratios, ROE and ROA. The autonomous factors are.

Model 1

This model examines the impact of elements on ROA of Commercial banks.

$ROA = \beta_0 + \beta_1 TITD_{it} + \beta_2 NPLR_{it} + \beta_3 CDR_{it} + \beta_4 CAR_{it} + \beta_5 LLPR_{it} \ldots\ldots + e_{it}$ --------- (i)

Model 2

This model inspects the effect of components on ROE of Business banks.

$ROE = \beta_0 + \beta_1 TITD_{it} + \beta_2 NPLR_{it} + \beta_3 CDR_{it} + \beta_4 CAR_{it} + \beta_5 LLPR_{it} \ldots\ldots + e_{it}$ ------- (ii)

Where,

Dependent Variables

ROE=Return on Equity

ROA=Return on Assets

Independent Variables

NPLR= Non-Performing Loan ratio

LLPR= Loan Loss Provision Ratio

TITD= Total Investment to Total Deposit Ratio

CDR = Credit Deposit Ratio

CAR= Capital Adequacy Ratio

CHAPTER – IV

RESULTS AND DISCUSSIONS

This chapter covers data collection, analysis, and presentation. The greater part of the exploration can be tracked down in the section Information show and examination. In the wake of changing over natural information into a justifiable show, the motivation behind this part is to examine and explain the gathered information to accomplish the review's objective. Following the examination approach talked about in the third section, the information have been broke down and deciphered involving monetary and factual devices in this part. The information that was accumulated from different sources has been organized in the expected tables as per their homogeneity in the examination segment.

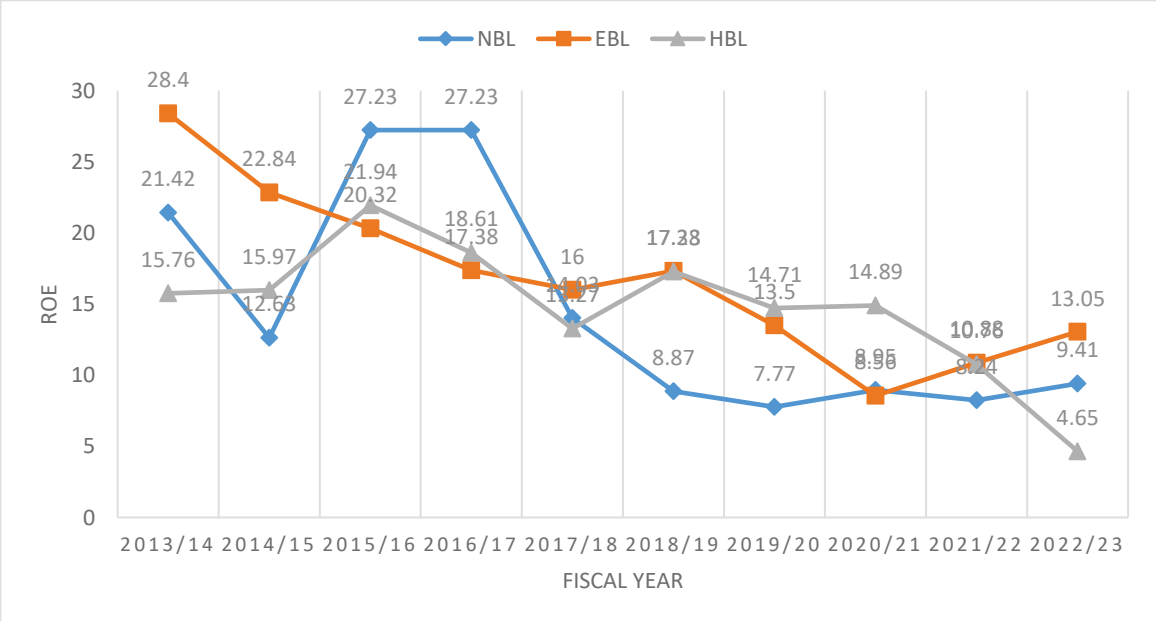
4.1 Situation of Dependent and Independent Variables

1. Return on Equity (ROE)

Return on equity (ROE) is a metric that shows how profitable equity funds invested in a bank are. It shows how much money is made for every rupee of capital invested. ROE is viewed as a vital measure since it mirrors the efficiency of the proprietorship (or hazard) capital utilized in the bank.

Figure 2

Return on Equity (ROE)



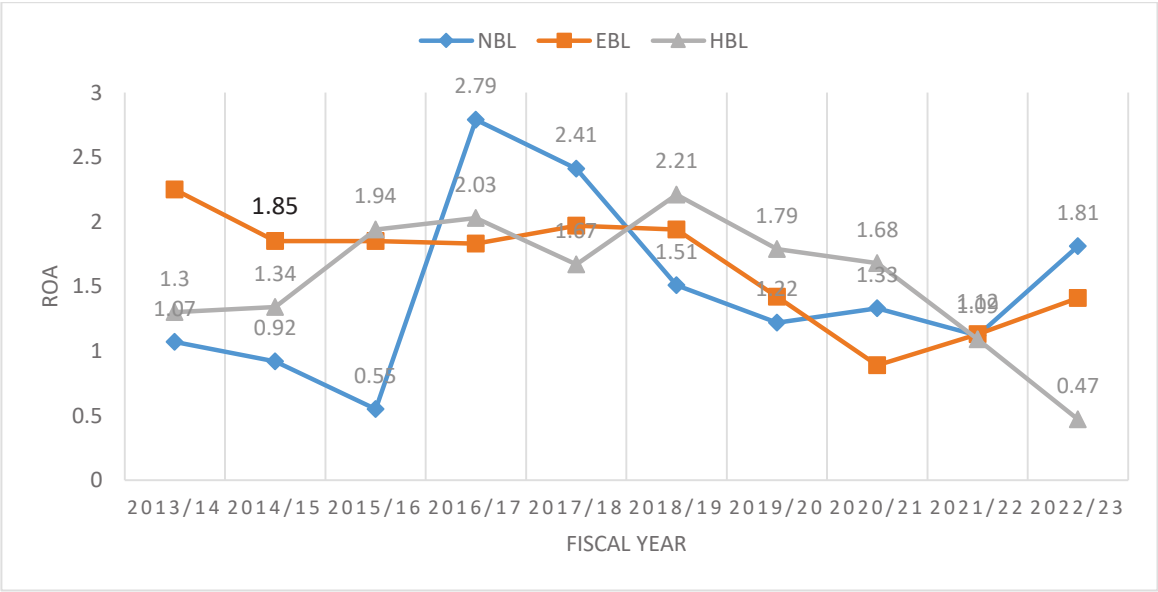
The pattern examination of Return on Equity (ROE) for Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from 2013/14 to 2022/23 is depicted in figure 2. Up until 2018/19, the pattern of ROE of NBL is found highly fluctuating. ROE of is in declining trend up to 2020/21 and then in increasing trend. ROE of HBL was fluctuating but has declined lot to 4.65% in F/Y2022/23. The benefit from ROE of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) is highest at 27.23%, 28.40% and 21.94% respectively during fiscal years under study.

2. Return on Assets (ROA)

This is likely the main single proportion in looking at the proficiency and working execution of banks as it shows the profits produced from the that bank claims. Return on Assets (ROA) is a sign of how well a bank uses its resources, by deciding how productive an organization is comparative with its complete resources. ROA is reflection of performance of bank in a large picture. ROA reflects benefit per unit of all financial assets held by bank. The ROA figure gives a supervisor, financial backers, or examiner a thought regarding how effective a bank's administration is at utilizing its resources for generating income.

Figure 3

Return on Assets (ROA)



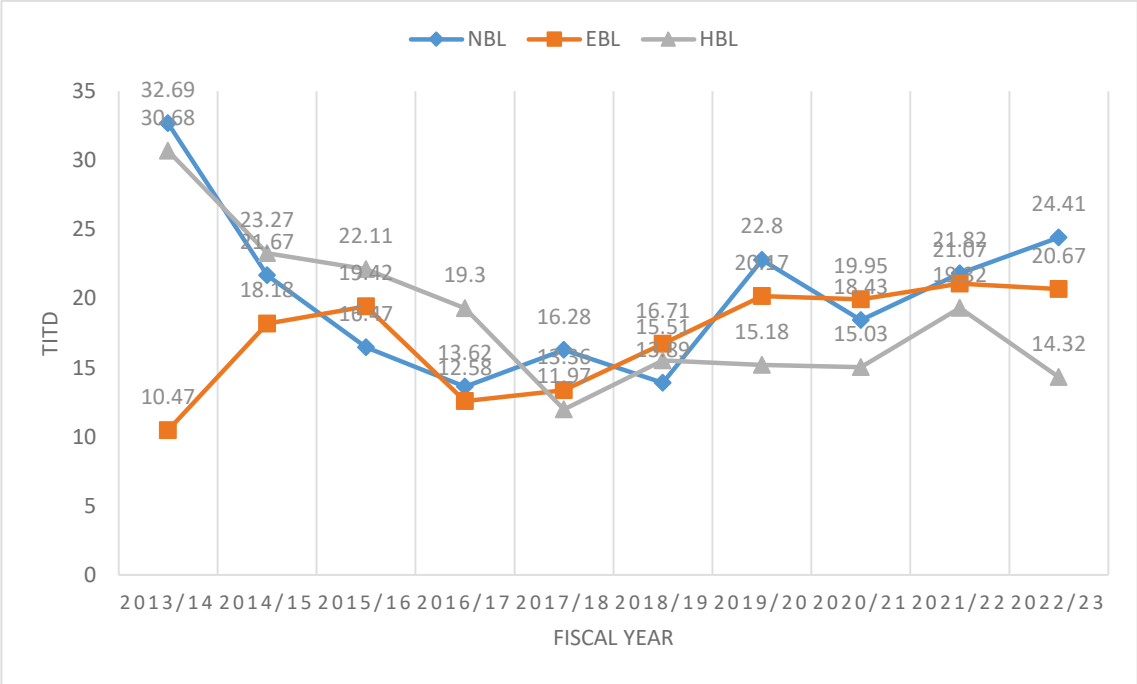
The Return on Assets (ROA) for Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from 2013/14 to 2022/23 are portrayed in Figure 3. Figure 3 shows that ROA of NBL is most fluctuating in comparison to other two banks under study. ROA of HBL is in continuous declining trend from 2018/19. ROA of EBL is increasing from 2020/21. ROA fluctuate having the highest ROAs of 2.85%, 3.63%, and 4.60%, respectively, and the lowest ROAs of 0.62%, 0.72%, and 0.17% respectively for Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL).

3. Total Investment to Deposit Ratio (TITD)

This proportion suggests the usage of bank's deposits on generating income through interest in government bonds, debentures and shares of different organizations and bank. Divide the total investment by the total deposit to get this ratio.

Figure 4

Total Investment to Deposit Ratio (TITD)



The TITD of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from 2013/14 to 2022/23 are depicted in Figure 3. All banks have very fluctuating TITD crossing each other in graphical presentation. NBL, EBL and HBL have highest TITD at 32.69%, 21.07% and 30.68% respectively. Moreover TITD of NBL, EBL and HBL is lowest at 13.62%, 10.47% and 11.97% respectively.

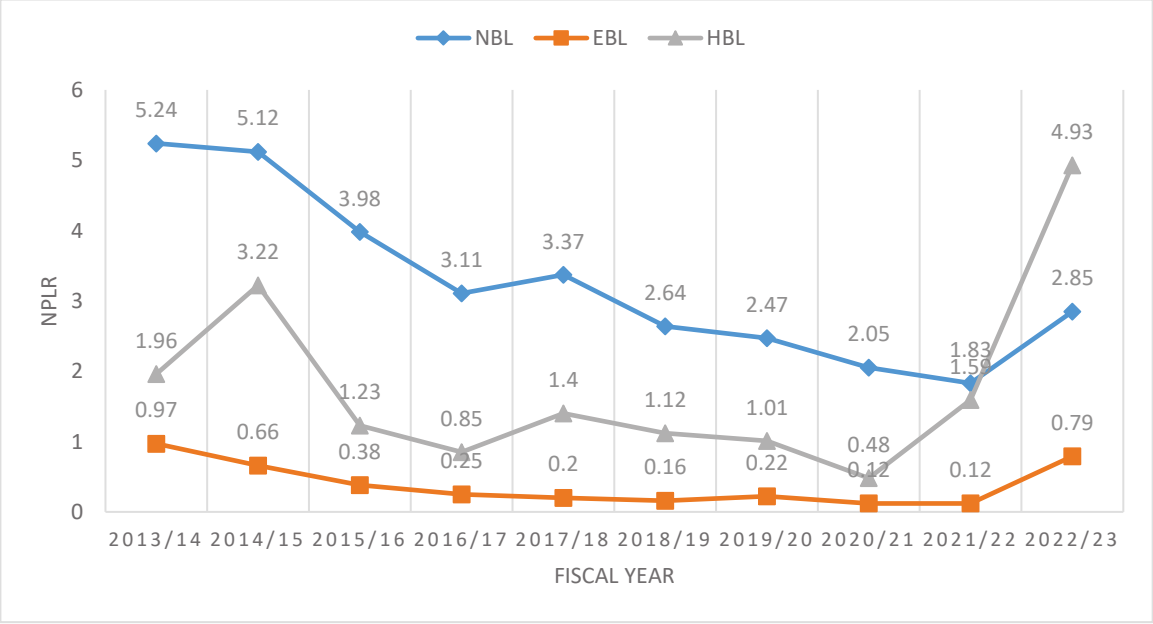
4. Non-Performing Loan Ratio (NPLR)

Non-performing loan ratio (NPLR) is also called non-performing advances. It tends to be characterized as the non-useful assets of the banks. On an average, above 89% of the total income received by BFIs of Nepal come from interest on loan and advances. All in all, it is the credit or terrible obligation and suspicious obligations that doesn't reimburse on time. The Proportion of NPL to add up to credit Advance uncovers how much or the credit and advances are non-performing loans.

NRB has guided every one of the organizations to make credit misfortune arrangement against the suspicious and terrible obligations. It adds alertness, hence safeguards all stakeholders.

Figure 5

Non-Performing Loan Ratio (NPLR)



The NPLR of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from 2013/14 to 2022/23 are depicted in Figure 5. NPLR of EBL, which

has always remained below 1% during the period of study, is more consistent than other banks under study. NPLR of NBL remained higher for longer period of time, while NPLR of HBL has hit higher in 2022/23 all of sudden. NBL, EBL and HBL have highest NPLR at of 5.24%, 0.97% and 4.93% respectively. Moreover, NBL, EBL and HBL have the most minimal proportions at 1.831%, 0.12% and 0.48% respectively for the chosen period.

5. Credit Deposit Ratio (CDR)

This proportion is determined to figure out what banks can using their Credit Deposit Ratio (CDR) and propels for benefit creating reason. This proportion can be acquired by isolating credit and advances by complete stores. Reserves acquired by an element from another substance, repayable after a particular period conveying financing cost are known as credit. It is a commitment which should be reimbursed back after the expiry of the specified period. The assets given by the bank to an element for a particular reason, to be repayable after a brief length is known as Advances. It is a credit office which ought to be reimbursed in something like one year according to the terms, conditions and standards gave by Nepal Rastra bank for loaning and furthermore by the plans of concerned bank. Banks credit and advances relies much upon their capacity to draw in store. Banks give the credit and advances based on their stores. Loans, advances, and deposits are all dependent on one another at banks. As a result, the ratio of loans to advances is calculated using the bank's total deposits.

Figure 6

Credit Deposit Ratio (CDR)

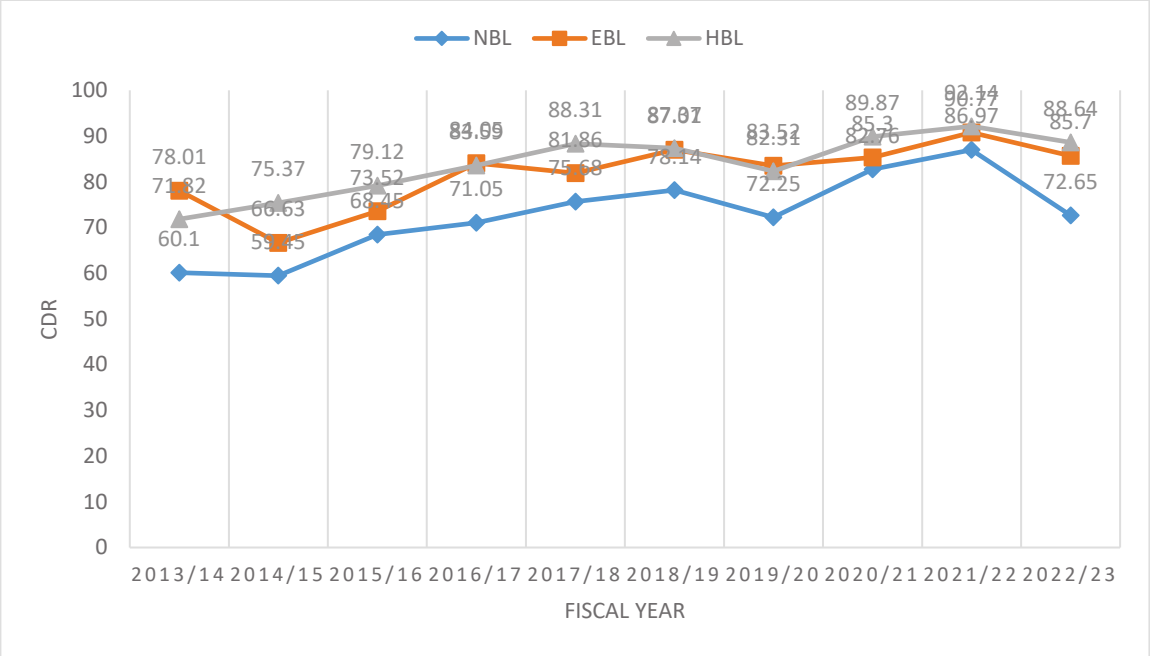


Figure 6 shows a trend analysis of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL)'s Credit Deposit Ratios (CDR) from 2013/14 to 2022/23. CDR of NBL has always remained below than that of HBL and EBL, while graph of HBL and EBL are crossing each other time and again. 86.97%, 90.77%, and 92.14% are the highest CDR found in NBL, EBL and HBL respectively. Moreover, NBL, EBL and HBL had lowest CDR at at 59.45%, 66.63% and 71.82% respectively.

6. Capital Adequacy Ratio (CAR)

Capital Adequacy Ratio (CAR) is the proportion of a bank's capital comparable to its risk-weighted assets. It is chosen by national banks and bank controllers to keep organizations from taking overabundance influence and becoming ruined all the while. The Capital Adequacy Ratio (CAR) is an estimation of a bank's accessible capital communicated as a level of banks risk weighted credit openness. Capital Adequacy Ratio (CAR) is how much capital a bank or other monetary foundation needs to hold as expected by its monetary controller. This helps to ensure that financial institutions do not participate in or hold investments that increase the likelihood of default. Likewise, to ensure that monetary establishments have sufficient funding to support working misfortunes while respecting withdrawals (Tam, 2023).

Figure 7

Capital Adequacy Ratio (CAR)

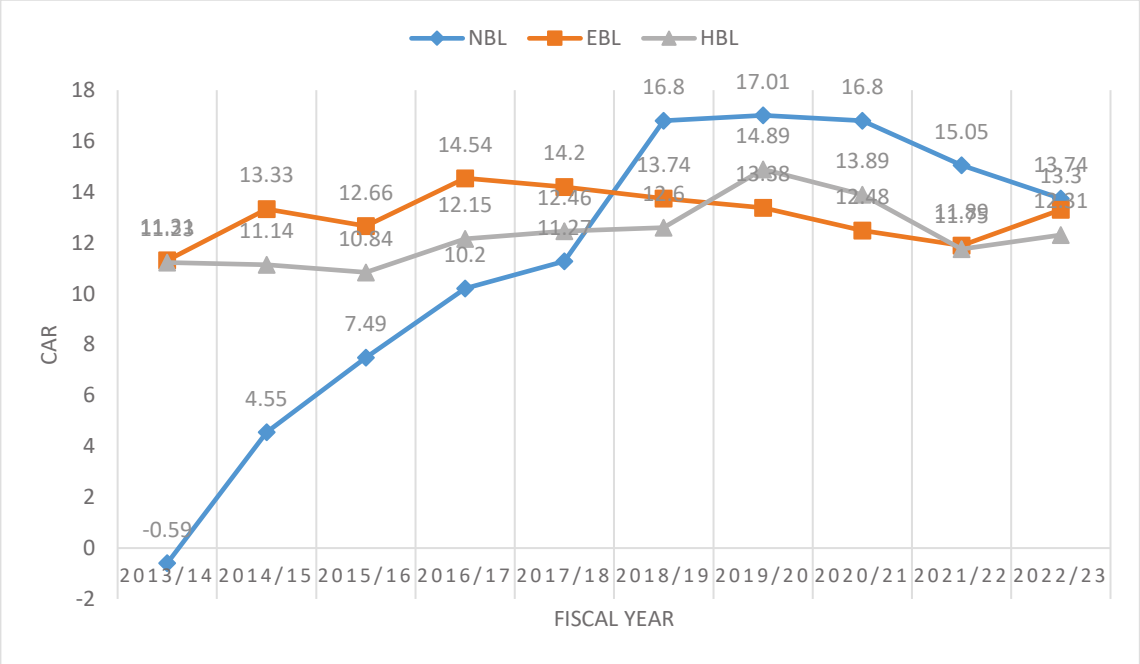


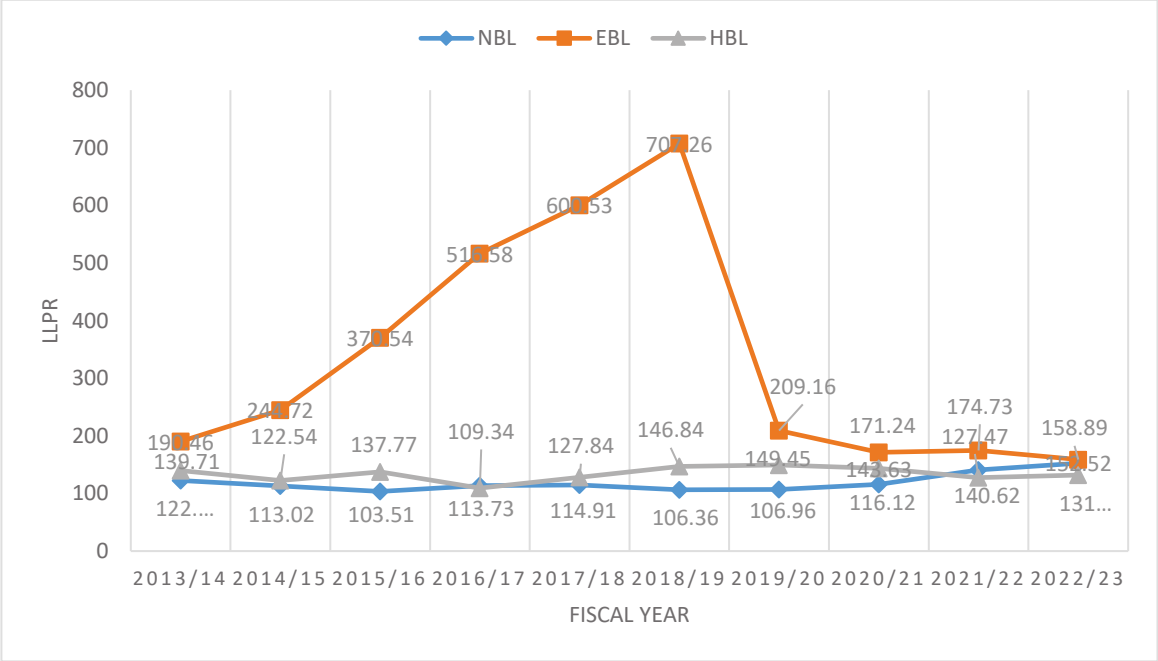
Figure 7 shows the Capital Adequacy Ratio (CAR) of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from 2013/14 to 2022/23. During the period of study NBL has improved a lot in CAR. EBL and HBL have better and more consistent CAR. In financial years 2019/20, 2016/17, and 2019/20 Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) had the most noteworthy proportions of 17.01%, 14.54% and 14.89% respectively.

7. Loan Loss Provision Ratio (LLPR)

This is the compulsion component because provision can only be made with all loans. Instead, the difference between this loan and a non-performing loan is too small to yield a profit.

Figure 8

Loan Loss Provision Ratio (LLPR)



The Loan Loss Provision Ratio (LLPR) of Nepal Bank Ltd. (NBL), Everest Bank Ltd. (EBL) and Himalayan Bank Limited (HBL) from 2013/14 to 2022/23 is depicted in Figure 8. The most noteworthy proportions are 149.45% for Himalayan Bank Limited (HBL), 707.26% for Everest Bank Ltd. (EBL), and 152.52% for Nepal Bank Ltd. (NBL), individually. In a similar vein, the Loan Loss Provision Ratio (LLPR) of NBL, EBL and HBL are the lowest, at 103.51 168.89, and 109.34 respectively. Figure shows that EBL has fluctuating LLPR while that of NBL and HBL are comparatively more consistent.

4.2 Descriptive Statistics

Table 1

Descriptive Statistics of Dependent and Independent Variables

		ROE	ROA	TITD	NPLR	CDR	LLPR	CAR
N	Valid	30	30	30	30	30	30	30
	Missing	0	0	0	0	0	0	0
Mean		15.396	1.560	18.712	1.811	79.414	196.021	12.214
Std. Deviation		6.124	0.539	5.094	1.565	8.802	151.362	3.506
Minimum		4.650	0.470	10.470	0.120	59.450	103.510	(0.590)
Maximum		28.400	2.790	32.690	5.240	92.140	707.260	17.010

Source: Appendix II

Table 1 displays a descriptive statistics table that provides a summary of key characteristics for each variable used in the study of profitability of commercial banks of Nepal. Return on Equity (ROE), Return on Assets (ROA), Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), and Loan Loss Provision Ratio (LPLR) are the seven factors that are examined in the table.

For instance, the mean of ROE and ROA are 15.369% and 1.560 % respectively. Moreover, the mean of TITD, NPLR, CDR, CAR, and LLPR are 18.712%, 1.811%, 79.414%, 196.021% and 12.214% respectively.

Minimum and maximum value of each individual variable of all 30 observations taken over the period of study (2013/14 to 2022/23) is also shown in the table. For instance, minimum value of NPLR is 0.12% in all 30 observations. Also, 5.24% is the highest value of NPLR during the period of study for these three commercial banks under study.

Standard Deviation measures the fluctuation of value of variables around the mean. For example, the standard deviation of ROE and ROA is 6.124 and 0.539, suggesting that the values of ROA are closer to the mean than the values of ROE.

4.3 Correlation Analysis

Here, we are analyzing correlation between different variables under study. Correlation is a statistical measure that indicates the extent to which two or more variables change together. A correlation can range from -1 to 1, with 0 indicating no correlation, 1 indicating a perfect positive correlation (as one variable increases, the other also increases), and -1 indicating a perfect negative correlation (as one variable increases, the other decreases).

Table 2

Correlation (Pearson) between ROE, ROA, TITD, NPLR, CDR, CAR and LLPR

Variables	ROE	ROA	TITD	NPLR	CDR	CAR	LLPR
Return on Equity (ROE)	1						
Sig. (2-tailed)							
Return on Assets (ROA)	.480**	1					
Sig. (2-tailed)	0.007						
Total Investment to Total Deposit Ratio (TITD)	-0.14	-.384*	1				
Sig. (2-tailed)	0.459	0.036					
Non Performing Loan Ratio (NPLR)	-0.053	-.372*	0.299	1			
Sig. (2-tailed)	0.779	0.043	0.108				
Credit Deposit Ratio (CDR)	-.416*	0.013	-.428*	-.591**	1		
Sig. (2-tailed)	0.022	0.948	0.018	0.001			
Capital Adequacy Ratio (CAR)	-.432*	0.21	-.430*	-.581**	.578**	1	
Sig. (2-tailed)	0.017	0.265	0.018	0.001	0.001		
Loan Loss Provision Ratio (LPLR)	0.148	0.265	-0.266	-.492**	0.178	0.213	1
Sig. (2-tailed)	0.435	0.156	0.155	0.006	0.346	0.258	

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

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

Source: Appendix III

Table 2 shows the correlation between the variables studied. The connection among ROE and ROA shows emphatically huge at 1% degree of importance with coefficient of 0.480

where CAR shows adversely critical connection with ROE of - 0.432 at 5% degree of importance. Likewise, CDR shows adversely huge relationship with ROE with coefficient of -0.416 at 5% degree of importance. The connection among ROA and NPLR is - 0.372 which shows moderate level of negative relationship with coefficient of 0.372. CDR and CAR shows serious level of negative connection with NPLR at 1% degree of importance. The connection among CDR and CAR is serious level of positive and the relationship is huge at 1% degree of importance.

4.3 Regression Analysis

Regression analysis is a statistical technique used in data science, finance, social science and economics to understand and quantify the relationship between a dependent variable and one or more independent variables. It is commonly used to make predictions and identify patterns in data. Multiple regression involves using more than one independent variable to predict the value of the dependent variable. This can be useful when trying to understand the impact of multiple factors on a particular outcome. It tends to be used to survey the strength of the connection among factors and for displaying the future connection between them. The dependent variables in this study are ROE and ROA, while the independent variables are the TITD, NPLR, CDR, CAR and LLPR.

4.3.1 Impact of TITD, NPLR, CDR, CAR and LLPR on ROE

Table 3

Model Summary of ROE

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.816[a]	0.666	0.596	3.89029

a. Predictors: (Constant), TITD, NPLR, CDR, CAR, LLPR

Source: Appendix V

R square, also known as the coefficient of determination, represents the proportion of variance in the dependent variable that is predictable from the independent variables in a regression model. The full form of R square is "Coefficient of Determination." The coefficient of determination, R^2 value of ROE is 0.666 which shows 66.60% of ROE is determined by independent variables under study, namely Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR),

Capital Adequacy Ratio (CAR), and Loan Loss Provision Ratio (LPLR). Moreover, remaining 33.40% of ROE is determined by other factors.

Table 4

ANOVA Table of ROE

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	724.413	5	144.883	9.573	.000[b]
	Residual	363.224	24	15.134		
	Total	1087.637	29			

a. Dependent Variable: ROE

b. Predictors: (Constant), LLPR, CDR, TITD, CAR, NPLR

Source: Appendix VI

Table 4 shows the ANOVA (Analysis of Variance) table. It is a statistical table that displays the results of an analysis of variance test. The table typically includes columns for the sources of variation, degrees of freedom, sum of squares, mean squares, F statistic, and p-value. The F-value of 9.573 with a p-value of 0.000 signifies that there is a statistically significant difference between groups being compared. In other words, the F-value indicates the ratio of variance between groups to variance within groups, and a high F-value suggests that the difference between groups is greater than the difference within groups. The p-value of 0.000 indicates that this difference is unlikely to have occurred by chance, suggesting that the results are significant. The higher the F value, the more likely it is that the difference between the groups is not due to random chance.

Table 5

Regression Coefficients of ROE

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	83.792	11.552		7.253	0
	TITD	-0.625	0.166	-0.52	-3.756	0.001
	NPLR	-2.825	0.705	-0.722	-4.01	0.001
	CDR	-0.46	0.114	-0.661	-4.028	0
	CAR	-1.179	0.281	-0.675	-4.199	0
	LLPR	-0.003	0.006	-0.084	-0.594	0.558

a. Dependent Variable: ROE

Source: Appendix- VII

The linear equation of this model is,

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$

$ROE = 83.792 – 0.625\ X_1 – 2.825\ X_2 – 0.460 X_3 – 1.179\ X_4 - 0.003\ X_5$

Regression coefficients are values that represent the relationship between a predictor (independent) variable and the response (dependent) variable in a regression model. They indicate the change in the dependent variable associated with a one-unit change in the independent variable, while holding all other variables constant. Table 5 shows the regression coefficient. The LLPR has p-value higher than 0.05, hence statistically insignificant. A p-value of 0.558 signifies that there is a high probability that the observed data could have occurred by random chance alone. The LLPR has inconsequential effect on ROE. Typically, in statistical testing, a p-value less than 0.05 is considered statistically significant, indicating that the results are unlikely to have occurred by chance. Here, the p-value of TITD, NPLR, CDR and CAR are 0.000, 0.001, 0.000, 0.001 and 0.001 respectively which are lesser than level of significance 0.05. It shows TITD, NPLR, CDR and CAR fundamentally affects ROE consistently

The beta coefficient of TITD is -0.625 which indicates that with1 unit increase in TITD ROE decreases by 0.625 units. Moreover, beta coefficient of NPLR, CDR and CAR are-2.825, -0.46 and -1.179 respectively which shows that 1 unit increase in NPLR, CDR and CAR leads to decrease in ROE by 2.825, 0.46 and 1.179 units respectively.

At the 95% confidence level, a t-value larger than 2 or less than -2 indicates that the relevant coefficient is statistically significant. In table 5, t-value of TITD, NPLR, CDR and CAR are all below -2. Thus, these variables affect ROE negatively and significantly. The t-value of LLPR is -0.594, hence LLPR is not statistically significant in this study.

4.3.2 Impact of LLPR, CAR, TITD, NPLR and CDR on ROA

Table 6

Model Summary of ROA

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.598[a]	0.358	0.224	0.475057643

a. Predictors: (Constant), LLPR, CAR, TITD, NPLR, CDR

Source: Appendix IX

The coefficient of determination, R^2 value of ROA is 0.358 which shows 35.80% of ROA is determined by independent variables under study, namely Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), and Loan Loss Provision Ratio (LPLR). Moreover, remaining 66.20% of ROE is determined by other factors.

Table 7

ANOVA Table of ROA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.014	5	0.603	2.671	.047[b]
	Residual	5.416	24	0.226		
	Total	8.43	29			

a. Dependent Variable: ROA

b. Predictors: (Constant), LLPR, CDR, TITD, CAR, NPLR

Source: Appendix X

Table 7 shows the ANOVA (Analysis of Variance) table of ROA. It is a statistical table that displays the results of an analysis of variance test. The table typically includes columns for the sources of variation, degrees of freedom, sum of squares, mean squares, F statistic, and p-value. In this case, an F-value of 2.671 indicates that there is a significant difference between the groups being compared. The p-value of 0.047 suggests that since the p-value is less than 0.05 (commonly used threshold for statistical significance), we can conclude that there is a statistically significant difference between the groups. The higher the F value, the more likely it is that the difference between the groups is not due to random chance.

Table 8

Regression Coefficients of ROA

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.213	1.411		3.696	0.001
	TITD	-0.047	0.02	-0.442	-2.301	0.03
	NPLR	-0.19	0.086	-0.552	-2.212	0.037
	CDR	-0.03	0.014	-0.492	-2.162	0.041
	CAR	-0.001	0.034	-0.009	-0.04	0.968
	LLPR	0	0.001	-0.034	-0.176	0.862

a. Dependent Variable: ROA

Source: Appendix- XI

The linear equation of this model is,

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$

$ROE = 5.213 - 0.047\ X_1 - 0.19\ X_2 - 0.03\ X_3 - 0.001\ X_4 - 0.000\ X_5$

Regression coefficients are values that represent the relationship between a predictor (independent) variable and the response (dependent) variable in a regression model. They indicate the change in the dependent variable associated with a one-unit change in the independent variable, while holding all other variables constant. Table 8 shows the regression coefficient of ROA. The CAR and LLPR has p-value higher than 0.05, hence statistically insignificant. A p-value of 0.968 and 0.862 of CAR and LLPR respectively signifies that there is a high probability that the observed data could have occurred by random chance alone. The CAR and LLPR have inconsequential effect on ROE. Typically, in statistical testing, a p-value less than 0.05 is considered statistically significant, indicating that the results are unlikely to have occurred by chance. Here, the p-value of TITD, NPLR and CDR are 0.03, 0.037 and 0.041 respectively which are lesser than level of significance 0.05. It shows TITD, NPLR and CDR fundamentally affect ROA consistently. At the 95% confidence level, a t-value larger than 2 or less than -2 indicates that the relevant coefficient is statistically significant. In table 8, t-value of TITD, NPLR and CDR are all below -2. Thus, these variables affect ROA negatively and significantly. The t-value of CAR and LLPR are -0.04 and -0.176, hence CAR and LLPR is not statistically significant in this study.

The beta coefficient of TITD, NPLR and CDR are -0.047, -0.19 and -0.03 respectively which shows that 1 unit increase in TITD, NPLR and CDR leads to decrease in ROA by -0.047, 0.19 and 0.03 units respectively.

4.4 Discussion

The reason for the research was to study impact of credit risk (hazard) on profitability of commercial banks of Nepal. The independent variables of this study are Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), and Loan Loss Provision Ratio (LPLR). The research is done using measurable variables in the review.

According to this research done on Everest Bank Ltd. (EBL), Nepal Bank Ltd. (NBL), and Himalayan Bank Limited (HBL), R^2 of ROE is 0.666 which is higher than the findings of Kumari et al. (2024), Siddique et al. (2022), Munangi ans Sibindi (2020), Kutum (2017), Noman et al. (2015), Ebenezer and Omar (2015) and Shahid et al. (2019) which were 0.658, 0.265, 0.0198, 0.149, 0.21, 0.6049 and 0.174 respectively. Hence, R^2 of this research is higher than other reviewed research. R^2 of ROA is .358 which is higher than the findings of Permata et al. (2024), Munangi and Sibindi (2020) , Bhattarai (2016), Noman et al. (2015) and Shahid et al. (2019) which were 0.292, 0.2064, 0.284, 0.22 and 0.244 respectively. Moreover, R^2 of ROA calculated by Siddique et al. (2022), Kumari et al. (2024), Kwashie et al. (2022), Jati (2021), Kutum (2017) and Rathnasiri (2016) were 0.372, 0.640, 0.7557, 0.777, 0.775 and 0.651 respectively which were higher than that of this research. F-value of ROE is 9.573 which is higher than the findings of Munangi and Sibindi (2020) , Kutum (2017) and Shahid et al. (2019) which was 2.45, 0.525 and 3.468 . Moreover, findings of Kwashie et al. (2022), AI-Eitan and Bani-Khalid (2019) and Ebenezer and Omar (2015) were 13.365, 79.94155 and 13.93 respectively which were higher than that of this research.

F-value of ROA is 2.671 which is lower than the findings of all the empirical review done in this research. Findings of F of ROA of Permata et al. (2024), Kwashie et al. (2022), Munangi and Sibindi (2020), AI-Eitan and Bani-Khalid (2019), Kutum (2017), Bhattarai (2016), Shahid et al. (2019) and Rathnasiri (2016) are 28.308, 12.311, 17.87, 91.074, 10.318, 5.635, 3.178 and 11.906 respectively.

The correlation between ROA and ROE is 0.480 at p-value 0.007. Hence the relationship is positive and statistically significant. Siddique et al. (2022) and Al-Eitan and Bani-Khalid (2019) found correlation between ROE and ROA of 0.757 and 0.9857 respectively.

In this research, it is observed that CDR has no relationship at all with ROA, despite negative and statistically significant relationship with ROE.

ROA and ROE, both have no significant relation with LLPR. Noman et al. (2015) had similar findings of LLPR.

CHAPTER-V
SUMMARY AND CONCLUSION

The study's overview, summary, and conclusion are provided in this section, which also includes a brief introduction and conclusion. It discusses the main objectives of the investigation, gives a quick rundown of the methods and procedures used, and sums up the findings and discussion. The discoveries are intentionally organized to address the review questions and give an end.

5.1 Summary

In Nepalese context where more than 89% of average income of BFIs comes from interest from loan and advances, credit risk is unavoidable. Fundamentally, credit risk reflects the weakness of borrowers repaying their advances. In Nepal, BFIs face hardships from high non-performing credits (NPLs), affecting their profitability. The policy maker practices high prudence to minimize credit risk. The motivation behind this research is to find some valuable suggestion in which a Nepalese BFIs could conceal them from credit risk.

In this research secondary data were directly taken from related banks' websites. MS-Excel, MS-Word and SPSS were few basic software used in the study. This study used graph method to study movement of variables of each banks separately during the period of study. Futher, descriptive statistics method is used to analyze variables individually. Pearson correlation analysisis is used to find relationship between variables. Regression analysis was used separately for ROE and ROA to find their relationship with other dependent variables.

During this research, it is found that TITD, NPLR, CDR and has negative and significant effect in ROE while LLPR has no effect on ROE. Moreover TITD, NPLR and CDR have negative and significant effect on ROA while CDR and LLPR have no effect on ROA.

5.2 Conclusion

The main functions of banks are to collect surplus money from depositors and lend it as advance and loan to the deficits, seeking for money. Hence, credit risk is unavoidable for

commercial banks of Nepal. Despite all these risk all banks of Nepal are doing good business, making profit and creating benchmarks in professionalism, efficiency, use of latest technology and hiring most elite professionals.

TITD, NPLR, CDR and CAR have negative and significant relationship with ROE. No relationship between LLPR and ROE could be established during this study. Moreover, TITD, NPLR and CDR have negative and significant relationship with ROA. No relationship of CAR and LLPR could be established with ROA during this study.

Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR) and Capital Adequacy Ratio (CAR) have negative and statistically significant impact on ROE, while Loan Loss Provision Ratio (LPLR) has no/unpredictable impact on ROE. Moreover, Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR) and Credit Deposit Ratio (CDR) have negative and statistically significant impact on ROA, while Capital Adequacy Ratio (CAR) and Loan Loss Provision Ratio (LPLR) has no/unpredictable impact on ROA.

5.3 Implications

In the study of impact of credit risk on profitability of commercial banks, a research on relationship of Total Investment to Total Deposit Ratio (TITD) on Return on Assets (ROA) and Return on Equity (ROE) is a new concept. Hence, this research is expected to offer valuable insights to academicians and the scholars who are seeking knowledge for the sake of knowledge. This research is done on three commercial banks of Nepal with seven variables five of which are independent variables namely Total Investment to Total Deposit Ratio (TITD), Non Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), and Loan Loss Provision Ratio (LPLR) and two are dependent variables namely Return on Equity (ROE) and Return on Assets (ROA). Hence it can also be of great value to the students of management.

Moreover, the findings and conclusions of this research also contribute as a source of valuable information to the bank management and managers of all the 20 commercial banks of Nepal who have to formulate plans and policies of banks and take many decisions each day. Also, this research will be valuable for financial analysts, investors,

regulatory bodies, economists or any other stakeholders that are taking any relevant decisions.

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APPENDICES

Appendix – I

ROE	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	21.42	12.63	27.23	27.23	14.03	8.87	7.77	8.95	8.24	9.41
EBL	28.4	22.84	20.32	17.38	16	17.33	13.5	8.56	10.88	13.05
HBL	15.76	15.97	21.94	18.61	13.27	17.28	14.71	14.89	10.76	4.65

ROA	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	1.07	0.92	0.55	2.79	2.41	1.51	1.22	1.33	1.12	1.81
EBL	2.25	1.85	1.85	1.83	1.97	1.94	1.42	0.89	1.13	1.41
HBL	1.3	1.34	1.94	2.03	1.67	2.21	1.79	1.68	1.09	0.47

TITD	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	32.69	21.67	16.47	13.62	16.28	13.89	22.8	18.43	21.82	24.41
EBL	10.47	18.18	19.42	12.58	13.36	16.71	20.17	19.95	21.07	20.67
HBL	30.68	23.27	22.11	19.3	11.97	15.51	15.18	15.03	19.32	14.32

NPLR	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	5.24	5.12	3.98	3.11	3.37	2.64	2.47	2.05	1.83	2.85
EBL	0.97	0.66	0.38	0.25	0.2	0.16	0.22	0.12	0.12	0.79
HBL	1.96	3.22	1.23	0.85	1.4	1.12	1.01	0.48	1.59	4.93

CDR	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	60.1	59.45	68.45	71.05	75.68	78.14	72.25	82.76	86.97	72.65
EBL	78.01	66.63	73.52	84.05	81.86	87.01	83.52	85.3	90.77	85.7
HBL	71.82	75.37	79.12	83.59	88.31	87.37	82.31	89.87	92.14	88.64

CAR	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	-0.59	4.55	7.49	10.2	11.27	16.8	17.01	16.8	15.05	13.74
EBL	11.31	13.33	12.66	14.54	14.2	13.74	13.38	12.48	11.89	13.3
HBL	11.23	11.14	10.84	12.15	12.46	12.6	14.89	13.89	11.75	12.31

LLPR	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NBL	122.32	113.02	103.51	113.73	114.91	106.36	106.96	116.12	140.62	152.52
EBL	190.46	244.72	370.54	516.58	600.53	707.26	209.16	171.24	174.73	168.89
HBL	139.71	122.54	137.77	109.34	127.84	146.84	149.45	143.63	127.47	131.86

Appendix - II

Statistics

		ROA	ROE	NPLR	CDR	TITD	CAR	LLPR
N	Valid	30	30	30	30	30	30	30
	Missing	0	0	0	0	0	0	0
Mean		1.559666666666667	15.395999999999995	1.8107	79.4137	18.7117	12.2137	196.0210
Std. Deviation		.539159520462866	6.124110406896831	1.56496	8.80194	5.09392	3.50594	151.36248
Minimum		.470000000000000	4.650000000000000	.12	59.45	10.47	-.59	103.51
Maximum		2.790000000000000	28.400000000000000	5.24	92.14	32.69	17.01	707.26

Appendix-III

Correlations

		ROE	ROA	TITD	NPLR	CDR	CAR	LLPR
ROE	Pearson Correlation	1	.480**	-.140	-.053	-.416*	-.432*	.148
	Sig. (2-tailed)		.007	.459	.779	.022	.017	.435
	N	30	30	30	30	30	30	30
ROA	Pearson Correlation	.480**	1	-.384*	-.372*	.013	.210	.265
	Sig. (2-tailed)	.007		.036	.043	.948	.265	.156
	N	30	30	30	30	30	30	30
TITD	Pearson Correlation	-.140	-.384*	1	.299	-.428*	-.430*	-.266
	Sig. (2-tailed)	.459	.036		.108	.018	.018	.155
	N	30	30	30	30	30	30	30
NPLR	Pearson Correlation	-.053	-.372*	.299	1	-.591**	-.581**	-.492**
	Sig. (2-tailed)	.779	.043	.108		.001	.001	.006
	N	30	30	30	30	30	30	30
CDR	Pearson Correlation	-.416*	.013	-.428*	-.591**	1	.578**	.178
	Sig. (2-tailed)	.022	.948	.018	.001		.001	.346
	N	30	30	30	30	30	30	30
CAR	Pearson Correlation	-.432*	.210	-.430*	-.581**	.578**	1	.213
	Sig. (2-tailed)	.017	.265	.018	.001	.001		.258
	N	30	30	30	30	30	30	30
LLPR	Pearson Correlation	.148	.265	-.266	-.492**	.178	.213	1
	Sig. (2-tailed)	.435	.156	.155	.006	.346	.258	
	N	30	30	30	30	30	30	30

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

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

Appendix-IV

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LLPR, CDR, TITD, CAR, NPLR[b]	.	Enter

a. Dependent Variable: ROE

b. All requested variables entered.

Appendix-V

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.816[a]	.666	.596	3.890287479239575

a. Predictors: (Constant), LLPR, CDR, TITD, CAR, NPLR

Appendix-VI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	724.413	5	144.883	9.573	.000[b]
	Residual	363.224	24	15.134		
	Total	1087.637	29			

a. Dependent Variable: ROE

b. Predictors: (Constant), LLPR, CDR, TITD, CAR, NPLR

Appendix-VII

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	83.792	11.552		7.253	.000
	TITD	-.625	.166	-.520	-3.756	.001
	NPLR	-2.825	.705	-.722	-4.010	.001
	CDR	-.460	.114	-.661	-4.028	.000
	CAR	-1.179	.281	-.675	-4.199	.000
	LLPR	-.003	.006	-.084	-.594	.558

a. Dependent Variable: ROE

Regression

Appendix-VIII

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	LLPR, CDR, TITD, CAR, NPLR[b]	.	Enter

a. Dependent Variable: ROA

b. All requested variables entered.

Appendix-IX

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.598[a]	.358	.224	.475057643405305

a. Predictors: (Constant), LLPR, CDR, TITD, CAR, NPLR

Appendix-X

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.014	5	.603	2.671	.047[b]
	Residual	5.416	24	.226		
	Total	8.430	29			

a. Dependent Variable: ROA

b. Predictors: (Constant), LLPR, CDR, TITD, CAR, NPLR

Appendix-XI

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.213	1.411		3.696	.001
	TITD	-.047	.020	-.442	-2.301	.030
	NPLR	-.190	.086	-.552	-2.212	.037
	CDR	-.030	.014	-.492	-2.162	.041
	CAR	-.001	.034	-.009	-.040	.968
	LLPR	.000	.001	-.034	-.176	.862

a. Dependent Variable: ROA

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ABSTRACT Credit risk management is crucial for banks to avoid financial difficulties and enhance profitability. Strong financial performance incentivizes stakeholders like shareholders and employees to invest and contribute more effectively. This study investigates how factors like Total Investment to Total Deposit Ratio (TITD), Non-Performing Loan Ratio (NPLR), Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR) and Loan Loss Provision Ratio (LLPR) influence the profitability of commercial banks in Nepal. The analysis also explores the relationships between these ratios and performance metrics like Return on Equity (ROE) and Return on Assets (ROA) for commercial banks in Nepal. Standard financial analysis techniques and statistical methods were applied to evaluate secondary data obtained from published annual reports of sample commercial banks namely Nepal

Bank Ltd . (NBL), **Everest Bank** Ltd. (**EBL) and Himalayan Bank Limited (HBL**

) from fiscal years 2013/14 to 2022/23. Multiple regression analysis was employed to assess the impact of credit risk on the profitability of Nepalese commercial banks. The results reveal a significant negative impact of CAR on ROE, with a beta value of