Major Research Project on

OPTIMIZING BANK MANAGEMENT: A DYNAMIC ANALYSIS OF PROFITABILITY, CREDIT RISK, LIQUIDITY RISK, AND CAPITAL

Submitted By
Subhasis Biswas
Roll 23/DMBA/130

Under the Guidance of
Prof. Pradeep Kumar Suri

DELHI SCHOOL OF MANAGEMENT
Delhi Technological University

Bawana Road Delhi 110042

DECLARATION

I, Subhasis Biswas , MBA (2023–2025) Student, Delhi School of Management, Delhi Technological University, do hereby certify that the Major Research Project titled: "Optimizing bank management: a dynamic analysis of profitability, credit risk, liquidity risk, and capital" is an original work submitted by me as partial fulfilment of the Master of Business Administration degree requirements.This project work has been accomplished by me, and the research findings included herein are based upon my own effort and analysis. To the best of my belief and knowledge, this work is not submitted for any other university or institution to any degree, diploma, or certificate.

Name: Subhasis Biswas
Roll No. 23/DMBA/130
Date: 20th May, 2025
Place: Delhi

CERTIFICATE

Mr Subhasis Biswas, Roll No. 23/DMBA/130 has submitted the Major research project "**Optimizing bank management: a dynamic analysis of profitability, credit risk, liquidity risk, and capital"** in partial fulfilment of the requirements for the award of the degree of Master of Business Administration (MBA) from the Delhi School of Management, Delhi Technological University, New Delhi during the academic year 2024-25.

(Prof. Pradeep Kumar Suri)	**(Dr. Saurabh Agrawal)** **Head (DSM)**

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EXECUTIVE SUMMARY

Purpose: For a decade long, we have seen that technological upgradation, macro economical volatility and various regulatory changes have resulted a significant impact on Indian banking industry. Those banks who wants to improve their financial status, it is very important for them to have a deep analysis on the key financial metrics and their interrelations among them. Profitability being an essential component of any businesses need to be looked carefully, that what impacts the present and future profitability of the business. Here, we will see the impact of key financial indicators, credit risk, liquidity risk and capital adequacy on the profitability of 29 banks in the particular year. Panel Vector Autoregression (PVAR) model is used to analyse 29 Indian banks for the time period of 10 years (2015-2024) this will capture both the cross sectional data and time series data respectively, which will help in forming a strong foundation for the research and findings.

Design, Methodology and Approach: This research project uses Panel Vector Autoregression (PVAR) model to calculate the interrelation of the financial metrics. This econometric model can calculate both the cause and the effect on the dataset, for the endogeneity of all internal variables. This model can also calculate the impact of exogeneous variables like GDP growth, interest rates and foreign exchange rates on the dependent variable.

Data from 2015 to 2024 of 29 Indian banks providing yearly ratios consisted of credit ratio, capital ratio, liquidity ratio and profitability ratio. The lag is introduced to find the impact of past year's profitability on the current year, the Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC) helps to choose the ideal lag for the PVAR model. Secondly, we will further run the Hausman test to find out the suitability of either the fixed effects or random effect for the model. The final result derives from the Wald test which confirms and explains the combined effect of the independent variables on the dependent variable.

Findings: This research provides insights into the dynamic relation between credit risk, liquidity risk, capital structure and profitability in Indian banks. The first finding is, banks profitability gets impacted from the rising of the credit risk. The second finding says the with the increase of liquidity we can see there is a rise in the profitability, as it helps the bank to meet their short term obligations and the capital structure with ideal amount of equity shows a positive effect on the profitability as capital acts as an buffer for the banking industry in times of economic unbalances, helping the banks to meet their long term obligations. Lastly, it is found out that the credit risk and liquidity risk have a neutrality, which means there is no compulsion of variation in credit risk will result in variation in liquidity and banks can handle these risks individually.

Research Limitations & Implications: The study admits several limitations even though it offers insightful information about the dynamic relationships between important financial indicators in the Indian banking industry. To completely understand the underlying mechanisms, a more coherent theoretical framework is required due to the intricacy of the dynamic interactions among the financial indicators. Future studies may concentrate on creating a framework like this, combining institutional and behavioural elements that affect bank performance. Furthermore, the study only looks at 29 banks during a ten-year period. The findings may be more broadly applicable if the dataset is expanded to cover a larger number of institutions and a longer time period. A more thorough picture of the external factors

affecting bank performance may also be obtained by include other macroeconomic variables, such as unemployment and inflation rates.

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Chapter 1

INTRODUCTION

1.1 Background

Banks are crucial components of the financial system because they serve as middlemen in the effective distribution of capital, promotion of economic growth, and preservation of financial stability. They play a crucial role in transferring money from savers to borrowers, which promotes growth in a number of economic sectors and enables the effective use of resources. Because of this intermediary role, banks are essential to both developed and emerging countries, as the macroeconomic climate frequently has a significant impact on their performance. Banks make money through a variety of financial services, including loans, deposits, and payment facilitation; interest margins and service fees are the main sources of income Koch & MacDonald, (2014). These revenue-generating endeavours are not risk-free; banks deal with a variety of operational and financial hazards on a daily basis.

Credit risk and liquidity risk are two of the most important risks since they have the potential to have a big influence on the stability and performance of the bank. The probability that a borrower would fail on a loan, which could result in losses for the bank, is known as credit risk. Conversely, liquidity risk occurs when a bank's assets and liabilities are out of balance, making it impossible for the bank to satisfy its short-term financial obligations. According to Saunders and Cornett (2014), these two hazards are generally acknowledged in scholarly and professional debate as the most urgent issues facing banking institutions.

Profitability and capital adequacy are more important component than credit and liquidity issues in banking industry. Being profitable shows how well the bank is earning after all the expenses incurred, it gives strength to the bank to cover losses and growth of the bank. Whereas, capital provides strength for surviving financial uncertainty like economic downturns and maintaining the capital reserves percentages according to the regulations for banking industries. Altogether the four components, credit risk, liquidity risk, capital adequacy and profitability form the foundation pillar for the bank's financial health and the other three factors have a significant effect on profitability.

The attention of various researchers have been attracted for these risks collective and individual effect on the bank's performance. Credit risk cause and effects in the banking industry has been the subject of many research. Duho et al. (2020), shows a thorough report into credit risk management procedures and it's effect on financial performance. Liquidity risk on other hand has been investigated by Dinger (2009), by researching on the effects of liquidity risk on banking industry. Rao (2005) points out the role of capital for ensuring a long term growth and survival of banks.

1.2 Problem Statement

We have seen a lot of research covering the topics credit risks, liquidity risks, capital adequacy and profitability individually but there are not many research covering a combined effect of all these three factors on the Indian banks' profitability and performance. As these components are very closely linked, they provide a substantial gap in the literature for the research. A related study of banks' profitability effect due

to credit risk, liquidity risk, capital adequacy is done on the Indonesian banks, Moch. Doddy Ariefianto, (2024).

A simple example for exploring the problem statement deeply, if for increasing the profitability of the bank, they start to lend more aggressively, this can lead to high credit risk which will surely impact the profitability as it will increase in bad loans resulting in creating huge provisions and cutting down the profit. Also, having lower liquidity can lead banks to not meeting the short term obligations like large withdrawal which may lead to loss in their customer base and adversely impact the profitability of the bank. On the other hand if there is lower capital balances in the books of the banks, it will lead to lower growth perspective resulting in lowering down in profitability. Hence, we can see that all these components are well connected and interdependent, so, a comprehensive study of the effects of the components on the profitability is needed.

According to Greenbaum et al., (2019), all these components, credit and liquidity risk, and capital adequacy is need to be maintained with a main objective of maximization of their profits. In developed and developing nations we can see that controlling these component becomes more difficult due to economic and regulatory environment, and the financial uncertainty.

As the existing body of research offers very limited insight into how these core banking ratios or risks can be managed collectively there is a need for a research which dives deep into the dynamic and simultaneous interactions of the variables. The aim is to for a framework for effective management of the banks risks and requirements to optimize the banking performance by maximization of the profitability.

1.3 Objectives of the study

Even so, the current body of research on this subject is extensive, the review has pinpointed several inquiries that remain unaddressed.:

1. How does credit risk impact the profitability of banks in India?
2. What impact does liquidity risk have on the profitability of Indian banks?
3. How do the capital levels affect the profitability of Indian banks?
4. What policy measures can be suggested in order to enhance the profitability and stability of Indian banks?

1.4 Scope of Study

The financial industry is built on banks, especially in developing and emerging nations where financial markets are still developing. Because they are organisations that administer payment systems, provide credit, and mobilise savings, their effectiveness and stability have a significant impact on systemic stability, financial inclusion, and economic growth. Because of their exposure to a variety of risks, banks continue to face substantial problems despite the vital responsibilities they perform. Among these, capital adequacy, credit risk, and liquidity risk have continued to be crucial topics in the ongoing discussion of banking performance and financial resilience. These components have a direct impact on a bank's profitability in addition to being essential to its operational health.

There is still a glaring lack of knowledge regarding the interrelated dynamics of credit risk, liquidity risk, and capital adequacy within a thorough and integrated framework, despite the fact that these individual components have been the subject of much research. Within this research gap, this study clearly establishes itself. To understand the dynamic interrelation more clearly I think closing this gap is very crucial

Here we will study many different binks for a different period of time, hence Panel Vector Autoregression (PVAR) is selected as the primary analytical framework. This technology, which was first created by Sims (1980) as Vector Autoregression (VAR), which allows the calculation of the effect on the independent variable without a strict need of exogeneity. Because of this, VAR with the panel extension is accurate for financial and macroeconomic data study Brooks, (2014). VAR helps to find the changes of the other variable due to the fluctuation of one variable over time.

By applying this technique to a panel data structure, Abrigo & Love (2016) enhanced it for both cross-sectional and time-series variations at the same time. This variant is called PVAR. Which incorporates external macroeconomic and fixed effects unique to a bank. This characteristics makes PVAR accurate for the effect study of capital adequacy, credit risk, liquidity risk on profitability in the banking industry. Which also closely match the goals of this study.

29 Indian banks operating in the emerging economies have been taken for the study, the 10 years, from 2015 to 2024 data has been taken for the study. This time frame captures various changes such as improving in digital technologies, COVID-19 pandemic which results in financial instability of the banks making it perfect for the research.

Credit risk, liquidity risk, capital sufficiency, and bank profitability are the main factors being taken into account. Return on Equity (ROE) and Return on Assets (ROA) are used to evaluate the bank's profitability. According to Pennacchi & Santos (2021), these ratios provide a true nature of the bank's financial status. ROE shows the profit earned with respect to the invested amount and ROA shows the profit with respect to the assets purchased.

The structure of the study flows as, Chapter 2 gives the literature of the study, summarising the results of all the previous research done on banking and profitability risks. The research methodology is explained in Chapter 3, which includes data collection method, sources, information on variable selection, and the econometric approach utilising PVAR. The detailed report is shown in Chapter 4, consisted of descriptive statistics, Hausman test and Wald test for the PVAR model. The research comes to an end at Chapter 5, which summarises the main findings.

Chapter 2

LITERATURE REVIEW

This literature review will explore the components of the research. Credit risk, liquidity risk, capital adequacy and profitability are the most important component for effective bank management. This review of literature will cover the existing research showing importance of individual components like credit risk on the bank's profitability, it will cover the impact of one component on another. This is crucial to understand the need of the dynamic research area of impact of the all the variables on the present profitability of the bank. Before we start calculating the impact of each variable on profitability by PVAR the review is very important.

2.1 Credit risk

Credit risk is a common thing which effects the profitability for any businesses. In banking industry, credit risk increases due to borrower's non compliance of the loan repayments which results in bank's increase in debts for creating more provisions for bad debts, this research has been covered by Abbas et al. (2019) and Saleh & Abu Afifa (2020) showing how bad loans increases the provisions and reduces the equity portion resulting in high debt to equity ratio. According to Louzis et al., (2012); Beck et al., (2015) sectoral downturns, regulatory changes and macroeconomic condition are another important component which impacts the bank's performance other than the internal strategies and factors. On the other hand Benbouzid et al. (2022) says that sometimes banks raises capital in anticipation for future capital issue due to bad loans.

2.2 Liquidity risk

After the incident of 2008 financial crisis the importance of liquidity in bank has been brought forward. According to Saleh & Abu Afifa (2020), banks that are experiencing liquidity issues would be forced to borrow money at higher rates or sell assets at very low sale prices, which would reduce their profitability. This negative association is supported by Batten & Vo (2019) and Saif-Alyousfi (2020), who contend that limited liquidity lowers interest margins and restricts the ability to finance revenue-generating endeavours.

Evans and Haq (2022) says that liquidity limitations impacts capital as to meet the short term obligations capital has to be depleted due to unavailability of enough liquid cash. The interrelation of these factors, liquidity impact on capital and then on profitability is required to be explored. De Bandt et al. (2021) research shows that if a bank is predominating and market leader then they can pass the liquidity cost to their customers by providing loans and services at higher rates.

Altunbas et al. (2010) research shows how the liquidity leads to more profitability in the banking industry.

2.3 Capital adequacy

Capital adequacy provides both the financial strength and legalities of Basel III framework BIS, (2011). Kanga et al. (2020) says that the capital strength gives banks a buffer during the economic uncertainties. According to Abbas et al. (2019), capital also helps the banks in expansion and not merger which happened to Dena bank, Vijaya bank. Both Altunbas et al. (2010) and Abbas et al. (2020) have emphasised the positive relationship between capital and profitability. Strong capital positions provide

banks greater freedom to select risk-adjusted yet lucrative projects, and they also win over investors, which improves funding circumstances.

2.4 Interconnectedness of Risks and Profitability

Profitability is more than just a target for banks—it's also the outcome of smart decisions around managing risk and capital. It's usually measured through indicators like Return on Equity (ROE) and Return on Assets (ROA), which aren't just numbers on a report. They influence big-picture decisions, like a bank's strategy, how executives are rewarded, and how investors view the bank Pennacchi & Santos, (2021).

When credit risk rises, banks are required to set aside more money to cover potential losses. This process—called provisioning—directly reduces profits, as explained by Meriläinen (2019). The same goes for liquidity shocks, which can shrink interest margins and put pressure on earnings (Tran et al., 2020; Nicoletti, 2018). These problems hit even harder when banks don't have enough capital to absorb the shock.

But not all banks are affected the same way. Research by Batten & Vo (2019) and Abbas et al. (2020) shows that banks with strong capital reserves and good liquidity are more likely to maintain steady profitability.

2.5 Methodological Approaches in Existing Literature

Sims (1980) was the first to use the VAR framework which later becomes the benchmarked method of research for macroeconomic research as it helps the researchers to analyse how different variables reacts in the time series. Love and Zicchino (2006) and then Abrigo & Love (2016), introduces the Panel Vector Autoregression (PVAR) model which includes both the time series and cross sectional data. This is very useful in our research as it can analyse both the difference between different banks and timely impact and changes due to the variables.

Through PVAR we can study how variance in one variable like capital inadequacy on profitability over time and also on other factors like lack of liquidity due to capital issues. We have combined all the factors; credit risk, liquidity risks, capital adequacy and profitability in PVAR to get more dynamic view of the banking industry components and impacts.

2.6 Gaps in the Literature

Even with a wealth of research, there are still gaps in our knowledge of the dynamic relationships between capital, credit risk, liquidity risk, and profitability, particularly in emerging nations. There is a lack of information on how these factors interact in various economic contexts because the majority of research focusses on developed economies:

- Absence of integrated models: The majority of research examines capital, profitability, liquidity, and credit risk separately. A systemic perspective that captures dynamic interconnections is rarely used.
- Limited usage of dynamic tools: Although PVAR is becoming more popular, it is still seldom used to analyse bank-level data in developing nations. The majority of research is focused on developed economies, despite the fact that developing nations confront particular economic and regulatory issues.
- Distortions in earnings management: According to Nicoletti (2018) and Tran et al. (2020), the use of loan loss provisions to smooth profits makes it more difficult to accurately estimate profitability and risk.
- Behavioural elements of bank management: Understudied topics that have a big impact on bank strategy include managerial risk preferences and institutional governance.

2.7 Summary

Key results from the fields of credit risk, liquidity risk, capital adequacy, and profitability in the banking industry have been included in this overview of the literature. It has shown how shocks spread and impact overall bank performance, underscoring the significance of examining these factors within a cohesive, dynamic framework. The current study attempts to bridge current gaps by using Panel Vector Autoregression, particularly in developing countries where there are still few integrated evaluations of this kind. It is anticipated that the results will support strategic bank management and practical policy formation in addition to scholarly discourse.

2.8 Hypothesis for this research

2.8.1 Credit Risk and Profitability

Higher credit risk often leads to decrease in profitability for financial institutions. This is because of the greater chance of loan defaults, which forces banks to set aside significant reserves for potential losses, reducing the institution's net income. Finding the right balance between extending credit and managing risk is crucial for banks' long-term financial health and profitability. High credit risk indicates a higher likelihood of borrowers defaulting on their loans.

H0: Credit risk does not have a significant negative effect on the profitability in Indian banks
H1: Credit risk have a significant negative effect on the profitability in Indian banks.

2.8.1 Liquidity Risk and Profitability

Liquidity risk can significantly impact the bank's profitability, as low in liquidity can lead to selling the capital assets to meet the short term requirements. On other hand keeping a very high liquid position can also effect as it may lead to low investment and growing of the money, or investing in low yielding assets.

H0: Liquidity risk does not have a significant negative effect on the profitability in Indian Banks
H1: Liquidity risk does have a strong significant negative effect on the profitability in Indian Banks

2.8.2 Capital and Profitability

As we know that more the capital, stronger the business becomes. As capital provides growth opportunities and strength during tough times. In banks capital strength can also cheaper loan availability to the banks. Also capital strength attracts the potential investors and lenders which leads to higher profitability.

H0: There is no significant positive correlation between the amount of capital employed and the profit margins in Indian banks.
H1: There is a significant positive correlation between the amount of capital employed and the profit margins in Indian banks.

Chapter 3

RESEARCH METHODOLOGY

This research is based upon the quantitative research technique on the secondary data to find the interrelationship between the primary financial ratios and parameters of Indian banks which are credit risk, liquidity risk, capital adequacy and profitability. The secondary data consisted robust information about the bank's financial health which will help to do the research in a macro financial area of the banking research. Also as it contains data for a longer period of time gives us an in dept scenario of the banking health and will help to carry an empirical study of the data.
We have taken into consideration 29 Indian commercial banks, both public and private sector banks to make the panel dataset. It covers data of 10 years from 2015 to 2024, taking the major economic changes and development, consisting of demonetisation of 2016, UPI and digital payment introduction on 2016, COVID-19 pandemic on 2020 and Insolvency and Bankruptcy Code (IBC) providing different contexts for a dynamic research dataset.

3.1 Source of Data

I have collected the secondary data, the ratios from Bloomberg a well-known and reliable source for financial data. Bloomberg is widely utilised in both business and academics and is renowned for its thorough, current, and accurate financial information. In an organised and trustworthy manner, it offers comprehensive financial statements, market data, ratios, and macroeconomic indicators. High comparability among companies and time periods is guaranteed by the platform, which is essential for panel data analysis.

This study uses Bloomberg to guarantee a high level of data trustworthiness and to gain access to sophisticated analytics and data export features that facilitate thorough econometric modelling. Due to unavailability of the subscription in our college, one of my acquaintance helped me gathering the data from their college's Bloomberg Terminal.

3.2 Frequency and Panel Structure

A balanced panel with 290 observations (subject to availability and any missing data points) is produced by the yearly format of the panel dataset, which spans 10 years (2015–2024) and 29 different banks. Since the financial ratios and capital adequacy criteria taken into consideration usually show significant changes at the end-of-year reporting cycle, annual data is suitable for this study. Avoiding noise and volatility that might impact weekly or monthly results is another benefit of using yearly data.

3.3 Selection of Banks

The following criteria were used to choose the 29 banks that were part in this study:

- Complete financial data for the research period is available,
- participation from the financial industries, both public and private,
- Including consistently significant banks,
- Variability in terms of operating scale, ownership structure, and size.

This wide selection covers the variation in bank performance and risk-taking behaviour and guarantees that the results are generalisable throughout the Indian banking sector.

3.4 Variable Definitions and Rationale

The study uses the following financial statistics as proxies to examine the relationships between the selected aspects of banking performance: capital, credit risk, liquidity risk, and profitability. These ratios are well-known for their ability to explain bank performance and risk and are often employed in the academic and financial communities.

3.4.1 Profitability: Return on Assets (ROA)

ROA = Net Income / Total Assets

One of the main indicators of a bank's operational effectiveness and profitability is its return on assets (ROA). It shows how well a bank makes use of its resources to produce profits. Better use of resources and enhanced financial health are indicated by higher ROA levels. In this study, ROA is preferred because:

- It accounts for variations in bank sizes,
- Unlike ROE, it emphasises asset efficiency rather than only equity performance.
- It is less likely to be distorted by variations in capital structure.

Since it represents the final result of a bank's choices regarding capital sufficiency, liquidity management, and credit risk management, profitability is a crucial variable in this study.

3.4.2. Liquidity Risk: Total Debt to Total Assets Ratio

Liquidity Ratio = Total Debt / Total Assets

This ratio calculates how much of a bank's assets are funded by debt. A larger ratio might be an indicator of possible liquidity difficulties as it shows a greater reliance on borrowing to fund operations. The potential for a bank to fail to satisfy its short-term obligations is known as liquidity risk, and it frequently results from discrepancies between cash inflows and withdrawals.
This action is essential because:

- To prevent asset fire sales or emergency borrowing, banks must have enough liquidity.
- Lack of money during difficult financial circumstances might raise questions about solvency.
- The RBI and Basel Committee are among the regulators that place a strong emphasis on stable funding ratios and liquidity coverage.

3.4.2 Credit Risk

- Total debt to EBIT

Credit Ratio = Total Debt / (EBIT)

Debt to EBIT ratio shows the capability of the bank how well they can use their operating profit which is generated from the main line of business to pay their own borrowings or long term debts. If the credit ratio is high it means that bank is not able to meet their interest obligations from the operating profit earned by the bank's business

- Total debt to Equity

Credit Ratio = Total Debt / Total Equity

This ratios shows the leverage of the business, which means what is the ratio between the debt financing and equity financing of the business. If there is a high debt it shows there is a potential risk of the bank of default in repayments. If the assets quality declines the repayment risk will rise.

- When evaluating the risk of the capital structure,
- Recognising exposure in times of economic recession,
- figuring out the bank's loan loss cushion.

When combined, these two measures offer a thorough understanding of credit risk from the standpoints of capital structure and income.

- Capital Strength

Capital Ratio = Total Equity / Total Assets

This ratio indicates the solvency of the bank and their financial stability. This shows the share of the assets of the bank which are backed by the equity. If the capital ratio is high it says that the bank has financial strength and can manage the upcoming risks. This indicator shows how financially stable and solvent a bank is. As bank has to maintain a certain level of capital, it is also useful to monitor the capital structure of the bank.
This ratio is useful to see:

- The level of a bank's capitalisation,
- Its resilience to shocks to credit and liquidity,
- investor confidence and its long-term viability.

Because better-capitalized banks may take advantage of lending opportunities and are seen more favourably by regulators and markets, high capital ratios frequently have a positive correlation with profitability.

3.4.3 Software used

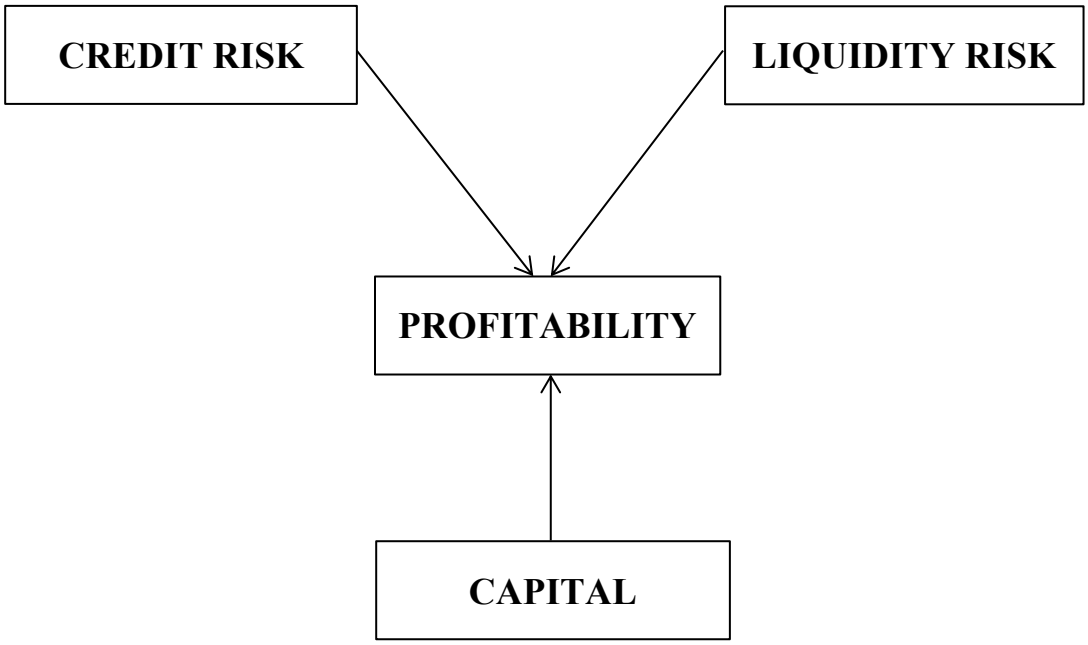
I have used EViews for data analysis and econometric modelling. This helps calculating the panel data econometrics. This software supports PVAR calculations, statistical testing, lag estimation which are fit for our research.

Chapter 4

PROJECT ANALYSIS

4.1 Theoretical Background

The study starts with the fundamental concept of bank risk management tool for analysing their financial status by finding the interrelationship between credit risk, liquidity risk, capital adequacy and profitability. It finds the banks management system which will find the internal vulanerabilty of banks due to different risks. Among these, credit risk will arrive from the bank's credit performance, how well the bank is able to pay their loans and intersets, liquidity risks arives due to lack of liquid cash to meet their short term obligations. The bank can have a negative impact in the profitability due to these issues. Higher the risk profile lower will be the profit earned due to these risks. The study also delves into the issue of capital shortage which will result in lower finacial strength which can act as a safety measure during economic downturns. This research will show the impact on profitability due to the above risks in the banking sectors with the help of PVAR framework.



4.2 Method and Data

In finance and banking industry it is important to know what is the reason behind the profitability of the business for both researchers and industry professionals. This research will show the impact of credit risk, liquidity risk, capital adequacy on profitability over the period of time across different banks. Profitability is the primary and dependent variable in this study which is observed from the ROA (Return on Assets ratio and the other ratios deriving the impact on the profitability. To examine this interrelations we will use PVAR (Panel Vector Autoregression) model which will take the both cross sectional data and time series data, resulting in capturing the insights of these determinants over the time.

4.2.1 Data collection

The study is started with collected data of 33 banks from which 29 are selected consisting of both private and public sector banks. Data is of 10 years, from 2015 to 2024. The data has been extracted from Bloomberg due to their accuracy and comprehensiveness of the businesses financial data. The research is followed to find the interrelation between the 3 risks on the profitability of the banks. ROA or Return on Assets is showing the profitability, Credit risk is from Total Debt to EBIT and Total Debt to Equity. Liquidity risk is examined via the Total Debt to Total Assets ratio, and capital adequacy was measured through the Equity to Total Assets ratio. These metrics were chosen for their pivotal role in highlighting the banks' financial stability and risk profile. The data gathered offers a robust framework for examining the intricate relationships between these critical financial indicators.

Table 1. Descriptive Statistics

	Profitability Ratio	Capital Ratio	Credit Ratio 1	Credit Ratio 2	Liquidity Ratio
Mean	0.44	8.10	20.36	103.28	13.73
Median	0.56	7.56	9.37	86.42	6.69
Maximum	2.62	18.10	388.84	525.82	214.36
Minimum	-5.15	2.31	0.36	1.08	0.09
Std. Dev.	1.17	2.68	35.20	76.10	29.43
Skewness	-1.56	0.97	6.13	1.67	4.86
Kurtosis	6.96	4.20	54.86	7.25	26.52
Jarque-Bera	306.78	63.11	34309.64	352.97	7825.99
Probability	0.00	0.00	0.00	0.00	0.00
Sum	127.16	2348.58	5904.89	29950.51	3981.29
Sum Sq. Dev.	397.14	2069.42	358100.30	1673867.00	250288.00
Observations	290.00	290.00	290.00	290.00	290.00

Table 1 shows the descriptive statistics, there is a substantial amount of variation in the financial ratios throughout the sample. The average profitability ratio is 0.44, which indicates moderate average earnings. However, some organisations have large losses (minimum of -5.15). While the credit ratios show high level of debt, especially the credit ratio 1 with its extreme outliers (highest of 388.84), the capital ratio has a healthy average of 8.10. The average liquidity ratio is 13.73, however there is a large range of values (highest of 214.36). Skewness, kurtosis, and Jarque-Bera values suggest non-normal distributions, with heavy-tailed data across most ratios.

4.2.2 Introduction to VAR Models

Vector Autoregression (VAR) models are a powerful and dependable statistical method used to understand the connections between several time series. The term "vector" refers to a group of multiple endogenous (interdependent) variables that are analysed together over time on a dependent variable and "autoregression" refers to the idea that each variable in the system depends not only on other variables, but also on its own past values.

In a VAR model, each variable is modelled as a linear combination of its past values and the historical values of every other variable in the model. This technique enables a dynamic examination of how variables interact with each other over time, laying a solid groundwork for this study. The Panel VAR model builds upon the traditional VAR framework by accommodating panel data, which comprises multiple cross-sectional units (e.g., banks) observed over time. PVAR allows to do the research with both cross sectional and time series data, which gives a more in dept analysis for the interdependency of the variables. By modelling every variable as according to its own historical values and the past values of other variables, Panel VAR depicts the dynamic interplay and feedback mechanisms among the variables. Including lagged values shared by all variables helps address potential endogeneity issues, where the independent variables are correlated with the error term.

4.2.3 Model Specification

The model used for the research, I observed that in the cointegration test, the probability value shows 0.1332, which means it is nonsignificant, and we failed to reject the null. That means there is no cointegration in the data and we use PVAR. The general Panel Vector Autoregression's structural composition (VAR) model can be articulated as follows:

$$Y_{it} = A_1 Y_{it-1} + \ldots + A_p Y_{it-p} + B X_{it} + \mu_{it} + \varepsilon_i$$

where Y_{it} is the vector of endogenous variables with k 1 dimension index, means using 1 variable each time, i denotes cross-section (bank) unit and t denotes selected time lag (p). The A1 to Ap are the matrices of the PVAR system, stating how much the current values of the variables are influenced by their past lags, the p is the number of lags to be included, which is determined using selection criteria like SIC or AIC, to be estimated with every A_j; j = 1..., X_{it} is the vector of exogenous (outside) variables, and B is the vector parameter, showing how much is the effect of exogenous variables. u_{it} is the vector of endogenous variable panel-specific fixed effect with a dimension of 1 k, and εi is k 1 vector, the error term.

4.2.4 Model Estimation

The Panel VAR model is estimated using the following steps:

1. *Cointegration test:* The cointegration test for a Panel Vector Autoregression (PVAR) model is essential to check for long-run relationships between variables in a panel dataset. While a typical Vector Autoregression (VAR) model presupposes that the variables are stable throughout the period in question., PVAR models are often applied to non-stationary panel data.
2. *Lag Selection:* Determine the optimal number of lags for the model using information criteria (e.g., AIC, BIC).

3. *Fixed or Random Effects Estimation:* The fixed effects model posits that certain traits unique to individuals, which are not directly observed, might have a relationship with the variables being studied. Its goal is to account for characteristics that do not change over time within each group being analyzed. Conversely, the random effects model operates under the assumption that these unseen individual traits have no correlation with the variables in question. This approach permits the consideration of variations that occur both within and among the groups under study.
4. *Wald Test:* The Wald test is a statistical test used to evaluate the importance of individual or joint coefficients in econometric models. This assists in assessing whether the independent variables in a model possess a statistically significant connection with the dependent variable.

4.3 Data Analysis

Gathering data involves collecting information from selected banks over a specific period, usually spanning 10 years. This dataset includes key financial metrics such as Profitability (ROA), Liquidity ratio, Credit ratio, and Capital Ratio for each bank in each year. It is important to organize the panel data properly to ensure that each bank-year observation is correctly aligned. In the model, I initially observed that the probability value in the cointegration test is 0.1332, which is not significant, and we fail to reject the null hypothesis. This null hypothesis indicates no cointegration in the data, and we use PVAR instead. When estimating a Panel Vector Autoregression (VAR) model, the first step is to ascertain the appropriate lag number. This might be accomplished by using information criteria like the Akaike Information Criterion (AIC) or the Schwarz Bayesian Information Criterion (SIC). When the PVAR model is to be constructed, we are taking time series data of past years, then we have to decide how many years as lags to be included. Considering of too few will result in missing the important information and too many can lead into messy and wrong predictions. The AIC and SIC help us to choose the best number of lags for the study by checking, how well the model fits the data and how simple the model is without having huge lags

The information criteria follows the following structure:-

Information Criterion + Model Fit + Penalty for Complexity

The model fit or likelihood measures how well the model fits the data, higher the likelihood is better fit of the model. The penalty terms are added due to adding too many variables or lags, so that overfitting is avoided.

$$AIC = -2 * \ln(L) + 2k$$

Here, log of likelihood is added with the number of estimated parameters, all the coefficients for each lag of each variable.

$$SIC = -2 * \ln(L) + k * \ln(n)$$

The Bayesian Information criteria uses n as the number of observation and heavily penalizes complexity of having large number of observations.

In the model, I considered AIC instead of SIC as the lag length is the lowest as the lower score is the best for model selections. The optimal lag length is crucial as it balances model complexity and explanatory power. Moving on to Fixed Random Effects, it is important to account for unobserved heterogeneity across banks. This can be achieved by including the model's fixed effects (or random effects, depending on the context). By incorporating fixed effects, I ensure that the unique characteristics of each bank, which do not vary over time, are appropriately considered in the model. To determine the appropriate effects, a Hausman test was conducted. The test results indicated a significant probability value of 0.000 for the Cross-section random test, leading to the rejection of the null hypothesis, which indicated that random effects are appropriate. Consequently, it was determined that fixed effects are suitable for the study. Further analysis involved conducting a Wald test to ascertain the collective effect of all independent variables on the dependent variable. The results revealed that all independent variables collectively impact the dependent variable. Additionally, the Wald test provided insights regarding the specific effects of different financial metrics. It indicated that credit ratios have an adverse impact on profitability, while liquidity and capital have a positive effect on profitability. These findings offer valuable insights into the relationship between financial metrics and bank profitability.

Table 3 Hausman Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.46797	0.18333	-2.55259	0.01130
PROFITABILITY (-1)	0.61509	0.04963	12.39447	0.00000
LIQUIDITY (-1)	0.00191	0.00094	2.04362	0.04770
CAPITAL (-1)	0.08778	0.02165	4.05397	0.00010
CREDIT_RATIO_ (-1)	-0.00085	0.00015	-5.77551	0.03390
CREDIT_TOTAL_DEBT_EQUITY (-1)	-0.00072	0.00035	-2.03738	0.01500

Table 3 Hausman test is used to figure out the fixed or random effect estimation. Here, we are figuring out whether the past probability significantly predicts the future probability of the variables. The present coefficient of the p-value as 0.0133 which shows the constant term is significant ($p < 0.05$) hence we reject the null hypothesis and accept the alternative that fixed effects to be taken for the PVAR test. The negative coefficient represents that the all the variables at zero, profitability is expected to decrease by approximately 0.47 units. The p value of profitability is 0 represents extreme significance of the present profitability with the past profitability. This shows favourable condition for the constant estimation of the present effect of the profitability with the past performance of the profitability. The profitability coefficient is 0.615 which means that with increase of 1 unit in the profitability of previous period will result in 0.615 unit of upsurge in the profitability. For liquidity 0.047 is the p-value

showing modest effect on the profitability as ($p < 0$) yet closer, have a coefficient of 0.0019 which means there will be a increase of 0.0019 units of profitability with an increase of 1 unit of liquidity. For capital it shows p-value of 0.0001, meaning a positive effect on the profitability. Here 1 unit of increase in liquidity will result in 0.0878 units of profitability. The p-value for credit ratio 1 which is Total debt/EBIT ratio is 0.0339, and the credit ratio adversely affects profitability. Here it has a negative coefficient which indicates that as the credit ratio increases by one unit, profitability decreases by 0.00085 units. The p-value for the total debt-to-equity ratio is 0.015. This variable adversely affects profitability, showing a coefficient of -0.00072. It reveals that a rise in the debt-to-equity ratio leads to a decrease in profitability, and this connection is statistically significant with a p-value less than 0.05.

To sum up, the profitability from the previous period is the strongest predictor of the profitability in the current period. Both capital and liquidity have positive and substantial impacts on profitability, with capital exhibiting a larger effect. Conversely, both the credit and total debt-to-equity ratios have negative impacts, indicating that higher credit risk and leverage diminish profitability. The negative constant suggests that profitability would be negative even in the absence of these factors. So, we are using the past probability as a significant effect for the future probability and keep this as constant as the fixed effect.

Test Statistic	Value	df	Probability
F-statistic	65.00459	(5, 255)	0.0000
Chi-square	325.0230	5	0.0000

Normalized Restriction (= 0)	Value	Std. Err.
C (2)	0.615088	0.049626
C (3)	0.001913	0.001833
C (4)	0.087779	0.021653
C (5)	-0.000849	0.001470
C (6)	-0.000716	0.001833

Table 4 says that after the regression analysis if the multiple variables, focusing on the target variable profitability. This study meticulously evaluates the effect of preceding year's merics which are Profitability, Liquidity, Capital, Credit Ratio, and Total Debt-to-Equity on current year probability outcomes. The high F- statistic value and negligible p-value shows that independent variables have a significant impact on the dependent variable. The F – statistic test was run to check whether the variables as a group makes a difference in the dependent variable, here we failed to accept the null that these variable doesn't have an significant impact on the profitability of the bank.

Secondly, we ran Chi-square test to check the collective impact of all the variables on the profitability, which again shows that the Chi-square value is significantly high and the p value is negligible which means the test is significant and we failed to accept the null.

After running both the test, we can say that the collective impact of liquidity, credit ratio and capital levels have an direct impact on the year's profitability. There is also a significant impact of past year's profitability and current year's profitability which means that if the bank has earned profit there is a high possibility to continue the earning due to the operational efficiency, balanced leverage and careful observations before giving loans.

The firm's liquidity status is a critical factor, with a modest coefficient, signifying the importance of maintaining financial fluidity for operational stability. Capital's positive relationship with profitability also shows huge importance, attributing to the strategic advantage of having substantial financial reserves for potential investments or cushioning against economic adversities. In contrast, a firm's credit ratio and leverage exhibit inverse relationships with profitability. The analysis indicates that larger the credit risk, due to the increase in non-performing loans or credit exposure, undermines profitability, highlighting the dangers of poor credit management. As, banks have to create separate provisions for the potential upcoming losses due to NPA's or NPL's. Likewise, a high debt-to-equity ratio is seen to decrease profitability margins, as huge loans takes large amount of profitability in the form of interest.

In simple terms, this analysis clearly shows that the financial factors studied have a real impact on the bank's profitability. The past profitability, liquidity, credit risk and capital strength stands as the most important contributors to the financial growth of the banks. The study warns us that higher the credit risk lower the profitability, as larger debts of banks will significantly lower the profitability, and over reliance on debt can weigh down the bank's long run performance. This study can be helpful for guidance for bank managers, financial planners and investors pointing the need for balanced, cautions and forward looking financial strategies, by this we can protect the long term profitability while minimizing the risk.

4.4 Findings and Recommendations

4.4.1 Findings

Using Panel Vector Autoregression (PVAR) modelling, this study looks at how profitability, credit risk, liquidity risk, and capital structure relate to one another across 29 Indian banks between 2015 and 2024. Evaluating the dynamic interactions between these internal financial measures over time and deriving conclusions for improving bank management were the main goals.

As determined by Return on Assets (ROA), the first important conclusion concerns the sustainability of profitability. Profitability in prior periods is a powerful predictor of future profitability, as seen by the extremely substantial and positive coefficient of lag profitability (0.615). This represents operational stability, sound managerial practices, and reinvestment potential and shows a consistent pattern across the banks in the sample. This conclusion highlights that, in the Indian banking setting, historical performance is still a good predictor of future success, maybe as a result of market positioning and institutional stability.

Remarkably, the model's constant term was statistically significant and negative (-0.46797), suggesting that profitability would decline in the absence of the explanatory factors that were included. This highlights how crucial it is to actively manage capital, credit exposure, and liquidity. The negative constant denotes operational inefficiencies or underlying systemic concerns that, if uncontrolled, might lower sector-wide profitability.

Liquidity, measured by the Total Debt to Total Assets ratio, also demonstrated a positive and statistically significant effect on profitability (coefficient = 0.00191, $p < 0.05$). Although the effect size is modest, this result underscores the importance of maintaining adequate liquidity buffers. Banks that can efficiently manage their short-term obligations tend to perform better, as they are well-positioned to capitalize on investment opportunities and mitigate funding pressures. Moreover, the stability condition test for the liquidity ratio confirmed that the banks consistently maintained stable liquidity profiles across the 10-year period.

Another important factor influencing profitability was capital sufficiency, which was measured by the equity to total assets ratio. The model showed a significant beneficial impact (coefficient = 0.08778, $p < 0.01$), emphasising how crucial capital is for financing activities and covering unforeseen losses. The stability tests also verified that, during the analysis period, capital ratios were stable and well-maintained across all institutions. The Basel III framework's focus on capital buffers as a defence against financial instability is consistent with this. Strong capital holdings indicate financial resilience and regulatory compliance in the Indian setting.

It was discovered that credit risk has a negative effect on profitability when measured using two different ratios: total debt to equity and total debt to EBIT. Higher credit risk, which is frequently represented by larger debt loads in relation to earnings, results in worse profitability, according to the Total Debt to EBIT ratio, which displayed a statistically significant negative coefficient (-0.00085). Likewise, the ratio of total debt to equity also exhibited a negative impact (-0.00072, $p = 0.015$), supporting the finding that high levels of leverage impair financial performance. These results demonstrate how an excessive dependence on borrowed money raises default risk, drives up the cost of capital, and reduces asset returns.

The robustness of the PVAR model is supported by the stability tests conducted on each model variable. The stability criteria was met by each of the fundamental ratios: profitability, liquidity, capital, and credit. This means that relationships are stable over time and that the system does not behave explosively. This reinforces the trustworthiness of the empirical data and further supports the utility of PVAR in modelling such financial dynamics.

The null hypothesis that the random effects model is acceptable was categorically rejected by the Hausman test, which yielded a significant p-value of 0.000 for fixed vs random effects. Therefore, unobserved heterogeneity among banks was controlled for using fixed effects. This choice made sure that the modelling took into consideration bank-specific features that change over time yet differ throughout institutions (e.g., management style, geography, legacy difficulties, or client demographics). The Wald test findings validated the inclusion of these particular financial ratios and supported the model's structural design by confirming that all of the included variables jointly affect profitability.

A closer examination of the coefficient table reveals the complex ways in which various factors affect profitability. The positive and statistically significant correlation between liquidity and capital supports the idea that banks with adequate capital and liquidity often have higher profitability rates. However, credit risk factors, especially those connected to leverage, show a statistically significant inverse association with profitability, indicating that banks should exercise caution when extending credit and raising debt levels in the absence of adequate protections. The strength of these

correlations supports regulatory data and well-established banking literature, demonstrating that unchecked loan expansion tends to reduce profitability over time.

4.4.2 Recommendation

Several policy and strategic recommendations are put forth to assist bank managers, regulators, and stakeholders in enhancing financial performance and risk management inside Indian banks, based on the thorough empirical findings of this study.

First, the banking industry as a whole urgently needs to improve its frameworks for managing credit risk. Banks should give priority to enhancing loan quality through improved credit evaluation systems, since both the Total Debt to EBIT and Total Debt to Equity ratios have a statistically significant negative influence on profitability. In order to reduce non-performing loans (NPLs), a thorough borrower review that incorporates industry stress scenarios and forward-looking measures is necessary. Furthermore, creating internal early warning systems can help banks see troublesome exposures before they turn into significant defaults.

Second, banks must to keep up and improve their liquidity management procedures. The modestly favourable effect of liquidity on profitability implies that keeping sufficient liquidity buffers enhances financial performance. Indian banks have to concentrate on dynamic liquidity planning that adapts to shifting macroeconomic circumstances, legal mandates (such as the Liquidity Coverage Ratio, or LCR), and consumer trends. Purchasing high-quality liquid assets (HQLAs) will assist in meeting cash flow requirements without resorting unduly on short-term wholesale finance, which can become costly or unavailable in times of crisis.

Third, bank leadership must continue to place a high premium on capital management. Because the Equity to Total Assets ratio has a large and statistically significant positive influence on profitability, banks should actively manage their capital base as a strategic tool to promote growth as well as to comply with regulatory standards. Risk-weighted asset optimisation should be used to increase capital sufficiency without sacrificing risk appetite, and retained earnings should be used carefully to increase capital. Additionally, banks will be better equipped to withstand unforeseen shocks during downturns if they maintain capital buffers during economic upturns in accordance with Basel III countercyclical buffer requirements.

Fourth, when it comes to controlling leverage, banks must exercise caution. According to the data, a greater debt-to-equity ratio reduces profitability. Taking too much loan can help during expansion but will also reduce the profits during financial downturns. Managers and decision should concentrate on more capital optimization instead of taking too much loan as loans or debts will increase the interest obligations and lowering down the net profitability.

Finally, as past profitability is a significant indicator of the present profitability, management should take proper measures by monitoring them and should enhance and grow their key performing areas which are giving higher yields and should restructure or close down the constant loss making segments or business lines. The better financial health will give a performance enhancing result and better future decision makings.

4.5 Limitations of the research

Even though the PVAR provides a insightful information regarding the interrelation between the credit risk, liquidity risk, capital adequacy and profitability; there are few limitations in this study as well which can affect the final results and interpretations.

4.5.1. Limitations on Data Sources

As the data has been collected from Bloomberg, the data may not contain all the Indian banks for example the private and cooperative bank as they are not publicly traded companies. There can be also a selection biasness of the banks during consideration for the study. As regional banks or smaller banks may not have been taken into consideration during data collection which can capture more detail scenario of Indian banks. This restriction can result into an inaccurate picturization of the industry in India as whole.

4.5.2. Endogeneity and Model Specification

As the research has been done only on the endogenous variable impacts it may omit the other exogenous impact such as inflation or new regulations which can also significantly impact the performance in the profitability of the banks. If the profitability is more impacted the exogenous variables it may impact the true scenario of the impact reasons and risk due to omitting them.

4.5.3. Assumption of Homogeneity Among Banks

In PVAR all the banks in the panel dataset are taken as homogenous entities which says that the behaviour and impact will be same across all banks. The size, ownership, operational focus such as corporate or retail banks and geographic locations shows huge variances. This variance can lead to different policies and treatment of financial shocks. The PVAR model can over simplify by removing the heterogeneity which can lead to a different scenario.

4.5.4. Elimination of Qualitative Elements

This study based on purely quantitative research, may have missed the qualitative components such as customer happiness and retention, technological advancement and infrastructure, corporate governance procedures, and management capabilities which can also significantly impact the profitability of the bank. Hence, this research is not as thorough as it would be with the consideration of qualitative factors.

4.5.5. Restricted External Validity

This study is focused on the Indian banks which may not be good fit for other countries due to different regulatory frameworks, market structures or economic situations. Using this research for other nations should take this into consideration these factors before implementing the methods and procedures while investigating their profitability impacts.

4.5.6. The possibility of overfitting

A potential risk lies of overfitting the model due to several variables and delays. Model may perform well in the historical data but badly during the prediction can arise due to overfitting the data in the model. It is essential to cross validate the model for generalising and industrial implementations.

4.5.12. Ignorance of Nonlinear Connections

The ignorance of nonlinear connection between variables is also there in the study, as PVAR assumes that there are only linear connections between the variables. For example there could be nonlinear connection between credit risk and profitability which means the variables are not directly proportionate to each other. The model could oversimplify and omit the complicated processes and give wrong results if nonlinearity is there and it is been ignored.

4.5.13. Lack of Stress Test Conditions

In this research the stress scenario testing has not been done, which can show the further banks' ability to withstand the financial stress situations due to economic downturns. This test could show more detail importance of the capital adequacy need to maintain the profitability, including this could make the study more accurate and detailed.

Chapter 5

CONCLUSION

The Panel Vector Autoregression (PVAR) model captures the dependency of the profitability on the bank's credit risk, liquidity risk and capital adequacy along with the past profitability of the bank. The credit risk ratio (total debt to EBIT and total debt to equity), liquidity ratio (total debt to total assets), capital ratio (equity to total assets) and return on assets (ROA) for profitability is taken for 10 years of 29 Indian banks. The panel data format helped to find out the possible impact of individual banks and their time series data. Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC) is used to find out the ideal lag time for significant impact on both short term and long term impact. The Wald test is run to find out the significant relationship between credit risk, liquidity, capital adequacy and past profitability in the present profitability. The Hausman test is done to check the unobserved heterogeneity for which fixed effects are best fitted.

This study gives a comprehensive picture on the performance measures and their interrelationship between key financial metrics. The findings crucially showed a negative correlation between profitability and credit ratios. Greater debts were associated with decreased profitability for banks, as shown by large debt-to-EBIT and debt-to-equity ratios. This shows that the banks' profitability is heavily impacted due to the huge interest payments. It is observed that the liquidity and capital have a positive impacts on the profitability, which means ore the liquidity and capital strength of the business results in more profitability of the bank. Because more liquidity increases the banks' ability to meet their short term obligations without impacting their fixed assets and capital strength which is indicated by equity to total assets, improves their financial strength during economic downturns which eventually improves and maintains the profitability. This findings shows how much it is important to have a efficient risk management procedures in the banking industry.

Hence, it is very important to carefully observe the lending or loan sanctioned to the customers to lower down the bad loans so that the profitability is not impacted due to the Non-Performing Loans (NPLs). Concurrently, long term growth and financial resilience depend on keeping sufficient liquidity and capital reserves. These findings emphasise to bank executives the necessity of coordinating internal financial plans with more general risk management objectives. To maintain the general stability of the banking system, however, policymakers should strengthen laws that support capital adequacy and liquidity norms.

The review and analysis conclude by showcasing the necessity for a well-optimized capital structure and the good balance between risk and profitability inside Indian banks. The future studies can be improved by including the exogenous variables (macroeconomic factors) like GDP growth rate, government policies and inflation along with enlarging the dataset. This would increase the results' applicability and encourage more powerful evidence-based management and policy choices in the financial industry.

Managerial Implications

For the Indian banking industry this research gives various valuable insights to the bank managers, policymakers, and regulatory authorities of the banks. It shows how crucial is to optimize the banks' risk management policies by understanding the complex relation between credit risk, liquidity, capital structure and profitability. This will include reducing taking excessive loans, giving loans to good credit score individuals and maintaining liquid cash and a strong capital structure. Consequently, banks are able to strengthen their finances well-being, operational effectiveness, and profit margins. This research also indicates a positive relationship between liquidity and profitability is there. Hence, managers should have perfect liquidity management strategies to guarantee that banks maintain sufficient liquid assets to navigate market volatility and unforeseen financial needs. The study also helps to understand that a significant influence of capital structure on profitability, suggesting that a higher capital ratio equips banks with a solid financial stability. This strength allows them to cover losses and follow profitable opportunities.

For policymakers and regulatory officials, the findings show the importance for laws to have a fixed level of liquidity and capital structure to be maintained by the banks and minimum exposures to the credit risks. Regulatory policies should be strong enough to effectively manage the risks of the bank. This study serves as a blueprint for banks to strengthen their financial strategies, increase the profitability, and achieve sustainable growth. It also says that the regulatory bodies should have stronger policies to have a good financial health and a strong banking system in India.

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ANNEXURE

Panel data of 29 Indian banks for past 10 years

	Bank	Year	Profitability Ratio	Liquidity Ratio
			Return on Assets	Total Debt/Total Assets
1	Bank of Baroda	2024	1.18	6.4
	Bank of Baroda	2023	1.04	7.34
	Bank of Baroda	2022	0.62	8.47
	Bank of Baroda	2021	0.13	6.15
	Bank of Baroda	2020	0.09	8.16
	Bank of Baroda	2019	0.14	8.64
	Bank of Baroda	2018	-0.26	8.95
	Bank of Baroda	2017	0.26	4.65
	Bank of Baroda	2016	-0.71	17.28
	Bank of Baroda	2015	0.55	20.55
2	Bank of India	2024	0.75	8.94
	Bank of India	2023	0.49	8.07
	Bank of India	2022	0.47	3.84
	Bank of India	2021	0.3	4.62
	Bank of India	2020	0.47	6.17
	Bank of India	2019	-0.84	7.22
	Bank of India	2018	-0.96	7.31
	Bank of India	2017	-0.4	15.56
	Bank of India	2016	-1	8.48
	Bank of India	2015	0.33	16.25
3	Bank of Maharashtra	2024	1.42	2.51
	Bank of Maharashtra	2023	1.04	4.28
	Bank of Maharashtra	2022	0.54	3.71
	Bank of Maharashtra	2021	0.31	2.52
	Bank of Maharashtra	2020	0.24	2.17
	Bank of Maharashtra	2019	-2.97	6.61
	Bank of Maharashtra	2018	-0.7	2.6
	Bank of Maharashtra	2017	-0.85	5.1
	Bank of Maharashtra	2016	0.08	5.73
	Bank of Maharashtra	2015	0.33	7.62
4	Canara Bank	2024	1.05	3.91
	Canara Bank	2023	0.85	4.36
	Canara Bank	2022	0.5	3.86
	Canara Bank	2021	0.3	4.42
	Canara Bank	2020	-0.27	5.92

	Canara Bank	2019	0.09	5.99
	Bank	**Year**	**Profitability Ratio**	**Liquidity Ratio**
			Return on Assets	Total Debt/Total Assets
	Canara Bank	2018	-0.64	6.37
	Canara Bank	2017	0.23	6.87
	Canara Bank	2016	-0.46	5.01
	Canara Bank	2015	0.54	4.8
5	Central Bank of India	2024	0.62	4.47
	Central Bank of India	2023	0.42	2.05
	Central Bank of India	2022	0.28	1.98
	Central Bank of India	2021	-0.28	1.56
	Central Bank of India	2020	-0.36	1.7
	Central Bank of India	2019	-1.7	1.7
	Central Bank of India	2018	-1.55	1.84
	Central Bank of India	2017	-0.77	2.88
	Central Bank of India	2016	-0.45	3.1
	Central Bank of India	2015	0.22	8.34
6	Indian Bank	2024	1.12	2.91
	Indian Bank	2023	0.8	3.36
	Indian Bank	2022	0.64	7.787
	Indian Bank	2021	0.67	4.19
	Indian Bank	2020	0.29	6.88
	Indian Bank	2019	0.14	4.54
	Indian Bank	2018	0.56	8.06
	Indian Bank	2017	0.69	6.92
	Indian Bank	2016	0.38	2.06
	Indian Bank	2015	0.55	1.37
7	Indian Overseas Bank	2024	0.8	8.87
	Indian Overseas Bank	2023	0.69	6.9
	Indian Overseas Bank	2022	0.6	1.26
	Indian Overseas Bank	2021	0.31	1.58
	Indian Overseas Bank	2020	-3.34	2.29
	Indian Overseas Bank	2019	-1.5	2.68
	Indian Overseas Bank	2018	-2.54	3.96
	Indian Overseas Bank	2017	-3.34	6.77
	Indian Overseas Bank	2016	-4.15	5.67
	Indian Overseas Bank	2015	-2.13	3.58
8	Punjab and Sind Bank	2024	0.42	6.79
	Punjab and Sind Bank	2023	1.2	6.85
	Punjab and Sind Bank	2022	0.9	2.24
	Punjab and Sind Bank	2021	-2.59	2.59
	Punjab and Sind Bank	2020	-0.95	3.38
	Punjab and Sind Bank	2019	-0.49	2.7

	Punjab and Sind Bank	2018	-0.71	4.08
	Bank	**Year**	**Profitability Ratio**	**Liquidity Ratio**
			Return on Assets	Total Debt/Total Assets
	Punjab and Sind Bank	2017	0.2	3.3
	Punjab and Sind Bank	2016	0.34	3.01
	Punjab and Sind Bank	2015	0.13	6.77
9	Punjab National Bank	2024	0.59	4.75
	Punjab National Bank	2023	0.24	4.95
	Punjab National Bank	2022	0.29	4.66
	Punjab National Bank	2021	0.24	4.34
	Punjab National Bank	2020	0.05	7.56
	Punjab National Bank	2019	-1.22	6.19
	Punjab National Bank	2018	-1.6	8.72
	Punjab National Bank	2017	0.12	6.26
	Punjab National Bank	2016	-0.55	21.46
	Punjab National Bank	2015	0.56	16.94
10	State Bank of India	2024	1.06	152.2
	State Bank of India	2023	0.98	147.55
	State Bank of India	2022	0.69	152.35
	State Bank of India	2021	0.5	158.33
	State Bank of India	2020	0.49	138.91
	State Bank of India	2019	0.06	181.96
	State Bank of India	2018	-0.13	168.45
	State Bank of India	2017	0.01	164.25
	State Bank of India	2016	0.42	214.36
	State Bank of India	2015	0.67	161.53
11	UCO Bank	2024	0.54	8.04
	UCO Bank	2023	0.66	7
	UCO Bank	2022	0.36	5.27
	UCO Bank	2021	0.07	6.27
	UCO Bank	2020	-1.04	6.84
	UCO Bank	2019	-1.94	6.34
	UCO Bank	2018	-1.98	5.8
	UCO Bank	2017	-0.78	4.16
	UCO Bank	2016	-1.14	7.08
	UCO Bank	2015	0.47	4.22
12	Union Bank of India	2024	1.03	1.92
	Union Bank of India	2023	0.69	3.32
	Union Bank of India	2022	0.46	4.29
	Union Bank of India	2021	0.35	4.8
	Union Bank of India	2020	-0.59	9.49
	Union Bank of India	2019	-0.59	8.69
	Union Bank of India	2018	-1.1	9.3

	Union Bank of India	2017	0.13	9.05
	Bank	**Year**	**Profitability Ratio**	**Liquidity Ratio**
			Return on Assets	Total Debt/Total Assets
	Union Bank of India	2016	0.34	7.52
	Union Bank of India	2015	0.48	9.17
13	DCB Bank	2024	1.32	7.21
	DCB Bank	2023	1.1	6
	DCB Bank	2022	0.93	5.31
	DCB Bank	2021	0.9	6.38
	DCB Bank	2020	0.99	7.61
	DCB Bank	2019	0.91	8.85
	DCB Bank	2018	0.86	11.32
	DCB Bank	2017	0.98	9.11
	DCB Bank	2016	0.96	7.86
	DCB Bank	2015	0.93	9.87
14	Dhanlaxmi Bank	2024	-1.66	6.98
	Dhanlaxmi Bank	2023	-1.56	2.34
	Dhanlaxmi Bank	2022	0.1	1.58
	Dhanlaxmi Bank	2021	-0.2	3.47
	Dhanlaxmi Bank	2020	0.1	1.95
	Dhanlaxmi Bank	2019	0.55	1.63
	Dhanlaxmi Bank	2018	0.29	1.27
	Dhanlaxmi Bank	2017	0.27	1.32
	Dhanlaxmi Bank	2016	0.34	3.43
	Dhanlaxmi Bank	2015	0.37	1.87
15	Federal Bank	2024	1.34	2.91
	Federal Bank	2023	0.55	5.54
	Federal Bank	2022	0.82	5.5
	Federal Bank	2021	0.73	9.1
	Federal Bank	2020	0.88	5.68
	Federal Bank	2019	0.92	6.93
	Federal Bank	2018	0.86	6.23
	Federal Bank	2017	0.91	8.93
	Federal Bank	2016	1.28	9.88
	Federal Bank	2015	1.32	8.12
16	HDFC Bank	2024	1.92	10.8
	HDFC Bank	2023	1.87	14.58
	HDFC Bank	2022	1.84	12.9
	HDFC Bank	2021	1.86	14.93
	HDFC Bank	2020	1.86	12.75
	HDFC Bank	2019	1.9	12.3
	HDFC Bank	2018	1.88	10.57
	HDFC Bank	2017	1.94	11.31

	HDFC Bank	2016	1.98	10.6
	Bank	**Year**	**Profitability Ratio**	**Liquidity Ratio**
			Return on Assets	Total Debt/Total Assets
	HDFC Bank	2015	1.95	18.47
17	AXIS Bank	2024	1.84	15.47
	AXIS Bank	2023	0.85	16.05
	AXIS Bank	2022	1.29	17.02
	AXIS Bank	2021	0.75	15.91
	AXIS Bank	2020	0.21	17.12
	AXIS Bank	2019	0.66	20.27
	AXIS Bank	2018	0.07	22.83
	AXIS Bank	2017	0.68	19.04
	AXIS Bank	2016	1.65	21.5
	AXIS Bank	2015	1.75	18.9
18	CITY Union Bank	2024	1.48	7.11
	CITY Union Bank	2023	1.46	7.6
	CITY Union Bank	2022	1.32	9.4
	CITY Union Bank	2021	1.15	2.87
	CITY Union Bank	2020	1	4.49
	CITY Union Bank	2019	1.6	1.99
	CITY Union Bank	2018	1.57	5.09
	CITY Union Bank	2017	1.5	2.06
	CITY Union Bank	2016	1.19	2.09
	CITY Union Bank	2015	1.49	0.61
19	CSB Bank	2024	1.74	4.87
	CSB Bank	2023	2.01	3.01
	CSB Bank	2022	1.88	8.04
	CSB Bank	2021	1.04	6.56
	CSB Bank	2020	0.07	4.27
	CSB Bank	2019	-1.22	0.09
	CSB Bank	2018	-0.82	0.39
	CSB Bank	2017	-0.37	0.35
	CSB Bank	2016	-0.95	0.27
	CSB Bank	2015	-0.34	0.65
20	ICICI Bank	2024	2.05	9.32
	ICICI Bank	2023	1.83	10.35
	ICICI Bank	2022	1.51	9.97
	ICICI Bank	2021	1.25	9.96
	ICICI Bank	2020	0.73	15.94
	ICICI Bank	2019	0.36	17.67
	ICICI Bank	2018	0.73	21.05
	ICICI Bank	2017	1.07	19.94
	ICICI Bank	2016	1.17	24.51

	ICICI Bank	2015	1.56	26.21
	Bank	**Year**	**Profitability Ratio**	**Liquidity Ratio**
			Return on Assets	Total Debt/Total Assets
21	IDBI Bank	2024	0.28	17.78
	IDBI Bank	2023	-0.98	19.07
	IDBI Bank	2022	-1.36	15.95
	IDBI Bank	2021	-2.28	18.45
	IDBI Bank	2020	-4.46	14.63
	IDBI Bank	2019	-4.13	12.54
	IDBI Bank	2018	0.51	5.84
	IDBI Bank	2017	0.84	5.29
	IDBI Bank	2016	1.17	4.52
	IDBI Bank	2015	1.66	4.69
22	Jammu & Kashmir Bank	2024	1.18	2.11
	Jammu & Kashmir Bank	2023	0.85	2.19
	Jammu & Kashmir Bank	2022	0.39	2.02
	Jammu & Kashmir Bank	2021	0.37	1.68
	Jammu & Kashmir Bank	2020	-1.13	1.86
	Jammu & Kashmir Bank	2019	0.49	2.59
	Jammu & Kashmir Bank	2018	0.24	1.82
	Jammu & Kashmir Bank	2017	-2.01	1.56
	Jammu & Kashmir Bank	2016	0.53	3.15
	Jammu & Kashmir Bank	2015	0.66	3.4
23	IndusInd Bank	2024	1.85	9.51
	IndusInd Bank	2023	1.73	10.95
	IndusInd Bank	2022	1.26	11.98
	IndusInd Bank	2021	0.87	14.32
	IndusInd Bank	2020	1.52	19.93
	IndusInd Bank	2019	1.32	17.24
	IndusInd Bank	2018	1.8	17.58
	IndusInd Bank	2017	1.78	12.9
	IndusInd Bank	2016	1.81	17.86
	IndusInd Bank	2015	1.83	19.22
24	Karnataka Bank	2024	1.21	3.79
	Karnataka Bank	2023	1.24	1.58
	Karnataka Bank	2022	0.57	2.53
	Karnataka Bank	2021	0.57	2.32
	Karnataka Bank	2020	0.53	5.11
	Karnataka Bank	2019	0.64	4.54
	Karnataka Bank	2018	0.48	1.52
	Karnataka Bank	2017	0.75	1.82
	Karnataka Bank	2016	0.77	2.37
	Karnataka Bank	2015	1.64	2.53

	Karur Vysya Bank	2024	1.64	2.86
	Bank	**Year**	**Profitability Ratio**	**Liquidity Ratio**
			Return on Assets	Total Debt/Total Assets
25	Karur Vysya Bank	2023	1.3	2.3
	Karur Vysya Bank	2022	0.87	2.13
	Karur Vysya Bank	2021	0.5	3.79
	Karur Vysya Bank	2020	0.34	2.05
	Karur Vysya Bank	2019	0.31	2.66
	Karur Vysya Bank	2018	0.54	4.05
	Karur Vysya Bank	2017	1	3.32
	Karur Vysya Bank	2016	1.01	5.34
	Karur Vysya Bank	2015	0.89	6
26	Kotak Mahindra Bank	2024	2.62	10.25
	Kotak Mahindra Bank	2023	2.56	9.69
	Kotak Mahindra Bank	2022	2.36	10.7
	Kotak Mahindra Bank	2021	2.17	10.47
	Kotak Mahindra Bank	2020	2.05	15.03
	Kotak Mahindra Bank	2019	1.97	17.28
	Kotak Mahindra Bank	2018	2.02	17.19
	Kotak Mahindra Bank	2017	1.91	18.47
	Kotak Mahindra Bank	2016	1.78	18.59
	Kotak Mahindra Bank	2015	2.25	21.8
27	South Indian Bank	2024	0.95	3.33
	South Indian Bank	2023	0.75	6.59
	South Indian Bank	2022	0.05	3.78
	South Indian Bank	2021	0.06	4.63
	South Indian Bank	2020	0.11	8.18
	South Indian Bank	2019	0.28	5.77
	South Indian Bank	2018	0.43	5.66
	South Indian Bank	2017	0.57	3.68
	South Indian Bank	2016	0.54	4.76
	South Indian Bank	2015	0.54	4.02
28	RBL Bank	2024	0.99	10.77
	RBL Bank	2023	0.83	12.08
	RBL Bank	2022	-0.16	10.7
	RBL Bank	2021	0.56	11.43
	RBL Bank	2020	0.59	19.29
	RBL Bank	2019	1.21	14.96
	RBL Bank	2018	1.16	15.35
	RBL Bank	2017	1.02	16.91
	RBL Bank	2016	0.88	27.09
	RBL Bank	2015	0.91	25.99
29	Yes Bank	2024	0.34	19.93

	Yes Bank	2023	0.22	22.1

	Bank	Year	Profitability Ratio	Liquidity Ratio
			Return on Assets	Total Debt/Total Assets
	Yes Bank	2022	0.36	22.94
	Yes Bank	2021	-1.31	23.58
	Yes Bank	2020	-5.15	44.24
	Yes Bank	2019	0.49	28.57
	Yes Bank	2018	1.6	24.26
	Yes Bank	2017	1.76	18.23
	Yes Bank	2016	1.68	19.35
	Yes Bank	2015	1.63	19.51

	Bank	Year	Credit Ratio		Capital
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
1	Bank of Baroda	2024	5.75	87.65	7.23
	Bank of Baroda	2023	7.63	105.63	6.88
	Bank of Baroda	2022	11.57	122.61	6.86
	Bank of Baroda	2021	50.87	89.3	6.85
	Bank of Baroda	2020	103.91	128	6.34
	Bank of Baroda	2019	65.12	127.93	6.71
	Bank of Baroda	2018	65.12	142.84	6.23
	Bank of Baroda	2017	18.82	77.23	5.99
	Bank of Baroda	2016	18.82	279.77	6.15
	Bank of Baroda	2015	39.35	357.35	5.72
2	Bank of India	2024	12.94	116.79	7.64
	Bank of India	2023	17.17	109.98	7.32
	Bank of India	2022	8.38	50.37	7.61
	Bank of India	2021	15.41	67.58	6.82
	Bank of India	2020	15.41	90.39	6.8
	Bank of India	2019	15.41	95.26	7.55
	Bank of India	2018	14.41	121.84	5.97
	Bank of India	2017	25.36	291.68	5.32
	Bank of India	2016	49.49	156.28	5.41
	Bank of India	2015	59.05	315.81	5.2
3	Bank of Maharashtra	2024	1.77	38.85	6.47
	Bank of Maharashtra	2023	4.4	72.79	5.9
	Bank of Maharashtra	2022	7.43	60.85	6.09
	Bank of Maharashtra	2021	9.01	40.34	6.25
	Bank of Maharashtra	2020	9.43	33.64	6.45
	Bank of Maharashtra	2019	21.05	175.51	3.57
	Bank of Maharashtra	2018	34.06	40.37	6.43
	Bank of Maharashtra	2017	50.74	108.94	4.69
	Bank of Maharashtra	2016	91.29	104.15	5.5

	Bank of Maharashtra	2015	24.67	64.49	5.56
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
4	Canara Bank	2024	3	76.32	6
	Canara Bank	2023	4.18	68.73	5.65
	Canara Bank	2022	8.4	68.4	5.56
	Canara Bank	2021	19.27	82.4	5.29
	Canara Bank	2020	41.66	104.64	5.56
	Canara Bank	2019	77.95	111.2	5.3
	Canara Bank	2018	55.68	107.44	5.84
	Canara Bank	2017	33.19	116.38	5.82
	Canara Bank	2016	18.89	85.92	5.75
	Canara Bank	2015	9.37	91.48	5.82
5	Central Bank of India	2024	7.77	61.67	7.23
	Central Bank of India	2023	5.18	28.46	7.18
	Central Bank of India	2022	7.2	27.76	7.11
	Central Bank of India	2021	9.02	21.7	7.16
	Central Bank of India	2020	6.08	28.15	6.03
	Central Bank of India	2019	15.63	29.01	5.84
	Central Bank of India	2018	21.62	33.02	5.56
	Central Bank of India	2017	25.29	52.74	5.44
	Central Bank of India	2016	32.08	51.25	6.04
	Central Bank of India	2015	42.81	146.89	5.67
6	Indian Bank	2024	2.1	38.39	7.57
	Indian Bank	2023	4	48.32	6.94
	Indian Bank	2022	5.74	41.66	6.67
	Indian Bank	2021	8.69	66.38	6.31
	Indian Bank	2020	28.13	93.57	7.34
	Indian Bank	2019	39.68	64.53	7.03
	Indian Bank	2018	16.15	108.84	7.4
	Indian Bank	2017	9.72	79.42	7.91
	Indian Bank	2016	5.88	25.44	8.04
	Indian Bank	2015	5.48	17.59	7.79
7	Indian Overseas Bank	2024	9.12	113.2	7.83
	Indian Overseas Bank	2023	9.19	86.92	7.94
	Indian Overseas Bank	2022	2.12	16.24	7.75
	Indian Overseas Bank	2021	5.21	25.56	6.18
	Indian Overseas Bank	2020	7.05	36.94	6.2
	Indian Overseas Bank	2019	9.25	40.92	6.54
	Indian Overseas Bank	2018	13.08	74.06	5.35
	Indian Overseas Bank	2017	16.82	121.66	5.56
	Indian Overseas Bank	2016	8.35	63.58	4.35
	Indian Overseas Bank	2015	11.36	48.67	4.89

	Punjab and Sind Bank	2024	16.83	64.51	10.52
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
8	Punjab and Sind Bank	2023	7.12	61.88	11.07
	Punjab and Sind Bank	2022	2.61	19.35	11.57
	Punjab and Sind Bank	2021	5.23	34.22	7.57
	Punjab and Sind Bank	2020	10.04	60.65	5.57
	Punjab and Sind Bank	2019	28.55	65.92	4.09
	Punjab and Sind Bank	2018	19.64	110.65	3.68
	Punjab and Sind Bank	2017	15.86	66.13	4.99
	Punjab and Sind Bank	2016	9.18	51.68	5.82
	Punjab and Sind Bank	2015	22.77	118.18	5.72
9	Punjab National Bank	2024	9.12	68.45	6.91
	Punjab National Bank	2023	24.07	71.48	6.89
	Punjab National Bank	2022	16.99	63.69	7.29
	Punjab National Bank	2021	25.81	59.73	7.23
	Punjab National Bank	2020	177.07	100.15	7.5
	Punjab National Bank	2019	121.42	106.4	5.83
	Punjab National Bank	2018	66.35	162.08	5.34
	Punjab National Bank	2017	50.94	104.46	5.99
	Punjab National Bank	2016	39.85	359.07	5.86
	Punjab National Bank	2015	24.42	253.02	6.61
10	State Bank of India	2024	7.18	152.2	6.16
	State Bank of India	2023	7.28	147.55	6.03
	State Bank of India	2022	9.7	152.35	5.7
	State Bank of India	2021	13.77	158.33	5.69
	State Bank of India	2020	11.87	138.91	5.98
	State Bank of India	2019	83.84	181.96	6.03
	State Bank of India	2018	100.54	168.45	6.37
	State Bank of India	2017	388.84	164.25	6.3
	State Bank of India	2016	22.04	214.36	5.88
	State Bank of India	2015	10.43	161.53	5.98
11	UCO Bank	2024	15.72	95.55	8.41
	UCO Bank	2023	11.3	82.18	8.51
	UCO Bank	2022	15.18	60.15	8.77
	UCO Bank	2021	95.14	70.29	8.92
	UCO Bank	2020	71.43	83.96	8.14
	UCO Bank	2019	65.59	48.28	7.55
	UCO Bank	2018	49.53	83.79	6.92
	UCO Bank	2017	31.21	75.45	5.51
	UCO Bank	2016	16.68	138.43	5.11
	UCO Bank	2015	6.55	82.62	5.1
12	Union Bank of India	2024	1.97	27.64	6.95

	Union Bank of India	2023	5.07	54.23	6.11
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
	Union Bank of India	2022	9.84	72.32	5.93
	Union Bank of India	2021	18.36	80.2	5.97
	Union Bank of India	2020	31.58	155.09	6.1
	Union Bank of India	2019	43.26	161.26	5.38
	Union Bank of India	2018	58.65	180.9	5.14
	Union Bank of India	2017	72.74	170.97	5.29
	Union Bank of India	2016	22.81	132.92	5.66
	Union Bank of India	2015	20.24	176.65	5.17
13	DCB Bank	2024	6.09	191.41	3.71
	DCB Bank	2023	5.9	144.07	4.17
	DCB Bank	2022	5.75	79.93	9.17
	DCB Bank	2021	6.59	90.63	9.29
	DCB Bank	2020	6.45	104.89	8.7
	DCB Bank	2019	7.55	108.61	8.88
	DCB Bank	2018	10.94	131.82	9.49
	DCB Bank	2017	12.25	117.86	9.04
	DCB Bank	2016	8.3	114.01	8.72
	DCB Bank	2015	9.94	141.5	8.04
14	Dhanlaxmi Bank	2024	11.41	138.41	5.04
	Dhanlaxmi Bank	2023	14.87	57.44	4.08
	Dhanlaxmi Bank	2022	15.7	29.7	5.31
	Dhanlaxmi Bank	2021	16.48	56.84	6.1
	Dhanlaxmi Bank	2020	19.76	30.3	6.45
	Dhanlaxmi Bank	2019	3.05	24.25	6.74
	Dhanlaxmi Bank	2018	4.49	19.31	6.6
	Dhanlaxmi Bank	2017	5.07	20.23	6.52
	Dhanlaxmi Bank	2016	10.52	54.04	6.35
	Dhanlaxmi Bank	2015	1.24	29.04	6.45
15	Federal Bank	2024	2.38	46.26	6.29
	Federal Bank	2023	10.75	65.05	8.51
	Federal Bank	2022	7.44	70.96	7.75
	Federal Bank	2021	13.93	103.2	8.82
	Federal Bank	2020	7.11	67.11	8.41
	Federal Bank	2019	8.18	84.7	8.08
	Federal Bank	2018	5.78	76.36	8.05
	Federal Bank	2017	10.28	103.29	8.51
	Federal Bank	2016	8.34	117.86	8.25
	Federal Bank	2015	6.57	83.47	9.47
16	HDFC Bank	2024	4.08	103.55	10.4
	HDFC Bank	2023	5.69	149.15	9.75

	HDFC Bank	2022	4.93	124.97	10.29
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
	HDFC Bank	2021	5.79	149.76	9.93
	HDFC Bank	2020	4.8	106.87	11.89
	HDFC Bank	2019	5.09	109.88	11.16
	HDFC Bank	2018	4.44	90.34	11.66
	HDFC Bank	2017	4.72	96.78	11.65
	HDFC Bank	2016	4.36	92.44	11.44
	HDFC Bank	2015	9.72	158.49	11.32
17	AXIS Bank	2024	6.68	149.13	10.34
	AXIS Bank	2023	11.59	165.74	9.65
	AXIS Bank	2022	11	175.73	9.89
	AXIS Bank	2021	16.34	153.5	10.35
	AXIS Bank	2020	30.09	183.76	9.31
	AXIS Bank	2019	21.74	243.1	8.33
	AXIS Bank	2018	283.95	249.99	9.12
	AXIS Bank	2017	19.55	206.24	9.22
	AXIS Bank	2016	9.26	219.21	9.8
	AXIS Bank	2015	7.92	196.37	9.62
18	CITY Union Bank	2024	4.09	59.92	11.86
	CITY Union Bank	2023	4.3	67.86	11.2
	CITY Union Bank	2022	85.87	87.87	10.7
	CITY Union Bank	2021	2.21	26.19	10.96
	CITY Union Bank	2020	3.81	42.16	10.65
	CITY Union Bank	2019	0.97	18.62	10.7
	CITY Union Bank	2018	2.57	48.85	10.42
	CITY Union Bank	2017	1.1	21.35	10.12
	CITY Union Bank	2016	1.49	21.77	9.6
	CITY Union Bank	2015	0.44	6.26	9.67
19	CSB Bank	2024	9.92	46.2	10.55
	CSB Bank	2023	1.6	27.36	10.99
	CSB Bank	2022	4.45	76.89	10.46
	CSB Bank	2021	7.01	70.26	9.34
	CSB Bank	2020	63.3	41.08	10.39
	CSB Bank	2019	33.56	1.08	8.47
	CSB Bank	2018	0.81	17.08	2.31
	CSB Bank	2017	0.36	10.04	3.46
	CSB Bank	2016	4.23	4.68	5.7
	CSB Bank	2015	1.61	23.02	2.81
20	ICICI Bank	2024	3.64	81.57	10.83
	ICICI Bank	2023	4.38	91.64	10.95
	ICICI Bank	2022	5.1	92.91	10.39

	ICICI Bank	2021	6.06	93.78	10.01
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
	ICICI Bank	2020	11.81	169.22	8.93
	ICICI Bank	2019	29.55	181.19	9.22
	ICICI Bank	2018	21.56	202.94	9.84
	ICICI Bank	2017	14.24	179.54	10.61
	ICICI Bank	2016	15.74	231.07	10.24
	ICICI Bank	2015	11.81	248.3	10.25
21	IDBI Bank	2024	45.16	259.06	6.85
	IDBI Bank	2023	38.12	254.56	7.48
	IDBI Bank	2022	34.83	247.69	6.42
	IDBI Bank	2021	31.89	294.37	6.24
	IDBI Bank	2020	23.89	122.16	11.94
	IDBI Bank	2019	17.71	107.92	11.58
	IDBI Bank	2018	12.05	46.24	12.6
	IDBI Bank	2017	4.31	37.51	14.07
	IDBI Bank	2016	2.82	32.26	13.97
	IDBI Bank	2015	2.04	33.45	14.02
22	Jammu & Kashmir Bank	2024	1.37	26.8	7.89
	Jammu & Kashmir Bank	2023	1.79	32.24	6.78
	Jammu & Kashmir Bank	2022	3.54	32.71	6.19
	Jammu & Kashmir Bank	2021	4.7	29.63	5.66
	Jammu & Kashmir Bank	2020	5.8	31.83	5.83
	Jammu & Kashmir Bank	2019	5.64	39.6	6.53
	Jammu & Kashmir Bank	2018	8.03	26.43	6.87
	Jammu & Kashmir Bank	2017	7.74	22.48	6.92
	Jammu & Kashmir Bank	2016	6.1	39.34	8
	Jammu & Kashmir Bank	2015	5.07	42.22	8.05
23	IndusInd Bank	2024	4.09	77.53	12.27
	IndusInd Bank	2023	6.74	91.18	12.01
	IndusInd Bank	2022	7.49	100.29	11.95
	IndusInd Bank	2021	13.23	119.5	11.99
	IndusInd Bank	2020	9.91	176.21	11.31
	IndusInd Bank	2019	9.62	179.47	9.61
	IndusInd Bank	2018	10.8	163.39	10.76
	IndusInd Bank	2017	8.04	111.65	11.56
	IndusInd Bank	2016	11.16	144.18	12.38
	IndusInd Bank	2015	7.74	197.03	9.76
24	Karnataka Bank	2024	3.37	40.55	9.35
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
	Karnataka Bank	2023	1.32	19.03	8.29

	Karnataka Bank	2022	4.55	32.61	7.75
	Karnataka Bank	2021	4.12	29.93	7.76
	Karnataka Bank	2020	9.85	71.24	7.17
	Karnataka Bank	2019	5.91	83.43	5.44
	Karnataka Bank	2018	3.46	19.84	7.69
	Karnataka Bank	2017	2.49	22.7	8.03
	Karnataka Bank	2016	2.54	36.29	6.53
	Karnataka Bank	2015	2.35	38.76	6.54
25	Karur Vysya Bank	2024	1.44	30.1	9.51
	Karur Vysya Bank	2023	1.44	24.14	9.52
	Karur Vysya Bank	2022	1.83	22.41	9.49
	Karur Vysya Bank	2021	5.29	40.6	9.33
	Karur Vysya Bank	2020	5.14	21.18	9.67
	Karur Vysya Bank	2019	5.71	28.66	9.26
	Karur Vysya Bank	2018	5.38	43.28	9.36
	Karur Vysya Bank	2017	2.32	40.7	8.15
	Karur Vysya Bank	2016	3.45	68.83	7.75
	Karur Vysya Bank	2015	6.89	75.06	7.99
26	Kotak Mahindra Bank	2024	3.3	60.56	16.93
	Kotak Mahindra Bank	2023	3.06	53.53	18.1
	Kotak Mahindra Bank	2022	3.67	60.16	17.78
	Kotak Mahindra Bank	2021	3.81	59.1	17.72
	Kotak Mahindra Bank	2020	5.83	99.19	15.15
	Kotak Mahindra Bank	2019	6.46	117.17	14.75
	Kotak Mahindra Bank	2018	6.56	119.02	14.95
	Kotak Mahindra Bank	2017	6.96	130.89	13.94
	Kotak Mahindra Bank	2016	8.91	132.64	13.86
	Kotak Mahindra Bank	2015	7.12	143.99	14.91
27	South Indian Bank	2024	2.56	43.32	7.52
	South Indian Bank	2023	9.15	106.32	6.2
	South Indian Bank	2022	84.35	64.56	5.85
	South Indian Bank	2021	70.48	75.12	6.17
	South Indian Bank	2020	53.07	144.9	5.64
	South Indian Bank	2019	13.99	99.78	5.78
	South Indian Bank	2018	9.37	89.3	6.34
	South Indian Bank	2017	4.55	56.36	6.52
	South Indian Bank	2016	5.93	78.58	6.06
	South Indian Bank	2015	5.08	66.24	6.08
28	RBL Bank	2024	11.83	100.47	10.72
	RBL Bank	2023	15.21	103.41	11.68
	Bank	**Year**	**Credit Ratio**		**Capital**
			Total Debt/EBIT	Total Debt/Equity	Equity/Total Assets
	RBL Bank	2022	15.75	90.66	11.18

	RBL Bank	2021	16.15	90.78	12.59
	RBL Bank	2020	22.97	162.46	11.87
	RBL Bank	2019	9.27	159.66	9.37
	RBL Bank	2018	9.75	141.8	10.8
	RBL Bank	2017	12.08	189.86	8.91
	RBL Bank	2016	24.78	354.87	7.63
	RBL Bank	2015	23.49	315.87	8.23
29	Yes Bank	2024	52.68	192.16	10.37
	Yes Bank	2023	80	192.8	11.86
	Yes Bank	2022	50.97	216.84	10.58
	Yes Bank	2021	47.32	194.69	12.11
	Yes Bank	2020	44.32	525.82	8.41
	Yes Bank	2019	46.32	404.71	7.06
	Yes Bank	2018	12.22	294.37	8.24
	Yes Bank	2017	7.76	177.86	10.25
	Yes Bank	2016	8.51	232.34	8.33
	Yes Bank	2015	9.15	227.69	8.57