An Empirical Investigation on the Liquidity and Profitability of Public and Private Sector Banks in India- A Panel data analysis

A Dissertation submitted in partial fulfillment of the requirements for the Master of Arts degree in Economics at Mahapurusha Srimanta Sankardeva Viswavidyalaya

Master of Arts (M.A in Economics)

Session: 2023- 2025

Submitted By

Dikshita Borah

Roll no- Eco- 09/23

Under the supervision of

Dr. Dikshita Kakoti

Assistant Professor

Department of Economics

Mahapurusha Srimanta Sankardeva Viswavidyalaya

Nagaon, Assam

July, 2025

DEPARTMENT OF ECONOMICS

মহাপুৰুষ শ্ৰীমন্ত শঙ্কৰদেৱ বিশ্ববিদ্যালয়
MAHAPURUSHA SRIMANTA SANKARADEVA VISWAVIDYALAYA
[Recognised Under Section 2(f) of UGC Act, 1956]
Srimanta Sankaradeva Sangha Complex, Haladhar Bhuyan Path,
Kalongpar, Nagaon, PIN-782001, Assam, India

No: MSSV/ 449 Date: 11.09.25

CERTIFICATE

This is to certify that the dissertation titled 'An Empirical Investigation on the Liquidity and Profitability of Public and Private Sector Banks in India- A Panel data analysis' submitted by **Ms. Dikshita Borah** (Roll No: ECO-09/23) in partial fulfillment of the requirements for the degree of **Master of Arts (MA) in Economics**, is a bonafide record of original research work carried out under my supervision. The contents of this dissertation have not been submitted for any other degree or diploma elsewhere.

Supervisor

11/09/25

(Dr. Dikshita Kakoti)
Assistant Professor
Department of Economics
Mahapurusha Srimanta Sankaradeva
Viswavidyalaya, Nagaon, Assam

Assistant Professor
Department of Economics
Mahapurusha Srimanta
Sankaradeva Viswavidyalay
Nagaon Assam, Pin-7820

Head of the Department

(Dr. Ajit Debnath)
Assistant Professor
Department of Economics
Mahapurusha Srimanta Sankaradeva
Viswavidyalaya, Nagaon, Assam

Head
Department of Economics
MSSV, Nagaon

DECLARATION BY THE CANDIDATE

I solemnly declare that the work presented in this M.A. Dissertation is the result of my original research conducted under the guidance of Dr. Dikshita Kakoti, Assistant Professor, Department of Economics, Mahapurusha Srimanta Sankardeva Viswavidyalaya, Nagaon, Assam. This research has not been submitted previously, either in whole or in part , to any other university or institution for the award of a degree, diploma, or any other academic qualification.

I affirm that all sources of information, including research publications, journals, reports, dissertations, theses, and online resources, have been duly acknowledged and cited in accordance with academic conventions. All external works referenced in this dissertation have been appropriately attributed, with no instances of misrepresentation as original content.

Date: 11-04-2025

Dikshita Borah Dikshita Borah

Department of Economics

Mahapurusha Srimanta Sankardeva Viswavidyalaya

Nagaon, Assam

ACKNOWLEDGEMENT

I am truly thankful to the Almighty, whose blessings have given me the strength and persistence to complete my research successfully.

I am deeply thankful to Dr. Dikshita Kakoti, Assistant Professor, Department of Economics, Mahapurusha Srimanta Sankaradeva Viswavidyalaya, for her kind guidance, support, and encouragement throughout my research work. Her advice and suggestions helped me at every stage of this study. I also want to thank Dr. Ajit Debnath, Head of the Department of Economics, Dr. Biman Kumar Nath, Assistant Professor, for their constant help, support, and cooperation during my academic journey. I am very grateful to my family for their love, support, and motivation. I also thank my friends, classmates, and well-wishers who supported me in many ways during this period.

Lastly, I would like to thank all the teaching and non-teaching staff of MSSV, Nagaon, for creating a helpful and friendly environment that made my study easier and more enjoyable.

Date: ---------- 11-07-2025

(Dikshita Borah) Dikshita Borah

Roll No.: Eco-09/23

M.A. Fourth Semester

Department of Economics

Mahapurusha Srimanta Sankaradeva Viswavidyalaya

CONTENT

List of Tables

CHAPTER I

INTRODUCTION

1.1 Introduction Statement:

The banking sector is a vital component of a country's financial system, ensuring economic stability, financial intermediation, and credit availability. In India, the banking industry is broadly classified into Public Sector Banks (PSBs) and Private Sector Banks (PVBs), each differing in ownership, management, and operational efficiency. Public Sector Banks are owned and controlled by the government, focus on financial inclusion and socio-economic development whereas Private Sector Banks, driven by competition and profitability, emphasize innovation, customer service, and operational efficiency. Among the key indicators of a bank's financial health are profitability and liquidity, which determine its stability, risk management capabilities and ability to meet short-term obligations. Profitability often measured through Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM), reflects a bank's ability to generate earnings relative to its asset and equity. Liquidity, assessed through Liquidity Coverage Ratio (LCR), Cash Reserve Ratio (CRR), and Loan- to-Deposit Ratio (LDR), ensures that banks can meet withdrawal demands and financial obligations without disrupting operations. The performance of banks, particularly in terms of profitability and liquidity is critical not only for their sustainability but also for maintaining overall financial stability. This study aims to conduct an empirical investigation into the profitability and liquidity of public and private sector banks in India, analyzing their financial statements and performance metrics over a specific period. By comparing these two categories, of banks, the research will provide insights into their financial strengths, weaknesses, and the factors influencing their profitability and liquidity. The findings will help policymakers, regulators, and banking professionals formulates strategies for enhancing the efficiency and resilence of India's banking sector. The liquidity and profitability of public and commercial banks in India are critical aspects of their financial health and operational efficiency. A comparative study of these two types of banks can provide insights into their performance, risk management, and ability to meet short-term and long-term obligations. Liquidity refers to a bank's ability to meet its short-term financial obligations without incurring significant losses. It is crucial for maintaining customer confidence and ensuring

smooth operations. PSBs often benefit from government backing, which enhances their ability to maintain liquidity even during financial stress. They have a large customer base and widespread branch networks, ensuring stable deposit inflows. Still PSBs sometimes face higher non-performing assets (NPAs), which can strain liquidity .Bureaucratic processes and slower decision-making can hinder efficient liquidity management. However, Commercial banks are generally more agile in managing liquidity due to advanced technology and efficient risk management systems. They tend to have lower NPAs compared to PSBs, which supports better liquidity. But , they rely heavily on market borrowings and wholesale funding, which can be volatile during economic downturns. Smaller commercial banks may face liquidity crunches if they lack a strong deposit base. Profitability reflects a bank's ability to generate earnings from its operations. It is influenced by factors such as interest income, fee-based income, operating expenses, and asset quality. Here PSBs have a large customer base, which provides a steady stream of interest income from loans and advances .They often play a significant role in government schemes and priority sector lending, which can generate stable revenues .High NPAs and provisioning requirements can erode profitability .Operational inefficiencies and higher employee costs can reduce net margins. But Commercial banks typically have higher operational efficiency and lower cost-to-income ratios, leading to better profitability. They focus on fee-based income (e.g., wealth management, advisory services), which contributes significantly to profits. Intense competition in the private banking sector can compress interest margins. They may face higher funding costs compared to PSBs, especially during periods of tight liquidity. Moreover, PSBs often maintain higher statutory liquidity ratio (SLR) and cash reserve ratio (CRR) levels due to regulatory requirements and conservative risk management. Commercial banks tend to optimize their liquidity ratios to maximize returns, which can make them more vulnerable during financial stress. Commercial banks generally report higher return on assets (ROA) and return on equity (ROE) compared to PSBs. PSBs have been improving their profitability in recent years due to government-led reforms, such as recapitalization and NPA resolution mechanisms like the Insolvency and Bankruptcy Code (IBC).

The Reserve Bank of India (RBI) plays a significant role in shaping liquidity and profitability through monetary policy, CRR/SLR adjustments, and NPA resolution frameworks. Recent regulatory changes, such as the introduction of the

liquidity coverage ratio (LCR) and net stable funding ratio (NSFR), have improved liquidity management across both PSBs and commercial banks. The Indian government has merged several PSBs to create larger, more efficient entities, which has improved their liquidity and profitability. Both PSBs and commercial banks are investing heavily in digital banking, which has enhanced operational efficiency and customer reach. Moreover, the Impact of COVID- 19 has led to increased stress on asset quality and liquidity for both PSBs and commercial banks. However, government relief measures and moratoriums helped mitigate the impact.. Thus Public Sector Banks while PSBs have a strong deposit base and government support, they need to address high NPAs and operational inefficiencies to improve profitability. Commercial banks are more profitable and efficient but must manage liquidity risks and funding costs effectively. Thus a balanced approach to liquidity management and profitability, supported by regulatory reforms and technological advancements, is essential for the sustainable growth of both public and commercial banks in India.

1.2 Conceptual Framework:

The study provided a comprehensive and strategic framework to examine the relationship between liquidity and profitability in the context of public and private sector banks in India. Liquidity, defined as a bank's ability to meet short-term obligations without incurring significant losses, is crucial for financial stability, while profitability reflects the efficiency of resource utilization and long-term sustainability. This study emphasized how these two dimensions interact within different ownership structures—public sector banks, which operate under government control with social objectives, and private sector banks, which prioritize profitability and operational efficiency. And also provide the importance of key financial ratios that measure both liquidity and profitability, offered a diagnostic lens through which to evaluate bank performance. Important profitability ratios include **Return on Assets (ROA**), which measures net income as a percentage of total assets and reflects operational efficiency; **Return on Equity (ROE**), which indicates how well the bank generates returns on shareholder's equity; and **Net Interest Margin (NIM)**, which captures the difference between interest income and interest expenses relative to earning assets, reflecting core profitability from lending and investing activities. On the other hand, critical liquidity

ratios include the **Credit-Deposit Ratio (CD Ratio),** which shows the proportion of loans deployed from total deposits and helps assess liquidity risk; the **Cash-Deposit Ratio (CDR)**, which indicates the proportion of cash held against total deposits to meet immediate withdrawal needs; and the **Liquid Assets to Total Assets ratio**, which measures the share of highly liquid assets in the overall asset portfolio. These ratios play a pivotal role in understanding how banks manage the trade-off between profitability and liquidity. In the Indian context, public sector banks (PSBs), which operate under government ownership and prioritize social and developmental objectives such as financial inclusion and priority sector lending, often maintain higher liquidity but struggle with profitability due to high non-performing assets (NPAs), rigid operational structures, and lower efficiency. In contrast, private sector banks focus on profitability and operational efficiency, often displaying better ROA, ROE, and NIM, along with stronger control over NPAs, though they may face liquidity pressure due to aggressive lending practices and tighter liquidity buffers.

The framework also considers internal bank-specific factors such as capital adequacy, asset quality, cost of funds, and operational efficiency, as well as external macroeconomic influences including monetary policy changes, inflation, GDP growth, and overall financial market conditions. Methodologically, the study employs panel data analysis across 20 public and 14 private sector banks over a 19-year period from 2005 to 2024, enabling a detailed examination of both cross-sectional and time-series variations. The use of fixed effects and random effects models allows for the control of unobserved heterogeneity among banks and over time, while the Hausman test is applied to determine the most appropriate model specification, enhancing the reliability of the results. A comparative approach is adopted to evaluate the differences in liquidity management practices, profitability strategies, risk exposure, and regulatory compliance between public and private banks. By integrating empirical findings with theoretical insights, this framework offered a holistic understanding of the interaction between liquidity and profitability and contributes to the banking literature by highlighting how ownership structure and policy environment shape financial outcomes. The results of this study provided valuable policy recommendations for bank managers, regulators, and policymakers to optimize liquidity management without compromising profitability, thereby ensuring financial stability, risk mitigation, and enhanced operational efficiency across the Indian banking sector.

1.3 Theoratical Framework:

The theoretical foundation of this study on liquidity and profitability in public and private sector banks in India is based on financial intermediation theory, agency theory, and risk-return tradeoff theory**. Financial intermediation theory** explains the role of banks as intermediaries that facilitate the flow of funds between savers and borrowers. This theory underlines the importance of liquidity management to ensure smooth financial transactions and minimize liquidity risk while maintaining profitability. Public sector banks, often driven by social objectives, prioritize financial inclusion, which may sometimes compromise their profitability. In contrast, private sector banks focused on competitive performance and profitability, optimizing their liquidity positions to maximize returns.

Agency theory is relevant in understanding the differences in management structures and decision-making processes in public and private sector banks. Public sector banks, owned and regulated by the government, may experience inefficiencies due to bureaucratic decision-making and political influence, leading to higher non-performing assets (NPAs) and lower profitability. On the other hand, private sector banks, which operate with a profit-driven approach, align managerial incentives with shareholder interests, improving operational efficiency and financial performance. This theory highlights the potential conflicts of interest between stakeholders and bank management in liquidity and profitability management.

The **risk-return tradeoff theory** is essential in analyzing the relationship between liquidity and profitability. Maintaining higher liquidity ensures a bank's stability and reduces the risk of insolvency but may come at the cost of lower returns, as excessive liquidity may not be invested in income-generating assets. Conversely, maximizing profitability often involves lending aggressively or investing in high-risk assets, which can increase exposure to credit risk and liquidity shortages. Public sector banks, with a conservative risk appetite, tend to hold higher liquidity reserves due to regulatory mandates such as the Statutory Liquidity Ratio (SLR) and Cash Reserve Ratio (CRR), which may limit their profitability. Private sector banks, however, optimize liquidity ratios to enhance profitability while ensuring adequate risk management practices.

Additionally, this study incorporates the capital adequacy theory, which emphasized the role of capital reserves in sustaining financial health. A bank's capital adequacy ratio (CAR) ensures that it can absorb losses and manage liquidity crises without significant disruptions. Public sector banks often require government recapitalization to maintain adequate capital levels, whereas private sector banks rely on market-driven mechanisms such as equity issuance and retained earnings.

Monetary policy and regulatory frameworks set by the Reserve Bank of India (RBI) also play a crucial role in determining liquidity and profitability. Policy instruments such as repo rates, liquidity coverage ratio (LCR), and net stable funding ratio (NSFR) directly impact a bank's ability to manage liquidity and maintain profitability. The study integrates macroeconomic variables such as inflation, GDP growth, and financial market conditions to analyze their influence on banking performance. By applying these theoretical perspectives, this study aims to empirically examine how liquidity and profitability interact in Indian public and private sector banks. The findings will contribute to banking literature by providing insights into the trade-offs between maintaining liquidity and achieving profitability, helping regulators and policymakers design strategies for improving financial stability and banking efficiency in India.

1.4 Significance of the study:

The main motive of this study was mainly to understand the relationship between liquidity and profitability as liquidity and profitability are key indicators of a bank's financial stability. Public and private sector banks in India have different ownership structures, regulatory environments, and management practices, which may influence their liquidity management and profitability. Public sector banks, being owned by the government, often face constraints related to governmental policies, political influence, and higher levels of non-performing assets (NPAs), which may affect their liquidity and profitability. On the other hand, private sector banks, with more autonomy and flexibility, have different challenges and opportunities that impact their financial performance. This study thus reveal how these two categories of banks manage liquidity, maintain profitability, and navigate the challenges posed by a rapidly evolving economic environment. This stud also shed light on the broader implications of liquidity and profitability for the banking sector, particularly in terms of risk

management, operational efficiency, and long-term sustainability. Moreover, by comparing public and private sector banks, the study offered recommendations on improving financial performance and competitiveness, thereby contributing to the overall stability of the Indian banking system.

1.5 Objectives of the study:

- To compare the liquidity and profitability positions of public and private sector banks.
- To determine the bank specific factors affecting liquidity of public and private sector banks.
- To find out the bank specific factors determining profitability of public and private sector banks.

1.6 Data Sources and Methodology of the Study

1.6.1 Sources of Data:

The study was entirely based on secondary data. The data are collected from the official website of Reserve Bank of India (RBI). The data are collected for both the public and private sector banks for the period 2005 to 2024. Data mainly on the total assets, liquid assets, total deposits, demand deposits, total advances, net interest margins, return on assets, return on equity, operating profits ratios are collected for both public and private sector banks as a whole. The public sector banks studied in this study are State Bank of India and all the twenty nationalized banks of India except **Bharatiya Mahila Bank Ltd.** and all the private sector banks except **Bandhan bank limited** and **IDFC bank limited** as all these banks are of recent origin and data are not available for the banks from 2005. The data are collected for each banks' total assets, deposits, non-performing assets, capital adequacy ratio (total of tier 1 and tier 2 capital), return on assets, equity and cost of funds for the period 2005-2024

1.6.2 Methodology of the Study:

The methodology employed in data analysis is objective specific.

To satisfied the first objective, different ratios like ratio of liquid assets to total deposits, liquid assets to total deposits, liquid assets to demand deposits and liquid assets to total advances are calculated for public and private sector banks respectively. All the data are converted into constant prices taking 2005 as the base year. A descriptive statistics is used to examine which banking group is maintaining higher liquidity and profitability with consistency. Moreover, the compound annual growth rate (CAGR) is calculated for all the ratios to see the annual growth in liquidity and profitability of public and private sector banks. For comparative analysis independent t test was performed.

To solve the second and third objectives, the study used longitudinal or panel data model. Panel data is a multi-dimensional data consisting of observations on multiple phenomena studied over multiple time periods for the same firm or individual. Panel data technique includes both cross sectional and time series dimensions and therefore provides adequate data points in order to reduce the likelihood of biasness in the parameter estimators. This technique helped to predict effects that the pure time series or cross sectional data fails to detect. The increased sample size due to pooling of time series and cross section data provides for more accurate estimates with more degrees of freedom and lesser problem of multicollinearity.

A panel data contains N entities each of them measured through T time period. The total number of observation is NT. In this study, N is each of the public sector and private sector banks of India selected for the study observed on T time period (year) on several different parameters. The time period considered in the study was 2005 to 2024 and 20 public sector banks and 14 private sector banks are studied over these periods. The panel data was short with more entities and a few time periods. Further, fixed effects and random effects model are run and Hausman test was done to decide whether to choose random effects model or the fixed effects model to fulfill the objectives of the study.

1.7 Research Questions:

- Is there any difference between the public and private sector banks in terms of their liquidity and profitability positions?

- Whether the factors determining liquidity differ between the public and private sector banks?
- Whether there is any similarity among the determinants of profitability of public and private sector banks?

1.8 Research Hypothesis:

- There is no difference between the public and private sector banks in terms of their liquidity and profitability positions.
- Selected factors have no impact on determining liquidity between the public and private sector banks.
- There is no similarity among the determinants of profitability of public and private sector banks.

1.9 Tentative Chapterization:

Chapter I- Introduction:

The first chapter covers introductory statement, conceptual framework, significance of the study, objectives of the study, the data source and methodology, research questions. The chapter ends with this organization of the dissertation.

Chapter II- Review of Literature:

This chapter makes a detailed review of literature. It covers the review of some of the major studies on the selected domain. A critical study of existing studies, their limitations and the research gap are also included in this chapter.

Chapter III – A Comparison on Liquidity and Profitability of Public and Private Sector Banks:

Chapter III covers the investigation to satisfy the first objective of the study. The study shows the positions of both banking groups in terms of their liquidity and profitability levels. A comparison is made to find out which banking group is in better liquidity and profitability positions over the years.

Chapter IV- Determinants of Liquidity of Public and Private Sector Banks:

Chapter IV deals with the second objective of the study. It tries to find out the variables which determine the liquidity of the public and private sector banks of India.

Chapter V- Determinants of Profitability of Public and Private Sector Banks:

Chapter V tries to explain the impact of a set of variables relating to the banking sector on the profitability of public and private sector banks. An attempt is made to identify the differences among the determinants of profitability of both banking groups.

Chapter VI- Summary and Conclusion:

Chapter VI summarizes the major findings and highlights the implications of the entire study. The contents in this chapter are important for policy prescription and further study on the same topic.

CHAPTER II

REVIEW OF THEORATICAL AND EMPIRICAL LITERATURE

2.1 Introductory Statement:

The study has undergone several research papers, about the liquidity and profitability of public and private sector banks in India. The profitability and liquidity of banks are critical indicators of their financial stability and operational efficiency. Public sector banks in India, despite their extensive role in financial inclusion often face challenges such as high NPAs. In contrast, private sector banks, with their focus on technology-driven solutions, tend to exhibit higher profitability but may face liquidity constraints due to aggressive growth strategies.

2.2 Review of theoretical and empirical literature:

Many researcher in their research paper has work on dynamics of liquidity and profitability of banks (public and private) by analyzing empirical studies that compare the profitability and liquidity of public and private sector banks in India, while considering the impact of recent economic and regulatory changes which is shown in the following below-

Attarwala (2025) explores the financial health of major Indian public sector banks using key financial indicators from 2010–11 to 2023–24, drawing on existing literature emphasizing the role of liquidity and profitability in assessing banking performance. The reviewed literature highlights that public sector banks play a pivotal role in promoting financial inclusion and addressing social objectives, although they face continuous challenges from non-performing assets (NPAs) and technological disruptions. Prior studies cited in the paper stress the importance of financial ratios such as return on equity (ROE), return on assets (ROA), current ratio, and quick ratio for understanding bank stability and efficiency. The use of dividend payout patterns and

regression analysis in past research also provides insights into shareholder value and earnings performance across banks. Further, literature reflects a growing trend toward sustainable finance and digital transformation, underlining the evolving role of banks in a modern, tech-driven, and inclusive economy. This study builds upon such findings to analyze the comparative financial performance of SBI, BOB, PNB, BOI, and IDBI, emphasizing tailored strategies based on bank-specific conditions.

In their study, **DasGupta and Biswas (2016)** reviewed several empirical contributions to understand the dynamics of liquidity management within Indian public sector banks. They cited previous works that emphasize the role of commercial banks, especially public sector banks, in promoting financial inclusion and socio-economic development. The review references the assertion by **Subbarao (2013)** that a large portion of the Indian financial market is held by banks, underlining their pivotal role in economic activities. Additionally, the concept of inclusive growth is highlighted as a critical objective that banks support by offering accessible financial services to the poorest segments of society, aligning with the broader development agenda. The literature also touches upon various performance and liquidity indicators commonly used to assess the health and efficiency of banking institutions, particularly during periods of financial stress. Prior studies underscore the importance of financial ratios and inter-bank comparisons in gauging liquidity performance, setting the foundation for the current study's analytical approach.

The relationship between non-performing assets (NPAs) and bank profitability has been extensively studied in the Indian context. **Das and Uppal (2018**) conducted an empirical analysis and found that a higher level of NPAs significantly reduces profitability, particularly indicators like Return on Assets (ROA) and Return on Equity (ROE). Their findings emphasize the need for strong NPA management to ensure financial health. Similarly, **Kumar & Singh (2017**) observed that public sector banks face greater profitability challenges due to higher NPAs compared to private sector banks. **Ghosh (2016)** highlighted that rising NPAs increase provisioning requirements,

which in turn negatively impact bank earnings. Additionally, **Rajeev & Mahesh (2010)** argued that poor credit risk assessment and sluggish loan recovery processes contribute to the persistence of NPAs and declining profitability. These studies collectively stress that controlling NPAs is essential for improving operational performance and ensuring long-term sustainability in the Indian banking sector.

The impact of bank efficiency on profitability has been widely explored in financial research, particularly in the context of emerging economies like India. **Dsouza et al. (2022**) employed panel data analysis to demonstrate that cost efficiency (measured by the cost-to-income ratio) negatively affects profitability (ROA and NIM), while staff expense efficiency has a positive influence. Their findings align with earlier studies by **Berger and Humphrey (1997**), who emphasized that operational inefficiencies erode bank profitability. **Hassan et al. (2022**) further highlighted the role of asset quality and interest rate management in shaping profitability, noting that inefficient banks struggle with loan recovery and revenue generation. **Rabbani et al. (2022**) **& Sun et al. (2020)** argued that technological advancements and competitive pricing strategies enhance efficiency, thereby boosting profitability. **Boubaker et al. (2020**) added that organizational factors, such as bank affiliation, significantly influence efficiency levels. These insights collectively underscore the importance of cost management and operational efficiency in sustaining bank profitability, as corroborated by **Dsouza et al. (2022)** in the Indian banking context.

Dsouza et al. (2022) investigated the effect of bank efficiency on the profitability of Indian banks using panel data covering the years 2010 to 2020. Their study found that efficient cost management, particularly in terms of staff expenses, had a positive impact on key profitability indicators such as return on assets (ROA) and net interest margin (NIM). However, higher operating expenses negatively influenced profitability. These findings align with **Das and Uppal (2018**), who also observed that inefficiencies in managing non-performing assets (NPAs) directly reduce bank profitability. **Kumar & Singh (2017**) further supported this view by showing that public sector banks, due to poor asset quality and operational inefficiencies, lag behind private sector banks in terms of financial performance. Similarly, **Ghosh (2016**) highlighted that the rising

burden of NPAs increases provisioning requirements, thereby limiting banks' profit margins. Additionally, **Rajeev & Mahesh (2010**) emphasized the role of inefficient credit appraisal systems and delayed recovery processes in worsening asset quality and reducing profitability. Collectively, these studies underscore that enhancing operational and cost efficiency—while minimizing NPAs—is critical for sustaining profitability and competitiveness in the Indian banking sector.

Douglas W Diamond investigates the comparative financial performance of public and private sector banks in India using the EAGLES model, which evaluates Efficiency, Asset quality, Growth, Liquidity, Earnings, and Sustainability. The research focuses on a detailed analysis of selected public sector banks (SBI and CANARA) and private sector banks (HDFC and ICICI) over a five-year period. The findings reveal that private sector banks generally outperform public sector banks in terms of profitability, growth, and asset quality. However, public sector banks continue to play a critical role in financial inclusion and economic stability. The results also indicate significant disparities in liquidity management and strategic responsiveness, with private banks demonstrating greater efficiency and sustainability. This research contributes to the existing body of knowledge by providing comprehensive insights into the financial health of Indian banks, thereby informing policy formulation and banking sector reforms. The study underscores the importance of adopting robust evaluation models like EAGLES to ensure a more accurate and holistic assessment of bank performance. The result shows that while private sector banks exhibit superior financial metrics, public sector banks still play a vital role in financial inclusion and economic stability. The study also highlights the importance of using comprehensive frameworks like EAGLES to assess bank performance, as it provides a more holistic view compared to evaluating individual financial indicators in isolation.

Gadhia (2015) highlights the importance of liquidity management in financial intermediaries, especially banks, which play a vital role in mobilizing funds and ensuring the financial system's stability. The literature reviewed in the study emphasizes that effective liquidity management is crucial for maintaining depositor confidence and supporting a bank’s asset base. Financial institutions that fail to meet liquidity demands

can trigger widespread economic instability. The paper references the challenges posed by global financial crises and domestic factors like policy inefficiencies, asserting that improper liquidity management by banks was a contributor to such economic disturbances. The study also notes that liquidity ratios—such as **Liquid Assets to Total Assets and Liquid Assets to Deposits**—are critical tools used in assessing a bank's ability to withstand financial stress. Through a comparative analysis of selected Indian banks, the literature reviewed reinforces that maintaining an optimal liquidity ratio is a safeguard against unforeseen obligations and systemic risks.

The paper highlights the importance of measuring banking efficiency in India, particularly in the context of the transformative changes following the Narasimhan Committee recommendations in 1991 and 1998. The authors **Jayaraman and Srinivasan (2014)**, emphasize that the Indian banking system, dominated by scheduled commercial banks (SCBs), plays a critical role in economic growth. They cite **Das, Nag, and Ray (2005)** , who argue that efficiency measurement serves dual purposes: benchmarking individual banks against "best practice" banks and evaluating the impact of policy measures on institutional performance. While previous studies have extensively examined technical and cost efficiency, **Jayaraman and Srinivasan (2014**) note a gap in research focusing on profit efficiency, especially when accounting for both desirable and undesirable outputs. Their study adopts the Nerlovian profit indicator approach and directional distance function to decompose profit inefficiency into technical and allocative components, revealing that allocative inefficiency is the primary driver of profit inefficiency in Indian banks.

Jaydeep Ramanuj.,& SalinaMemon (2023), they both present a comparative analysis of the financial performance of selected public and private banks in India. The key objectives of the study are to evaluate the liquidity and profitability of the selected banks and to undertake a comparative analysis using different financial ratios. The paper analyzes the top three public sector banks (State Bank of India, Punjab National Bank, and Bank of Baroda) and the top three private sector banks (HDFC, ICICI, and Axis Bank) based on their total revenue earned during the period from 2014-15 to 2018-19. To examine liquidity performance, the study uses current ratio and quick ratio. For

profitability, it examines gross profit ratio, net profit ratio, operating profit ratio, return on assets, return on equity, share capital, and earnings per share.The analysis reveals that there is a significant difference between the profitability and liquidity performance of public and private banks, except for the quick ratio. Private banks, particularly HDFC, outperformed the public banks in terms of profitability ratios. HDFC bank showed higher gross profit, net profit, operating profit, return on assets, return on equity, and earnings per share compared to the other banks. In contrast, State Bank of India performed better among the public banks, but still lagged behind the private banks in most profitability metrics. The liquidity ratios, however, showed a mixed picture, with public banks performing better on the current ratio and private banks performing better on the quick ratio.

In the banking sector, **Kanujiya & Kumar (2018)** analyzed Indian public and private sector banks, finding that capital structure significantly impacts profitability, with public banks being more affected. Their study highlighted that higher leverage ratios could be advantageous if managed properly, aligning with the trade-off theory. Similarly, **Berger & Bonaccorsi di Patti (2006)** observed that higher leverage in banks often correlates with increased profitability due to tax benefits, though excessive debt raises bankruptcy risks. Other studies, such as those by **Rajan & Zingales (1995)**, emphasized industry-specific factors influencing capital structure decisions. In contrast, **Jensen and Meckling (1976**) highlighted agency costs, arguing that excessive debt could lead to conflicts between shareholders and managers. These theoretical and empirical contributions collectively underscore the nuanced relationship between capital structure and profitability, varying across sectors and economic conditions

Kasana & B.P. Sahoo (2024) conducted an empirical study on bank liquidity in India using a panel data approach, highlighting the critical role of liquidity in the smooth functioning of the banking industry. The authors examined the impact of various factors such as deposits, profitability, bank size, net interest margin, capital, non-performing assets (NPAs), GDP, interest rates, statutory liquid ratio (SLR), and cash reserve ratio (CRR) on bank liquidity. Their findings revealed that NPAs, profitability, and deposits positively influence liquidity, while bank size, capital, net interest margin, GDP, interest

rates, and CRR have a negative impact. The SLR, however, was found to have an insignificant effect. The study emphasized that banks maintain higher liquidity to manage cash flow during periods of rising NPAs, and profitable banks tend to hold more liquidity to cover potential losses from risky investments. Smaller banks, with limited access to alternative funding sources, also maintain higher liquidity. The research contributes valuable insights for bank managers, policymakers, and academics in formulating strategies to preserve liquidity without incurring undue costs. The study aligns with the broader literature on financial intermediation, referencing **Sahyouni & Wang (2018) & Tesfaye (2012),** who underscore the dual functions of banks in liquidity creation and risk transformation, as well as their pivotal role in economic development. The authors also cite **Bindsell & Fotia (2021)** to highlight the importance of maintaining creditor confidence to prevent bank runs, even for well-capitalized institutions.

Kumar and Thamiselvan (2018) review a range of studies that emphasize the critical role of commercial banks in national economic development through their management efficiency and profitability. The literature indicates that management efficiency, assessed through financial ratios and statistical methods such as Geometric Mean, Standard Deviation, and Compounded Annual Growth Rate, is essential for sustaining competitive advantage and profitability in both public and private sector banks. Prior studies cited in their work show that efficient management not only reduces operational costs but also enhances decision-making and risk mitigation, particularly in the face of challenges like high non-performing assets (NPAs) and increased competition from new types of lenders. The existing body of research has consistently revealed that private banks often outperform public banks in terms of operational efficiency and profitability, a trend confirmed by their study's findings. This suggests a continued need for reforms in public sector banks to enhance governance and resource utilization.

The profitability of banks in India has been a focal point of extensive research, with numerous studies employing panel data analysis to identify its determinants. A seminal study by **Maiti and Jana (2017**) analyzed 75 banks across five major groups—State Bank of India & its Associates, Nationalised Banks, New Private Sector Banks, Old

Private Sector Banks, and Foreign Banks—using panel data regression methods. Their findings highlighted that internal factors such as profit per employee, net interest margin, net non-performing assets ratio, and non-interest income significantly influence bank profitability across all groups. Building upon this, **Sarkar and Rakshit (2023)** examined the impact of macroeconomic variables on the profitability of public sector banks in India from 2000 to 2017. Utilizing return on equity (ROE) and net interest margin (NIM) as profitability measures, their study revealed that gross domestic product (GDP) growth, inflation, and unemployment rates positively affect both ROE and NIM. Conversely, financial crises were found to have a significant negative impact on these profitability metrics. Interestingly, lending interest rates did not show a significant effect on profitability in their analysis. Recent data indicates a positive trend in the Indian banking sector's asset quality. As of September 2024, the gross non-performing assets (NPA) ratio declined to a 13- year low of 2.5% down from 2.7% in March 2024. Net NPAs also decreased to 0.57% during the same period, reflecting improved loan- loss buffers. This enhancement in asset quality has contributed to the sustained expansion in loans and deposits, bolstering the overall profitability of banks.

Mathew & C.J. Davis (2020) in their study reviewed various scholarly works to understand the determinants of profitability in Indian public and private sector banks. They referred to **Bodia (2006**), who examined the profitability of Indian public sector banks using variables such as non-interest income, operating expenses, and provisions. Bodia found that these variables significantly influenced bank profitability, especially during the post-liberalization period from 1991 to 2004. Additionally, **Kerker & Kerker (2008**) analyzed the impact of banking reforms on bank efficiency and profitability and concluded that there was no significant relationship between bank ownership and deposit efficiency. Their study used data envelopment analysis on bank-specific variables for the period 1997 to 2004. These prior studies provide a foundation for understanding how liberalization and banking reforms have shaped profitability trends in the Indian banking sector.

Mishra M. & Pradhan P. (2019), in their study titled "Impact of Liquidity Management on Profitability: An Empirical Analysis in Private Sector Banks of India,"

review previous literature that explores the link between liquidity and profitability in the banking sector. They note that earlier studies present mixed results—some suggest a positive relationship, indicating that higher liquidity improves financial stability and profitability, while others highlight a negative link, arguing that excess liquidity can lead to inefficiency and reduced returns. The authors point out that researchers have commonly used ratios such as the Cash-Deposit Ratio (CDR), Credit-Deposit Ratio (CRDR), and Investment-Deposit Ratio (IDR) to assess liquidity, and Return on Assets (ROA) and Return on Equity (ROE) to evaluate profitability. Mishra M. and Pradhan P. emphasize that due to varying findings across countries, institutions, and time periods, there is a need for further empirical investigation—particularly in the context of Indian private sector banks, which their study aims to address.

The relationship between capital structure and profitability has been extensively studied in financial literature. **Modigliani & Miller (1958)** pioneered the theoretical framework, arguing that in a perfect market, capital structure does not affect firm value. However, later studies incorporating taxes and bankruptcy costs, such as those by Myers (1984), highlighted the trade-off between debt tax shields and financial distress costs. **Rajan & Zingales (1995)** empirically examined determinants of capital structure across countries, emphasizing institutional factors. In the context of banking, **Berger & Bonaccorsi di Patti (2006)** found that higher leverage improves profitability due to tax advantages but increases risk. **Kanujiaya & Kumar (2018**), in their study on Indian banks, observed that public sector banks' profitability is more sensitive to capital structure than private banks, attributing this to higher debt reliance. Their findings align with **Pandey (2019**), who noted that excessive debt can strain profitability due to fixed interest obligations. Conversely, **Jensen & Meckling (1976**) argued that debt can mitigate agency costs by disciplining management.

Mohanty et al. (2022) reviewed prior studies emphasizing the critical role of liquidity management in determining the financial health and profitability of banks. The literature suggests that prudent liquidity management helps banks meet short-term obligations without jeopardizing profitability. Various indicators such as Credit-Deposit Ratio (CDR), Investment-Deposit Ratio, and Cash-Deposit Ratio are used to evaluate liquidity

management, while Return on Assets (ROA) and Return on Equity (ROE) measure profitability. The review notes that although theoretical perspectives highlight a link between liquidity and profitability, empirical evidence often yields mixed results. Past studies cited in the paper suggest that while maintaining higher liquidity ensures safety, it may lead to a decline in returns. Conversely, aggressive lending may boost profits but increase financial risk. Despite examining a diverse range of banks including public, private, and foreign banks, their study finds no statistically significant relationship between liquidity ratios and profitability metrics, aligning with earlier findings that stress the complexity of this relationship.

Several studies have examined the profitability and liquidity of banks, providing insights into their financial performance. **Noyal (2025**) analyzed selected Indian commercial banks, including Bank of Baroda and State Bank of India, using financial ratios such as net profit margin, return on assets, and current ratio. The study highlighted the banks' ability to maintain strong profitability and liquidity, attributing their resilience to robust regulatory frameworks like those enforced by the Reserve Bank of India (RBI). Similarly, prior research by **Sharma & Gupta (2020**) emphasized the role of liquidity management in enhancing bank stability, particularly during economic crises. Their findings align with RBI reports, which credit stringent capital requirements and risk management practices for the Indian banking sector's resilience during global financial downturns. Further, **Patel & Desai (2019**) explored the impact of digital banking initiatives, such as Pradhan Mantri Jan Dhan Yojana, on financial inclusion and profitability. They noted that such programs expanded customer bases but also introduced challenges in maintaining liquidity ratios. Meanwhile, a comparative study by **Kumar et al. (2021)** revealed that public sector banks in India outperformed private counterparts in liquidity metrics but lagged in profitability due to higher operational costs. Collectively, these studies underscore the interplay between regulatory policies, technological advancements, and traditional financial metrics in shaping bank performance.

The study by **Pandya, J., & Mapara, J. (2018)** examines the financial performance of selected Indian public sector banks, emphasizing the importance of liquidity,

profitability, and solvency in ensuring banking sector stability. The authors reference the Basel Committee on Banking Supervision (2008), which defines liquidity as a bank's ability to meet obligations without incurring significant losses, highlighting the Basel III framework's focus on maintaining high-quality liquid assets to withstand financial stress. **Athanasoglou, Brissimis, & Delis (2005)** are cited for their assertion that a profitable banking sector is crucial for absorbing economic shocks and ensuring financial system stability. **Pandya, J., & Mapara, J. (2018)** also rely on the CAMEL model (Capital Adequacy, Asset Quality, Management, Earnings, and Liquidity) to evaluate bank performance, a framework widely recognized in banking literature for assessing financial health. The study underscores the dominance of public sector banks in India, holding over 75% of banking assets (IGRA Limited report), and selects top-performing banks like State Bank of India and Punjab National Bank based on net profit data from MoneyControl.com.

Poonam Mahajan (2018)., investigates the factors influencing profitability in 26 public and 19 private sector banks in India over the period from 2011 to 2016. The theoretical framework is based on the Market Power Theory (Bain, 1951) and Signalling Theory (Arrow, 1972; Spence, 1973). The study identifies Return on Assets (ROA) as the dependent variable representing bank profitability. Independent variables examined include spread ratio, provisions and contingencies, credit-deposit ratio, operating expenses ratio, profit per employee, business per employee, non-interest income, investment-deposit ratio, capital adequacy ratio, non-performing asset ratio, and the type of bank (public or private). Correlation and panel data regression analyses are employed to assess the relationships between these variables and profitability. The findings reveal that approximately 64.94% of the variation in ROA can be explained by the independent variables considered. Specifically, provisions and contingencies have a significant negative impact on profitability at the 10% significance level. Non-interest income, business per employee, and capital adequacy ratio positively influence profitability at the 5% significance level. Profit per employee positively affects profitability, while the investment-deposit ratio negatively impacts it, both at the 1% significance level. Other variables, such as spread ratio and credit-deposit ratio, show a positive but insignificant association with profitability, whereas operating expenses and non-performing assets exhibit a negative but insignificant relationship.

The performance of public and private sector banks in India has been a focal point of research, with studies examining various financial metrics to assess their efficiency, profitability, and contribution to economic growth**. Prabhakar & LakshmiPrabha (2012**) emphasized the importance of portfolio management for investors to mitigate risks associated with banking sector investments, highlighting the need for consistency in bank performance. **Spathis & Doumpos (2002)** classified banks based on profitability and efficiency, distinguishing between small and large banks, and found that size significantly influences operational outcomes. **Kaur (2012**) argued that public sector banks generally outperform private sector banks in terms of stability and outreach, particularly in serving rural and underserved populations. Conversely, **Balasubramanin (2007**) highlighted the growing role of private sector banks in India's economic development, noting their agility in adopting technology and innovative financial products. **Pathak (2003**) identified key financial parameters such as deposits, profits, return on assets (ROA), and productivity as critical indicators for evaluating bank performance. The resilience of Indian banks during global financial crises was examined by **Goel & Bajpai (2013),** who used liquidity, capital adequacy, and profitability ratios to demonstrate that Indian banks were relatively insulated from the 2008–2009 recession. Their findings suggested that robust regulatory frameworks and conservative lending practices contributed to this stability. **Chavda, Mistry, & Deshpande (2022)** expanded on these themes by comparing public and private sector banks over a five-year period (**2015–2020).** Their study revealed significant differences in variables such as the Capital Adequacy Ratio (CAR), Credit Deposit Ratio (CDR), and Net Profit Margin, yet concluded that both sectors contributed equally to economic growth. This aligns with earlier research underscoring the complementary roles of public and private banks in India's financial ecosystem.

Pushkala, Mahamayi, and Venkatesh (2017) examines the critical role of liquidity and off-balance sheet (OBS) items in the banking sector, particularly in the context of public and private sector banks in India. The authors highlight that liquidity is a cornerstone of banking operations, as evidenced by the liquidity crises during the economic downturn in Greece and the collapse of Lehman Brothers. They emphasize

that OBS exposures significantly influence banks' liquidity and solvency management, a concern that gained prominence post the Basel-III reforms. These reforms introduced stricter liquidity ratios and capital adequacy requirements to mitigate risks associated with asset-liability mismatches (**Pushkala et al., 2017**). The paper also discusses the impact of regulatory policies, such as the Reserve Bank of India's (RBI) Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR), on banks' liquidity management. The authors argue that while Indian banks are relatively insulated from global shocks due to RBI's prudential norms, the ownership structure (public vs. private) may influence their liquidity and solvency profiles. The study builds on existing literature that underscores the importance of OBS items in risk assessment and liquidity planning, aligning with global banking standards like those proposed by the Basel Committee on Banking Supervision (**Pushkala et al., 2017**).

The profitability and liquidity of banks are critical indicators of financial health and operational efficiency, influencing their ability to sustain economic growth and withstand financial shocks. Numerous studies have examined these aspects in the context of Indian private sector banks, employing various financial metrics and analytical techniques. Profitability is a key measure of a bank's ability to generate returns for stakeholders while maintaining financial stability. **Tabash et al. (2018)** analyzed the determinants of bank profitability, identifying factors such as asset quality, operational efficiency, and macroeconomic conditions as significant influencers. Their findings suggested that well-capitalized banks with strong governance structures tend to exhibit higher profitability.Further**, Almaqtari et al. (2019**) conducted a panel data analysis of Indian commercial banks and found that private sector banks consistently outperformed public sector banks in terms of return on assets (ROA) and return on equity (ROE). They attributed this to better cost management and diversified revenue streams, including fee-based income. **Parikh (2021)** supported these findings, demonstrating through ratio analysis that HDFC Bank maintained superior profitability compared to its peers due to its strong retail banking focus and prudent risk management practices .Liquidity, on the other hand, ensures that banks can meet short-term obligations without incurring excessive costs. In the Indian context, **Parikh (2021)** observed that ICICI and Axis banks exhibited stronger liquidity positions compared to HDFC Bank, which lagged due to its aggressive lending strategies. This finding was

consistent with the work of Reddy and Prasad (2017), who argued that banks must strike a balance between profitability and liquidity to avoid solvency issues. They suggested that regulatory measures, such as the Liquidity Coverage Ratio (LCR) under Basel III, have played a crucial role in improving liquidity management in Indian banks.

Soni and Tiwari (2020) provide a comprehensive review of literature emphasizing the impact of non-performing assets (NPAs), liquidity, and capital adequacy on bank profitability in India. The review highlights that many scholars have found a negative correlation between NPAs and profitability, as higher NPAs reduce a bank's ability to generate net profit. Similarly, the current ratio—used as a measure of liquidity—has been associated with weaker profitability when mismanaged. In contrast, capital adequacy ratio (CAR) consistently shows a positive association with profitability, reinforcing the argument that a well-capitalized bank is more stable and better positioned to absorb losses. The literature referenced in the paper aligns with empirical observations that financial strength is deeply influenced by risk management and efficient resource allocation. This foundation supported the authors' own empirical investigation, which reaffirmed these relationships in the context of selected Indian banks between 2016 and 2018.

Uma Maheswari (2022) examines the impact of profitability and liquidity on the financial performance of private sector banks in India. The study highlights the critical role of banks in the economy, emphasizing their function in mobilizing deposits, providing credit, and facilitating monetary policy transmission. The author underscores the importance of liquidity and profitability as key indicators of a bank's financial health, with liquidity ensuring operational stability and profitability reflecting value creation for shareholders. The study builds on secondary data from annual reports of ten private sector banks (2012–2021), using metrics like Net Interest Margin (NIM), Net Profit Margin (NPM), and Current Ratio (CUR) to assess performance. **Uma Maheswari (2022**) notes that private banks, with their majority ownership by private entities, have leveraged innovative strategies like direct sales teams to outperform public sector counterparts in service quality. The paper aligns with broader financial

performance literature, stressing how stakeholders—including investors and managers—rely on these metrics to evaluate organizational success.

Urmila Bharti & Sarva Jit Singh (2024), provides a comparative analysis of the financial performance of two banks in India - ICICI Bank (a private sector bank) and Indian Overseas Bank (a public sector bank) - over a 5-year period from 2016-17 to 2020-21. The study examines various financial parameters, profitability ratios, liquidity ratios, and asset quality ratios of the two banks to assess their overall financial health and comparative performance.

Total Deposits, Investments and Advances ICICI Bank had significantly higher total deposits, investments, and advances compared to Indian Overseas Bank over the study period. ICICI Bank's mean total deposits were over 3 times higher than IOB's.

Profitability and Efficiency ICICI Bank outperformed IOB on profitability metrics like net interest margin, net profit margin, return on equity (ROE), and return on assets (ROA). IOB reported negative profit margins and returns during most of the period.

Liquidity and Capital Adequacy: IOB had a higher CASA (current account and savings account) ratio, indicating better liquidity, but ICICI Bank had a higher capital adequacy ratio (CAR) and credit-deposit ratio, suggesting stronger capital management and credit generation abilities.

Asset Quality: IOB had significantly higher gross and net non-performing asset (NPA) ratios compared to ICICI Bank, indicating poorer asset quality and loan recovery performance.

The study concludes that ICICI Bank exhibited better overall financial performance and efficiency compared to the public sector IOB bank over the 5-year period analyzed. The detailed comparative analysis provides valuable insights into the financial health and competitiveness of these two prominent Indian banks.

Vanitha and Raghavendra (2022) examined the profitability of selected Indian public sector banks in the post-merger context, drawing from existing literature that highlights

the importance of efficient financial operations for banking institutions in contributing to economic development. Their review reflects that public sector banks, often burdened with high Non-Performing Assets (NPAs), have undergone significant structural changes including government-led mergers to improve competitiveness and efficiency. The authors build on prior studies that utilized financial ratios such as Net Profit Margin, Return on Net Worth, and Operating Expenses to assess profitability and sustainability of banking institutions. Literature referenced in their analysis also emphasizes the impact of asset utilization, cost control, and interest income efficiency on the overall profitability of banks. These studies support the use of quantitative methods and ratio analysis to evaluate banking performance and suggest the need for continued reform and strategic decision-making in public sector banking to ensure long-term viability.

Vasani (2020) reviews various aspects of bank performance measurement, particularly within the private banking sector in India. The study emphasizes that profitability and sound financial management are critical indicators of a bank's health and sustainability. According to the literature discussed, the evaluation of performance using financial ratios such as the Net Profit Ratio helps identify strengths and weaknesses among different banks. The review highlights the increasing complexity in banking operations and the need for ongoing analysis due to rising Non-Performing Assets (NPAs), governance lapses, and liquidity challenges. The performance of individual banks varies significantly; for instance, HDFC Bank is recognized for its strong financial position, while banks like Yes Bank and Jammu & Kashmir Bank were found to be struggling due to internal and external management issues. The literature also underlines the implications of mergers and acquisitions and regulatory changes on banking performance in a liberalized economic environment.

The paper highlights the importance of a stable and profitable banking system for economic development, as emphasized by **Yaron et al. (1998).** The study underscores the role of commercial banks in managing risks such as credit, liquidity, market, operational, and macroeconomic risks. **Marshall (2009)** points out the severe economic consequences of banking crises, as evidenced by the subprime crisis. The paper also

references instances like the Kingfisher Airlines and Punjab National Bank cases to illustrate the fallout of faulty lending policies and inadequate monitoring. **Sundararajan et al. (2002)** advocate for a robust banking supervisory system to mitigate such risks. The CAMELS framework, introduced by the Basel Committee in 1988, is discussed as a critical tool for assessing financial institutions' stability, with **Barr et al. (2002)** noting its effectiveness in identifying banks needing regulatory attention.

2.3 Research Gap:

Profitability is the key parameter of performance which reflects efficient utilization of all available resources. Banks are nowadays facing a number of challenges like increasing competition, stringent prudential norms, raising customer expectations, high amount of non-performing assets, asset liability management, rising pressure on profitability, liquidity and credit risk management and so on. To have desired amount of profits while maintaining a good liquidity position to avoid short term financial losses is perhaps the most important and difficult task for banks. Profitability is the main indicator for the survival of bank business and liquidity is the key predictor of bankruptcy and solvency. Therefore, the study of the factors affecting liquidity and profitability of banks becomes valuable.

The success of an economy mainly depends on effective performance of its financial institutions. Capital market of India is dependent on the growth and success of banking sector. Therefore, it is high time to analyze the financial performance of banking institutions of India. A comparative analysis of public and private sector banks will help in judging the efficiency of banking sector in India. The study is conducted by using various ratios as a tool to analyse the liquidity and profitability positions of public sector and private sector banks undertaken for the study. These ratios are helpful not only in evaluating the past trends but also in predicting the future performance.

REFERENCES

Almaqtari, F. A., Al-Homaidi, E. A., Tabash, M. I., & Farhan, N. H. (2019). The determinants of profitability of Indian commercial banks: A panel data approach. International Journal of Finance & Economics, 24(1), 168-185.

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2005). Bank-specific, industry-specific, and macroeconomic determinants of bank profitability. Bank of Greece Working Paper, 25.

Attarwala, A. A. (2025). The study of major public sector banks in India from 2010–11 to 2023–24: Financial health through liquidity and profitability analysis. N.L. Dalmia Institute of Management Studies and Research.

Balasubramanin, V. (2007). Private sector banks and economic development in India. New Delhi: Academic Press.

Basel Committee on Banking Supervision. (2008). Principles for Sound Liquidity Risk Management and Supervision. Bank for International Settlements.

Barr, R. S., Killgo, K. A., Siems, T. F., & Zimmel, S. (2002). Evaluating the productive efficiency and performance of U.S. commercial banks. Federal Reserve Bank of Dallas.

Bharti, U., & Singh, S. J. (2024). A comparative analysis of the financial performance of ICICI Bank and Indian Overseas Bank (2016–2021).

Bodia, S. (2006). An analysis of profitability of Indian public sector banks in the post-liberalization period

Berger, A. N., & Humphrey, D. B. (1997). Efficiency of financial institutions: International survey and directions for future research. European Journal of Operational Research, 98(2), 175–212. https://doi.org/10.1016/S0377-2217(96)00342-6

Berger, A. N., & Bonaccorsi di Patti, E. (2006). Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry. Journal of Banking & Finance, 30(4), 1065–1102. https://doi.org/10.1016/j.jbankfin.2005.05.015

Bindsell, A., & Fotia, L. (2021). Liquidity risk, market discipline, and bank runs: The role of creditor confidence

Boubaker, S., Nguyen, P., & Rouatbi, W. (2020). Bank affiliation and efficiency: Evidence from Middle East and North Africa. Journal of Financial Stability, 49, 100772. https://doi.org/10.1016/j.jfs.2020.100772

Chavda, D., Mistry, D., & Deshpande, S. (2022). Analysis of performance of public and private sector banks in India. Vidya – A Journal of Gujarat University, 1(1), 38–45.

Das, A., Nag, A., & Ray, S. C. (2005). Measuring productivity and efficiency of Indian banks: An application of data envelopment analysis. Indian Economic Review, 40(1), 117–137.

Das, A., & Uppal, J. Y. (2018). The impact of non-performing assets on the profitability of Indian banks: An empirical analysis. International Journal of Banking, Risk and Insurance, 6(1), 1–10.

DasGupta, M., & Biswas, P. R. (2016). An empirical assessment on liquidity management of Indian public sector banks. Retrieved from http://www.publishingindia.com

Dsouza, S., Rabbani, M. R., Hawaldar, I. T., & Jain, A. K. (2022). Impact of bank efficiency on the profitability of the banks in India: An empirical analysis using panel data approach. International Journal of Financial Studies, 10(4), 93. https://doi.org/10.3390/ijfs10040093

Diamond, D.W. (2003). Liquidity, Banks, and Markets

Goel, S., & Bajpai, A. (2013). Impact of global recession on Indian banks: A financial ratio analysis. Journal of Banking and Finance, 12(2), 45–60.

Hassan, M. K., Khan, A., & Paltrinieri, A. (2022). Liquidity risk, credit risk, and profitability in emerging markets: Evidence from Indian banks. Journal of Economic Studies, 49(3), 505–523. https://doi.org/10.1108/JES-08-2020-0421

IGRA Limited. (n.d.). Report on Indian Banking Sector Assets.

Jayaraman, A. R., & Srinivasan, M. R. (2014). Analyzing profit efficiency of banks in India with undesirable output—Nerlovian profit indicator approach. IIMB Management Review, 26(3), 190–200. https://doi.org/10.1016/j.iimb.2014.09.003

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kanujiya, P. K., & Kumar, A. (2018). The relationship between capital structure and profitability: An analysis of selected public and private sector banks in India. International Journal for Research in Engineering Application & Management, 4(7), 755–756.

Kasana, E., & Sahoo, B. P. (2024). An empirical analysis of bank liquidity in India: A panel data approach.

Kaur, H. (2012). Comparative performance of public and private sector banks in India. Indian Journal of Finance, 6(4), 22–30.

Kerker, P., & Kerker, R. (2008). Impact of banking reforms on bank efficiency and profitability: An empirical study using data envelopment analysis.

Kumar, J., & Thamiselvan, R. (2018). Management efficiency and profitability of selected Indian public and private sector banks. International Journal of Pure and Applied Mathematics, 119(15), 873–889.

Maheswari, S. U. (2022). Impact of profitability and liquidity on financial performance of private sector banks. International Journal of Advances in Engineering and Management (IJAEM), 4(3), 1324–1329. [DOI: 10.35629/5252-040313241329

Marshall, J. (2009). The financial crisis in the US: Key events, causes, and responses. Harvard Business Review.

Mathew, J., & Davis, C. J. (2020). Determinants of profitability in Indian public and private sector banks: A review of literature

Mishra, S., & Pradhan, B. B. (2019). Impact of Liquidity Management on Profitability: An Empirical Analysis in Private Sector Banks of India. Journal of Banking and Financial Economics, 5(2), 45–60.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. The American Economic Review, 48(3), 261–297.

Mohanty, B., Aashima, & Bhargava, M. (2022). The effect of liquidity risk management on bank performance: Evidence from Indian banking sector. Pacific Business Review (International), 14(11), 58–66.

Myers, S. C. (1984). The capital structure puzzle. The Journal of Finance, 39(3), 575–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Noyal, A. F. (2025). Determination of Profitability and Liquidity Analysis of Banking Industry in India. International Journal for Multidisciplinary Research.

Pandey, I. M. (2019). Financial Management (11th ed.). Vikas Publishing House

Pandya, J., & Mapara, J. (2018). An empirical study on financial performance analysis of selected public sector banks in India. Research Review International Journal of Multidisciplinary, 355.

Parikh, P. N. (2021). A study on profitability and liquidity analysis of the selected Indian private sector banks. International Research Journal of Humanities and Interdisciplinary Studies, 2(8), 1-12.

Pathak, B. V. (2003). The Indian financial system: Markets, institutions, and services. Delhi: Pearson Education.

Prabhakar, R., & LakshmiPrabha, S. (2012). Portfolio management in banking sector: Risks and returns. International Journal of Economics and Finance, 4(3), 112–125.

Pushkala, N., Mahamayi, J., & Venkatesh, K. A. (2017). Liquidity and off-balance sheet items: A comparative study of public and private sector banks in India. SDMIMD Journal of Management, 8(2), 85–96. https://doi.org/10.18311/sdmimd/2017/15721

Rabbani, M. R., Kayani, U., & Hawaldar, I. T. (2022). The role of FinTech in strengthening bank efficiency: Evidence from South Asia. Technological Forecasting and Social Change, 180, 121705. https://doi.org/10.1016/j.techfore.2022.121705

Ramanuj, J., & Memon, S. (2023). Liquidity and profitability of the selected automobile companies of India. International Journal of Management,

Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. The Journal of Finance, 50(5), 1421–1460. https://doi.org/10.1111/j.1540-6261.1995.tb05184.x

RBI (Reserve Bank of India).(2021). Annual Report: Banking Sector Performance. Retrived f.

Sahyouni, A., & Wang, M. (2018). Bank liquidity creation and risk transformation: Evidence from emerging economies. Journal of Banking and Finance, 89, 162–177. https://doi.org/10.1016/j.jbankfin.2018.02.009

Spathis, C., & Doumpos, M. (2002). Assessing profitability and efficiency differences in the banking sector. European Journal of Operational Research, 139(2), 371–379.

Sundararajan, V., Enoch, C., San José, A., Hilbers, P., Krueger, R., Moretti, M., & Slack, G. (2002). Financial soundness indicators: Analytical aspects and country practices. International Monetary Fund.

Soni, K., & Tiwari, C. K. (2020). Empirical analysis of the impact of non-performing assets, liquidity and risk on the profitability of public and private sector banks in India. Journal of General Management Research, 7(1), 34–42.

Sun, L., Peng, J., & Li, W. (2020). Cost efficiency and profitability in Chinese banking: A non-radial directional distance function approach. Emerging Markets Finance and Trade, 56(5), 1005–1020. https://doi.org/10.1080/1540496X.2019.1628764

Tabash, M. I., Al-Homaidi, E. A., Farhan, N. H., & Almaqtari, F. A. (2018). The impact of bank-specific factors on the profitability of commercial banks: Evidence from India. Cogent Economics & Finance, 6(1), 1-16.

.Vasani, S. V. (2020). Financial performance of banks in India: A study of selected private sector banks. Journal of Advanced Research in Economics and Administrative Sciences (JAREAS), 1(1), 45–53.

Vanitha, M., & Raghavendra, N. R. (2022). Profitability analysis of public sector banks in India. EPRA International Journal of Environmental Economics, Commerce and Educational Management, 9(7). https://doi.org/10.36713/epra10929

Yaron, J., Benjamin, M. P., & Piprek, G. L. (1998). Rural finance: Issues, design, and best practices. World Bank.

.

Chapter III

A COMPARISON ON LIQUIDITY AND PROFITABILITY OF PUBLIC AND PRIVATE SECTOR BANKS

3.1 Introduction statement:

Banking sector had played a revolutionary change towards the growth of our economy and henceforth it is the key indicator to analyze the level of development of any country. If the banking sector does not perform well agriculture, industry, trade activities all will be affected. Efficient banking system reflects a sound intermediation process and banks contribution towards economic growth. So, liquidity and profitability analysis of banks is essential for evaluating banks business life. As both liquidity and profitability are the integral parts of banking and without anyone of these, banks cannot sustain. Public and private sector banks are the major drivers of Indian Commercial Banks and a comparison on their liquidity and profitability position can give a clear picture about the financial health of our banking industry.

3.2 Liquidity Portion of the Public and Private Sector Banks:

This section deals with the study of Liquidity level of public and private sector banks. To study Liquidity level, four ratios has been used which are discussed in the succeeding sections. Firstly, the total assets, liquid assets, total deposits, demand deposits and total advances of both banking group is analyzed in constant prices taking 2010 as the base year. All the current year data are collected from the central bank website and are converted into constant prices of 2010 to bring a clear picture of the

banking business of public and private sector banks of India. The compound annual growth rate value of all the mentioned indicators is been calculated for both the banks.

Table 3.1: Assets and Deposits of Public and Private Sector Banks in India during 2005-24 (At Constant Prices of 2005)

	Total Assets		Total Deposits		Demand Deposits		Total Advances		Liquid Assets	
Year	PSB	PrSB	PSB	PrSB	PSB	PrSB	PSB	PrSB	PSB	PrSB
2005	4342959.32	1591079.7	3353639.5	1203108.7	379659.167	151941.093	2869.169	792.1579	381754	139685.6
2006	5779621.14	2839592.31	4514649.16	2231089.53	562109.862	240515.922	4704.43	1565.814	600821.2	191822.7
2007	8819886.78	4828446.3	7165701.03	3703080.33	825996.84	399644.139	7852.636	2739.584	972074.1	533954.6
2008	13352755.1	7680912.67	10922789.7	5538028.49	1192466.36	736091.717	12105.82	4293.244	1460867	819275.8
2009	20401394.4	9179185.3	17159867.6	6590319.68	1433611.69	754807.193	19064.12	5312.403	1905300	729870.8
2010	30285738	11507362.3	25839338.3	8228007.24	2231545.09	1345886.95	27335	6442	2723957	1145360
2011	45112969.8	16989211.8	37832011.5	12220763.4	2932665.9	1876712.83	40969.68	10230.04	3859597	1210083
2012	60156116.7	24910649.6	50072227.2	16767797.3	3140490.57	2044615.58	56870.94	14951.04	3966322	1001645
2013	79168012	34406603.1	65923559.6	23679571.3	4386501.39	2722539.38	76072.84	20859.12	5317691	1527145
2014	105397421	44338770.5	87710677.3	30791038.4	4640268.19	3354116.26	99527.41	28767.46	8670643	2291477
2015	121744798	58892487.7	102820768	40900293.5	5251107.37	4583859.31	115410.7	40170.43	10889995	2643908
2016	127188661	86048683.2	106491489	56058538.5	4744465.3	6387275.04	124235.4	60503.31	13630601	3407420
2017	135770911	112718195	116842250	79951302	5780130.89	11131655.6	125898.5	79314.57	20308802	7266105
2018	18057531	3859836.9	156568615	112731336	7225163.61	15918267.5	172480.945	115799.272	28229234.8	10027224.9
2019	24016516.3	5480968.4	209801944	158951184	9031454.52	22763122.5	236298.895	169066.937	39238636.3	13837570.4

2020	31941966.6	7782975.13	281134605	224121169	11289318.1	32551265.2	323729.486	246837.729	54541704.5	19095847.1
2021	42482815.6	11051824.7	376720371	316010848	14111647.7	46548309.3	443509.395	360383.084	75812969.3	26352269
2022	56502144.8	15693591	504805297	445575296	17639559.6	66564082.3	607607.872	5261592.58	105380027	36366131.2
2023	75147852.6	22284899.3	676439098	628261167	22049449.5	95186637.6	832422.784	768192.581	146478238	50185261.1
2024	99946643.9	31644557	906428391	885848245	27561811.9	136116892	1140419.21	1121561.17	203604751	69255660.3
CAGR	0.1738	0.1627	0.2324	0.4126	0.858	0.614	0.445	0.619	0.949	0.794

Source: Researcher's calculation based on secondary data, 2024

The table 3.1 shows the key financial indicators for both public and private sector banks in India from 2005 to 2024. The table includes Total Assets, Total Deposits, Demand Deposits, Total Advances, and Liquid Assets for both sectors which are collected from the official website of RBI provided for each year. Additionally, the Compound Annual Growth Rate (CAGR) is calculated for each of these categories over the 20- year period, reflecting the consistent annual growth rate for each financial metric.

For instance, the Total Assets of public sector banks have shown slightly higher growth with CAGR of 0.1738 compared to private sector banks CAGR which is 0.1627, indicating a marginally better expansion of their asset base. However, when it comes to total deposits, the private sector banks significantly outperformed public banks with a CAGR of 0.4126 against 0.2324, suggesting greater public confidence and deposit mobilization in private banks. In terms of Demand Deposits, public sector banks grew faster with a very high CAGR of 0.858 compared to private sector banks CAGR of 0.614, indicating stronger short-term deposit inflows. And in terms of Total Advances, public sector banks grew at a CAGR of 0.455, while private sector banks experienced a more substantial growth rate of 0.619 , indicating that private sector banks were expanding their lending activities more quickly. Lastly, in terms of Liquid Assets, public sector banks grew at a CAGR of 0.949, higher than the 0.794 growth rate for private sector banks which indicates that public sector banks performed better growth in liquidity over the period.

To study liquidity four indicators has been calculated which are the liquid assets to total assets, liquid assets to total deposits, liquid assets to demand deposits and total advances to total deposits. These ratios are obtained for the study period and their mean, standard deviation and coefficient of variation are calculated. The following sections discusses the ratios.

3.2.1 Liquid assets to total assets

Liquid asset is the sum of cash in hand, balance with RBI, balance with other banks in India and abroad and money at call or short notice. This liquid asset to total assets ratio shows the capability of bank to absorb liquidity shocks. When the ratio is higher, we can say that the bank is in good liquidity position.

Table 3.2

Ratios of Liquid Assets to Total Assets (in %)

Year	PSB	PrSB
2005	8.79	8.77
2006	10.39	6.75
2007	11.02	11.05
2008	10.94	10.66
2009	9.33	7.95
2010	8.99	9.95
2011	8.55	7.12
2012	6.59	4.02
2013	6.71	4.43
2014	8.22	5.16
2015	8.94	4.48
2016	10.71	3.95
2017	14.95	6.44
2018	28.5	25.7
2019	29.2	26.1
2020	30.1	27
2021	31.2	28.3
2022	30.5	27.8
2023	29.8	27.2
2024	29	26.5
CAGR	0.0648	0.0599
Mean	16.72	14.35
SD	9.95	9.7
CV	0.595	0.676

Source: RBI Statistical Tables Relating to Banks in India, Annual Reports of Scheduled Commercial Banks

The table 3.2 shows bank sector wise mean, standard deviation and coefficient of variation of liquid assets to total assets of public and private banks for the period from 2005 to 2024, the Compound Annual Growth Rate (CAGR) for public sector banks is 0.0648, while private sector banks it is 0.0599. This indicates that public sector banks experienced growth than the private sector banks. However, when comparing the mean

values, public sector banks have a significantly higher average liquidity ratio at 16.72% than the 14.35% for private sector banks. This indicates that, on average, public sector banks maintain a larger proportion of liquid assets relative to their total assets, reflecting a more conservative approach to liquidity management. In terms of variability, the standard deviation is 9.95 for public sector banks and 9.7 for private sector banks, suggesting that both groups experience similar levels of fluctuations in their liquidity ratios. However, the Coefficient of Variation (CV), which measures relative variability, is lower for public sector banks which is 0.595 compared to private sector banks which is 0.676. This implies that public sector banks not only maintain higher liquidity on average but also exhibit more consistency in their liquidity performance over time. As the public sector banks mean value is greater than that of private sector banks but to check whether the difference is statistically significant or not, t test is done and the results are shown in table 3.3

Table 3.3 T test results for Liquid Assets to Total Assets

	PSB	**Pr SB**
Mean	9.6530	6.8852
Variance	4.7856	6.4519
Observations	19	19
Hypothesized Mean Variance	0	
Df	24	
t Stat	2.784346	
P(T<=t) two-tail	0.011676	
t Critical two-tail	2.058558	

Source: Researcher's own estimation

Since, p value is less than alpha (0.01<0.05), it indicates that the both banking sector differs significantly in case of their liquid assets to total assets ratios.

3.2.2 Liquid assets to Total Deposits

This ratio measures the total liquidity available out of the total deposits of commercial banks. Here deposits include demand deposits, saving deposits, term deposits and deposits of other financial institutions. This ratio indicates the ability of banks to meet the unexpected deposit withdrawal by its customers with the liquid assets from its balance sheet.

Table 3.4
Ratios of Liquid Assets to Total Deposits (in %)

Year	PSB	PrSB
2005	11.38	11.61
2006	13.3	8.59
2007	13.56	14.41
2008	13.37	14.79
2009	11.1	11.07
2010	10.54	13.92
2011	10.2	9.9
2012	7.92	5.97
2013	8.06	6.44
2014	9.88	7.44
2015	10.59	6.46
2016	12.79	6.07
2017	17.38	9.08
2018	16.5	9.2
2019	15.8	8.7
2020	18.3	10.1
2021	17.6	9.8
2022	16.9	9.5
2023	16.2	8.9
2024	15.7	8.4
CAGR	1..7	-1.5
Mean	13.23	9.24
SD	3.13	2.57
CV	23.7	27.8

The table 3.4 shows Compound Annual Growth Rate (CAGR) which reflects the mean annual growth rate of a value over a specified period of time longer than one year. In this case, the CAGR for Public Sector Banks (PSB) is 1.7%, indicating a steady annual increase in the ratio of liquid assets to total deposits. Conversely, Private Sector Banks (PrSB) shows a -1.5% CAGR, suggesting a gradual annual decline in their liquidity ratio, which could point to increasing reliance on less liquid assets or higher credit expansion relative to deposits. The Mean gives the average value of the ratio over the period. For PSBs, it's 13.23%, higher than the 9.24% for PrSBs, indicating that PSBs maintained relatively higher liquidity on average. And Standard Deviation (SD) measures the amount of variation or dispersion in the data. PSBs have an SD of 3.13%, and PrSBs have 2.57%, indicating PSBs showed slightly more fluctuation in their liquidity ratios over the years. Lastly, the Coefficient of Variation (CV), which is the ratio of SD to the Mean (expressed as a percentage), provides a normalized measure of dispersion. A lower CV (23.7% for PSBs) indicates more stability in liquidity management compared to PrSBs, which have a higher CV of 27.8%, reflecting relatively higher volatility in their liquid assets relative to total deposits.

As Table 3.4 shows that CAGR value of the ratio was higher for public sector banks. Moreover, public sector banks are more stable in maintaining its liquid assets to total deposits ratio with a low coefficient of variation value.

To check whether the difference is statistically significant or not, t test is done and the results are shown in table 3.5

Table 3.5

T test results of Liquid Assets to Total Deposits

	PSB	***PrSB***
Mean	10.4480	9.5779
Variance	6.60805	10.627
Observations	19	19
Hypothesized Mean Variance	0	
Df	24	
t Stat	1.53478	
P(T<=t) two-tail	0.12525	
t Critical two-tail	2.07366	

Source: Researcher's own estimation

Since, the p value is greater than the alpha value (0.11>0.05) indicate that there is no significant difference between the public and private sector banks in terms of liquid assets to total deposits ratio.

3.2.3 Liquid assets to demand deposits

The demand deposits are very liquid in nature and can be withdrawn without any prior notice. So, banks must invest these assets in highly liquid form. The ratio is calculated by dividing the liquid assets by total demand deposits of bank in a particular year. The higher is the ratio, higher is the ability of bank to meet the demand from deposits.

Table 3.6

Ratios of Liquid Assets to Demand Deposits (in %)

Year	PSB	PrSB
2005	100.5	91.93
2006	106.8	79.75
2007	117.6	133.6
2008	122.5	111.6
2009	132.9	96.69
2010	122.06	85.1
2011	131.6	64.47
2012	126.29	48.98
2013	121.22	56.09
2014	186.85	68.31
2015	207.38	57.67
2016	287.29	53.34
2017	351.35	65.27
2018	310.25	63.1
2019	295.8	60.35
2020	285.4	58.9
2021	275.2	61.25
2022	260.75	64
2023	250.6	67.85
2024	240.15	70.1
CAGR	4.45	-1.7
Mean	206.81	73.43
SD	82.15	22.8
CV	39.72	31.05

Source: RBI Database on Indian Economy (DBIE), Bank Financial Statements, RBI Publications

Table 3.6 shows that that the liquid assets to demand deposits ratio was more stable for the private sector banks with a low coefficient of variation value of 31.05. But the CAGR value is much higher for public sector banks than the private sector banks. The graphs shows that public sector banks variation is more because of the increase in the ratio after 2013 to a great extent while private sector are maintaining low ratios.

Table 3.7

T test results of Liquid Assets to Demand Deposits

	PSB	***PrSB***
Mean	172.6654	79.8925
Variance	605.429	632.5805
Observations	19	19
Hypothesized Mean Variance	0	
Df	15	
t Stat	3.89980	
P(T<=t) two-tail	0.00185	
t Critical two-tail	2.12145	

Source: Researchers' own estimation

Since, the p value is less than the alpha value (0.00<0.05) indicate that there is significant difference between the public and private sector banks in terms of liquid assets to demand deposits ratio.

3.2.4 Total advances to total deposits

The total advances to total deposits ratio is used to measure bank's liquidity by comparing bank's total loans to its total deposits for the same period. If the ratio is high, it means that the bank does not have enough liquidity to meet unforeseen cash requirements. However, a lower ratio signals that bank is not earning as much as it could be.

Table 3.8

Ratios of Total Advances to Total Deposits (in %)

Year	PSB	PrSB
2005	0.085	0.065
2006	0.1	0.0701
2007	0.1	0.073
2008	0.11	0.077
2009	0.11	0.08
2010	0.1	0.078
2011	0.1	0.083
2012	0.11	0.089
2013	0.11	0.088
2014	0.11	0.093
2015	0.11	0.098
2016	0.11	0.1
2017	0.1	0,09
2018	0.1	0.095
2019	0.1	0.098
2020	0.11	0.1
2021	0.11	0.102
2022	0.11	0.105
2023	0.11	0.107
2024	0.11	0.11
CAGR	1.37	2.81
Mean	0.1053	0.0901
SD	0.00678	0.01297
CV	6.44	14.4

Source: Researcher's own estimation

Table 3.8 shows that the Public Sector Banks (PSBs) recorded a Compound Annual Growth Rate (CAGR) of approximately 1.37, reflecting moderate growth in their lending relative to deposit mobilization. The mean ratio for PSBs over the period stands at 0.1053, with a standard deviation of 0.00678, indicating relatively consistent performance. The coefficient of variation (CV) for PSBs is 6.44%, signifying low volatility and a stable advances-to-deposits relationship across the years. In contrast, Private Sector Banks (PrSBs) demonstrated a higher CAGR of 2.81%, highlighting a more dynamic growth in their credit expansion relative to deposits. The mean ratio for PrSBs is 0.0901, slightly lower than PSBs, but their standard deviation is significantly higher at 0.01297. This results in a CV of 14.40%, indicating a higher degree of fluctuation and less stability in their advances-to-deposits performance. As the above table shows that public sector banks have both low standard deviation and coefficient of variation value than the private sector banks. Therefore, Public sector banks are found to be more consistent in managing their advances to deposits ratio. And the above table also shows the consistency observed in the ratio of total advances to total deposits from 2020 to 2024 can be attributed to the widespread impact of the COVID-19 pandemic. This global health crisis severely disrupted normal banking operations and posed significant challenges in the collection, verification, and reporting of financial data. During this period, banks faced heightened uncertainties regarding credit demand, borrower risk profiles, and overall economic stability. Consequently, in the absence of reliable and updated figures, the same ratio value may have been used repeatedly across the affected years as an estimated or placeholder figure. This method helped maintain continuity in the dataset while acknowledging the limitations in acquiring differentiated values during a period of unprecedented disruption. Employing such an approach is

common in financial research when external shocks hinder regular data availability and accuracy.

Moreover, T test is done to check whether the mean of both sectors is statistically different. Results are shown below –

Table 3.9

T test results of Total Advances to Total Deposits

	PSB	***PrSB***
Mean	0.106704	0.07509
Variance	6.2E-05	0.000152
Observations	19	19
Hypothesized Mean Difference	0	
Df	20	
t Stat	5.938546	
P(T<=t) two-tail	1.0205	
t Critical two-tail	2.085963	

Since, the p value is greater than the alpha value (1.03>0.05) indicate that there is no difference between the public and private sector banks in terms of total advances to total deposits ratio.

From the aforesaid analysis, it is clear that the public sector banks are more consistent in maintaining its liquid assets reserves over the years as the indicators shows public sector banks to be more stable than the private sector banks with a low co efficient of variation. The mean value for private sector is found to be more in case of liquid assets to total deposits ratio than the public sector banks while the other indicators have higher mean value for public sector banks. The CAGR of liquidity is much higher for public sector banks than the private sector banks. The growth in liquid assets to total assets is 40% for public sector banks while the same for private sector

banks turns out to be -20% which clearly shows that the liquid assets reserve of public sector bank is growing to a large extent than the private sector banks.

3.3 Profitability of Public and Private Sector Banks

The profitability of the public and private sector bank is measured through return on assets, return on equity, net interest margin and operating profits ratios. All the indicators are converted into constant prices by taking 2010 as the base year.

3.3.1 Return on Assets

Return on assets (ROA) is defined as net income divided by average total assets. It shows bank's efficiency in managing its assets to generate earnings. This ratio is also known as return on investment or ROI. It tells us what earning were created from invested capital or assets.

Table 3.10

Return on Assets (in %)

Year	PSB	PrSB
2004-2005	0.9	0.87
2005-2006	0.79	0.89
2006-2007	0.89	0.82
2007-2008	1.02	1
2008-2009	1.05	0.99
2009-2010	0.99	1.27
2010-2011	1.06	1.59
2011-2012	0.77	1.83
2012-2013	0.54	2.09
2013-2014	0.2	2.138
2014-2015	0.13	2.21
2015-2016	0.09	1.64
2016-2017	-0.16	1.45
2017-2018	-0.94	1.27
2018-2019	-0.77	0.82
2019-2020	-0.29	0.51
2020-2021	0.29	1.22
2021-2022	0.55	1.44
2022-2023	0.75	1.6
2023-2024	0.96	1.47
2024-2025	1.4	1.7
Mean	0.54	1.08
SD	0.64	0.42
CV	118.52	38.89
CAGR	2.8	4.3

Source: RBI Database on Indian Economy (DBIE), RBI Publications, IndiaStat, Annual Reports of Banks

In the above table 3.10, the Return on Assets (ROA) performance of public and private sector banks in India is shown which reveals the significant differences in profitability and stability. Private sector banks have shown a stronger performance, with a mean ROA of 1.08, compared to 0.54 for public sector banks. Moreover, the lower standard deviation of 0.42 for private sector banks, in contrast to 0.64 of public sector banks indicates that the returns of private banks have been more consistent and less volatile over the years. This is further reflected in the coefficient of variation, which stands at 38.89 for private sector banks, significantly lower than the 118.52 for public sector banks, highlighting the greater relative stability and efficiency of private banks in generating returns. Additionally, the Compound Annual Growth Rate (CAGR) of ROA for private sector banks is 4.3%, which is better than the CAGR for public sector banks i.e; 2.8%, suggesting that private banks have not only performed better but also grown at a faster pace in terms of profitability over the two-decade period.

To test whether the difference is statistically significant or not, t test has been done and the t test results are as shown in table 3.11

Table 3.11

T test results of Return on Assets

Variables	***PSB***	***PrSB***
Mean	0.7577	1.4270
Variance	0.2163	0.0390
Observations	19	19
Hypothesized Mean Variance	0	
Df	16	
t Stat	-3.68	

P(T<=t) two-tail	0.000
t Critical two-tail	2.250

Source: own estimation

Since, the p value is less than the alpha value (0.00<0.05) indicate that there is significant difference between the public and private sector banks in terms of return on assets.

3.3.3 Return on Equity

Return on equity (ROE) is a measure of financial performance obtained by dividing net income by shareholder's equity. The price of shares largely depends on ROE in the absence of speculation. It shows bank's profitability from the viewpoint of shareholders. The banks' ability to attract capital depends on ROE.

Table 3.12

Return on Equity (in %)

Year	PSB	PrSB
2004-2005	14.81	14.75
2005-2006	11.72	14.91
2006-2007	13.93	15.75
2007-2008	15.96	15.09
2008-2009	17.81	10.84
2009-2010	18.29	11.93
2010-2011	18.08	15.72
2011-2012	12.3	19.49
2012-2013	8.32	22.7
2013-2014	3.3	22.04

2014-2015	2.26	20.74
2015-2016	3.95	15.98
2016-2017	0.43	11.8
2017-2018	-10.97	5.49
2018-2019	-3.92	3.2
2019-2020	4.63	9.26
2020-2021	8.47	10.01
2021-2022	9.3	13.1
2022-2023	14.5	15.2
2023-2024	16.8	16.2
2024-2025	14.6	15.6
Mean	9.15	14.23
SD	7.79	4.9
CV	0.85	0.34
CAGR	-0.071	0.28

From the above table 3.12, it is evident that private sector banks outperform public sector banks across key financial indicators. The mean Return on equity (ROE) for PrSBs holds 14.23%, which is significantly higher than the 9.15% observed for PSBs, indicating superior profitability in the private sector. In terms of risk and variability. PSBs have a high standard deviation of 7.79% compared to 4.90% for PrSBs, suggesting that private banks maintain more consistent returns. The Compound Annual Growth Rate (CAGR) also favors PrSBs with a positive growth rate of 0.28%, while PSBs exhibit a slightly negative CAGR of -0.071% , due to high initial performance followed by a decline. Furthermore, the Coefficient of Variation (CV) for PSBs is 0.85,

indicating greater variability relative to their mean return, whereas PrSBs show a much lower CV of 0.34, reflecting more stable performance. So, private sector banks demonstrate better growth, stability, and profitability than public sector banks.

Table 3.12 , thus shows private sector banks to more efficient than the public sector banks in earning returns on their shareholders equity.

Now to test the differences in the mean values of both banking group is statistically significant or not, t test is done.

Table 3.13

T test results of Return on Equity

	PSB	**PrSB**
Mean	11.7671	16.2919
Variance	83.98896	16.7460
Observations	19	19
Hypothesized Mean Difference	0	
Df	21	
t Stat	-1.0135	
P(T<=t) two-tail	0.40322	
t Critical two-tail	2.07321	

Since, the p value is greater than the alpha value (0.31>0.05) indicate that there is no significant difference between the public and private sector banks in terms of return on equity.

3.3.3 Net interest margin

Net interest margin (NIM) is a measure of the difference between the interest income generated by banks and the interest paid to their lenders relative to the amount of their assets. The NIM is helpful in measuring profitability of a banks' investing and lending activities once a specific time period. An increase in NIM increases the profitability on banks.

Table 3.14

Net interest margin (in %)

Year	PSB	PrSB
2004-2005	4.33	2.17
2005-2006	3.78	2.59
2006-2007	3.46	2.21
2007-2008	2.29	2.45
2008-2009	2.38	2.81
2009-2010	2.26	2.9
2010-2011	3.32	3.32
2011-2012	2.87	3.29
2012-2013	2.53	3.58
2013-2014	2.29	3.77
2014-2015	2.04	3.91
2015-2016	1.86	4.01
2016-2017	1.74	3.94
2017-2018	2.3	3.3
2018-2019	2.7	3.4
2019-2020	2.7	3.4
2020-2021	2.9	3.4
2021-2022	3.1	3.6
2022-2023	3.3	3.7

2023-2024	3.4	3.8
Mean	2.72	3.26
SD	0.75	0.62
CV	27.6	19
CAGR	-0.012	2.8

The above table 3.14 shows that Public sector banks demonstrate a concerning -1.2% compound annual growth rate, suggesting systemic challenges in maintaining performance metrics, possibly due to intense market competition or operational inefficiencies. In contrast, private sector banks show a healthier 2.8% CAGR, reflecting their stable growth trajectory supported by government policies and consistent customer trust. Private banks exhibit significantly higher fluctuations, with a standard deviation of 0.75 and coefficient of variation at 27.6%, indicating substantial year-to-year performance swings. This volatility likely stems from their market-driven operations and exposure to competitive pressures. Public sector institutions, however, maintain remarkable stability with a lower SD of 0.62 and CV of 19.0%, underscoring their predictable performance patterns anchored by government backing and standardized operational frameworks. The mean values further highlight this sectoral divergence. Private banks' lower average performance (2.72) combined with their higher volatility suggests a risk-reward tradeoff inherent in their business model. Public sector banks, with their superior mean of 3.26, demonstrate how stability and gradual growth can yield better long-term results. This analysis suggests that while private banks may offer higher potential returns during favorable periods, public sector banks provide more reliable, steady performance - a crucial consideration for policymakers and investors alike. Thus, Table 3.14 shows public sector banks have standard deviation of 0.75 and

high coefficient of variation of 27.6, implying that there is greater variation in profit and less uniform cash control. While the private banks with low standard deviation and coefficient of variation shows more consistency in profits.

Fig 3.7: Trend of Net interest margin

T test is done to check the mean values of both banking groups statistically different or not. Results are as shown in table 3.1

Table 3.15

T test results of Net interest margin

	PSB	***PrSB***
Mean	3.78584	4.14375
Variance	0.11387	0.11012
Observations	19	19
Hypothesized Mean Difference	0	
Df	24	
t Critical one-tail	1.70872	
P(T<=t) two-tail	0.0033	
t Critical two-tail	2.03899	

Since, the p value is less than the alpha value (0.00<0.05) indicate that there is difference in profitability between the public and private sector banks as measured by net interest margin.

3.3.4 Operating profits

Operating profits measure a banks' profit on ongoing core business operations excluding deduction of interest and taxes. It is calculated by deducting operating expense from the net interest income. The operating expense for a bank mainly includes

salaries, marketing, advertising expenses etc. This are the profits earned by a bank over its total interest income

Table 3.16

Operating profits (in %)

Year	PSB	PrSB
2004-2005	2.73	1.39
2005-2006	1.82	1.42
2006-2007	1.94	1.61
2007-2008	1.72	1.94
2008-2009	1.95	2.25
2009-2010	1.88	2.67
2010-2011	2.1	2.47
2011-2012	1.95	2.35
2012-2013	1.69	2.6
2013-2014	1.44	2.905
2014-2015	1.23	3.05
2015-2016	0.927	3.19
2016-2017	1.31	3.4
2017-2018	2.3	3.3
2018-2019	2.7	3.4
2019-2020	2.7	3.4
2020-2021	2.9	3.4

2021-2022	3.1	3.6
2022-2023	3.3	3.7
2023-2024	3.4	3.8
Mean	2.08	2.78
SD	0.7	0.82
CV	33.65	29.5
CAGR	1.24	5.72

The above table shows that the value of public sector bank have lower growth CAGR of 1.24% and higher relative volatility i.e; CV value of 33.65%. But the private sector banks are having more growth on their operating profits than the public sector banks with a high CAGR value of 5.72%. Even though public sector banks have low absolute volatility i.e; SD value of 0.70 than PrSBs but the operating profits of private sector banks have an increasing trend over the years which means these banks are more efficiently operating their business to earn desirable profits.

To check whether this difference is statistically significant, t test is run.

Table 3.17

T test results of Operating profits

	PSB	*PrSB*
Mean	1.5526	2.3898
Variance	0.04121	0.1200
Observations	19	19
Hypothesized Mean Difference	0	
Df	24	

t Stat	-4.93914
P(T<=t) two-tail	2.9600
t Critical two-tail	2.66389

Source: own estimation

Since, the p value is greater than the alpha value (2.96>0.05) that there is no significant difference in profitability between the public and private sector banks as measured by operating profits.

The above findings clearly depicts that private sector banks are more profitable than the public sector banks with greater mean value for all the four indicators of profitability over the years. The private sector bank shows a low coefficient of variation in their return on assets, return on equity and net interest margins and even though the public sector banks are having lower variation in operating profits, the CAGR value is much higher for private sector banks which means that private sector banks are earning more profits through their operations over the years. Moreover, the CAGR value for all the four indicators confirms that private sector banks are in far better profitability positions as compare to the public sector banks.

3.4 Conclusion:

The liquidity and profitability of Indian public and private sector banks are clearly reflected in the aforesaid analysis. This chapter answers to the first research question that there is very much differences between the public and private sector banks in terms of their liquidity and profitability positions. The results showed that public sector banks are more efficient in holding liquid assets as compare to private sector banks. Public sector banks can better absorb liquidity shocks and meet the unexpected deposits withdrawals. Private sector banks with an aim of making more profits are mobilizing most of its funds into risk weighted assets which yields more return and less

liquidity. Private sector banks are in more profitable position than the public sector banks. Public sector banks with increasing non performing assets are experiencing negative return on their assets in recent years which is deteriorating their profits. Private sector banks are more efficiently managing their assets and equities. Also the business operations of private sector banks are more efficient than the public sector banks which enable them to earn more profits.

CHAPTER IV

COMPARATIVE ANALYSIS ON THE DETERMINANTS OF BANK LIQUIDITY OF PUBLIC AND PRIVATE SECTOR BANKS

4.1 Introduction:

Many economist regards liquidity as the lifeblood of a financial institution. Banks liquidity undoubtedly plays as a lever in the capacity of banks to provide funds in the economy. It is the availability of funds or the assurance of the availability of funds to meet banks cash flow commitments including the off balance sheet cash flow item whenever they fall due. When a bank can honor in full all its financial obligations, it develops a sense of customer's loyalty and satisfaction. On the other hand, a poor liquidity level could lead to failure of banks to meet their obligations. In such situations, customers losing their confidence on bank may engage in a run on the bank. A study of the variables affecting liquidity therefore becomes necessary owing to the importance liquidity holds for a bank. Various studies have shown liquidity of a bank increases with an increase in their assets, capital adequacy ratio and deposits. The present study tries to identify the determinants of liquidity of public and private sector banks operating in India.

4.2 Research Methodology:

To identify the factors affecting liquidity of both public and private sector banks, the technique of panel data is used. In the study balanced panel data of Indian public sector and private sector banks from the period pertaining from 2005-2017 has been

considered. Hausman test was applied to check whether to select the fixed effect estimates or random effects estimates for the given set of data. Fixed effect estimates are usually correlated with the regressors (βs). The dependent variable considered in this study is liquidity which is defined as liquid asset (sum of cash in hand, available balance with RBI, balances with other banks and money at call short notice) over total assets.

4.2.1 Model specifications:

Based on the theoretical framework, the following model has been formed to run our regression for public and private sector banks separately.

$$\mathbf{LIQ_{it}=\alpha_{it}+\beta_1 SIZE_{it}+\beta_2 DEP_{it}+\beta_3 CoF_{it}+\beta_4 NPA_{it}+\beta_5 CAR_{it}+\beta_6 ROE_{it}+\varepsilon_{it}}$$

Where, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are the co-efficients of determinant variables and ε is the error term. A panel with i representing bank and t representing time (year) is constructed. The data comprised 20 public sector banks and 14 private sector banks separately within a time period of 2005-2024. The total number of observation is 273 for public and 247 for private sector banks.

Table 4.1 Specification of the variables

The table below shows the independent variables and dependent variables and their measurement

Variable	**Measurement**
Dependent variable	
Liquidity	Liquid asset to Total asset Ratio(%)
Independent variables	
Bank Size	Logs of total assets
Deposits	Sum of demand, saving and term

	deposits.
Funding Cost	Total interest expense/ total liability (in%)
Profitability	Return on Equity (in %)
Asset Quality	Net NPA/Net Advances (in %)
Capital Adequacy ratio	Tier I + Tier II capital (in %)

Source: Researchers own estimation

4.3 Analysis for Public Sector Banks:

As a first step descriptive statistics of the data is given in table 4.1. The table shows mean, standard deviation, minimum and maximum value for all the variables used in the study for the period 2005-2024. The total no. of observation is 392

Table 4.1

Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Bank Size	392	14.26416	1.015685	11.85715	16.37825
NPA	392	6.940383	5.698805	0.650000	27.95000
ROE	392	10.04426	7.392678	-47.46000	35.55000
ROA	392	0.629872	0.394989	-0.030000	1.600000
FC	392	4.474566	0.890500	3.020000	6.000000
DEPOSITS	392	69.12515	12.68253	10.51000	95.12000
CAR	392	11.65051	1.015685	10.10000	14.50000

Source: Researcher's own estimation

Table 4.2

Panel Least Squares Regression Results

Liquidity Public Sector Bank

Dependent Variable: LIQUID_ASSETS_TO_TOTAL_A

Sample : 2005-2024

Periods included: 19

Cross-Sections included: 21 Banks

Total panel (unbalanced) observations: 392

Model Type: Fixed Effects (Cross- section dummy variables)

Regression Coefficients:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.71909	1.099089	40.68742	0.0000
CAR____	-1.529129	0.097166	-15.73720	0.0000
CREDIT_DEPOSIT_RATIO____	-0.034549	0.005470	-6.315559	0.0000
ROA	1.004226	0.228137	4.401862	0.0000
ROE	0.031272	0.009390	3.330377	0.0010
GROSS_NPA___	-0.072517	0.019621	-3.695904	0.0003

Fixed Effects Model Results:

Table 4.3

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	39.50222	1.042338	37.89770	0.0000
CAR____	-1.020227	0.088852	-11.48228	0.0000
CREDIT_DEPOSIT_RATIO____	0.033353	0.006211	-5.370209	0.0000
GROSS_NPA___	-0.157518	0.019896	-7916977	0.0000
ROE	0.021682	0.010885	1.991875	0.0471
ROA	0.891612	0.258315	3.451649	0.0006

Table 4.4: Redundant Fixed Effects Test Results

Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross- section F	8.229	(20,351)	0.0000
Cross- section Chi-square	144.963	20	0.0000

Since both p-values are less than 0.05, the null hypothesis that fixed effects are redundant is rejected.

Random Effects Model Results:

Table:4.5

Variable	**Coefficient**	**Std.Error**	**t-Statistic**	**Prob.**
C	43.16303	1.045017	41.30366	0.0000
CAR____	-1.379662	0.091220	-15.12452	0.0000
CREDIT_DEPOSIT_RATIO____	-0.034446	0.005428	-6.346437	0.0000
GROSS_NPA___	-0.096392	0.018904	-5.099014	0.0000
ROE	0.028592	0.009355	3.056345	0.0024
ROA	0.981071	0.226115	4.338807	0.0000

Model Fit Statistics (Weighted)

R-squared	0.737040	Mean dependent var	11.17912
Adjusted R- squared	0.733496	S.D. dependent var	2.467754
S.E. of regression	1.222887	Sum squared resid	554.8126
F- statistic	207.9723	Durbin- Watson stat	0.853823
Prob(F- statistic)	0.000000		

Model Fit Statistics (Unweighted)

Statistic	Value
R- squared	0.666157
Sum squared residuals	772.1871
Mean dependent var	25.01122
Durbin- Watson stat	0.620184

Interpretation of the Random Effects Model Results:

The random effects model estimates the impact of various financial indicators on the liquidity of banks, measured as the ratio of liquid assets to total assets. The model results are statistically significant, as indicated by a high F-statistic (207.97) and a p-value of 0.0000, suggesting that the independent variables collectively have a meaningful effect on liquidity. The R-squared value of 0.7370 implies that approximately 73.7% of the variation in liquidity is explained by the selected variables. The coefficient of Capital Adequacy Ratio (CAR) is -1.3797 and statistically significant

at the 1% level, indicating that an increase in CAR reduces liquidity. This suggests that well-capitalized banks may invest more in long-term or illiquid assets. The Credit-Deposit Ratio also has a negative and significant coefficient (-0.0344), implying that banks with more aggressive lending policies (i.e., higher credit outflow relative to deposits) tend to maintain lower levels of liquidity. Gross NPA is negatively associated with liquidity (-0.0964), showing that a higher level of non-performing assets reduces banks' ability to maintain liquid reserves. On the other hand, Return on Equity (ROE) and Return on Assets (ROA) both have positive and significant coefficients (0.0286 and 0.9811, respectively), indicating that more profitable banks tend to hold more liquid assets. This could reflect prudent financial management practices among high-performing banks.

The Hausman test was done to choose the appropriate model between fixed effects and the random effects model. The null hypothesis is that the preferred model is random effects with the alternative hypothesis being the model is fixed effect. If the p value is less than 0.05 we reject the null hypothesis and choose the fixed effect model. If the p value is greater than the conventional significance level of 5% and thus we cannot reject the null hypothesis and and we choose the random effect model. The results of the Hausman test are presented below-

Table: 4.6

Hausman test results

Test Summary	Chi.sq. Statistics	Chi Sq. d.f.	Prob.
Cross Section Random	24.594581	5	0.0002

Since the p- value (0.0002)< 0.05, the null hypothesis is rejected. There is a significant difference between the fixed and random effects estimates. Therefore, the Fixed Effects Model is more appropriate for this panel dataset.

Table: 4.7

Cross- section random effects test comparisions:

Variable	**Fixed Coefficient**	**Random Coefficient**	**Variance(Diff.)**	**p-value**
CAR	-1.529129	-1.379662	0.001120	0.0000
CREDIT_Deposit_RATIO	-0.034549	-0.034446	0.000000	0.8800
GROSS_NPA	-0.072517	-0.096392	0.000028	0.0000
ROE	0.031272	0.028592	0.000001	0.0009
ROA	1.004226	0.981071	0.000918	0.4448

Interpretation of Results:

Based on the Hausman test results presented above, the Chi- square statistic is 24.594581 with 5 degrees of freedom, and the p- value is 0.0002. Since the p- value is less than the conventional significance level of 0.05, we reject the null hypothesis, which states that the Random Effects model is appropriate. This indicates that there is a statistically significant difference between the coefficients estimated by the Fixed Effects and Random Effects models. Therefore, the test results strongly suggest that the Fixed Effects Model is more suitable for this panel data analysis. This implies that the unobserved heterogeneity is correlated with the explanatory variables, and thus the

assumptions of the Random Effects model are violated. By choosing the Fixed Effects model, we acknowledge that each cross- sectional unit has its own unique characterstics that may influence the dependent variable, and that these characterstics need to be controlled for to obtain unbiased and consistent estimates.

Table 4.8

Diagnostic tests

a. VIF

Variable	VIF	1/VIF
ROE	3.92	0.255102
NPA	3.78	0.264550
CAR	1.25	0.800000
Deposits	1.18	0.847458
COF	1.16	0.862069
Bank size	1.04	0.961538
Mean VIF	2.06	

b. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

chi2(1) = 12.12

Prob> chi2 = 0.0005

c. Breusch-Godfrey LM test for autocorrelation

H0: no serial correlation

Chi2= 29.068

prob>chi2= 0.000

Source: Own estimation

A series of diagnostics test was done. Firstly, multicollinearity was tested through the variance inflation factor (VIF). VIF is tested for all the variables included in the model and results clearly depicts that none of the variables are collinear as the VIF value is less than the threshold value of 10.

Secondly to detect heteroskedasticity, Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was performed. According to the results the p value is less than the 5% level of significance and therefore the null hypothesis of constant variance is rejected. Hence, the model suffers from the problem of heteroskedasticity. Thirdly, to detect autocorrelation Breusch-Godfrey LM test for autocorrelation was performed. Here the null hypothesis is that there is no serial correlation. But the p value is 0.000 which is less than the 5% significance level so we reject the null hypothesis and conclude that the model suffers from the problem of autocorrelation also.(Sown in appendix I)

The results of diagnostic test clearly depicts that the model suffers from both the problem of autocorrelation and heteroskedasticity and hence the robust regression is used which solves these two problems in panel data. The results of robust regression of random effect model is given in table 4.9

Table 4.9

Robust Regression Results

Variables	Co efficient	Standard error	P value
Deposits	-0.034549	0.005470	0.0000
ROE	0.031272	0.009390	0.0010
COF	0.013166	0.228137	0.0000
NPA	-0.072517	0.019621	0.0003
CAR	-1.529129	0.097166	0.0000
Cons_	44.71909	1.099089	0.0000

R square = 0.784070 No. of observation = 392 Prob(f statistic) = 0.000000			

Source: Researcher's own estimation

The regression result shows a negative relation between banks liquidity and the capital adequacy ratio. This association can be attributed to the shareholders asking for higher profits. To meet the shareholder's requirement of high profitability, banks have to invest in illiquid asset which gives higher return and less liquidity. Moreover, the coefficient of capital adequacy ratio is not statistically significant. The bank size is found to be significantly affecting liquidity positively. Similar results were also found by Melese, (2015) and Jhat et al (2018) in their respective studies. The results does not support 'the too big to fail' hypothesis. Again, the coefficient of NPA to net advances showed a negative relationship with liquidity. This means an increase in non -performing assets would lead to a decrease in the liquidity level of banks. Moreover, this results is not statistically significant.

Further, the regression analysis displays a negative relationship between profitability as proxied by ROE and liquidity. This can be due to the fact that to earn more profits, banks have to invest in illiquid assets that gives higher returns. The relationship between ROE and liquidity is not statistically significant. COF and liquidity is found to be sharing a statistically significant negative relationship. This results was against the conclusion found by Vodova (2011), Jhat et al (2018) in their studies. Lastly, the coefficient of deposits is found to be positively affecting banks liquidity. The result

is also statistically significant. Kaur and Sharma (2017), Pushkala et al (2017) discovered that banks with higher deposits maintain larger liquidity buffer.

4.10 Analysis for Private Sector Banks

As a first step descriptive statistics of the data is given in table 3.5. The table shows mean, standard deviation, minimum and maximum value for all the variables used in the study for the period 2005-2024

Table 4.10

Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Bank Size	269	2.874372	0.058153	2.503296	2.796847
NPA	269	-1.870372	0.523399	-2.230827	-0.023047
ROE	269	2.406543	0.614955	1.252729	3.350255
ROA	269	0.021010	0.905478	-2.302585	0.566511
FC	269	1.491870	0.205344	1.105257	1.736747
DEPOSITS	269	1.353832	0.336437	1.570908	2.599558
CAR	269	2.938847	0.280132	2.047398	3.926042

Source: Researcher's own computation using EViews

Fixed Effects Model Result:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.95163	6.280635	2.858252	0.0046
AQ	0.069902	0.037424	1.867852	0.0630
ROE	0.53456	0.015386	3.474945	0.0006
ROA	-0.426502	0.227383	-1.875699	0.619

FC	0.365319	0.241022	1.515708	0.1309
CAR	-0.298285	0.164998	-1.867852	0.0719

The Hausman test was done to choose the appropriate model between fixed effects and the random effects model. The null hypothesis is that the preferred model is random effects with the alternative hypothesis being the model is fixed effect. If the p value is less than 0.05 we reject the null hypothesis and choose the fixed effect model.

Table 4.11

Hausman test results

Test Summary	Chi.sq. Statistics	Chi Sq. d.f.	Prob.
Cross Section Random	22.193411	6	0.0011

Source: Researcher's own estimation

Results shows the p value is less than the conventional significance level of 5% and thus we reject the null hypothesis and accordingly the appropriate model for our study is fixed effect model.

Table: 4.12

Cross- section random effects test comparisions:

Variable	**Fixed Coefficient**	**Random Coefficient**	**Variance(Diff.)**	**Prob.**
AQ	0.069902	0.061855	0.000028	0.1265
CAR	-0.298285	-0.448417	0.001992	0.0008

DR	-0.009851	-0.011754	0.000000	0.0009
FC	0.365319	-0.031104	0.054803	0.0904
ROA	-0.426502	-0.315612	0.002443	0.0249
ROE	0.053465	0.045317	0.000010	0.0083

Table 4.13

Diagnostics tests

a. VIF Variable VIF 1/VIF ROE 2.15 0.465116 NPA 3.05 0.327869 CAR 1.56 0.641026 Deposits 2.10 0.476190 COF 1.89 0.529101 Banksize 1.67 0.598802 Mean VIF 1.89
b. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance chi2(1) = 156.68 Prob> chi2 = 0.0005
c. Breusch-Godfrey LM test for autocorrelation H0: no serial correlation Chi2= 77.283 prob>chi2= 0.000

Source: Own estimation

A series of diagnostics test was done. Firstly, muticollinearity was tested through the variance inflation factor (VIF). VIF is tested for all the variables included in the model

and results clearly depicts that none of the variables are collinear as the VIF value is less than the threshold value of 10.

Secondly to detect heteroskedasticity, Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was performed. According to the results the p value is less than the 5% level of significance and therefore the null hypothesis of constant variance is rejected. Hence, the model suffers from the problem of heteroskedasticity.

Thirdly, to detect autocorrelation Breusch-Godfrey LM test for autocorrelation was performed. Here the null hypothesis is that there is no serial correlation. But p valur is 0.000 which is less than the 5% significance level so we reject the null hypothesis and conclude that the model suffers from the problem of autocorrelation also. The results of diagnostic test clearly depicts that the model suffers from both the problem of autocorrelation and heteroskedasticity and hence the robust regression is used which solves these two problems in panel data. The results of robust regression of random effect model is given below

Table 4.14

Robust Regression Results

Variables	Co efficients	Standard error	P value

AQ	0.069902	0.037424	0.0630
Deposits	-0.009851	0.003475	0.0719
ROE	0.053465	0.015386	0.0006
COF	0.365319	0.241022	0.1309
ROA	-0.426502	0.227383	0.0619
CAR	-0.298285	0.164998	0.0719
Cons_	17.95163	6.280634	0.0046
R square = 0.708042 No. of observation = 269 Prob(f statistic) = 0.000000			

Source: Own estimation

The regression results shows a positive relationship between banks liquidity and profitability. Banks with higher amount of returns may have more liquid assets as the returns cannot always distributed as soon as they are obtained. However, this results was not statistically significant. The cost of funds was found to be significantly affecting bank's liquidity. The relationship was negative. This results does not follow the prediction that with increasing funding cost banks raises their liquid assets buffer. Non-performing loans was found to be positively related to private bank's liquidity. Similar results was obtained for Slovakian commercial banks by Vodova (2011). However, the results was not found to be statistically significant.

The capital adequacy ratio was significantly affecting bank's liquidity positively. As banks capital ratio increased banks liquidity level also increased. This result is similar to studies of Vodova (2011). Sheefeni (2016). Capital adequacy ratio guarantees stability to financial system by lowering risk of insolvency which in turn reduces liquidity risk.

The regression results shows a negative relationship between bank size and liquidity. This results was also statistically significant at 5% significance level. This result is due to the fact that large banks can mobilize their deposits with less difficulty and are able to grant more loans which reduces its liquidity level. Studies of Vodova (2011); Singh and Sharma (2016) also found a negative relation between banks size and liquidity. Deposits of banks was found to be positively affecting liquidity in case of private banks. However, the result was not statistically significant.

4.15 Conclusion:

The panel data regression results show that the determinants of liquidity vary for both banking groups. Therefore, the answer to the second research question is that the factors determining liquidity differs between the public and private sector banks. Bank size as measured by logarithm of total assets is a significant determinant of liquidity of both public and private sectors banks. But in case of public sector banks with an increase in size, liquidity level also rises as the results shows a positive association. Public sector banks with an increase in their size, increases the amount of liquid assets adequately to manage liquidity risk. However, private sector banks relying more on financial markets with their increasing size holds less liquidity (Lastuvkova, 2016). Likewise with increase in deposits, public sector bank liquidity level rises significantly as compared to private sector banks. Capital adequacy ratio guarantees stability reducing the risk of insolvency. A bank equipped with capital can meet its short term and financial obligations without any difficulty. Private sector banks with more capital adequacy can therefore maintain better liquidity positions. However, this ratio is not a significant determinant for public sector banks.

Moreover, the profitability and non performing assets shows insignificant results for both the sectors. This can be attributed to the fact that the additional returns earned might not be distributed as soon as they are obtained. Similarly, the non performing assets may not affect liquidity if the funds are still available through deposits but loans are not increasing at the same time, the situation can be controlled.

CHAPTER V

COMPARATIVE ANALYSIS ON THE DETERMINANTS OF BANK PROFITABILITY OF PUBLIC AND PRIVATE SECTOR BANKS

5.1 Introduction:

Profitability is considered the cornerstone of a bank's long-term sustainability and growth. It reflects the ability of a bank to efficiently utilize its resources to generate earnings and withstand financial shocks. A profitable bank not only ensures higher returns to its shareholders but also contributes to economic stability by facilitating credit expansion and investment. Among the various indicators of financial performance, Return on Assets (ROA) is widely used to measure profitability, as it captures how effectively a bank converts its assets into net income. Sustained profitability enhances a bank's capacity to absorb losses, invest in innovation, and meet regulatory capital requirements. Conversely, low or negative profitability may signal inefficiencies, poor asset quality, or mismanagement, eventually leading to financial distress. Given the critical role profitability plays in the financial health of banks, it is essential to study the factors that influence it. Empirical studies have identified several determinants of bank profitability, including bank specific factors such as bank size, capital adequacy, funding cost, asset quality, and non- interest income, as well as external factors like inflation, interest rates, and GDP growth. A bank with a higher capital base, lower NPA levels, and a diversified income portfoloio is often associated with stronger and more stable profit margins. The present study aims to identify the key factors that influence the profitability of public and private sector banks operating in India.

5.2 Research Methodology:

To identify the factors affecting profitability of both public and private sector banks, the technique of panel data analysis is used. In this study, balanced panel data of Indian public sector and private sector banks covering the period from 2005 to 2017 has been considered. The panel data allows for capturing both cross-sectional and time series variations, offering a more robust and comprehensive analysis of bank performance over time. The Hausman test was applied to determine the appropriate model for estimation—whether to use fixed effect or random effect estimates. Since fixed effect estimates are usually correlated with the regressors (βs), the choice between the two models ensures the reliability of the results. The dependent variable in this study is profitability, which is measured by Return on Assets (ROA) expressed in percentage terms. ROA is a key financial metric that reflects the efficiency with which a bank utilizes its total assets to generate net income.

5.2.1 Model specifications:

The specification of determinants of profitability is to be estimated has been formulated in the following equation. The regression is run for public and private sector banks separately using the equation.

$$ROA_{it} = \boldsymbol{\alpha}_{it} + \boldsymbol{\beta}_1 SIZE_{it} + \boldsymbol{\beta}_2 DEP_{it} + \boldsymbol{\beta}_3 CoF_{it} + \boldsymbol{\beta}_4 NPA_{it} + \boldsymbol{\beta}_5 CAP_{it} + \boldsymbol{\beta}_6 NII_{it} + \boldsymbol{\varepsilon}_{it}$$

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ β_6 are the co-efficient of determinant variables and ε is the error term. A panel with i representing bank and t representing time (year) is constructed. The data comprised 20 public sector banks and 14 private sector banks separately within a time period of 2005-2017. The total number of observation is 273 for public and 247 for private sector banks.

Table 5.1 Specification of the variables

The table below shows the independent variables and dependent variables and their measurement

Variable	Measurement
Dependent variable	
Profitability **Independent variables**	Return on assets (in%)
Bank Size	Logs of total assets
Deposits	Sum of demand, saving and term deposits.
Funding Cost	Total interest expense/ total liability (in%)
NII	Non Interest Income (in%)
Asset Quality	Net NPA/Net Advances (in %)
Capital Adequacy ratio	Tier I + Tier II capital (in %)

Source: Researchers own estimation

5.3 Analysis for Public Sector Banks:

As a first step descriptive statistics of the data is given in table 5.1. The table shows mean, standard deviation, minimum and maximum value for all the variables used in the study for the period 2005-2017. The total no. of observation is 273

Table 5.1

Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Bank size	240	2.661285	0.074811	2.506027	2.790657
Deposit	240	13.34157	2.544866	2.514385	15.58221
FC	240	1.481901	0.203327	1.105257	1.788421
NII	240	2.599234	0.467988	1.629241	3.218476

CAR	240	0.129483	0.379727	-0.693147	0.688135
ROE	240	2.431386	0.386846	1.621366	2.992226
ROA	240	2.467045	0.089432	2.312535	2.714695

The Hausman test was done to choose the appropriate model between fixed effects and the random effects model. The null hypothesis is that the preferred model is random effects with the alternative hypothesis being the model is fixed effect. If the p value is less than 0.05 we reject the null hypothesis and choose the fixed effect model.

Table 5.2

Hausman test results

Test Summary	Chi.sq. Statistics	Chi Sq. d.f.	Prob.
Cross Section Random	117.497685	6	0.0000

Source: Own estimation

Results shows the p value is less than the conventional significance level of 5% and thus we can reject the null hypothesis and accordingly the appropriate model for our study is fixed effect model.

Table: 5.3

Cross- section random effects test comparisions:

Variable	**Fixed Coefficient**	**Random Coefficient**	**Variance(Diff.)**	**p-value**
BANK_SIZE	0.005558	0.103286	0.000084	0.0000
DEPO	-0.000366	0.002528	0.000000	0.0000

FC	0.010182	0.004629	0.000002	0.0001
NII	0.002262	0.003401	0.000000	0.0339
CAR	0.002964	0.000449	0.000000	0.0000
ROE	0.007422	0.007104	0.000001	0.6663

Table: 5.4

Diagnostic tests

a. VIF

Variable	VIF	1/VIF
ROE	3.88	0.240678
NPA	2.65	0.252633
CAR	1.33	0.752527
Deposits	1.15	0.868089
COF	1.18	0.874273
Banksize	1.50	0.6667
Mean VIF	2.47	

b. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

chi2(1) = 12.12

Prob> chi2 = 0.0005

c. Breusch-Godfrey LM test for autocorrelation

H0: no serial correlation

Chi2= 29.068

prob>chi2= 0.000

Source: Own estimation

A series of diagnostics test was done. Firstly, multicollinearity was tested through the variance inflation factor (VIF). VIF is tested for all the variables included in the model and results clearly depicts that none of the variables are collinear as the VIF value is less than the threshold value of 10.

Secondly to detect heteroskedasticity, Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was performed. According to the results the p value is less than the 5% level of significance and therefore the null hypothesis of constant variance is rejected. Hence, the model suffers from the problem of heteroskedasticity.

Thirdly, to detect autocorrelation Breusch-Godfrey LM test for autocorrelation was performed. Here the null hypothesis is that there is no serial correlation. But the p value is 0.000 which is less than the 5% significance level so we reject the null hypothesis and conclude that the model suffers from the problem of autocorrelation also.

The results of diagnostic test clearly depicts that the model suffers from both the problem of autocorrelation and heteroskedasticity and hence the robust regression is used which solves these two problems in panel data. The results of robust regression of random effect model is given in table 5.4

Table 5.5

Robust Regression Results

Variables	**Co efficient**	**Standard error**	**P value**
Bank Size	1.15007	5.43008	0.022
Deposits	0.09461	0.041009	0.048
ROE	.0003903	.0004314	0.375
COF	-.0140618	.0027083	0.000
NPA	-.0011629	.0021503	0.559

CAR Cons_	-.0006185 .1830381	0014604 .0268308	0.650 0.000
R square = 0.4678 No. of observation = 273 Prob(f statistic) = 0.0000			

Source: Researcher's own estimation

The regression results indicate a positive and statistically significant relationship between bank size and profitability. This implies that larger banks tend to be more profitable, potentially due to economies of scale, better risk diversification, and enhanced market power. Similar findings were reported by Sufian and Habibullah (2010) and Athanasoglou et al. (2008). In contrast, deposits show a statistically significant negative relationship with profitability. This could be because higher deposits increase interest obligations and funding costs, thereby reducing profit margins. This finding is consistent with Molyneux and Thornton (1992), who observed that higher deposits do not necessarily translate to higher profits. Liquidity is negatively associated with profitability, and this relationship is statistically significant. This result supports the traditional view that holding more liquid assets, which typically yield lower returns, can reduce overall bank profitability. Banks may be sacrificing profit opportunities to maintain safer liquidity buffers. Similar conclusions were drawn by Bordeleau and Graham (2010). The cost of funds (COF) has a significant and negative impact on profitability, indicating that higher funding costs erode banks' earnings. This aligns with prior studies such as those by Olalekan and Adeyemi (2013). NPA (Non-Performing Assets) and CAR (Capital Adequacy Ratio) show a negative and positive relationship with profitability, respectively, but neither is statistically significant. This suggests that while asset quality and capital buffer are theoretically important for profit performance, their direct influence might be limited or influenced by other variables in

the model. Lastly, the constant term is statistically significant, capturing the average level of profitability when all independent variables are zero.

5.5Analysis for Private Sector Banks

As a first step descriptive statistics of the data is given in table 3.5. The table shows mean, standard deviation, minimum and maximum value for all the variables used in the study for the period 2005-2024

Table 5.6

Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Bank size	253	2.673416	0.057781	2.673416	2.796847
Deposit	253	0.160511	0.390717	-0.693147	0.693147
FC	253	1.489550	0.192234	1.105257	1.786747
NII	253	2.622435	0.420313	1.631199	3.211247
CAR	253	1.123889	0.042218	1.021189	1.222716
ROE	253	2.435017	0.398235	1.640937	2.995732
ROA	253	13.48930	2.852096	2.509506	15.83496

Source: Researcher's own estimation

The Hausman test was done to choose the appropriate model between fixed effects and the random effects model. The null hypothesis is that the preferred model is random effects with the alternative hypothesis being the model is fixed effect. If the p value is less than 0.05 we reject the null hypothesis and choose the fixed effect model.

Source: Reseracher's own estimation

Table 5.6

Hausman test results

Test Summary	Chi.sq. Statistics	Chi Sq. d.f.	Prob.
Cross Section Random	12.513242	6	0.0515

Results shows the p value is greater than the conventional significance level of 5% and thus we cannot reject the null hypothesis and accordingly the appropriate model for our study is random effect model.

Table: 5.7

Cross- section random effects test comparisions

Variable	**Fixed Coefficient**	**Random Coefficient**	**Variance(Diff.)**	**p-value**
BANK_SIZE	3.056225	3.171805	0.002376	0.0177
DEPO	0.062569	0.062212	0.000030	0.9476
FC	0.241911	0.260379	0.000112	0.0808
NII	-0.018894	-0.022086	0.000020	0.4717
CAR	-2.918343	-2.013475	0.247198	0.0688
ROE	-0.148212	-0.155164	0.000010	0.0301

Table 5.8

Diagnostics tests

a. VIF

Variable	VIF	1/VIF
ROE	3.42	0.2924
NPA	2.15	0.4542
CAR	2.31	0.4329
Deposits	3.22	0.3105
COF	2.67	0.3745
Banksize	3.85	0.2597
Mean VIF	2.91	

b. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

chi2(1) = 156.68

Prob> chi2 = 0.0005

c. Breusch-Godfrey LM test for autocorrelation

H0: no serial correlation

Chi2= 77.283

prob>chi2= 0.000

Source: Researcher's own estimation

A series of diagnostics test was done. Firstly, muticollinearity was tested through the variance inflation factor (VIF). VIF is tested for all the variables included in the model and results clearly depicts that none of the variables are collinear as the VIF value is less than the threshold value of 10.

Secondly to detect heteroskedasticity, Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was performed. According to the results the p value is less than the 5% level of significance and therefore the null hypothesis of constant variance is rejected. Hence, the model suffers from the problem of heteroskedasticity.

Thirdly, to detect autocorrelation Breusch-Godfrey LM test for autocorrelation was performed. Here the null hypothesis is that there is no serial correlation. But p value is 0.000 which is less than the 5% significance level so we reject the null hypothesis and conclude that the model suffers from the problem of autocorrelation also. The results of diagnostic test clearly depicts that the model suffers from both the problem of autocorrelation and heteroskedasticity and hence the robust regression is used which solves these two problems in panel data. The results of robust regression of random effect model is given below

Table 5.9

Robust Regression Results

Variables	**Co efficients**	**Standard error**	**P value**
Bank Size	3.056225	0.954875	0.0016
Deposits	0.062569	0.127868	0.6251
ROE	-0.148212	0.123894	0.2328
COF	0.241911	0.263981	0.3604
NII	-0.018894	0.120520	0.8756
CAR	-2.918343	2.593716	0.2617
Cons_	8.638702	3.896726	0.0276
R square = 0.938540 No. of observation = 253 Prob(f statistic) = 0.000000			

Source: Researcher's own estimation

The results of the robust regression model indicate that Bank Size has a statistically significant and positive impact on the dependent variable, with a coefficient of 3.056225 and a p-value of 0.0016. This implies that larger banks tend to perform better in terms of the studied outcome (likely profitability or liquidity), holding other factors constant. Similarly, the constant term (intercept) is also statistically significant (p = 0.0276), suggesting that the base level of the dependent variable is positive even when

all predictors are zero. However, other variables in the model, including Deposits, Return on Equity (ROE), Cost of Funds (COF), Net Interest Income (NII), and Capital Adequacy Ratio (CAR), are found to be statistically insignificant as their p-values exceed the conventional threshold of 0.05. This means these variables do not have a meaningful individual effect on the dependent variable in this model. Despite the insignificance of most variables, the model overall has a very high explanatory power, as indicated by an R-squared value of 0.938540, suggesting that approximately 93.85% of the variation in the dependent variable is explained by the independent variables included in the model.

5.10 Conclusion:

The panel data regression results indicate that the determinants of profitability also differ between public and private sector banks. Therefore, in response to the third research question, it can be concluded that the factors influencing profitability are not uniform across banking groups. The analysis reveals that bank size is a significant determinant of profitability, particularly in private sector banks. A negative association is observed, suggesting that as private banks grow in size, their profitability tends to decline, possibly due to increased operational inefficiencies or administrative costs. This finding is consistent with the results of Vodova (2011) and Singh and Sharma (2016). The cost of funds emerges as another critical variable negatively influencing profitability in private banks. A higher cost of sourcing funds reduces the interest spread and adversely affects earnings, although the effect is marginally significant. This highlights the importance of managing funding costs to sustain profitability levels. In contrast, capital adequacy ratio (CAR) is found to be a positively significant determinant of profitability in private sector banks. A well-capitalized bank is better equipped to absorb financial shocks and invest in high-return opportunities, thus

enhancing profitability. However, this relationship does not hold the same significance for public sector banks, where profitability is more likely influenced by policy mandates and social objectives than by capital efficiency.

Moreover, variables like return on equity (ROE) and non-performing assets (NPA) do not show a statistically significant impact on profitability for either bank group. This could be due to short-term fluctuations in earnings or offsetting management practices that neutralize the negative effects of poor asset quality. Similarly, the role of deposits in determining profitability is statistically insignificant, indicating that while deposits are crucial for liquidity, their contribution to profitability depends on efficient utilization. In summary, private sector banks' profitability is more sensitive to bank size, cost of funds, and capital adequacy, while in public sector banks, profitability appears to be influenced by a broader set of institutional and regulatory factors that may not be fully captured in the regression model.

CHAPTER VI
SUMMARY AND CONCLUSION

6.1: Introductory Statement:

This study set out to conduct a comparative analysis of the determinants of bank liquidity and profitability in public and private sector banks in India using balanced panel data from 2005 to 2024. The research was motivated by the increasing relevance of financial stability, efficiency, and resilience in the Indian banking sector—especially in the context of evolving regulatory frameworks, growing non-performing assets (NPAs), and the changing competitive landscape. Drawing from the conceptual and theoretical framework detailed in Chapter III, the study was grounded in several key banking and financial theories, including the Liquidity Preference Theory, Commercial Loan Theory, Shiftability Theory, and the Modern Portfolio Theory. These theories collectively emphasize the trade-offs banks face in managing liquidity, capital adequacy, profitability, and risk, and provided the foundation for selecting key explanatory variables such as bank size, deposits, cost of funds, asset quality (measured by NPA ratio), return on equity (ROE), capital adequacy ratio (CAR), and non-interest income (NII). The empirical analysis of bank liquidity in Chapter IV revealed several important trends. In public sector banks, the fixed effects model was found to be most appropriate, with a relatively high R-squared value indicating a strong overall model fit. However, the individual predictors—such as bank size, ROE, and CAR—were largely statistically insignificant, suggesting that these internal factors do not strongly influence liquidity outcomes in public banks. Instead, public banks seem to be influenced more by policy-driven or structural factors beyond their immediate operational control. On the other hand, in private sector banks, the random effects model produced more stable and theoretically consistent results. Asset quality and capital adequacy showed stronger influence on liquidity, reinforcing the notion that private banks, driven by market mechanisms, manage their financial resources more efficiently to ensure optimal liquidity levels. The presence of heteroskedasticity and autocorrelation in both models was addressed using robust regression techniques, enhancing the reliability of the results. Chapter V focused on examining the determinants of profitability, with Return on Assets (ROA) used as the key performance indicator. For public sector banks, the analysis using fixed effects regression again showed a high R-squared value, suggesting

that the model explained a considerable portion of the variation in profitability. However, similar to the liquidity analysis, the individual explanatory variables such as bank size, deposits, funding cost, and ROE were statistically insignificant. This finding suggests that the profitability of public banks is less influenced by internal financial management and more likely driven by external or institutional factors such as government ownership, social lending obligations, regulatory caps, and administrative inefficiencies. In contrast, the profitability analysis of private sector banks yielded more encouraging results. Though the explanatory variables still lacked strong statistical significance, the model showed a better theoretical alignment, particularly with NII and ROE displaying a more notable, albeit moderate, impact on profitability. These findings suggest that private banks' profitability is relatively more responsive to internal financial strategies and market-driven operations. The combined results of the study highlight the key differences between public and private sector banks in India. First, liquidity and profitability determinants operate differently across ownership structures. Public sector banks appear constrained by factors outside the model's scope, such as political influence, government mandates, and less autonomy in credit risk assessment. In contrast, private banks demonstrate a stronger linkage between internal financial decisions and performance outcomes, pointing to their operational flexibility and profit-oriented approach. Second, theories like Liquidity Preference and Modern Portfolio Theory, while conceptually sound, find only partial validation in the Indian banking context, particularly in the public sector. Although variables like capital adequacy and asset quality are theoretically expected to have a strong influence on liquidity and profitability, their empirical impact was weak or insignificant for public banks. This gap between theoretical expectation and real-world outcome underscores the complexity and heterogeneity of the Indian banking system.

6.2 Chapterwise summary:

6.2.1 Objective 1: To compare the liquidity and profitability positions of public and private sector banks.

6.2.2 Research Questions: Is there any difference between the public and private sector banks in terms of their liquidity and profitability positions?

The third chapter of the study was devoted to analyzing and comparing the liquidity and profitability positions of public and private sector banks in India over the period from 2005 to 2024. To fulfill the objective, key financial ratios such as the liquid asset ratio, current ratio, return on assets (ROA), and return on equity (ROE) were used as indicators of liquidity and profitability. The chapter applied descriptive statistics and t-tests to assess the differences in the average performance of the two groups of banks. In addition to these comparative tools, the study also employed Compound Annual Growth Rate (CAGR) to assess the long-term growth trends of the selected financial indicators. CAGR analysis provided a deeper understanding of how the liquidity and profitability ratios evolved over the 19-year period. It offered a smoothed annual growth rate that neutralizes year-to-year fluctuations, thus presenting a more stable and reliable picture of the banks' financial trajectories. The CAGR values revealed that private sector banks experienced relatively higher growth in profitability indicators such as ROA and ROE, reflecting their dynamic financial strategies and stronger revenue generation capabilities. Public sector banks, although maintaining a conservative approach, showed moderate growth in liquidity ratios, consistent with their policy-driven role in the economy. The overall analysis revealed noticeable contrasts between public and private sector banks in terms of both liquidity and profitability. Public sector banks were found to maintain relatively higher levels of liquidity, possibly due to their regulatory obligations and risk-averse policies. However, these banks lagged behind private sector banks in profitability performance, as indicated by lower ROA and ROE values. On the other hand, private sector banks showed better efficiency in managing their assets and generating returns, albeit with slightly tighter liquidity positions. These findings reflect the structural and operational differences between the two banking groups and suggest that ownership type plays an important role in shaping financial strategies and outcomes.

6.2.3 Major Findings:

- **Liquidity Position:**

Public sector banks consistently maintained higher liquidity levels compared to private sector banks. As because the average Liquid Assets to Total assets ratio was 16.72% for public banks and 14.35% for private sector banks over the period 2005-

2024. The t-test value for this difference was t = 2.78, p = 0.0117, indicating statistical significance at the 5% level.

- **Profitability Positions:**

The profitability analysis reveals that private sector banks outperformed public sector banks in terms of both Return on Assets (ROA) and Return on Equity (ROE) during 2005- 2024. Private banks recorded a higher mean ROA (1.08%) than public banks (0.54%) with more stable performance, as shown by a lower CV (38.89% vs. 118.52%) and higher ROA growth (CAGR of 4.3% vs. 2.8%). The ROA difference was statistically significant (t = -3.68, p = 0.000). For ROE, private banks again had a higher average (14.23% vs. 9.15%), but the difference was not statistically significant (t= -1.01, p = 0.403). Overall, private banks showed better profitability, though only the ROA difference is statistically significant.

- **Risk- Return Trade- Off:**

Private sector banks showed higher profitability (ROA and ROE), while public sector banks maintained greater liquidity of 13.23% than private sector banks of 9.24%, reflecting a conservative approach. This indicates a classic trade-off- private banks took more risk for higher returns, whereas public banks prioritized stability. However, t-test results show that the differences are not statistically significant (p- values> 0.05).

6.2.4 Conclusion:

The comparative analysis of the liquidity and profitability positions of public and private sector banks in India, as presented in Chapter III, it can be concluded that there is a clear distinction in the financial behaviour and performance of public and private sector banks in India. The study revealed that public sector banks generally maintained a higher level of liquidity compared to their private counterparts, primarily due to their regulatory obligations and cautious financial approach. However, this emphasis on liquidity came at the cost of profitability, as public banks consistently reported lower returns on assets (ROA) and equity (ROE). On the other hand, private sector banks were found to be more efficient in managing their resources, achieving stronger profitability despite operating with relatively tighter liquidity levels. This risk-return trade-off highlights the different strategic priorities and operational philosophies between the two

groups. The statistical analysis further confirmed that the differences in financial performance between public and private sector banks were significant, underlining the influence of ownership structure on banking behavior. The findings suggest that while public sector banks focus more on financial stability and regulatory compliance, private sector banks are oriented toward maximizing efficiency and returns, leading to divergent performance outcomes within the Indian banking system. Overall, this chapter established a clear differentiation in the liquidity and profitability behavior of public and private sector banks in India. The combination of descriptive statistics, t-tests, and CAGR analysis addressed the central research question and provided a comprehensive empirical foundation for the deeper econometric analysis presented in the subsequent chapter.

6.2.5 Objective 2: To determine the bank specific factors affecting liquidity of public and private sector banks.

6.2.6 Research Questions: Whether the factors determining liquidity differ between the public and private sector banks?

6.2.7: Major Findings:

This chapter presented the empirical findings based on panel data regression analysis using the fixed effects model (FEM), which was selected as the most appropriate estimation method. The choice was statistically supported by the Hausman test, which indicated a significant p-value ($\chi^2 = 25.63$, $p < 0.01$), confirming that the fixed effects model provides more consistent and efficient estimates than the random effects model. To address heteroskedasticity and autocorrelation concerns identified via the Breusch-Pagan test ($\chi^2 = 18.45$, $p < 0.05$) and Wooldridge test for autocorrelation ($F = 11.29$, $p < 0.01$), robust standard errors were applied in all regression models.

Public Sector Banks (PSBs) : For public sector banks, the fixed effects model revealed the following significant relationships with liquidity:

- **Return on Assets (ROA):** Positive and statistically significant ($\beta = 0.193$, $p < 0.01$). This suggests that higher profitability enhances liquidity positions.
- **Capital Adequacy Ratio (CAR):** Also positive and significant ($\beta = 0.164$, $p < 0.05$), indicating that well-capitalized banks maintain stronger liquidity buffers.

- **Gross Non-Performing Assets (GNPA):** Negative and highly significant ($\beta = -0.238$, $p < 0.01$), implying that asset quality deterioration adversely affects liquidity.
- **Bank Size (LNTA):** Negative and significant ($\beta = -0.089$, $p < 0.05$), suggesting that larger banks may face more liquidity management challenges.

Private Sector Banks (PvSBs): For private sector banks, the fixed effects model produced slightly different results:

- **Return on Equity (ROE):** Positive and statistically significant ($\beta = 0.147$, $p < 0.01$), implying that shareholder return is positively linked with liquidity.
- **Investment to Total Assets (INV/TA):** Negative and significant ($\beta = -0.121$, $p < 0.05$), showing that a higher investment share reduces available liquidity.
- **Net Interest Margin (NIM):** Positive but weakly significant ($\beta = 0.089$, $p < 0.10$), suggesting some link between profitability from core banking operations and liquidity.

  Overall, these findings highlight that profitability (ROA, ROE) and capital strength (CAR) positively influence bank liquidity, while poor asset quality (GNPA) and larger operational size tend to weaken liquidity, especially in public sector banks.

  6.2.8: Conclusion:

  The analysis of bank liquidity determinants from 2005 to 2024 reveals distinct patterns between public and private sector banks in India. Using the fixed effects model with robust standard errors, the study found that for public sector banks, liquidity is positively influenced by profitability (ROA) and capital adequacy (CAR), suggesting that more profitable and well-capitalized banks maintain stronger liquidity positions. However, liquidity is negatively affected by deteriorating asset quality (GNPA) and larger bank size, indicating challenges in liquidity management for bigger institutions. In contrast, for private sector banks, liquidity is positively driven by return on equity (ROE), highlighting the role of shareholder returns, while higher investment in total assets (INV/TA) negatively impacts liquidity. A weak but positive relationship was also found between net interest margin (NIM) and liquidity. Overall, the results suggest that

while both sectors benefit from profitability in managing liquidity, public sector banks are more vulnerable to asset quality issues and scale-related inefficiencies, whereas private sector banks manage liquidity more efficiently through capital returns and more efficient asset allocations.

6.2.9 Objective 3: To find out the bank specific factors determining profitability of public and private sector banks.

6.2.10 Research Questions: Whether there is any similarity among the determinants of profitability of public and private sector banks?

6.2.11: Major Findings:

This chapter presented the empirical findings based on panel data regression analysis using the fixed effects model (FEM), which was selected as the most appropriate estimation method. The choice was statistically supported by the Hausman test, which indicated a significant p-value ($\chi^2 = 32.58$, $p < 0.01$), confirming that the fixed effects model provides more consistent and efficient estimates than the random effects model. To address heteroskedasticity and autocorrelation concerns (identified via the Breusch-Pagan test: $\chi^2 = 25.63$, $p < 0.01$ and Wooldridge test for autocorrelation: $F = 16.21$, $p < 0.01$), robust standard errors were applied in all regression models.

Public Sector Banks (PSBs): For public sector banks, the fixed effects model revealed the following significant relationships with Return on Assets (ROA):

- **Bank Size (SIZE):** Positive and statistically significant ($\beta = 0.0181$, $p < 0.01$). This implies that larger banks achieve higher profitability due to economies of scale or better market leverage.
- **Cost of Funds (COF):** Negative and statistically significant ($\beta = -0.0008$, $p < 0.01$). This suggests that higher funding costs reduce profitability.
- **Deposit Ratio (DEP):** Negative and significant ($\beta = -0.0145$, $p < 0.01$), indicating that excess reliance on deposits might be inefficient in generating profits.
- **Liquidity (LIQ):** Negative and statistically significant ($\beta = -0.0022$, $p < 0.01$), showing that holding excessive liquid assets may lower profitability.
- **Private Sector Banks (PvSBs):** For private sector banks, the regression results showed the following:

- **Bank Size (SIZE):** Positive and statistically significant ($\beta = 0.0099$, $p < 0.01$). This indicates that larger private banks are more profitable
- .**Cost of Funds (COF):** Negative and statistically significant ($\beta = -0.0021$, $p < 0.01$). This affirms that cost-efficiency is a key driver of profitability in private banks.

Other variables like CAR, DEP, LIQ, ROE, NPA, and NII were found to be statistically insignificant for private sector banks, suggesting that profitability in these banks is primarily driven by scale and cost control.

6.2.12 Conclusion:

This chapter analyzed the determinants of profitability for public and private sector banks in India during the period 2005–2024 using robust panel regression analysis. The study revealed that for public sector banks, Return on Equity (ROE) and Non-Performing Assets (NPA) had significant negative impacts on profitability, indicating issues with asset quality and lower efficiency in generating returns. In contrast, for private sector banks, profitability was significantly influenced by bank size (SIZE) and cost of funds (COF). A larger bank size positively contributed to profitability due to economies of scale, while a lower cost of funds improved profit margins, reflecting strong cost management practices. Other variables such as Capital Adequacy Ratio (CAR), Deposits (DEP), Liquidity (LIQ), Return on Equity (ROE), NPA, and Net Interest Income (NII) were statistically insignificant for private banks, suggesting that profitability in these banks is primarily driven by scale and cost control rather than asset quality or capital strength. Thus, private sector banks outperformed public sector banks in terms of profitability during the study period, driven by operational efficiency and effective cost management, whereas public sector banks continued to struggle with high NPAs and poor returns on equity.

6.2.13 Policy Implications and Suggestions:

The findings derived from the descriptive and econometric analyses in the preceding chapters offer several important policy implications for enhancing the liquidity and profitability of public and private sector banks in India. The descriptive analysis highlighted that public sector banks generally face challenges in terms of asset quality and profitability, whereas private sector banks exhibit stronger performance in

maintaining higher returns and better liquidity positions. This calls for targeted policies to improve operational efficiency and financial discipline in public sector banks, including better risk assessment and credit monitoring systems. The econometric results further emphasized the significant role of bank- specific factors such as capital adequacy ratio (CAR), return on equity (ROE), asset quality (NPA ratio), and cost of funds in determining profitability and liquidity. Policymakers should encourage prudent capital management, strengthen asset quality mechanisms, and incentivize innovations in banking operations. Additionally, regulatory reforms that support consolidation, technology adoption, and improved governance can contribute to long-term financial sustainability. Tailored strategies for both sectors focusing on improving efficiency in public banks and sustaining healthy growth in private banks are essential to ensure balanced and robust banking sector performance.

BIBLIOGRAPHY

Almaqtari, F. A., Al-Homaidi, E. A., Tabash, M. I., & Farhan, N. H. (2019). The determinants of profitability of Indian commercial banks: A panel data approach. International Journal of Finance & Economics, 24(1), 168-185.

Annual Reports of Public and Private Sector Banks (2005–2024). Retrieved from individual bank websites

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2005). Bank-specific, industry-specific, and macroeconomic determinants of bank profitability. Bank of Greece Working Paper, 25.

Attarwala, A. A. (2025). The study of major public sector banks in India from 2010–11 to 2023–24: Financial health through liquidity and profitability analysis. N.L. Dalmia Institute of Management Studies and Research.

Balasubramanin, V. (2007). Private sector banks and economic development in India. New Delhi: Academic Press.

Basel Committee on Banking Supervision. (2008). Principles for Sound Liquidity Risk Management and Supervision. Bank for International Settlements.

Barr, R. S., Killgo, K. A., Siems, T. F., & Zimmel, S. (2002). Evaluating the productive efficiency and performance of U.S. commercial banks. Federal Reserve Bank of Dallas.

Bharti, U., & Singh, S. J. (2024). A comparative analysis of the financial performance of ICICI Bank and Indian Overseas Bank (2016–2021).

Bodia, S. (2006). An analysis of profitability of Indian public sector banks in the post-liberalization period

Berger, A. N., & Humphrey, D. B. (1997). Efficiency of financial institutions: International survey and directions for future research. European Journal of Operational Research, 98(2), 175–212. https://doi.org/10.1016/S0377-2217(96)00342-6

Berger, A. N., & Bonaccorsi di Patti, E. (2006). Capital structure and firm performance: A new approach to testing agency theory and an application to

the banking industry. Journal of Banking & Finance, 30(4), 1065–1102. https://doi.org/10.1016/j.jbankfin.2005.05.015

Bindsell, A., & Fotia, L. (2021). Liquidity risk, market discipline, and bank runs: The role of creditor confidence

Boubaker, S., Nguyen, P., & Rouatbi, W. (2020). Bank affiliation and efficiency: Evidence from Middle East and North Africa. Journal of Financial Stability, 49, 100772. https://doi.org/10.1016/j.jfs.2020.100772

Chavda, D., Mistry, D., & Deshpande, S. (2022). Analysis of performance of public and private sector banks in India. Vidya – A Journal of Gujarat University, 1(1), 38–45.

Das, A., Nag, A., & Ray, S. C. (2005). Measuring productivity and efficiency of Indian banks: An application of data envelopment analysis. Indian Economic Review, 40(1), 117–137.

Das, A., & Uppal, J. Y. (2018). The impact of non-performing assets on the profitability of Indian banks: An empirical analysis. International Journal of Banking, Risk and Insurance, 6(1), 1–10.

DasGupta, M., & Biswas, P. R. (2016). An empirical assessment on liquidity management of Indian public sector banks. Retrieved from http://www.publishingindia.com

Dsouza, S., Rabbani, M. R., Hawaldar, I. T., & Jain, A. K. (2022). Impact of bank efficiency on the profitability of the banks in India: An empirical analysis using panel data approach. International Journal of Financial Studies, 10(4), 93. https://doi.org/10.3390/ijfs10040093

Diamond, D.W. (2003). Liquidity, Banks, and Markets

Goel, S., & Bajpai, A. (2013). Impact of global recession on Indian banks: A financial ratio analysis. Journal of Banking and Finance, 12(2), 45–60.

Hassan, M. K., Khan, A., & Paltrinieri, A. (2022). Liquidity risk, credit risk, and profitability in emerging markets: Evidence from Indian banks. Journal

of Economic Studies, 49(3), 505–523. https://doi.org/10.1108/JES-08-2020-0421

IGRA Limited. (n.d.). Report on Indian Banking Sector Assets.

IHS Global Inc. (2022). EViews (Version 12) https://www.eviews.com

Jayaraman, A. R., & Srinivasan, M. R. (2014). Analyzing profit efficiency of banks in India with undesirable output—Nerlovian profit indicator approach. IIMB Management Review, 26(3), 190–200. https://doi.org/10.1016/j.iimb.2014.09.003

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kanujiya, P. K., & Kumar, A. (2018). The relationship between capital structure and profitability: An analysis of selected public and private sector banks in India. International Journal for Research in Engineering Application & Management, 4(7), 755–756.

Kasana, E., & Sahoo, B. P. (2024). An empirical analysis of bank liquidity in India: A panel data approach.

Kaur, H. (2012). Comparative performance of public and private sector banks in India. Indian Journal of Finance, 6(4), 22–30.

Kerker, P., & Kerker, R. (2008). Impact of banking reforms on bank efficiency and profitability: An empirical study using data envelopment analysis.

Kumar, J., & Thamiselvan, R. (2018). Management efficiency and profitability of selected Indian public and private sector banks. International Journal of Pure and Applied Mathematics, 119(15), 873–889.

Maheswari, S. U. (2022). Impact of profitability and liquidity on financial performance of private sector banks. International Journal of Advances in Engineering and Management (IJAEM), 4(3), 1324–1329. [DOI: 10.35629/5252-040313241329

Marshall, J. (2009). The financial crisis in the US: Key events, causes, and responses. Harvard Business Review.

Mathew, J., & Davis, C. J. (2020). Determinants of profitability in Indian public and private sector banks: A review of literature

Ministry of Finance, Government of India. (2005–2017). Economic Survey of India. Retrieved from https://www.indiabudget.gov.in

Mishra, S., & Pradhan, B. B. (2019). Impact of Liquidity Management on Profitability: An Empirical Analysis in Private Sector Banks of India. Journal of Banking and Financial Economics, 5(2), 45–60.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. The American Economic Review, 48(3), 261–297.

Mohanty, B., Aashima, & Bhargava, M. (2022). The effect of liquidity risk management on bank performance: Evidence from Indian banking sector. Pacific Business Review (International), 14(11), 58–66.

Myers, S. C. (1984). The capital structure puzzle. The Journal of Finance, 39(3), 575–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Noyal, A. F. (2025). Determination of Profitability and Liquidity Analysis of Banking Industry in India. International Journal for Multidisciplinary Research.

Pandey, I. M. (2019). Financial Management (11th ed.). Vikas Publishing House

Pandya, J., & Mapara, J. (2018). An empirical study on financial performance analysis of selected public sector banks in India. Research Review International Journal of Multidisciplinary, 355.

Parikh, P. N. (2021). A study on profitability and liquidity analysis of the selected Indian private sector banks. International Research Journal of Humanities and Interdisciplinary Studies, 2(8), 1-12.

Pathak, B. V. (2003). The Indian financial system: Markets, institutions, and services. Delhi: Pearson Education.

Prabhakar, R., & LakshmiPrabha, S. (2012). Portfolio management in banking sector: Risks and returns. International Journal of Economics and Finance, 4(3), 112–125.

Pushkala, N., Mahamayi, J., & Venkatesh, K. A. (2017). Liquidity and off-balance sheet items: A comparative study of public and private sector banks in India. SDMIMD Journal of Management, 8(2), 85–96. https://doi.org/10.18311/sdmimd/2017/15721

Rabbani, M. R., Kayani, U., & Hawaldar, I. T. (2022). The role of FinTech in strengthening bank efficiency: Evidence from South Asia. Technological Forecasting and Social Change, 180, 121705. https://doi.org/10.1016/j.techfore.2022.121705

Ramanuj, J., & Memon, S. (2023). Liquidity and profitability of the selected automobile companies of India. International Journal of Management,

Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. The Journal of Finance, 50(5), 1421–1460. https://doi.org/10.1111/j.1540-6261.1995.tb05184.x

RBI (Reserve Bank of India).(2021). Annual Report: Banking Sector Performance. Retrived f.

Reserve Bank of India. (2005–2024). Statistical Tables Relating to Banks in India. Retrieved from https://www.rbi.org.in

Reserve Bank of India. (2005–2024). Report on Trend and Progress of Banking in India. Retrieved from https://www.rbi.org.in

Reserve Bank of India. (2005–2024). Database on Indian Economy (DBIE). https://dbie.rbi.org.in

Reserve Bank of India. (2005–2024). Basic Statistical Returns of Scheduled Commercial Banks in India. Retrieved from https://www.rbi.org.in

Sahyouni, A., & Wang, M. (2018). Bank liquidity creation and risk transformation: Evidence from emerging economies. Journal of Banking and Finance, 89, 162–177. https://doi.org/10.1016/j.jbankfin.2018.02.009

Spathis, C., & Doumpos, M. (2002). Assessing profitability and efficiency differences in the banking sector. European Journal of Operational Research, 139(2), 371–379.

Sundararajan, V., Enoch, C., San José, A., Hilbers, P., Krueger, R., Moretti, M., & Slack, G. (2002). Financial soundness indicators: Analytical aspects and country practices. International Monetary Fund.

Soni, K., & Tiwari, C. K. (2020). Empirical analysis of the impact of non-performing assets, liquidity and risk on the profitability of public and private sector banks in India. Journal of General Management Research, 7(1), 34–42.

Sun, L., Peng, J., & Li, W. (2020). Cost efficiency and profitability in Chinese banking: A non-radial directional distance function approach. Emerging Markets Finance and Trade, 56(5), 1005–1020. https://doi.org/10.1080/1540496X.2019.1628764

Tabash, M. I., Al-Homaidi, E. A., Farhan, N. H., & Almaqtari, F. A. (2018). The impact of bank-specific factors on the profitability of commercial banks: Evidence from India. Cogent Economics & Finance, 6(1), 1-16.

.Vasani, S. V. (2020). Financial performance of banks in India: A study of selected private sector banks. Journal of Advanced Research in Economics and Administrative Sciences (JAREAS), 1(1), 45–53.

Vanitha, M., & Raghavendra, N. R. (2022). Profitability analysis of public sector banks in India. EPRA International Journal of Environmental Economics, Commerce and Educational Management, 9(7). https://doi.org/10.36713/epra10929

Yaron, J., Benjamin, M. P., & Piprek, G. L. (1998). Rural finance: Issues, design, and best practices. World Bank.