To Study the Impact of E-Banking on Bank Profitability in India

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DECLARATION BY STUDENT

I here by declare that the data presented in this Dissertation report entitled, "To study the impact of E-banking on bank profitability in India" is based on the results of investigations carried out by me in the Goa Business School at the Goa University under the Supervision of Ms Ankita Chari and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities / College will be not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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COMPLETION CERTIFICATE

This is to certify that the dissertation report "To Study the Impact of E-Banking on Bank Profitability in India" is a bonafide work carried out by Ms Saimah Shajid Khilji under my supervision in partial fulfilment of the requirements for the award of the degree of M.A. Economics in the Discipline Goa Business School at the Goa University.

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PREFACE

The banking sector has undergone substantial transformation with the advent of electronic banking (e-banking) technologies. This transformation has not only revolutionized the way financial transactions are conducted but has also brought about significant changes in the operational dynamics and profitability of banks. As electronic banking continues to evolve, it becomes imperative for stakeholders to understand its impact on the financial performance of banks, particularly in the context of public sector banks versus private sector banks.

This study delves into the intricate relationship between e-banking and bank profitability, focusing on selected public sector banks and private sector banks operating in the Indian financial landscape. Through a comprehensive analysis of key profitability and performance ratios spanning the years 2014 to 2023, this research aims to shed light on the comparative financial performance and operational efficiency of both banking sectors.

The objectives of this study are twofold: first, to conduct an in-depth analysis of the financial performance of public sector banks and private sector banks across selected profitability ratios including Current Account Savings Account (CASA), Net Interest Margin (NIM), Net Profit Margin (NPM), Cost to Income Ratio (CIR), Non-Interest Income to Total Assets ratio (NII/TA), and Operating Profit Margin (OPM), as well as performance ratios such as Return on Equity (ROE) and Return on Assets (ROA); and second, to compare the profitability of public and private sector banks on these selected ratios.

The hypothesis testing framework employed in this study forms the backbone of our analysis. The null hypothesis posits no significant difference in the mean profitability ratios between public and private sector banks, while the alternative hypothesis contends the presence of a significant difference. Through rigorous statistical analysis including t-tests, mean comparisons, standard deviation assessments, and standard error of the mean calculations, we aim to discern any statistically significant disparities in the financial performance of the two banking sectors.

The findings presented in this study provide valuable insights into the impact of e-banking on bank profitability, offering a nuanced understanding of how public sector banks fare against their private sector counterparts. It is our hope that this research contributes to the body of knowledge in the field of banking and finance, aiding policymakers, banking executives, investors, and researchers in making informed decisions and shaping the future of the banking industry.

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ABBREVIATIONS USED

Entity	Abbreviation
Current Account Savings Account	CASA
Net Interest Margin	NIM
Net Profit Margin	NPM
Cost to Income Ratio	CIR
Non-Interest Income to Total Assets ratio	NII/TA
Operating Profit Margin	OPM
Return on Equity	ROE
Return on Assets	ROA
Standard error Mean	SEM
Standard Deviation	STDEV
Public Sector Banks	PSBs
Private Sector Banks	PVBs

ABSTRACT

This study investigates the impact of e-banking on the profitability and financial performance of public sector banks and private sector banks in India from 2014 to 2023. The analysis focuses on selected profitability and performance ratios, including Current Account Savings Account (CASA), Net Interest Margin (NIM), Net Profit Margin (NPM), Cost to Income Ratio (CIR), Non-Interest Income to Total Assets ratio (NII/TA), Operating Profit Margin (OPM), Return on Equity (ROE), and Return on Assets (ROA). Through a comparative analysis between Public Sector Banks (Canara Bank, SBI, PNB) and Private Sector Banks (HDFC Bank, ICICI Bank, Axis Bank), the study aims to discern differences in financial performance trends and operational efficiency. The research methodology involves calculating mean performance metrics, standard deviation, standard error of the mean, graphs and conducting t-tests to assess the significance of differences between Public Sector Banks and Private Sector Banks. Findings reveal that Private Sector Banks generally outperform PSBs across most metrics, indicating superior profitability and operational effectiveness. Specifically, Private Sector Banks exhibit higher mean performance in CASA, NIM, NPM, NII/TA, OPM, ROE, and ROA compared to Public Sector Banks.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

E-banking, or electronic banking, is a form of banking where financial transactions are conducted online through the internet. It offers customers the convenience of accessing their accounts, making transactions, and managing their finances from the comfort of their own homes or offices. E-banking has gained significant popularity over the years, and its impact on bank profitability has become a topic of interest among researchers and industry professionals.

In recent years, India has experienced rapid growth in its e-banking sector. The government's push towards digitalization, the rise in smart phone usage, and the increasing internet penetration have all contributed to the surge in e-banking adoption. as a result, it has become crucial for banks in India to understand the impact of e-banking on their profitability.

E-banking offers numerous benefits to both customers and banks. For customers, it provides convenience, accessibility, and a wide range of banking services at their fingertips. They can perform transactions, check account balances, and even apply for loans and credit cards without visiting a physical branch. This convenience has led to increased customer satisfaction and loyalty. On the other hand, for banks, e-banking offers cost savings and operational efficiency. With the digitalization of banking services, banks can reduce their reliance on physical infrastructure and staff, resulting in significant cost savings. Moreover, e-banking allows them to reach a larger customer base, including those in remote areas, without establishing physical branches. These factors contribute to improved profitability for banks.

However, the impact of e-banking on bank profitability is not without challenges. one significant challenge is the increased risk of cyber threats and fraud. As e-banking relies heavily on technology and online platforms, it becomes crucial for banks to ensure the security of their systems, protect customer information, and mitigate cyber

risks effectively. Failure to address these risks can lead to financial losses, reputational damage, and loss of customer trust, ultimately impacting bank profitability.

Additionally, customer adoption and usage of e-banking services can vary significantly. Factors such as age, income levels, education, and awareness play a crucial role in determining the extent to which customers embrace and utilize e-banking services. Banks need to understand these factors and tailor their offerings and marketing strategies accordingly to maximize the profitability of their e-banking services.

The Indian banking sector has witnessed a remarkable transformation in recent years, driven by the proliferation of electronic banking (e-banking) services. E-banking encompasses a broad spectrum of technologies enabling customers to conduct financial transactions remotely, including internet banking, mobile banking, and automated teller machines (ATM's). This shift towards digital banking has fundamentally altered the way banks operate and interact with their customers.

The integration of electronic channels into traditional banking infrastructures has unlocked a myriad of opportunities for both financial institutions and their customers. with the convenience of anytime, anywhere access to banking services, customers are increasingly embracing e-banking as their preferred mode of conducting financial transactions. This shift in consumer behaviour has compelled banks to invest substantially in upgrading their technological capabilities to meet the evolving demands of the digital era. However, while the adoption of e-banking holds the promise of enhanced operational efficiency and customer satisfaction, its impact on bank profitability remains a subject of debate and scrutiny within the financial industry.

The emergence of e-banking has reshaped the traditional banking landscape, introducing new channels for delivering financial services and interacting with customers. The advent of digital technology has transformed various facets of the banking sector globally, leading to the emergence of electronic banking (e-banking) as a prominent feature of modern banking systems. India, as one of the world's largest

and fastest-growing economies, has experienced significant shifts in its banking landscape due to the proliferation of e-banking services.

E- banking has become an integral part of the banking industry in India. its convenience, accessibility, and cost-saving benefits have contributed to improved bank profitability. However, banks must also address the challenges associated with e-banking, such as cyber threats and varying customer adoption rates.

1.2 AIM AND OBJECTIVES

AIM

In this study, we aim to examine the financial performance of selected public sector banks and private sector banks by analyzing various profitability and performance ratios. Specifically, we will focus on key indicators such as Current Account Savings Account (CASA), Net Interest Margin (NIM), Net Profit Margin (NPM), Cost to Income Ratio (CIR), Non-Interest Income to Total Assets ratio (NII/TA), Operating Profit Margin (OPM), Return on Equity (ROE), Return on Assets (ROA). By comparing these ratios between public and private sector banks over the specified study period, we seek to gain insights into the comparative profitability and operational efficiency of both banking sectors.

OBJECTIVES

1. Analyze profitability ratios like CASA, NIM, NPM, CIR, NII/TA, and OPM, as well as performance ratios ROE and ROA for public and private sector banks.
2. Compare CASA, NIM, NPM, CIR, NII/TA, OPM, ROE, and ROA between public and private banks for profitability assessment.

1.3 HYPOTHESES/ RESEARCH QUESTIONS

HYPOTHESIS

Null hypothesis (h0): There is no significant difference in the mean profitability ratios (CASA, NIM, NPM, CIR, NII/TA, OPM, ROE, ROA) between public and private sector banks.

Alternative hypothesis (h1): There is a significant difference in the mean profitability ratios (CASA, NIM, NPM, CIR, NII/TA, OPM, ROE, ROA) between public and private sector banks.

RESEARCH QUESTIONS

1. Is there a significant difference in the CASA ratio between public and private sector banks?
2. Do public and private sector banks exhibit differences in NIM?
3. Are there disparities in NPM between public and private sector banks?
4. Is there a significant variation in CIR between public and private sector banks?
5. Do public and private sector banks differ in their NII/TA ratio?
6. Is there a significant difference in OPM between public and private sector banks?
7. Do public and private sector banks show differences in ROE?
8. Is there a significant variation in ROA between public and private sector banks?

1.4 Scope

This study aims to conduct an extensive analysis of the financial performance of both public sector banks which includes Canara bank, State bank of India (SBI) , Punjab national bank (PNB) and private sector banks which includes ICICI bank, Axis bank, HDFC bank over the period from 2014 to 2023. The focus is primarily on evaluating selected profitability and performance ratios to understand the impact of e-banking on bank profitability in India. The selected ratios for analysis include Current Account Savings Account (CASA), Net Interest Margin (NIM), Net Profit Margin (NPM), Cost to Income Ratio (CIR), Non-Interest Income to Total Assets Ratio (NII/TA), Operating Profit Margin (OPM), Return on Equity (ROE), and Return on Assets (ROA).

CHAPTER 2

LITERATURE REVIEW

Internet banking is new and changing rapidly. The link between internet banking and performance is an empirical issue. (Husin Ali Khrawish, 2011) aimed to test the effect of e-banking services provided by banks on the internet on the profitability of these banks during the period 2000-2009. They followed the previous works of Demirguc and Huizinga (1999), Athanasoglou (2008) and Aburime (2008). This study employs a comprehensive approach to data collection, incorporating both primary and secondary methods. The study sample consists of all domestic banks in Jordan separated into 3 groups i.e. non-internet services providers, recent adopters of the service, and early adopters of the service. ratios are used to test the effect on profitability: return on assets, return on equity, margin of interest as profitability measures. Regression analysis is used to test the effect of e-banking services on the profit. the regression analysis showed that there is no significant effect of e-banking services on the profitability of recent adopters banks in term of ROA and ROE. For early adopters, the result were much better than those for the early adopters, but still not significant with the profitability of these banks.

E-banking is considered to have a substantial impact on banks performance. (Sana Haider Sumra, 2011) investigated the services provided by the banks and their impact on their profitability. This paper consist of twelve banks across Pakistan. The study evaluates the impact of e-banking on managers of various banks in three cities, Bahawalpur, Lahore and Islamabad using a descriptive and exploratory survey method, focusing on profitability levels. It also discusses the effect of customers' literacy on the provision of services from banks' perspective and the basic motives of banks to adopt e-banking services. The results show that e-banking has increased the profitability of banks, enabling them to meet their costs and earn profits even in a short span of time. The main motive for banks to adopt e-banking is to increase their client age and retain customers. the profitability of banks has augmented in transitioning to e-banking medium. The study also discusses the services provided by banks to its customers and reveals the major rationales for the banks to use e-banking services.

The increased adoption and penetration of internet has recently redefined the playground of retail banks. (Sadr, 2013) employs data on selected Asian countries from 1990-2010 to examine the relationship between e-banking profitability and economic growth (GDP) and total deposit. Using a blend of cross-sectional and time-series data, they analyzed the correlation between these factors. Employing panel cointegration and full modified OLS techniques to address endogeneity, The findings suggest a short run steady state relationship between these variables across the countries studied. this study employs the Im, Pesaran, and Shin (IPS) approach which builds upon the widely recognized dickey fuller procedure. By employs a novel heterogeneous panel cointegration approach, this research contributes to a deeper understanding of how internet banking influences competition and financial intermediation infrastructure development in emerging economies, emphasizing the gradual positive impact of e-banking on banking sector performance indicators such as return on assets and return on equity.

E-banking has been significant growth globally, yet empirical research on its impact on banks performance remains limited, particularly in regions like Bangladesh. (Md.Nur Alam Siddik, 2015) studied the gap by analyzing panel data from 13 Bangladeshi banks over a decade (2003-2013), the research investigates the effects of e-banking adoption on banks profitability measured by return on equity, return on assets, net interest margin. Private commercial banks were selected due to their status as e- banking pioneers in Bangladesh and their strong financial stability compared to public sector banks. Out of the 39 private commercial banks identified in the Bangladesh bank's 2013 scheduled bank statistics, nine newly established banks lacked data. Thirteen banks responded, and panel data spanning from 2003 to 2013 were compiled from audited annual reports. The study's data encompassed multiple years, comprising both cross-sectional and time-series components, thereby necessitating the use of pooled ordinary least square (OLS) regression analysis, a method employed in similar research by Al- Smadi and Al- Wabel (2011) and Oyewole et al. (2013). The findings reveal a gradual positive impact on e-banking on bank performance with a two year time lag observed for ROE, consistent with findings from studies in developed countries. This study employs multiple profitability indicators and incorporates control variables, such as liquidity and credit risk. Despite the significant positive impact observed, the study acknowledges limitations stemming from data availability and advocates for further research to

validate and expand upon these findings as more comprehensive datasets become accessible.

(Mawutor, 2014) examined how the transition from traditional banking methods to electronic banking, driven by technological advancements, affected the profitability of a bank in Ghana. The study delved into the influence of electronic banking services such as internet and ATM facilities on overall banking operations and the financial performance of the agricultural development bank. Employing a quantitative methodology, the researchers distributed 150 structured questionnaires to customers across selected branches of the bank to gather insights into their experiences with e-banking. The data collected were meticulously organized and analyzed using the statistical package for social sciences (SPSS). The study primarily adopted a descriptive approach, supplemented by inferential statistics to test hypotheses. Results indicated a significant impact of e-banking on the bank's profitability, evidenced by a notable increase in net profit margin following the introduction of e-banking in 2011. Although there was a slight decline in profitability in 2012, it rebounded in the subsequent year (2013). the study revealed that customers predominantly favor e-banking products like ATMS over quicnet internet banking due to perceived benefits such as time-saving, easy access to cash, and convenience. Customers also perceive these products as safer and more secure compared to internet banking. Ultimately, the findings underscored the positive effect of e-banking on the agricultural development bank's profitability.

(Abaenewe, 2013) examined how the profitability of Nigerian banks was affected after they fully implemented electronic banking systems. employing a judgmental sampling method, data were collected from four Nigerian banks distinguished by their consistent brand names and listing on the Nigerian stock exchange since 1997. Profitability performance was assessed using metrics such as returns on equity (ROE) and returns on assets (ROA). Utilizing standard statistical techniques for independent samples, the study compared pre- and post-adoption of e-banking performance differences in terms of roe and ROA at a significance level of 5 percent. The analysis uncovered a positive and significant enhancement in the returns on equity (ROE) of Nigerian banks following the adoption of electronic banking. conversely, it was found that e-banking did not significantly improve the returns on assets (ROA) of Nigerian banks. The unimproved returns may stem from the substantial costs associated with equipment maintenance, software upkeep, and personnel training. Despite its cost-

intensive nature, electronic banking is expected to contribute positively to overall profitability performance in the future, particularly as incidents of banking fraud related to electronic facilities decrease and assets mature.

In today's landscape, electronic banking systems have expanded their operations significantly, driven by the substantial economic benefits they offer. These benefits include reducing bank costs, enhancing profitability, improving service quality for customers, overcoming time and space constraints, broadening the scope of banking activities, and facilitating electronic marketing efforts. (Dr. Saeid Daei Karimzadeh, 2014) examined the impact of electronic banking expansion on the profitability of Sepah bank using quarterly data spanning from 2004 to 2012, employing the autoregressive distributed lag model (ARDL). The study focused on total return on assets (ROA) as the dependent variable, with the number of ATM machines, terminal branches, and point of sales (POS), market concentration, and bank size as independent variables. increasing the number of ATM’s, credit cards, poss, and pin pads has demonstrated a positive and significant effect on bank profitability. The adverse impact of market concentration on bank profitability suggests the need for measures to promote competition and efficiency within the banking sector. Policymakers should prioritize initiatives aimed at enhancing market competitiveness to mitigate the negative effects of concentration. recognizing the positive correlation between bank size and profitability, policymakers should support strategies that facilitate the growth of banks assets. this could involve implementing policies that encourage mergers and acquisitions or providing incentives for banks to expand their operations.

(Bilandib, 2014) embarks on an empirical inquiry focused on scrutinizing the impact of electronic banking on the profitability and market share dynamics within the Iranian banking industry. The research incorporates information gathered from a sample of 16 banks operating within the Iranian banking industry, with five being governmental entities and eleven private institutions. This data analysis spans the duration of 2007 to 2012. The proposed study delineates two primary hypotheses and eight sub-hypotheses aimed at examining how electronic banking impacts profitability and market share within the banking industry. The first main hypothesis posits a positive correlation between electronic banking and profitability. This hypothesis is further divided into five sub-hypotheses, each investigating the specific effects of ATM development, POS development, pin pad development, number of branches,

and bank size on profitability. The second main hypothesis explores the influence of electronic banking on market share. This hypothesis is dissected into five sub-hypotheses, which delve into the effects of ATM development, POS development, pin pad development, number of branches, and bank size on market share. The study's use of two regression techniques has unveiled that pin pad development potentially contributes to a positive effect on return on assets, contrasting with the insignificant impact observed for ATM and POS development on profitability. Additionally, the analysis indicates that none of the technological facilities scrutinized significantly affected market share. However, an intriguing finding emerged, revealing a notable and positive correlation between bank size and market share.

Exploring the effects of electronic banking on bank profitability is a significant endeavor in contemporary financial research. despite numerous studies in this domain, there has been a notable gap in thoroughly investigating the impact of various e-banking instruments, including internet banking, telephone banking, ATM, and POS, utilizing a system dynamics approach. to address this deficiency, (Vahid Shahabi, 2019) endeavored to construct an analytical model systematically, employing a structured approach to identify and analyze the impacts of different areas of e-banking services within a financial institution. Based on the prediction data, rates and auxiliary variables were introduced to the model to refine its accuracy and predictive capabilities. Simulation results indicate that physical branches are associated with considerable costs. To reduce visits to physical branches, banks should increase investment in advertisement and e-banking instruments, promoting the use of e-banking services. The simulation results indicate that e-banking development increases online customer numbers, leading to higher transaction fees and resource absorption. However, traditional customers prefer e-banking services, reducing the number of physical branches and associated expenses. therefore, banks should focus on reducing physical branches and increasing e-banking usage for long-term growth and profitability.

As e-commerce continues to thrive in china, an increasing number of young individuals are embracing e-banking services, including e-payment, for their product purchases. (Shaohua Yang, 2018) investigated how the widespread adoption of e-banking systems has influenced the overall performance metrics, particularly in terms of profitability and cost efficiency, within Chinese banks. Utilizing a stratified random sampling approach, this research selects banks based on specific criteria,

including their significant market share in e-banking, availability of sufficient financial data, and clear documentation of e-banking operations in their annual reports. They chose sample banks for the study period from 2003 to 2013 include bank of China, industrial and commercial bank of China, ping an bank, Shanghai Pudong development bank, and China construction bank. the t-test was utilized to evaluate the hypothesis, providing statistical validation to the findings derived from the data analysis conducted using SPSS and excel. The study rejects the null hypothesis e-banking does enhance Chinese banks' performance in the long term. This is supported by significant positive impacts on ROA, ROE, and operating margin. Although the impact on nim and efficiency ratio is less pronounced, the potential for future benefits shouldn't be disregarded. E-banking appears to be a balancing act, with short-term adjustments followed by long-term gains for both banks and customers.

The rapid development of information technology (ICT) has significantly impacted the banking industry, particularly in the money markets and banking sector. This has led to the introduction of internet banking, electronic payment, security investments, and information exchange. Electronic commerce has become an integral part of e-commerce, with banks providing online banking services to customers via the internet. in Ethiopia, the commercial bank of Ethiopia (CBE) introduced ATM's in late 2001 to deliver services to local users. the commercial bank of Ethiopia (CBE), being the pioneer in introducing ATM - based payment systems, is currently implementing various e-banking services to improve operational efficiency and profitability. as of September 30, 2016, the bank had over 1065 ATM machines, over 1 million active debit card users, and over 1,400,000 mobile and internet banking users. (BEZA, 2005) investigates how e-banking influences the profitability of the commercial bank of Ethiopia. To achieve the objective, a combination of explanatory and descriptive research methodologies was employed. The study population consisted of all two hundred fifteen CBE branches in addis ababa city administration. Both primary and secondary data were gathered for analytical purposes. A formal survey was conducted to collect primary data, while secondary data was gathered from published and unpublished documents of CBE. The study used SPSS version 20 and multiple regression models to analyze the effects of electronic banking on the profitability of central bank of Ethiopia (CBE). A logit regression model was used to test the relationship between e-banking and CBE profitability. the study aimed to examine long-term causality among study variables and tested the model significance using

Anova at a 95% confidence level and 5% level of significance. There is a positive relationship between e-banking and profitability, with a strong relationship between financial performance of CBE and internet banking, automatic teller machine, point of sale, mobile phone banking, and bank size. E-banking practices in CBE are correlated positively with service quality, reducing disputes between employees and conducting business outside normal branch working hours.

Bank of Kigali (BK) has been serving the commercial banking needs of individuals, small businesses, and large corporations since 1966, under the licensing of the national bank of Rwanda. Boasting a network of 33 branches across Rwanda, with 15 located in Kigali city. (Asia, 2015) aims to assess the influence of e-banking on the performance of bank of Kigali in Rwanda, focusing specifically on its headquarters in Kigali city. The study will entail an analysis of e-banking and the bank's performance over a five-year period from 2008 to 2012, coinciding with the full recognition of e-commerce within the banking sector in Rwanda. The researcher used a descriptive research design, combining qualitative and quantitative methodologies to assess the impact of e-banking on financial institutions' performance. The bank of Kigali was chosen as the case study, with 50 employees from various departments. Stratified sampling was used to select specific departments, followed by census and purposive sampling. Data processing and analysis were done using SPSS, with qualitative analysis techniques applied. Secondary data sources were also analyzed, and some primary data statistics were integrated into the research findings. The study reveals a significant relationship between e-banking and the performance of the bank of Kigali in Rwanda. The independent variable has a positive high correlation to the dependent variable, with a p-value of less than 0.01, indicating a correlation between the variables. This suggests that e-banking contributes to the positive performance of banks, despite challenges such as network failures, inadequate skills, and security issues that threaten the confidentiality and integrity of their information.

(Michael Ngugi Njoroge, 2018) aims to evaluate the impact of electronic banking on equity bank limited financial performance in its Nairobi central business district branches. the objectives include evaluating the impact of mobile banking, automated teller machines, debit cards, and internet banking. The study also aims to determine the effects of these technologies on equity bank's overall financial performance. A descriptive survey was used to describe the characteristics of the variables of interest, ensuring high reliability and eliminating observer subjectivity. The target population

consisted of 500 employees from equity bank limited central business district branches, with 50 employees from each branch. In conducting data analysis, the study utilized the statistical package for social sciences version 21.0. for assessing significance, the paired t-test, a non-parametric test of differences developed by sir Williams Gosset, was employed at a significance level of 0.05. To ascertain the impact of e-banking on the financial performance of commercial banks in Kenya from 2012 to 2016, the researcher conducted multiple regression analysis using a specific regression model. In this model, return on assets was employed as a measure of performance, with overall operating cost serving as the independent variable. Four hypotheses were tested: mobile banking, ATM installations, debit cards, and internet banking. Results showed a strong association between mobile banking and financial performance, with a 31.10% increase in performance. ATM installations led to a 24.20% increase in performance, while debit cards improved the bank's financial situation by 19.90%. Internet banking also showed a 16.62% boost, with a moderately strong relationship between the two variables. These findings support the hypothesis that electronic banking can significantly improve the financial performance of equity banks.

(Mansour Dehghan, 2015) examines the impact of core banking services, including internet banking, mobile banking, telephone banking, point of sale (POS), ATM, and electronic money, on profitability. Core banking is a general term used to describe the services provided by a group of network bank branches, bank customers may occurs their funds and other simple transaction from any of the member. The research focuses on 59 branches in Mashhad from 2010 to 2012, focusing on customers' academic degrees and interviews with branch heads. Preliminary data was collected through financial reporting programs and analytical software, with core banking services as independent variables and profitability as the dependent variable. Secondary information was gathered through desk research, documents, articles, theses, libraries, and the internet, and statistical tests were conducted using SPSS software. The study found that internet banking and ATM’s significantly impact profitability, suggesting that banks should encourage customers to use these tools. however, other core banking services like mobile banking, telephone banking, POS, and electronic money do not significantly affect profitability. Banks should encourage customers to adopt these services and change their perceptions about new core banking services and electronic tools. Therefore, banks should encourage customers

to use electronic tools and improve profitability.

(Ajayi, 2016) investigates the impact of electronic banking on bank performance in Ekiti state, Nigeria. it examines the effects of automated teller machines, internet banking, mobile banking, and electronic fund transfers on bank performance. This study utilized a descriptive survey research design and collected primary data through questionnaires administered to selected respondents. For this study, a total of thirty-two (32) questionnaires will be distributed to seventeen (17) bank branches located in Ado-Ekiti metropolis. The target population consisted of one hundred and twenty-eight (128) top bank management personnel in Ekiti state, specifically those at the supervisory level of bank branches in Ado-Ekiti metropolis, including bank managers, operational managers, customer officers, and marketing managers. The data will be subjected to sorting, coding, and analysis employing descriptive and inferential statistics, with a focus on frequency tables for descriptive statistics and regression analyses for inferential statistics. The results of the analysis indicate a rejection of the null hypothesis, suggesting a significant relationship between electronic banking and bank performance in Ekiti state. Additionally, the study's findings are consistent with previous research conducted in Tunisia and Kenya, further validating the importance of electronic banking in enhancing banking operations and customer satisfaction.

E-banking constitutes an it application facilitating customer transactions via personal accounts through internet-connected computers or mobile devices, thus enabling non-cash transactions. (Rizki Sri Lasmini, 2019) endeavors to examine the link between e-banking implementation and the financial performance metrics of publicly traded banks within the Indonesian on the Indonesia stock exchange. To achieve this, the study utilizes a sample of 25 banks selected through purposive sampling over a five-year period, with ROE as the dependent variable and e-banking implementation as the independent variable represented by a dummy variable. Additionally, control variables including company size, credit risk, liquidity, and business cycles are employed to account for external influences on the observed relationship. In this study, partial correlation analysis, is utilized to assess the strength of the relationship between variables by controlling for other influencing factors. Prior to conducting this analysis, classical assumption tests, including normality, multicollinearity, autocorrelation, and heteroskedasticity tests, are performed to ensure the validity of the model. Additionally, model feasibility tests, such as the coefficient of determination (r2) test, f test, and hypothesis testing (t test), are conducted to assess

the suitability of the analytical approach and validate the obtained results. The study found a positive correlation between internet banking and the financial performance of Indonesian banks going public, while mobile banking showed a positive and insignificant correlation with the same performance.

(Hussein Mohamed Abdullai, 2018) aimed to investigate the impact of internet banking on the operational performance of commercial banks within Nakuru county, Kenya, guided by the specific objective of assessing this effect. The study drew upon bank-focused theory and the technology acceptance model (TAM) as theoretical frameworks to inform its investigation. adopting a cross-sectional research design, the study examined the state of affairs within the population of commercial banks in Nakuru county at a specific point in time. Given the limited number of banks in the area, a census survey was employed, encompassing all 56 employees of the commercial banks as the study population. Structured questionnaires were utilized for data collection, following a pilot study in Uasin Gishu county to ascertain the validity of research instruments using Cronbach's alpha coefficient (0.7). Data analysis involved correlation and regression analysis techniques, suggest a strong association between internet banking and operational performance, indicating a positive influence resulting from its adoption. The findings suggest that commercial banks should invest more in internet banking to gain a competitive edge and enhance their operational performance.

(Pun, 2012) aimed to explore the influence of electronic banking on the financial performance of commercial banks in Nepal, focusing on identifying e-banking tools, analyzing challenges faced by these banks, and examining the overall impact of electronic banking on their financial performance. The research undertook a comprehensive examination of 4525 employees across four commercial banks in Nepal up to the fiscal year 2017/18, employing a combination of descriptive and analytical methodologies. The data was analyzed using SPSS, utilizing descriptive statistics, correlation analysis, and multiple regression analysis as primary tools. The implementation of electronic banking systems in Nepalese commercial banks faces challenges such as network reliability, internet coverage, and customer ignorance. The satisfaction presentation shows that 66.3% of respondents are satisfied with bank services, indicating that electronic banking significantly fills the gap between expected and perceived service quality. The study found that internet banking positively impacts the return on assets (ROA) of Nepalese commercial banks, while

no independent variables (mobile banking and ATM card) have a significant impact on ROA. Internet banking also significantly impacts ROE, while no independent variables significantly affect the profitability of Nepalese commercial banks.

The adoption of electronic banking by financial institutions in Nigeria has been driven by the belief that it can enhance both retail and wholesale banking services, thereby elevating customer satisfaction and loyalty. This study explores the ramifications of electronic banking on the performance of money deposit banks in Nigeria from 2006 to 2017. The study utilized secondary data from the CBN statistical bulletin, NBS, and other reliable sources. (Jonathan O. Oniore, 2019) investigated the relationship between the explained variable and the explanatory variable. It examined the characteristics of time series data to avoid spurious regression analysis. the study used the augmented dickey-fuller (ADF) unit root test to adjust for serial correlation. If the ADF calculated is higher than the critical level at 5% significance level, the time series are not stationary. The study then used a multiple regression model based on ordinary least squares (OLS) technique to determine the effect of electronic banking on deposit bank performance in the country. The regression analysis reveals that, in the long run, all variables exhibit the expected positive impact on bank performance, with the exception of inter-bank transfers, which display a negative association. This underscores the nuanced effects of electronic banking implementation on overall bank performance. The study's findings carry significant policy implications, suggesting that the gradual integration of electronic banking positively influences the performance of banks in Nigeria, potentially contributing to broader economic growth initiatives. Consequently, it emphasizes the importance of banks aligning their technological strategies with specific organizational goals, rather than adopting technology merely for the sake of industry trends or peer pressure. The study advocates for robust regulatory enforcement by entities such as the central bank of Nigeria to ensure compliance with new standards and policies governing electronic banking transactions, thereby fostering a more secure and efficient banking environment.

The past decade has witnessed a significant trend toward the modernization of the banking sector in new EU member state economies. Financial innovations have played a pivotal role, furnishing banks with essential tools to gain competitive advantages. Against this backdrop, (Ovidiu Stoica, 2013) endeavors to examine how the advent of internet banking services, as a key financial innovation, can augment the

overall efficiency of Romanian banks. This paper explores strategies to improve efficiency through cost-saving mechanisms in internet banking services. It focuses on Romania, a new EU member with a dynamic banking sector, as a case study for examining the relationship between internet banking and efficiency, offering potential policy implications for other EU nations. The study uses data envelopment analysis (DEA) that uses mathematical linear programming models to construct optimal Pareto efficient frontier to assess the efficiency of Romanian banks and their operational strategies in providing internet banking services. They considered a wide array of financial and non-financial factors, resulting in a total of 45 possible combinations of inputs and outputs for the 24 Romanian banks examined. Then they used principal component analysis (PCA) as a ranking method to validate the results obtained through the application of DEA. PCA provides us with the possibility to differentiate clearly between the banks that employ internet banking services to improve their overall efficiency and the banks that employ a more traditional approach to enhance their performances, given the costs minimization. The findings indicate that Banca Transylvania and OTP bank are the only two Romanian banks that effectively employ online banking services to improve their overall performance. The majority of other banks favor a hybrid strategy that combines cost-cutting measures with internet banking services. To boost productivity and retain customers, the report advises encouraging individuals and companies to use internet banking for routine tasks including deposits, payments, and money transfers.

Using information from secondary sources, (Almazari, 2014) examined the internal variables influencing the profitability of Saudi and Jordanian banks. Internal factors are influenced by management decisions and goals, and can be divided into two variables: financial statements and unrelated variables like branch office status. Employing financial ratios and various statistical tools including percentages, averages, natural logarithms, correlation analysis, analysis of variance (Anova), and regression, hypotheses are tested to discern differences and similarities among the sample banks. Empirical investigation focuses on internal factors, with yearly average ratios and means calculated for each selected bank to facilitate comparison. To ensure consistency, Saudi riyal values are converted to Jordanian dinar at a rate of 5.34sr/1jd. Nine Saudi banks and fourteen Jordanian banks were among the 161 observations that this study examined from 2005 to 2011. The banks were selected according to their standing on the Amman stock exchange (ASE) and the Saudi stock exchange

(Tadawul). Twelve Saudi banks that operate in Saudi Arabia and sixteen Jordanian banks that operate in Jordan were the two models that were employed. Two were just founded, while three were eliminated since they weren't on the ASE. Secondary sources include balance sheets and financial statements, the Saudi stock exchange, ASE, Sama, the central bank of Jordan, books, papers, articles, international journals, the internet, and earlier research projects were all used to collect the data. The results showed that Saudi banks profitability surpassed Jordanian banks profitability indicating that they are more profitable and efficiently utilizing resources. The profitability of Saudi banks was positively correlated with total investments to total assets ratio, total equity to assets ratio, liquidity risk, net credit facilities to total assets ratio,and net credit facilities to total deposits ratio variables. Conversely, Jordanian banks profitability was positively correlated with liquidity risk, net credit facilities to total assets ratio, total equity to assets ratio, and net credit facilities to total deposits ratio variables. The study also found a negative relationship between profitability and bank size, supporting the idea that growing banks may face diminishing marginal returns, leading to average profits declining with size. The findings of this study could be of interest to academics, bankers and policymakers.

This study delves into the impact of electronic banking-related fraud on the financial performance of deposit money banks in Nigeria during the period spanning from 2013 to 2016. (Adaora Immaculata Muoghalu, 2018) focuses on the impact of fraud on automated teller machines, mobile banking, point of sale terminals, and the web on return on assets, return on equity, interest income, and non-interest income of banks. The regression equation was estimated using ordinary least squares (OLS) to examine the relationship between electronic banking fraud across different channels and financial performance. additionally, Granger causality analysis was employed to investigate the causal links between fraud on electronic banking channels and financial performance indicators. It found that fraud on point of sale terminals significantly affects interest income, while fraud on automated teller machines, mobile banking, and web had no effect on return on assets, return on equity, and non-interest income. The study also found a negative relationship between electronic banking via various platforms and deposit money banks' financial performance in Nigeria. The study concludes that electronic banking fraud has a negative and devastative effect on the financial performance of deposit money banks in Nigeria. It recommends that deposit money banks authenticate transactions on point of sale

terminals by sending confirmation codes to mobile numbers linked to the account, and install biometric scans on ATM’s to confirm transactions originated from the real cardholder, not a third party.

Transactional internet banking (TIB) allows bank customers to perform most transactions, particularly fund transfers, online. (Sathye, 2005) examines the impact of transactional internet banking on the performance and risk profile of major credit unions in Australia. The study uses data envelopment analysis (DEA) to measure the performance of financial institutions, specifically credit unions. The DEA measures 'relative' efficiency scores, which are bounded by 0 and 1. The study uses the input oriented model of DEA with deposit, physical capital, and staff numbers as inputs and loans as outputs for calculating technical efficiency DEA scores. To check the robustness of the results, the DEA scores were recalculated using prices of these inputs. The dependent variable, performance, is measured using a censored normal regression model or Tobit model. the independent variable of interest in this study is internet experienced credit union (IECU), which is a binary variable denoting whether a credit union introduced transactional internet banking (TIB) at least one year prior to the year of study (2002). As for control variables, size is typically gauged by factors such as total assets, deposits, number of staff or members, and number of branches. In this study, total assets (logasset) serve as the measure of size, allowing for the consideration of differences stemming from scale economies. a positive coefficient for logasset is expected, reflecting the expected positive relationship between size and performance. The study found no significant association between the adoption of transactional internet banking (TIB) and the performance of major Australian credit unions in the sample. These results align with Sullivan's (2000) study, which similarly found no performance difference between internet banks and non-internet banks. however, they contrast with Furst et al.'s (2000) findings, which indicated that institutions with TIB outperformed non-internet banks in terms of profitability. Regarding risk variables, regression analysis showed that TIB adoption did not have a significant association with operating risk. Sullivan (2000) also studied the impact of internet banking on risk profiles and found no evidence of higher risk in internet banks compared to non-internet banks. However, the study noted that internet experienced credit unions (IECUS) may be willing to take more credit risks.

The research delved into the correlation between electronic banking and the performance of deposit money banks (DMBS) in Nigeria. (Prof.G.O.Demaki, 2021)

examines the performance of 21 Nigerian banks using quarterly time series data from 2009 to 2020 and an ex post facto research design. This time frame was selected in alignment with the availability of electronic banking data disclosed by the central bank of Nigeria (CBN) in its statistical bulletin. The study encompassed twenty-one banks in Nigeria, representing the entire population of interest, including deposit money banks (DMBS) with international, national, and regional coverage. Electronic banking measures, comprising mobile banking, point of sales (POS), automated teller machines (ATM's), and internet banking, were collected from the CBN statistical bulletin. performance metrics, specifically return on assets (ROA), were also obtained from the same source. The collected data underwent comprehensive analysis, incorporating both descriptive statistics (mean, maximum, minimum, standard deviation, skewness, kurtosis, and jacque-bera test) and inferential techniques (pearson correlation, variance inflation factor, breusch pagan godfrey test, unit root test, co-integration analysis, and error correction model). The study found that mobile banking, automated teller machines, and point of sales are significant technological factors enhancing the financial performance of banks in Nigeria. Internet banking was found to be weak, indicating that electronic banking has an effect on the performance of digital banking institutions (DMBS). The study recommends that banks encourage customers to adopt mobile banking and determine their technical background before using advanced technologies.

In the realm of commercial banking, the performance metrics are intricately linked to the returns generated from operational assets, with the loan portfolio representing a significant yet inherently risky component. To maintain competitiveness, commercial banks globally often engage in business process re engineering endeavors aimed at bolstering their financial standing. In Kenya, the landscape is further complicated by intense competition from mobile money transfer platforms such as MPESA. Against this backdrop, (Alice Mwale Noah, 2019) sought to probe into the impact of internet banking on the financial performance specifically of tier one commercial banks in Kenya. The study employed both descriptive and explanatory research designs to comprehensively explore the phenomenon under investigation. The target population comprised business development managers in tier one commercial banks headquartered in Nairobi, totaling six banks according to the central bank of Kenya's classification. A census technique was utilized to encompass the entire target population, consisting of 51 business development managers in tier one banks within

Nairobi. Data collection was facilitated through structured questionnaires. Data analysis was performed using SPSS version 24 software, considering the structured nature of the questionnaire, which facilitated ease of analysis. Quantitative data was presented in tables, with descriptive statistics such as means and standard deviations calculated. inferential statistics, including multiple linear regressions and Pearson correlation, were employed to scrutinize the relationships between variables, with a linear regression model utilized to illustrate these connections. the research findings highlighted a notable increase in deposits and withdrawals facilitated by agency banking, consequently contributing to the enhanced financial performance of commercial banks. The rejection of the hypothesis suggesting no significant statistical effect of agency banking on the financial performance of tier one commercial banks in Kenya underscores the substantial influence of internet banking on their financial outcomes. It has been discovered that internet banking improves control over banking procedures and streamlines operations, saving time. With a regression coefficient of 0.241, the analysis also showed a positive and significant association between internet banking and the tier one commercial banks financial performance.

Banks, as financial intermediaries, are crucial for the economy's stability, especially in Macau where there is no debt market. They are the sole providers of funds, and understanding their profitability determinants is essential for maintaining the financial system's stability. (Anna P.I.Vong, 2009) delves into the influence of various factors, including bank characteristics and macroeconomic and financial structure variables, on the performance of the banking industry in Macao. Utilizing bank-level data spanning from 1993 to 2007, the study employs panel data regression to identify key factors influencing profitability. The datasets includes five banks, representing 75% of total assets and loans in the banking sector. Macroeconomic variables, such as economic growth, inflation rate, and interest rates, are sourced from the Macao statistics and census service and the monetary authority of Macao. To maintain financial stability, it is essential to identify the determinants influencing bank performance. Banks with more equity capital are perceived to have more safety, leading to higher profitability. However, a higher loan-to-total assets ratio may not necessarily lead to higher profits due to the competitive credit market and interest rate cuts. instead, the spread and quality of loans matter. Smaller banks generally achieve higher return on assets than larger ones. The positive relationship between inflation and bank performance suggests that income increases more with inflation than costs.

(Pastory, 2012) investigated the profitability of commercial banks in Tanzania over a ten-year period from 2000 to 2009, focusing on national microfinance bank (NMB), national bank of commerce (NBC), and CRDB as case studies. various profitability measures were employed, including return on average assets, net interest income to average earning assets, and non-interest expenses to average assets, to gauge performance. Traditional ratio analysis techniques were employed to derive profitability measures for the commercial banks, with the ratios computed using excel. A regression model was constructed to examine the relationship between profitability, as measured by return on assets, and other independent variables such as capital adequacy, liquidity, and asset quality. the analysis revealed no significant difference in the earning positions of commercial banks in Tanzania, as indicated by the results of the one-way Anova tests conducted on various profitability measures. The regression model employed in the study elucidated that capital adequacy, liquidity, and asset quality significantly influence the profitability of commercial banks. The adjusted r-squared value of 73.5% suggests that these variables explain a substantial portion of profitability variation. The coefficients associated with asset quality were predominantly positive, except for the ratio of non-performing loans, indicating a negative effect on profits.

CHAPTER 3

RESEARCH METHODOLOGY

This study examines the financial performance of selected public sector banks (Canara Bank, SBI Bank, PNB) and private sector banks (HDFC Bank, ICICI Bank, Axis Bank) from 2014 to 2023. The analysis focuses on various profitability and performance ratios to understand the impact of e-banking on bank profitability.

Data collection

For this investigation, secondary data was gathered and used. All the ratios were taken from Money control website. For more references banks website, annual reports for each year were used.

Current Account Savings Account (CASA):

CASA ratio measures the proportion of a bank's deposits that are in current and savings accounts relative to its total deposits.

It indicates the bank's ability to retain low-cost deposits, which typically have lower interest rates compared to fixed deposits, helping to reduce funding costs.

CASA Ratio = CASA Deposits / Total Deposits

Net Interest Margin (NIM):

NIM is a measure of a bank's profitability, representing the difference between the interest income earned from loans and investments and the interest expenses paid on deposits and borrowings.

It reflects the efficiency of a bank in managing its interest-earning assets and interest-bearing liabilities.

NIM = (Interest Income – Interest Expenses) / Average Earning Assets

Net Profit Margin (NPM):

NPM measures the percentage of revenue that remains as net income after deducting all expenses, including interest, taxes, and operating costs, from total revenue.

It provides insight into a bank's efficiency in generating profits from its operations.

NPM = Net Income / Total Revenue

Cost to Income Ratio (CIR):
cir measures the proportion of operating expenses (costs) relative to operating income (revenue) of a bank.
it reflects the efficiency of a bank in managing its expenses in relation to its revenue generation.
CIR = Operating Expenses / Operating Income

Non-Interest Income to Total Assets Ratio (NII/ta):
NII/TA ratio assesses the proportion of a bank's non-interest income (such as fees, commissions, and trading income) relative to its total assets.
It indicates the diversification of a bank's revenue sources beyond traditional interest income.
NII/TA Ratio = Non – Interest Income / Total Assets

Operating Profit Margin (OPM):
OPM measures the percentage of operating income (revenue minus operating expenses) relative to total revenue.
it indicates the efficiency of a bank in generating profits from its core operations.
OPM = Operating Income / Total Revenue

Return on Equity (ROE):
roe measures the profitability of a bank by assessing the return generated on its shareholders' equity.
it shows how effectively a bank is using its equity to generate profits for shareholders.
ROE = Net Income / Shareholders Equity

Return on Assets (ROA):
ROA measures the profitability of a bank by evaluating the return generated on its total assets.
it provides insight into the efficiency of a bank in generating profits from its assets.
ROA = Net Income / Total Assets

These ratios are chosen because they collectively provide a comprehensive overview

of a bank's financial health, profitability, operational efficiency, and risk management capabilities. Analyzing these ratios allows stakeholders to assess various aspects of a bank's performance and make informed decisions regarding investment, regulation, and strategic planning.

To accomplish our objectives, we employ a rigorous analytical framework that combines statistical methods with financial ratio analysis. We begin by collecting and organizing data pertaining to the selected ratios for both PSBs and PVSBs from reputable sources. Subsequently, we compute descriptive statistics including mean, standard deviation, and standard error mean, graphs using tools such as Microsoft Excel. Further, we utilize t-tests to determine the statistical significance of observed differences between the two banking sectors. Through this approach, we aim to provide nuanced insights into the comparative financial performance of public banks and private banks, shedding light on the implications of e-banking adoption on their profitability and operational efficiency.

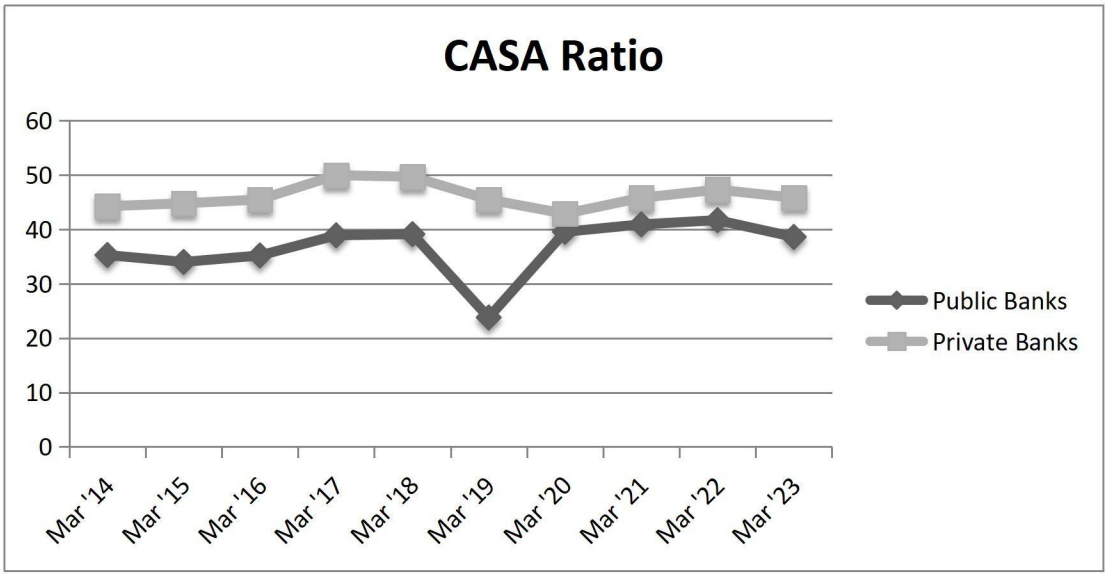
CHAPTER 4

ANALYSIS AND CONCLUSIONS

The table presented below encapsulates the financial performance of selected public sector banks and private sector banks over the period from 2014 to 2023. It delineates key profitability and performance ratios crucial to understanding the comparative performance of these banking sectors. The selected ratios encompass vital metrics such as Current Account Savings Account (CASA), Net Interest Margin (NIM), Net Profit Margin (NPM), Cost to Income Ratio (CIR), Non-Interest Income to Total Assets ratio (NII/TA), Operating Profit Margin (OPM), as well as performance ratios including Return on Equity (ROE) and Return on Assets (ROA).

CASA Ratio:

Fig 4.1



This graph represents the CASA (Current Account Savings Account) Ratio for Public Banks and Private Banks over a period from March 2014 to March 2023. The CASA ratio is a key indicator of a bank's financial health, showing the proportion of deposits in current and savings accounts to the total deposits. Both Public Banks and Private Banks show fluctuations in their CASA ratios over the years. Public Banks have a CASA ratio that starts just above 40 in March 2014, peaks around 50 in the subsequent years, and then experiences a sharp decline around March 2018, reaching a low near 30. After this point, the ratio recovers and stabilizes around the 40 mark.

Private Banks have a more stable CASA ratio, maintaining a level close to 50 throughout the entire period, with only minor fluctuations. The most notable event in the graph is the sharp decline in the CASA ratio for Public Banks around March 2018, which does not seem to affect Private Banks. Overall, Private Banks maintain a higher CASA ratio compared to Public Banks, suggesting a higher proportion of current and savings account deposits relative to their total deposits.

Table 4.1

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara bank, SBI bank, PNB)	36.68	4.541203856	1.43605475
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	46.116	1.454396616	0.459920593

Table 4.2

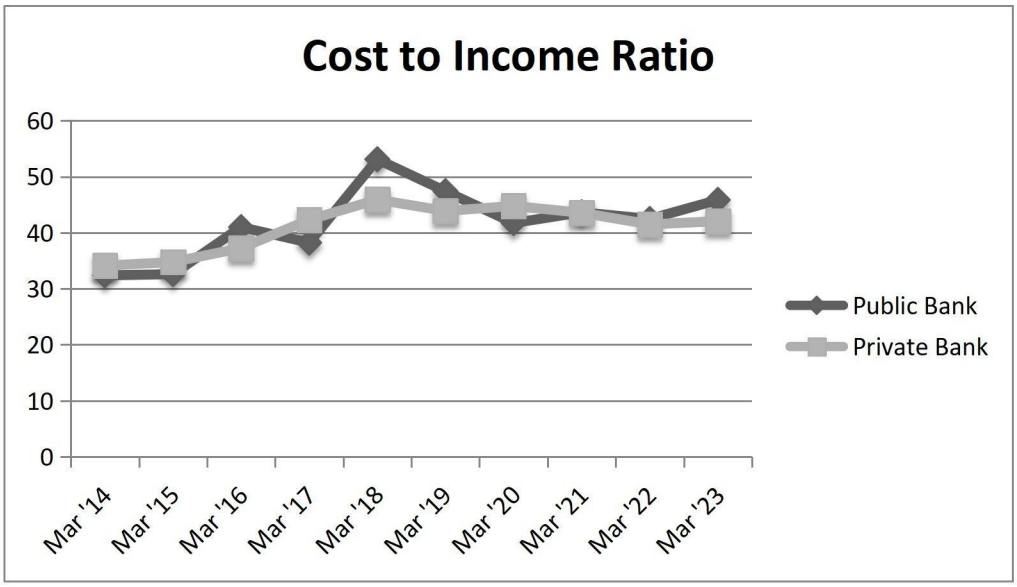
t-Test: Two-Sample Assuming Unequal Variances		
	35.24666667	*44.23666667*
Mean	36.83925926	46.32481481
Variance	30.07306327	5.201114198
Observations	9	9
Hypothesized Mean Difference	0	
df	11	
t Stat	-4.791324431	
P(T<=t) one-tail	0.000280554	
t Critical one-tail	1.795884814	
P(T<=t) two-tail	0.000561109	
t Critical two-tail	2.200985159	

The mean performance of public banks over the period is 36.68, while that of private banks is 46.116. This indicates that private banks have higher performance metrics compared to public banks. Public banks exhibit a higher variability in their

performance metrics (STDEV: 4.541203856) compared to private banks (STDEV: 1.454396616). This suggests that the performance of public banks fluctuates more widely over the given period compared to private banks. The SEM for public banks (SEM: 1.43605475) is higher than that of private banks (SEM: 0.459920593). A higher SEM indicates more uncertainty in the estimate of the mean for public banks compared to private banks. The t-test is conducted to determine whether the mean difference between public and private banks is statistically significant. The t-statistic value is -4.791324431, and the p-value is very low (0.000280554). Since the p-value is less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

Cost to Income Ratio (CIR)

Fig 4.2



This graph shows the Cost to Income Ratio for Public Banks and Private Banks from March 2014 to March 2023. The Cost to Income Ratio is a financial metric used to evaluate a bank's efficiency, indicating the proportion of costs (operating expenses) in relation to its income. Both Public Banks and Private Banks have experienced fluctuations in their Cost to Income Ratios over the ten-year period. Public Banks start with a ratio just under 50 in March 2014, which increases to a peak above 50 around March 2016. After this peak, the ratio declines and then stabilizes, fluctuating around the 40 mark towards the end of the period. Private Banks begin with a ratio around 40

in March 2014, and their ratio also peaks around March 2016, although it remains below the peak of Public Banks. After this peak, the ratio for Private Banks decreases and then levels off, showing less variability compared to Public Banks and maintaining a ratio generally below that of Public Banks. The shaded areas around the lines likely represent the margin of error or confidence intervals, indicating that the actual values could vary within these bounds. Overall, Private Banks tend to have a lower Cost to Income Ratio compared to Public Banks throughout the period, suggesting that Private Banks may be operating more efficiently, with lower costs relative to their income.

Table 4.3

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	42	3.577007086	1.13114896
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	41.0	1.872800644	0.592231564

Table 4.4

t-Test: Two-Sample Assuming Unequal Variances		
	32.37333333	34.12
Mean	42.89740741	41.7833333
Variance	33.40364105	12.9926111
Observations	9	9
Hypothesized Mean Difference	0	
df	13	
t Stat	0.490674934	
P(T<=t) one-tail	0.315917325	
t Critical one-tail	1.770933383	
P(T<=t) two-tail	0.63183465	
t Critical two-tail	2.160368652	

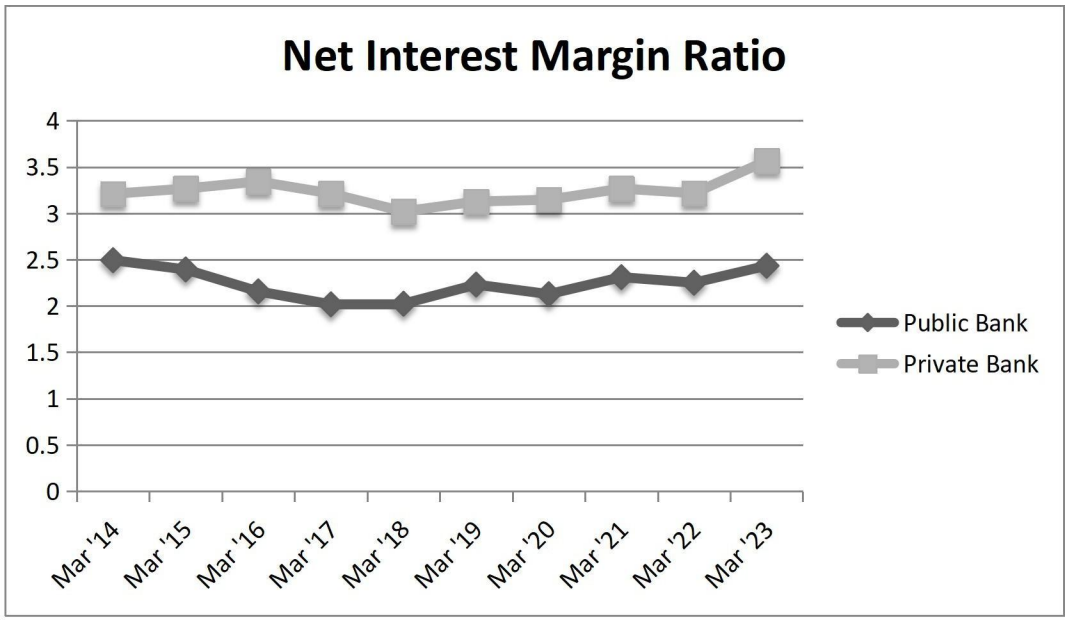
The mean performance of public banks over the period is 42, while that of private banks is 41. This suggests that public banks have slightly higher performance metrics compared to private banks, although the difference is minimal. Public banks exhibit a lower variability in their performance metrics (STDEV: 3.577007086) compared to private banks (STDEV: 1.872800644). This indicates that the performance of public banks tends to fluctuate less over the given period compared to private banks.

The SEM for public banks (SEM: 1.13114896) is slightly higher than that of private banks (SEM: 0.592231564). A higher SEM suggests more uncertainty in the estimate of the mean for public banks compared to private banks, albeit the difference is not substantial. The t-statistic value is 0.490674934, and the p-value is relatively high (0.63183465). Since the p-value is greater than the significance level of 0.05 (assuming a standard significance level), we fail to reject the null hypothesis.

This indicates that there is no statistically significant difference between the mean performance of public and private banks. The t-statistic being positive suggests that there might be a slight tendency for public banks to have a higher mean performance compared to private banks, but this difference is not statistically significant.

Net Interest Margin (NIM)

Fig 4.3



The graph displays the Net Interest Margin (NIM) Ratio for Public Banks and Private Banks from March 2014 to March 2023. The NIM is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders (for example, on deposits), relative to the amount of their interest earning assets. It is a profitability indicator for banks. Public Banks have a lower NIM compared to Private Banks throughout the entire period. The NIM for Public Banks starts at just above 2 in March 2014 and shows a slight upward trend, reaching closer to 2.5 by March 2023. Private Banks start with a NIM around 3 in March 2014, and this ratio increases over time, reaching approximately 3.5 by March 2023. The shaded areas around the lines for both Public and Private Banks likely represent the margin of error or confidence intervals, suggesting that the actual NIM values could vary within these bounds. The consistent gap between the two lines indicates that Private Banks have consistently maintained a higher NIM compared to Public Banks over the ten-year period.

Table 4.5

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	2.24	0.169705269	0.053665518
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	3.24	0.106157443	0.033569931

Table 4.6

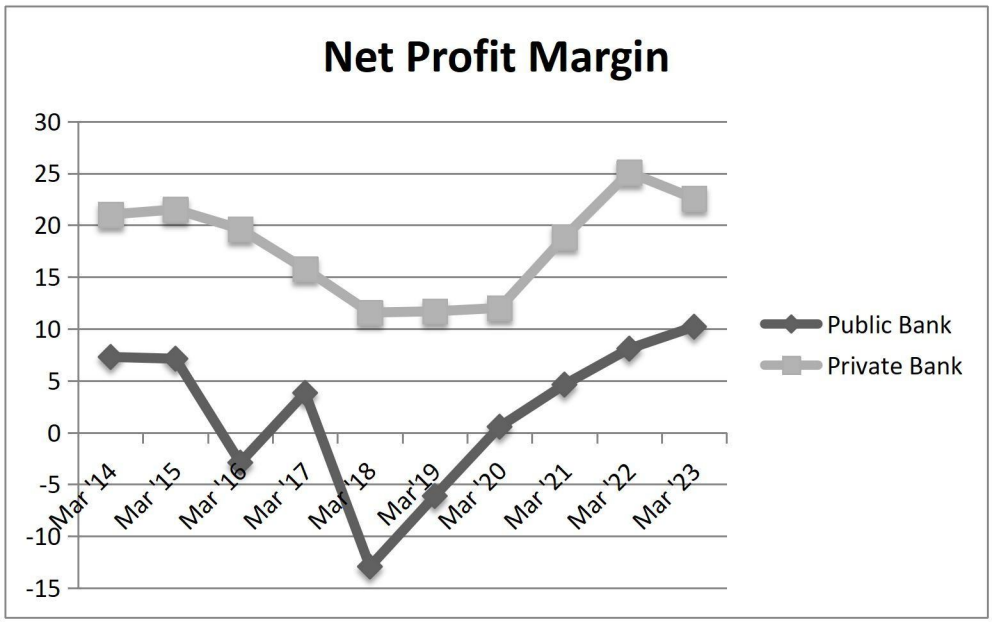
t-Test: Two-Sample Assuming Unequal Variances		
	2.4933333	*3.21*
Mean	2.21555556	3.24074074
Variance	0.02215278	0.02375216
Observations	9	9
Hypothesized Mean Difference	0	
df	16	
t Stat	-14.354692	
P(T<=t) one-tail	7.3738E-11	
t Critical one-tail	1.74588367	
P(T<=t) two-tail	1.4748E-10	
t Critical two-tail	2.11990529	

The mean performance of public banks over the period is 2.24, while that of private banks is 3.24. This indicates that private banks have higher performance metrics compared to public banks. Public banks exhibit a lower variability in their performance metrics (STDEV: 0.169705269) compared to private banks (STDEV: 0.106157443). This suggests that the performance of public banks tends to fluctuate

less over the given period compared to private banks. The SEM for public banks (SEM: 0.053665518) is slightly higher than that of private banks (SEM: 0.033569931). A higher SEM suggests more uncertainty in the estimate of the mean for public banks compared to private banks, although the difference is relatively small. The t-statistic value is -14.3546918, and the p-value is extremely low (approximately 1.47476E-10). Since the p-value is much less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

Net Profit Margin (NPM)

Fig 4.4



The graph displays the Net Interest Margin (NIM) Ratio for Public Banks and Private Banks from March 2014 to March 2023. The NIM is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders (for example, on deposits), relative to the amount of their interest-earning assets. It is a profitability indicator for banks. Public Banks have a lower NIM compared to Private Banks throughout the entire period. The NIM for Public Banks starts at just above 2 in March 2014 and shows a slight upward trend, reaching closer to 2.5 by March 2023. Private Banks start with a NIM around 3 in March 2014, and

this ratio increases over time, reaching approximately 3.5 by March 2023. The shaded areas around the lines for both Public and Private Banks likely represent the margin of error or confidence intervals, suggesting that the actual NIM values could vary within these bounds. The consistent gap between the two lines indicates that Private Banks have consistently maintained a higher NIM compared to Public Banks over the ten-year period.

Table 4.7

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	1.978666667	3.977362138	1.257752343
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	17.97766667	3.910881556	1.236729338

Table 4.8

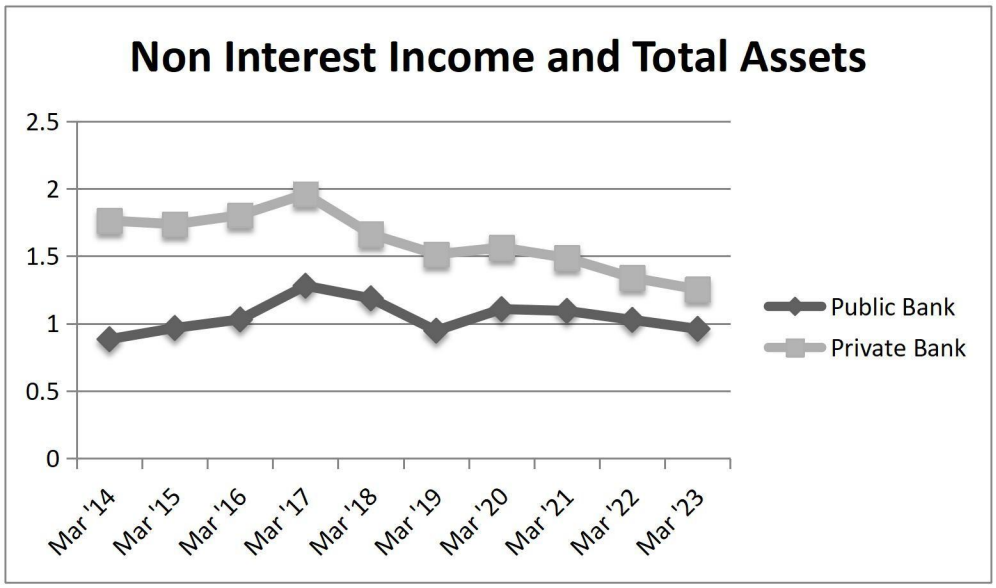
t-Test: Two-Sample Assuming Unequal Variances		
	7.29	*21.0333333*
Mean	1.3885185	17.63814815
Variance	56.54465	25.95464198
Observations	9	9
Hypothesized Mean Difference	0	
df	14	
t Stat	-5.367099	
P(T<=t) one-tail	4.967E-05	
t Critical one-tail	1.7613101	
P(T<=t) two-tail	9.934E-05	
t Critical two-tail	2.1447867	

The mean performance of public banks over the period is 1.978666667, while that of private banks is 17.97766667. This indicates that private banks have significantly higher performance metrics compared to public banks. Public banks exhibit a higher variability in their performance metrics (STDEV: 3.977362138) compared to private banks (STDEV: 3.910881556). This suggests that the performance of public banks tends to fluctuate more widely over the given period compared to private banks. The SEM for public banks (SEM: 1.257752343) is slightly higher than that of private banks (SEM: 1.236729338). A higher SEM indicates more uncertainty in the estimate of the mean for public banks compared to private banks, although the difference is relatively small. The t-statistic value is -5.367099046, and the p-value is extremely

low (approximately 9.93363E-05). Since the p-value is much less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

Non-Interest Income to Total Assets ratio (NII/TA)

Fig 4.5



The graph displays the Non Interest Income and Total Assets for Public Banks and Private Banks from March 2014 to March 2023. Non Interest Income and Total Assets assesses the proportion of a bank's non-interest income (such as fees, commissions, and trading income) relative to its total assets. It indicates the diversification of a bank's revenue sources beyond traditional interest income. The value for the public bank starts just above 1.5 in March 2014. It peaks at around 2.0 in March 2015. There is a general downward trend until March 2018, where it reaches approximately 1.5. From March 2018 to March 2023, the value fluctuates slightly but remains relatively stable around 1.5. The value for the private bank starts at around 2.0 in March 2014. It decreases steadily to just above 1.5 by March 2017. From March 2017 to March 2023, the value shows a slight downward trend, ending just below 1.5 in March 2023. Overall, both types of banks show a decrease in the ratio or value of non-interest income to total assets over the period displayed, with the private

bank experiencing a slightly more pronounced decline. The public bank's values level off after 2018, while the private bank's continue to decline slightly.

Table 4.9

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	1.048	0.117067941	0.037020134
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	1.608333333	0.160932328	0.050891271

Table 4.10

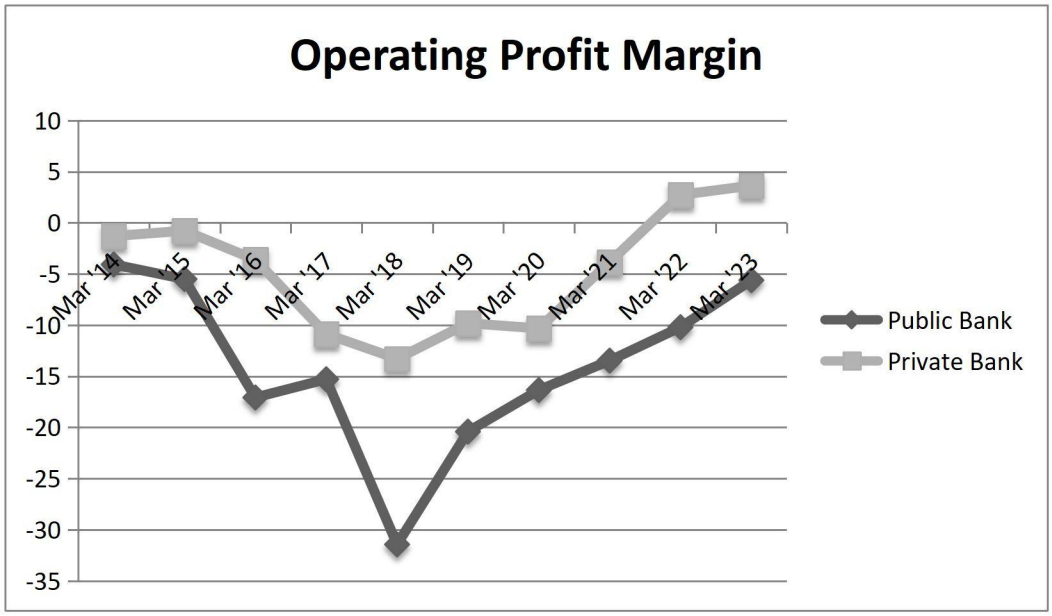
t-Test: Two-Sample Assuming Unequal Variances		
	0.8833333	*1.763333333*
Mean	1.0662963	1.591111111
Variance	0.0126179	0.0503
Observations	9	9
Hypothesized Mean Difference	0	
df	12	
t Stat	-6.276828	
P(T<=t) one-tail	2.043E-05	
t Critical one-tail	1.7822875	
P(T<=t) two-tail	4.087E-05	
t Critical two-	2.1788128	

tail		

The mean performance of public banks over the period is 1.048, while that of private banks is 1.608333333. This indicates that private banks have higher performance metrics compared to public banks. Public banks exhibit a lower variability in their performance metrics (STDEV: 0.117067941) compared to private banks (STDEV: 0.160932328). This suggests that the performance of public banks tends to fluctuate less over the given period compared to private banks. The SEM for public banks (SEM: 0.037020134) is slightly lower than that of private banks (SEM: 0.050891271). A lower SEM indicates less uncertainty in the estimate of the mean for public banks compared to private banks, albeit the difference is relatively small. The t-statistic value is -6.276827986, and the p-value is extremely low (approximately 4.08681E-05). Since the p-value is much less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

Operating Profit Margin (OPM)

Fig 4.6



The graph displays the Operating Profit Margin for Public Banks and Private Banks

from March 2014 to March 2023. Operating Profit Margin measures the percentage of operating income (revenue minus operating expenses) relative to total revenue. It indicates the efficiency of a bank in generating profits from its core operations. The operating profit margin for the public bank starts at around -5% in March 2014. It experiences a sharp decline to nearly -30% by March 2016. From March 2016 to March 2023, the public bank's operating profit margin improves steadily, reaching just below 0% in March 2023. The operating profit margin for the private bank starts at around -25% in March 2014. It shows a general upward trend over the entire period, with some fluctuations. By March 2023, the private bank's operating profit margin has improved significantly, reaching approximately 5%. Overall, both types of banks have shown improvement in their operating profit margins over the ten-year period. The trend suggests that both banks have been successful in increasing their operational efficiency or profitability over time.

Table 4.11

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	-13.95066667	3.898411906	1.232786088
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	-4.753666667	4.138619128	1.308746281

Table 4.12

t-Test: Two-Sample Assuming Unequal Variances		
	-4.07667	*-1.30333*
Mean	-15.0478	-5.13704
Variance	63.66612	38.7443
Observations	9	9
Hypothesized Mean Difference	0	
df	15	
t Stat	-2.93802	
P(T<=t) one-tail	0.005089	
t Critical one-tail	1.75305	
P(T<=t) two-tail	0.010178	
t Critical two-tail	2.13145	

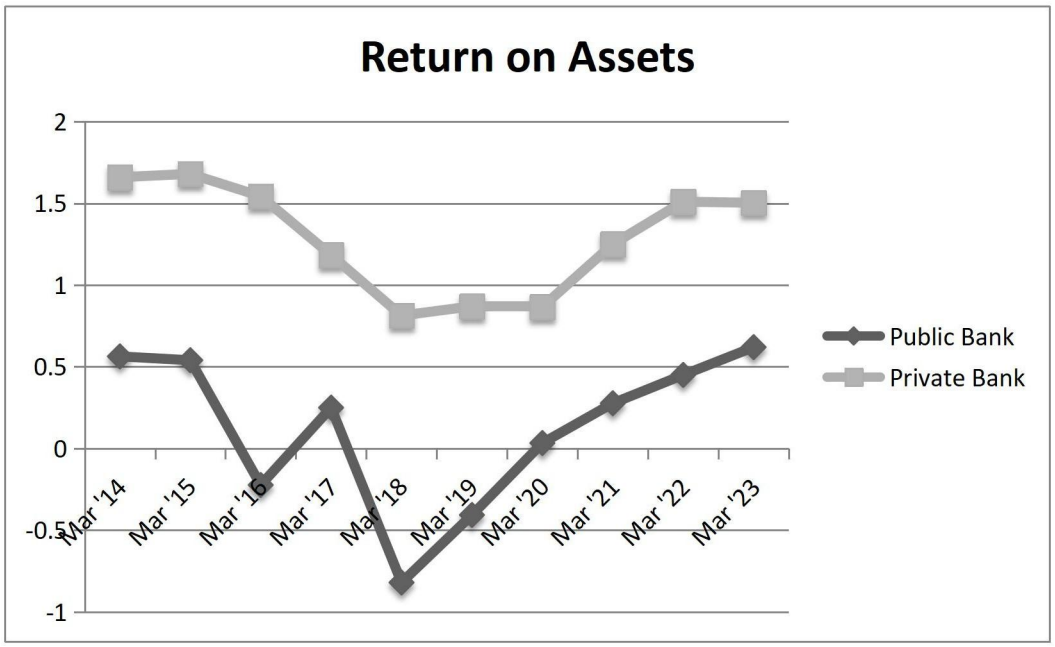
The mean performance of public banks over the period is -13.95066667, while that of private banks is -4.753666667. This indicates that private banks have higher performance metrics compared to public banks. Public banks exhibit a higher variability in their performance metrics (STDEV: 3.898411906) compared to private banks (STDEV: 4.138619128). This suggests that the performance of public banks tends to fluctuate more widely over the given period compared to private banks.

The SEM for public banks (SEM: 1.232786088) is slightly lower than that of private banks (SEM: 1.308746281). A lower SEM indicates less uncertainty in the estimate of the mean for public banks compared to private banks, although the difference is relatively small. The t-statistic value is -2.938023782, and the p-value is 0.010178099. Since the p-value is less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a

statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

Return on Assets (ROA)

Fig 4.7



The graph shows the Return on Assets (ROA) for public and private banks from March 2014 to March 2023. he ROA for the public bank starts at approximately 0.5% in March 2014. It experiences a sharp decline to just below 0% in March 2017.
After March 2017, the public bank's ROA recovers and shows a steady upward trend. By March 2023, the public bank's ROA has increased to around 1.5%. The ROA for the private bank starts at around 1.75% in March 2014. It shows a slight decline until March 2016, reaching around 1.5%. From March 2016 to March 2023, the private bank's ROA remains relatively stable, with minor fluctuations around 1.5%. Overall, the private bank maintains a relatively stable and higher ROA throughout the period compared to the public bank. he ROA is an indicator of how efficiently a bank is using its assets to generate earnings, and the trends suggest that the private bank has consistently been more efficient in this regard, although the public bank has shown improvement after the dip in 2017.

Table 4.13

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	0.128333333	0.263409781	0.083297487
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	1.288	0.288038986	0.091085925

Table 4.14

t-Test: Two-Sample Assuming Unequal Variances		
	0.563333	*1.66*
Mean	0.08	1.246667
Variance	0.231089	0.111136
Observations	9	9
Hypothesized Mean Difference	0	
df	14	
t Stat	-5.98291	
P(T<=t) one-tail	1.68E-05	
t Critical one-tail	1.76131	
P(T<=t) two-tail	3.35E-05	
t Critical two-	2.144787	

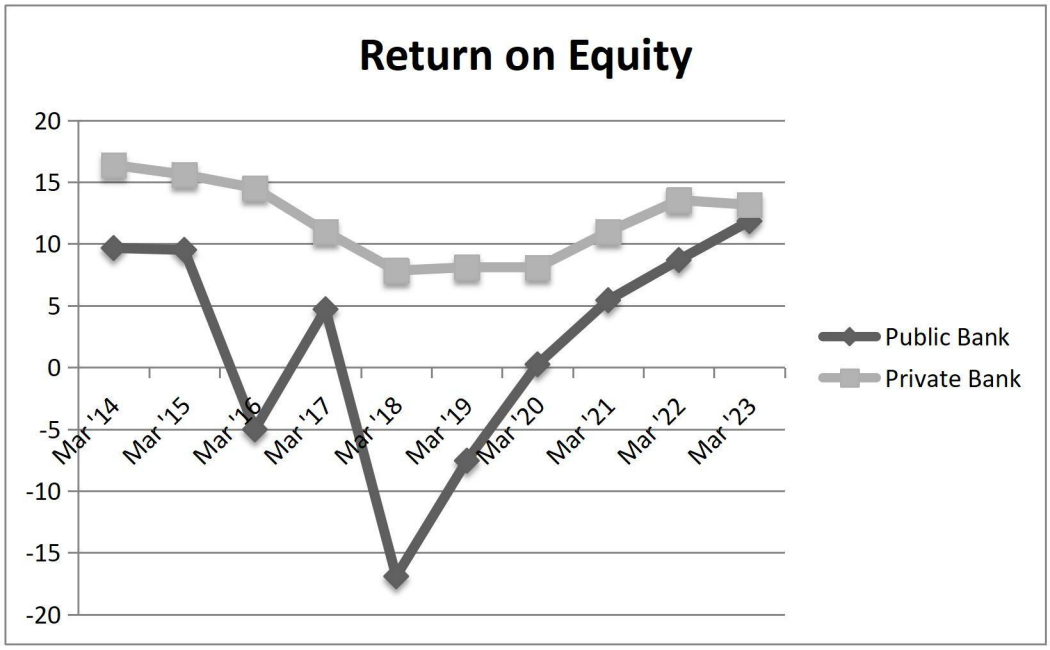
tail		

The mean performance of public banks over the period is 0.128333333, while that of private banks is 1.288. This suggests that private banks have higher performance metrics compared to public banks. Public banks exhibit a lower variability in their performance metrics (STDEV: 0.263409781) compared to private banks (STDEV: 0.288038986). This indicates that the performance of public banks tends to vary less over the given period compared to private banks. The SEM for public banks (SEM: 0.083297487) is slightly lower than that of private banks (SEM: 0.091085925).

A lower SEM indicates less uncertainty in the estimate of the mean for public banks compared to private banks, although the difference is relatively small. The t-statistic value is -5.982905983, and the p-value is 3.35192E-05. Since the p-value is less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

Return on Equity (ROE)

Fig 4.8



This graph represents the Return on Equity (ROE) for two types of banks, public and

private, over a period from March 2014 to March 2023. The ROE for public banks starts just above 10% in March 2014, experiences a significant drop to below 0% in March 2018, and then recovers to around 5% by March 2019. From there, it shows a steady increase, reaching just below 15% by March 2023. The ROE for private banks begins just below 15% in March 2014 and shows a general declining trend until March 2018, where it dips slightly below 5%. After this point, the ROE for private banks increases, surpassing the starting point and reaching above 15% by March 2023. Both types of banks experienced a downturn around March 2018, with public banks showing a more pronounced drop. By March 2023, both public and private banks have recovered and are showing higher ROE percentages than they did in March 2014, with private banks showing a slightly higher ROE than public banks. Overall, private banks have a more stable performance with less volatility in their ROE, while public banks show a more volatile pattern with a significant dip and recovery.

Table 4.15

	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Public Bank (Canara Bank, SBI Bank, PNB Bank)	2.062333333	5.295713067	1.674651513
Private Bank (HDFC Bank, ICICI Bank, AXIS Bank)	11.922	2.073038589	0.655552362

Table 4.16

t-Test: Two-Sample Assuming Unequal Variances		
	9.663333	*16.38333*
Mean	1.217778	11.4263
Variance	89.10159	8.753071
Observations	9	9
Hypothesized Mean Difference	0	
df	10	
t Stat	-3.09594	
P(T<=t) one-tail	0.005664	
t Critical one-tail	1.812461	
P(T<=t) two-tail	0.011329	
t Critical two-tail	2.228139	

The mean performance of public banks over the period is 2.062333333, while that of private banks is 11.922. This suggests that private banks have significantly higher performance metrics compared to public banks. Public banks exhibit a higher variability in their performance metrics (STDEV: 5.295713067) compared to private banks (STDEV: 2.073038589). This indicates that the performance of public banks tends to vary more over the given period compared to private banks. The SEM for public banks (SEM: 1.674651513) is higher than that of private banks (SEM: 0.655552362). A higher SEM indicates more uncertainty in the estimate of the mean for public banks compared to private banks. The t-statistic value is -3.095944884, and the p-value is 0.011328642. Since the p-value is less than the significance level of 0.05 (assuming a standard significance level), we reject the null hypothesis. This indicates that there is a statistically significant difference between the mean performance of public and private banks. Since the t-statistic is negative, it suggests that public banks have a significantly lower mean performance compared to private banks.

FINDINGS

CASA Ratio:

i. Private banks have a significantly higher mean performance in terms of the CASA ratio compared to public banks.
ii. Public banks exhibit higher variability in their CASA ratio, indicating more fluctuations over time.
iii. The t-test results suggest a statistically significant difference between the mean CASA ratio of public and private banks, with private banks performing better on average.

Cost to Income Ratio:

i. While public banks have a slightly higher mean performance in terms of the cost to income ratio, the difference is not statistically significant.
ii. Public banks show lower variability in their cost to income ratio compared to private banks.
iii. The t-test results indicate that there is no statistically significant difference between the mean cost to income ratio of public and private banks.

Net Interest Margin Ratio:

i. Private banks have a significantly higher mean performance in terms of the net interest margin ratio compared to public banks.
ii. Public banks exhibit lower variability in their net interest margin ratio.
iii. The t-test results suggest a statistically significant difference between the mean net interest margin ratio of public and private banks, with private banks performing better on average.

Net Profit Margin:

i. Private banks have significantly higher mean performance in terms of the net profit margin compared to public banks.
ii. Public banks exhibit higher variability in their net profit margin.
iii. The t-test results indicate a statistically significant difference between the mean net profit margin of public and private banks, with private banks performing better on average.

Non-Interest Income and Total Assets:

i. Private banks have a significantly higher mean performance in terms of non-interest income and total assets compared to public banks.
ii. Public banks exhibit lower variability in their non-interest income and total

assets.

iii. The t-test results suggest a statistically significant difference between the mean performance of public and private banks in terms of non-interest income and total assets, with private banks performing better on average.

Operating Profit Margin:

i. Private banks have a significantly higher mean performance in terms of the operating profit margin compared to public banks.
ii. Public banks exhibit higher variability in their operating profit margin.
iii. The t-test results indicate a statistically significant difference between the mean operating profit margin of public and private banks, with private banks performing better on average.

Return on Assets:

i. Private banks have a significantly higher mean performance in terms of return on assets compared to public banks.
ii. Public banks exhibit lower variability in their return on assets.
iii. The t-test results suggest a statistically significant difference between the mean return on assets of public and private banks, with private banks performing better on average.

Return on Equity:

i. Private banks have a significantly higher mean performance in terms of return on equity compared to public banks.
ii. Public banks exhibit higher variability in their return on equity.
iii. The t-test results indicate a statistically significant difference between the mean return on equity of public and private banks, with private banks performing better on average.

CONCLUSIONS

Based on the comprehensive analysis conducted on the financial performance of public sector banks and private sector banks over the period from 2014 to 2023, several significant conclusions can be drawn. Firstly, private sector banks consistently outperformed public sector banks across key profitability and performance ratios, including CASA, Net Interest Margin (NIM), Net Profit Margin (NPM), Cost to Income Ratio (CIR), Non-Interest Income to Total Assets ratio (NII/TA), Operating Profit Margin (OPM), Return on Equity (ROE), and Return on Assets (ROA). This trend indicates a distinct advantage for private banks in terms of operational efficiency and profitability.

Furthermore, the analysis revealed notable differences in variability between the two banking sectors. Public sector banks exhibited higher variability in their performance metrics compared to private sector banks, suggesting that the financial performance of public banks tends to fluctuate more widely over the specified period. Additionally, the standard error of the mean (SEM) for public banks was generally higher than that of private banks, indicating greater uncertainty in the estimate of the mean for public sector banks.

The t-test results further confirmed significant disparities between public and private sector banks across most metrics, with p-values indicating statistically significant differences in mean performance. Specifically, public banks consistently demonstrated lower mean performance compared to private banks across all analyzed ratios. These findings underscore the superior financial performance and operational efficiency of private sector banks relative to their public counterparts over the study period.

In conclusion, the study provides compelling evidence of the impact of e-banking on bank profitability, with private sector banks emerging as clear beneficiaries of technological advancements and operational strategies. These findings have significant implications for policymakers, regulators, and stakeholders in the banking industry, highlighting the need for public sector banks to adopt innovative approaches and enhance efficiency to remain competitive in an increasingly digital landscape dominated by private sector players.

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