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BALKAN JOURNALS

Pre & Post-Merger Financial & Operational Performance of Public Sector Banks-An Analysis

Anjali Gupta, Netra Pal Singh, Saraswati Tewatia

Abstract:

In India, the Public Sector Banks (PSBs) play a crucial role in the financial system that promotes financial growth and delivers core banking facilities to customers. With a view to gaining stronger financial recapturing abilities, operational improvement, and managing the surging non-performing assets (NPAs), the government has used mergers as a mechanism in PSBs in India. This paper presents the financial performance of Public Sector Banks, pre- and post-merger periods, using DuPont Analysis with emphasis on the important key performance indicators such as Return on Equity (ROE), Return on Assets (ROA), and efficiency of operational performance. The analysis covers data points between 2008 and 2024 that are subjected to statistical tests, such as the Wilcoxon Signed-Rank Test, to evaluate the difference between pre-post performance.

Based on the analysis, effective integration has been observed with improvement in profitability, operational efficiency, and financial stability in the post-merger period in the State Bank of India (SBI), Bank of Baroda (BOB), and others. Banks such as Punjab National Bank (PNB) and Union Bank of India, on the other hand, are grappling with shrinking profitability, increasing NPAs, and uneven ROE, which indicate the difficulties in handling inherited weaknesses and management processes inefficiencies. The study asserts that despite these facts, mergers could prove beneficial to PSBs, but the success depends on proper post-merger integration, operational rationalization, and adequate governance to achieve long-term financial sustainability.

Introduction

In India, the Public Sector Banks (PSBs) hold a key position in the financial system of the country and contribute greatly to the economic growth of the country. PSBs provide all the essential banking services to all citizens under the all-inclusive growth policies of the Government of India. In the past years, several mergers have taken place among public sector banks with different objectives. In all cases, the government strived to reinforce the banking sector and enhance its financial stability, which in turn helps in the growth of the economy. The f mergers in the banking sector, particularly in PSBs, are likely to generate synergies, operational efficiency, and ultimately financial performance. Nonetheless, the real effects of these mergers on the financial performance are a matter of subject of scholarly research. The Reserve Bank of India (RBI) has been advocating in recent years that the emergence of underperforming banks is possible through mergers. The strategy is generally driven by the need to reduce the increasing rate of non-performing assets (NPAs), improve operating efficiencies, and achieve better financial stability under a competitive and pressurized banking framework. This is possible if the number of public sector banks is manageable.

The DuPont model is used to determine the productivity of a financial institution. It was developed during the mid-1900s by Brown (1918) to review a greater level of monetary information. The mathematical model of DuPont is the correlation between profitability and the ratio of return on equity (ROE), and it is determined by the ratio of return on assets (ROA). A company's financial performance can be measured using several types of financial ratios, such as performance, liquidity, profitability, and leverage ratios. Saunders (2000) elaborates that the DuPont model of financial analysis consists of three elements of ROE, namely: net profit margin, asset turnover ratio, and equity multiplier. The net profit margin shows the profitability by taking into consideration all the expenses, whereas total asset turnover indicates the effectiveness of the company in the use of assets to make sales. Equity multiplier reflects the amount of debt funding that goes into purchasing assets, and when the ratio is higher, it implies higher stress of the debt. Boshkoska (2017) employed DuPont analysis to assess the performance of businesses operating in the pharmaceutical industry. In addition, the research of Rogova (2014) shows that DuPont analysis is an effective tool in determining the factors of efficiency leading to investment appeal. Vanniarajan and Joseph (2007) used the model to analyse the performance of banks. Prendergast (2006) used a modified version of the DuPont model and noted its advantages in analysing financial

matters in businesses. DuPont analysis is one of the tools that is also important in determining the financial performance of banks. The DuPont model can break Return on Equity (ROE) into a detailed analysis of its drivers, where one can examine the examination of its fundamental causes of financial performance. The DuPont model provides information about how a bank operates, the level of profitability in the bank, and leverage using ROE components such as profit margin, asset turnover, and leverage. When applied in the context of mergers, the model may be beneficial to compare the financial health of PSBs prior to and post-merger consolidation. Baptista et al. (2021) used DuPont analysis to deconstruct ROE and compare shareholder values across banks. Seble and Sahoo (2021) have analysed pre-post-merger financials using DuPont analysis for the period 2015-19. Sharma and Mahapatra (2022) concluded that private banks in India perform better than Public sector banks by implementing technology and better cost management using the DuPont Model. Therefore, it can be termed as an effective way of determining the shareholder wealth as it disaggregates the sources of return on equity (ROE). Rotating around the most important aspects of financial performance, ROE makes it possible to consider the strengths and weaknesses of the organization under consideration.

Literature Review

The DuPont model is well known as a model used to assess the financial well-being of the firm, with far-reaching studies demonstrating its applicability in various sectors as well as geographical locations. DuPont Analysis is an effective indicator of financial performance, and researchers find it to be one of their preferred options (Altahtamouni et al., 2018; Bunea et al., 2019; Burja & Mărginean, 2014; Gitayuda Boy, 2020). According to Mangiero (2004). They identified three significant benefits of DuPont Analysis to firms. First, DuPont analysis separates components of the return on equity (ROE), and firms can learn about the factors that contribute to making profits and measure their performance over the years. Second, it determines the growth potential by using sustainable growth analysis, which is critical to business valuation. Third, DuPont analysis lends credence to earnings forecasting through the projection of future growth in earnings. In addition, DuPont analysis is also an effective benchmark to consider the variations of ROE and forecast the existing values (Altahtamouni et al., 2018). ROE is an overall indicator of financial performance that guides important operating, investing, and financing decisions (Burja & Mărginean, 2014; Kim, 2016; Sheela & Karthikeyan, 2012).

The indicators that have a major impact on the ROE are price-earnings (PE) ratio, total asset turnover (TAT), and the multiplier of equity, as identified by Bunea et al. (2019) and Kharatyan et al. (2017). Likewise, a significant number of studies have analysed the effects of the financial performance of mergers and acquisitions (M&A) in the banking sector, frequently by using financial ratios to quantify the efficiency and profitability impacts in a post-merger environment (Ramachandran, 2022; Shah & Parmar, 2021; Paul, 2017; Shenoy & V.T., 2021; Kumar et al., 2019; Ladha, 2017; Lohia et Daniya et al. (2016), Georgios and Georgios (2011), Lotto (2016), Rahman et al. (2018), and Vidhya and Ravichandran (2018). They observed that mergers and acquisitions had an overall positive influence on the financial performance, including the ROE, attributed to the better cost management, efficient use of organizational assets, and financial leverage, although these studies pointed out a lack in the ROA or no improvement in the performance due to an external factor like a financial crisis (Akinyomi & Olutoye, 2014; Bao, 2017)

According to several studies, Merger enhances financial performance. Rani et al. (2013) studied 383 Indian companies involved in M&A between 2003 and used the DuPont analysis and paired t-tests to determine the significance of M&A that improved operating performance. Lakhawani et al. (2017) analysed 24 companies that participated in M&A in 2006. They used the weighted and unloaded DuPont and the ARIMA model. Sinha et al. (2010) generated similar results: the financial performance after M&A was recorded to have improved in Indian firms based on the scale of ratio analysis and the Wilcoxon signed-rank test. Nonetheless, other researchers suggest that better performance is not a constant outcome of M&A. As an example, dealing with companies in India, Gupta and Banerjee (2017) examined seven firms that were involved in M&A, conducted ratio analysis and paired t-tests, and discovered an abridgment in profits after alteration. Verma and Sharma (2014) used 59 Indian firms that performed M&A throughout the period of 2001-2008 using ratio analysis, Ordinary Least Squares (OLS) regression, and augmented Dickey-Fuller tests, and concluded that M&A did not enhance operating performance. Kumar (2009) evaluated 30 firms that had completed M&A between 1999 and 2002 by making a comparison of financial performance using DuPont and other analytical tools and found that there was a reduction in financial performance after M&A activities.

All in all, though the DuPont model is a reliable instrument of financial performance analysis, and especially its use as a ROE tracking tool, the effects of a merger on the financial performance of a company seem to be conditional and depend on

economic circumstances, conditions of the industry in which a company operates, and other firm-specific aspects.

Objective of the Study

This study aims to understand the financial performance of Public Sector Banks (PSBs) using the DuPont Model. It focuses on how profitability, efficiency, and capital structure affect key indicators like ROE and ROA. The study also looks at the differences in performance before and after mergers to see their impact on the banks' overall financial health.

1. To analyse the financial performance of Public Sector Banks (PSBs) using the DuPont Model.

2. To compare the Return on Equity (ROE) of PSBs in the pre-merger and post-merger periods.

3. To analyse the impact of Net Profit Margin and Total Asset Turnover ratio on Return on Assets.

4. To examine the relative contribution of operational efficiency, investment management, and capital structure to achieving return on equity (ROE).

5. To assess the role of ROE and ROA in evaluating the profitability of public sector banks through the DuPont model.

6. To evaluate the impact of Return on Assets and Equity Multiplier on Return on Equity.

Research Questions

The following research questions have been formulated to achieve the study objectives. These questions aim to provide a clear understanding of the financial performance of PSBs and the effects of mergers on profitability, operational efficiency, and capital structure.

1. How is the financial performance of Public Sector Banks (PSBs) evaluated using the DuPont Model?
2. What are the differences in Return on Equity (ROE) of Public Sector Banks (PSBs) between the pre-merger and post-merger periods?

3. To what extent do Net Profit Margin and Total Asset Turnover ratio influence return on assets (ROA) in Public Sector Banks?
4. What is the relative contribution of operational efficiency, investment management, and capital structure to achieving ROE?
5. How do ROE and ROA help in assessing profitability in the public sector banks using the DuPont model?
6. What is the impact of Return on Assets and Equity Multiplier on Return on Equity?

Research Methodology

Research Design

This study employs a quantitative research approach based on secondary data to assess the financial and operational performance of Indian public sector banks (PSBs) before and after mergers. The study utilizes descriptive and inferential statistics to investigate the most important key performance indicators (KPIs), such as the profitability of the company, quality of assets, effectiveness, and financial stability. The study will help in understanding the detailed analysis of the impact of the merger in the short-term and long-term. The analysis is done for three periods, i.e., pre-merger, base year, and post-merger. This holistic layout makes sure that the findings will be more useful.

Data Collection

The study will be based on secondary data collected from open-access websites, such as banks' annual reports, financial databases available in the market, databases such as Money Control, and research sites of the stock market. This dataset is captured for a time span of 17 years, 2008- 2024, which is sufficient to find out trends. The data obtained in the process on the metrics of banks such as deposits, advances, CASA ratios, non-performing assets (NPAs), profitability indicators (ROE and ROA), and operational parameters like a branch network and staff strength, hence providing a wholesome foundation of the analysis. The details of mergers in public sector banks are given in Table 1.

Data Analysis

The research uses the DuPont model to evaluate the impact of mergers on profitability and long-term sustainability, along with non-parametric tests. The structure of patterns and variability across key performance indicators (KPIs) is described using descriptive statistics, mean, standard deviation, and standard error. To measure statistical significance, a non-parametric test, the Wilcoxon Signed-Rank Test, is used; it compares operational and financial measures before and after the mergers. The analysis is aided by SPSS and Microsoft Excel for performing statistical calculations, visualization, and tests of hypotheses. Therefore, a methodological framework is appropriate to provide a consistent evaluation of the consequences of the mergers based on the shifts in profitability, operational efficiency, and fiscal stability.

Table 1:

List of Merged Indian Public Sector Banks

S.No.	Merged into (Anchor Banks)	Banks Merged	Merger year
1	State Bank of India	State Bank of Bikaner and Jaipur	1st April, 2017
		State Bank of Hyderabad	
		State Bank of Mysore	
		State Bank of Patiala	
		State Bank of Travancore	
		Bhartiya Mahila Bank	
2	Bank of Baroda	Dena Bank	1st April, 2019
		Vijaya Bank	
3	Canara Bank	Syndicate Bank	1st April, 2020
4	Indian Bank	Allahabad Bank	1st April, 2020
5	Punjab National Bank	Oriental Bank of Commerce	1st April, 2020
		United Bank of India	
6	Union Bank of India	Andhra Bank	1st April, 2020
		Corporation Bank	
Adapted from (Rawat, n.d.; Mishra, 2026; Moneyview, 2026; BankBazaar, n.d.)			

Analysis and Results

The paper uses the DuPont Model (3- and 5-step variation- Fig. 1, Fig. 2), in order to deconstruct and decompose Return on Equity (ROE). The 3- step model decomposes ROE into Net Profit Margin, Total Asset Turnover, and Equity Multiplier, and the five-step model further divides it into Operating Margin, Interest Burden, and Tax Burden in order to have a more detailed approach to ROE. Indicators of profitability (ROE, ROA, Net Interest Margins(NIM)), asset quality (Gross NPA and Net NPA ratios, Slippage Ratios, Provision Coverage), operation efficiency (Cost-to-Income Ratio, CASA Ratio, Yield on Advances), and financial (Deposits, Advances, and Total Asset Turnover) are some of the key financial parameters assessed.

This research design will offer constructive ideas on the effectiveness of mergers in enhancing the financial performance of PSBs since it focuses on a longer duration and subjects data to a comprehensive analysis.

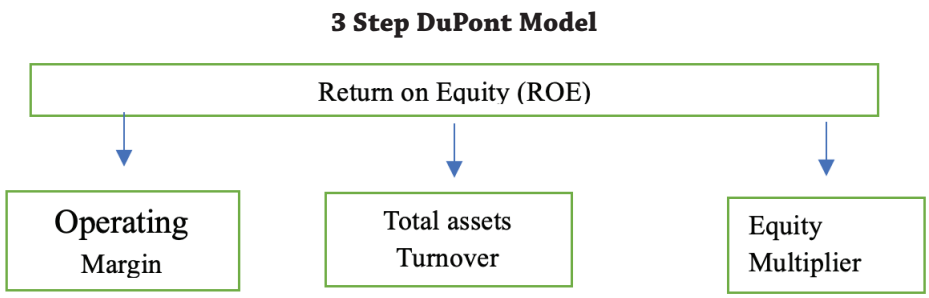


Fig.1. Component of ROE

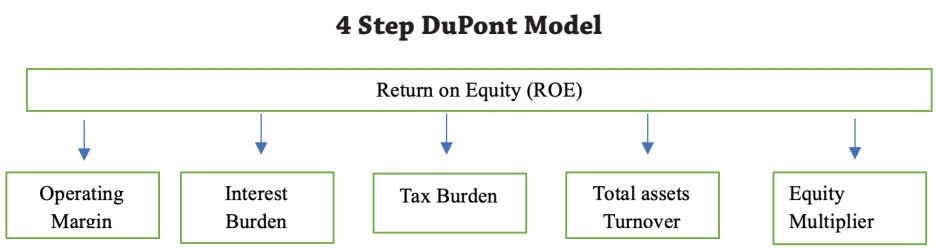


Fig. 2. Component of ROE

Analysis & Interpretation of State Bank of India (SBI)

This section presents an analysis of the State Bank of India based on DuPont Analysis. As can be seen from the data given in Table 1, the State Bank of India absorbed many public sector banks that were not performing to expectations. It is worth mentioning that SBI is one of the largest banks in India. The analysed data collected from different sources are given in Tables 2 and 3.

Table 2:

ROE Analysis of SBI Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.11	0.11	0.10	0.12	0.11	0.09	0.06	0.07	0.05	0.00	-0.01	0.01	0.05	0.06	0.09	0.12	0.16
Total Asset Turnover	0.08	0.08	0.08	0.07	0.08	0.09	0.09	0.10	0.09	0.09	0.08	0.09	0.09	0.08	0.08	0.08	0.07
Equity Multiplier	16.79	18.04	17.46	17.23	17.23	17.06	16.26	16.73	17.02	15.86	15.70	16.58	16.72	17.58	17.54	16.59	15.64
ROE	0.15	0.15	0.14	0.15	0.15	0.15	0.10	0.11	0.07	0.00	-0.02	0.01	0.07	0.09	0.12	0.17	0.16
Adapted from (Top Stock Research, n.d.; Money Control, n.d: Annual Report of the bank, n.d.)																	

Table 3:

ROE Analysis of SBI Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.75	0.78	0.73	0.78	0.71	0.62	0.60	0.59	0.57	0.50	0.46	0.48	0.49	0.47	0.47	0.55	0.74
Interest Burden	0.22	0.22	0.22	0.23	0.23	0.21	0.15	0.18	0.12	0.03	-0.02	0.03	0.13	0.20	0.26	0.30	0.29
Tax Burden	0.65	0.62	0.64	0.67	0.67	0.69	0.72	0.65	0.70	-0.08	1.72	0.61	0.81	0.66	0.73	0.71	0.76
Total Assets Turnover	0.08	0.08	0.08	0.07	0.08	0.09	0.09	0.10	0.09	0.09	0.08	0.09	0.09	0.08	0.08	0.08	0.07
Equity Multiplier	16.79	18.04	17.46	17.23	17.23	17.06	16.26	16.73	17.02	15.86	15.70	16.58	16.72	17.58	17.54	16.59	15.64
ROE	0.15	0.15	0.14	0.15	0.15	0.15	0.10	0.11	0.07	0.00	-0.02	0.01	0.07	0.09	0.12	0.17	0.16
ROA	0.87	0.84	0.81	0.87	0.87	0.86	0.60	0.65	0.41	-0.01	-0.12	0.08	0.43	0.50	0.68	0.95	1.07
Adapted from (Top Stock Research, n.d.; Money Control, n.d.: Annual Report of the bank, n.d.)																	

Table 2 presents ROE for the State Bank of India (SBI), as evaluated using the DuPont model. It can be seen from the data given in Table 2 that ROE was primarily affected by variations in Net Profit Margin during the pre-merger, base year, and post-merger years. The Total Asset Turnover and Equity Multiplier were quite steady; the Net Profit Margin experienced a sharp drop in 2017, which resulted in zero ROE. With the recovery of Net Profit Margin in the post-merger years, the increase in ROE was significant. This indicates that profitability emerged as the most dominant determinant of ROE, followed by capital structure, whereas operational efficiency exerted the least influence on ROE. These two indicators, ROE and ROA, go hand in hand in describing the financial performance and profitability of the bank.

Table 3 shows that the financial performance of SBI, measured with the help of an extended DuPont model, was quite different during the pre-merger, base year, and post-merger periods. During the pre-merger period, the ROE was stable with the help of a stable operating margin, average interest and tax load, and a high equity multiplier. In 2017 (base year), ROE was zero, largely because of the steep decline in interest and tax burdens, in spite of constant operational efficiency. The recovery of the ROE in the post-merger was aided by a gradual increase in the Operating Margin, TAX Burden, and ROA. The study's findings reveal that profitability determinants such as operating margin, interest burden, and tax Burden exert a greater influence on SBI's Return on Equity (ROE) than operational efficiency or capital structure. This suggests that profitability constitutes the principal driver of both ROE and Return on Assets (ROA), whereas efficiency and leverage contribute comparatively less. These results are consistent with the research objectives, underscoring the pivotal role of profitability in shaping the bank's financial performance. It can be seen further that the financial performance of SBI has improved drastically after the merger, with a robust revival in profitability, efficiency, and financial stability.

Analysis & Interpretation of Bank of Baroda (BOB)

This section presents DuPont analysis for the Bank of Baroda. Two public sector banks, i.e., Dena Bank and Vijaya Bank, were merged with Bank of Baroda. Like SBI, this merger had an impact on the performance of Bank of Baroda. The data and analysis are presented in Tables 4 and 5 for the Bank of Baroda.

Table 4:

ROE Analysis of Bank of Baroda Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.08	0.09	0.11	0.07	0.07	0.12	0.11	0.08	-0.10	0.03	-0.04	0.02	0.01	0.02	0.09	0.13	0.16
Total Asset Turnover	0.11	0.11	0.10	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	16.16	17.38	18.09	16.04	16.04	16.81	17.86	17.47	16.26	16.70	16.06	16.41	15.77	14.60	14.59	14.52	13.71
ROE	0.14	0.18	0.20	0.18	0.18	0.14	0.13	0.09	-0.12	0.04	-0.04	0.02	0.01	0.02	0.08	0.14	0.16
Adapted from (Top Stock Research, n.d.; Money Control, n.d: Annual Report of the bank, n.d.)																	

Table 5:

ROE Analysis of Bank of Baroda Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.52	0.53	0.55	0.34	0.34	0.71	0.71	0.68	0.52	0.60	0.50	0.55	0.56	0.50	0.53	0.59	0.00
Interest Burden	0.23	0.26	0.29	0.25	0.25	0.18	0.18	0.17	-0.12	0.10	0.00	0.05	-0.02	0.14	0.22	0.32	51.46
Tax Burden	0.66	0.67	0.72	0.83	0.83	0.91	0.82	0.64	1.60	0.59	23.18	0.71	-0.76	0.23	0.77	0.71	1.02
Total Assets Turnover	0.11	0.11	0.10	0.16	0.16	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	16.16	17.38	18.09	16.04	16.04	16.81	17.86	17.47	16.26	16.70	16.06	16.41	15.77	14.60	14.59	14.52	13.71
ROE	0.14	0.18	0.20	0.18	0.18	0.14	0.13	0.09	-0.12	0.04	-0.04	0.02	0.01	0.02	0.08	0.14	0.16
ROA	0.84	1.03	1.12	1.14	1.14	0.85	0.73	0.52	-0.73	0.25	-0.26	0.13	0.08	0.12	0.57	0.96	1.13
Adapted from (Top Stock Research, n.d.; Money Control, n.d.: Annual Report of the bank, n.d.)																	

It can be seen from the results given in Table 4 and Table 5 that the Net Profit Margin and Operating Margin have been varying significantly, and, in 2016, there was a significant reduction in the Net Profit Margin, and ROE was impacted negatively by the Net Profit Margin in 2016. Nevertheless, the Total Asset Turnover did not

change, which means that the company was efficient in its operations in the long run. The Equity Multiplier indicated a steady drop after the merger, indicating a conservative capital structure during the recent years. These trends were reflected in ROE, which plunged into negative numbers in 2016 but has been steadily increasing since the merger, reaching 0.16 in 2024. The additional 5-step model identifies the changes in Interest Burden and Tax Burden that also had a significant impact on ROE and ROA, particularly in the base year and the initial years of post-merger. On the whole, profitability ratios, in particular, Net and Operating Margins influenced the value of ROE, whereas the capital structure and efficiency ratios demonstrated their relative contribution to the financial performance and profitability of the Bank of Baroda.

Overall, the financial performance of Bank of Baroda was rather volatile after the merger but strengthened considerably by 2024, as the ROE, ROA, and other key ratios recovered, which means that the organization found its level and is on a positive trend following the initial failure.

Analysis & Interpretation of Canara Bank

This section presents DuPont analysis for Canara Bank. One public sector bank, i.e., Syndicate Bank, was merged with Canara Bank. Like SBI and Bank of Baroda, this merger had an impact on the performance of Canara Bank. The data and analysis are presented in Tables 6 and 7 for Canara Bank.

Table 6:

ROE Analysis of Canara Bank Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.07	0.06	0.09	0.05	0.05	0.08	0.06	0.06	-0.05	0.03	-0.08	0.01	-0.03	0.03	0.06	0.10	0.14
Total Asset Turnover	0.14	0.13	0.12	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	21.25	21.15	20.70	18.57	18.57	16.66	16.61	17.19	17.39	17.19	17.11	18.89	17.99	18.90	17.98	17.69	16.66
ROE	0.21	0.18	0.22	0.09	0.09	0.12	0.09	0.09	-0.08	0.04	-0.11	0.01	-0.05	0.04	0.08	0.14	0.17
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 7:

ROE Analysis of Canara Bank Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.51	0.50	0.53	0.65	0.65	0.20	0.20	0.19	0.19	0.15	0.14	0.04	0.12	0.08	0.09	0.60	0.79
Interest Burden	0.17	0.16	0.21	0.28	0.24	0.51	0.37	0.40	-0.33	0.23	-0.97	-0.91	-0.20	0.52	1.13	0.22	0.23
Tax Burden	0.84	0.79	0.77	0.30	0.34	0.78	0.80	0.78	0.88	0.71	0.64	-0.26	1.34	0.70	0.63	0.75	0.75
Total Assets Turnover	0.14	0.13	0.12	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	21.25	21.15	20.70	18.57	18.57	16.66	16.61	17.19	17.39	17.19	17.11	18.89	17.99	18.90	17.98	17.69	16.66
ROE	0.21	0.18	0.22	0.09	0.09	0.12	0.09	0.09	-0.08	0.04	-0.11	0.01	-0.05	0.04	0.08	0.14	0.17
ROA	1.00	0.78	0.46	0.23	-0.27	0.08	-0.65	0.21	-0.47	0.51	0.52	0.70	0.49	0.49	1.05	0.86	1.00
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Tables 6 and 7 depict the Return on Equity (ROE) analysis of Canara Bank based on the 3-step and 5-step DuPont analysis of Canara Bank pre-merger, base year, and post-merger. It can be inferred from the analysis of tables 6 and 7 that there was a large variation in the Net Profit Margin and Operating Margin, and some years, like 2016 and 2018, recorded negative margins that impacted profitability negatively. In spite of these fluctuations, the Total Asset Turnover has been quite steady, albeit quite low, indicating that there is not much efficiency in using the assets. An Equity Multiplier showed the slow reduction in the years following the merger that indicates the more conservative approach is applied to capital structure. ROE followed these patterns, where it was negatively valued at times, but it gradually improved after the merger to 17% in 2024. The 5-step DuPont analysis also points out that the movement of Interest Burden and Tax Burden also contributed significantly to changing the ROE and Return on Assets (ROA), especially in unstable times.

Overall, the profitability, leverage, and assets management of the Canara Bank collectively dictated the financial performance of the bank, with its profitability ratios making the most significant difference in the ROE according to the DuPont analysis. Canara Bank was resilient and recovered after the merger and gradually made progress in terms of profitability and efficiency despite the early instability.

Analysis & Interpretation of Indian Bank

This section presents DuPont analysis for the Indian Bank. One public sector bank, i.e., Allahabad Bank was merged with Canara Bank. Like SBI, Canara Bank, and Bank of Baroda, this merger had an impact on the performance of Canara Bank. The data and analysis are presented in Tables 8 and 9 for the Indian Bank.

Table 8:

ROE Analysis of Indian Bank Using 3-step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.12	0.11	0.13	0.17	0.13	0.10	0.07	0.06	0.04	0.08	0.06	0.02	0.03	0.07	0.09	0.10	0.13
Total Asset Turnover	0.12	0.13	0.12	0.09	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.08
Equity Multiplier	14.03	14.01	14.12	14.35	14.52	13.48	13.37	12.84	12.37	12.53	13.52	14.22	13.62	15.92	15.00	14.41	13.21
ROE	0.21	0.21	0.22	0.21	0.18	0.13	0.08	0.07	0.04	0.08	0.07	0.02	0.03	0.08	0.09	0.11	0.14
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 9:

ROE Analysis of Indian Bank Using 5-step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.53	0.54	0.56	0.76	0.75	0.74	0.75	0.75	0.71	0.70	0.63	0.59	0.62	0.58	0.55	0.58	0.63
Interest Burden	0.29	0.30	0.34	0.33	0.23	0.16	0.12	0.11	0.07	0.32	0.41	0.02	0.09	0.11	0.13	0.20	0.28
Tax Burden	0.82	0.70	0.66	0.65	0.77	0.87	0.79	0.69	0.75	0.35	0.25	1.13	0.55	1.03	1.23	0.89	0.74
Total Assets Turnover	0.12	0.13	0.12	0.09	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.08
Equity Multiplier	14.03	14.01	14.12	14.35	14.52	13.48	13.37	12.84	12.37	12.53	13.52	14.22	13.62	15.92	15.00	14.41	13.21
ROE	0.21	0.21	0.22	0.21	0.18	0.13	0.08	0.07	0.04	0.08	0.07	0.02	0.03	0.08	0.09	0.11	0.14
ROA	1.48	1.49	1.55	1.43	1.25	0.97	0.62	0.53	0.35	0.65	0.50	0.11	0.24	0.48	0.59	0.75	1.06
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Tables 8 and 9 show the ROE analysis of Indian Bank based on the 3-step and 5-step DuPont models in terms of pre-merger, base year, and post-merger. It can be seen from the analysis presented in Tables 8 and 9 that the Net Profit Margin was positive, which shows that the company has been profitable on a regular basis, and the Total Asset Turnover was holding steady but low, which demonstrates the low efficiency of assets. The Equity Multiplier declined a little bit following the merger, which indicated less financial leverage. In turn, ROE varied with a decrease in difficult years but an increase in the post-merger period to 14% in 2024. The 5-step model indicated a high Operating Margin, but the fluctuation in Interest and Tax Burdens affected net profits. Return on Assets (ROA) also improved, which indicates that assets are used better. Overall, the financial performance of Indian Bank improved after the merger, and the DuPont model helps to see the combination of profitability, asset management, and capital structure that impacts the shareholder returns.

Analysis & Interpretation of Punjab National Bank (PNB)

This section presents DuPont analysis for Punjab National Bank. It can be seen from Table 1 that two public sector banks, i.e., Oriental Bank of Commerce and United Bank of India, were merged with PNB. Like other banks, this merger had an impact on the performance of PNB. The data and analysis are presented in Tables 10 and 11 for Punjab National Bank.

Table 10:

ROE Analysis of PNB Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.09	0.10	0.11	0.15	0.12	0.10	0.07	0.06	-0.06	0.02	-0.22	-0.17	0.01	0.02	0.04	0.03	0.08
Total Asset Turnover	0.12	0.13	0.12	0.08	0.09	0.10	0.09	0.09	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	17.66	18.06	17.64	18.28	16.95	14.41	14.92	14.93	17.05	16.99	18.34	17.15	13.33	13.83	13.72	14.52	14.34
ROE	0.19	0.23	0.23	0.22	0.18	0.14	0.09	0.08	-0.09	0.02	-0.30	-0.22	0.01	0.02	0.04	0.03	0.08
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 11:

ROE Analysis of PNB Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.53	0.54	0.55	0.71	0.74	0.73	0.67	0.65	0.50	0.60	0.25	0.33	0.59	0.58	0.58	0.56	0.71
Interest Burden	0.34	0.31	0.32	0.29	0.22	0.20	0.06	0.11	-0.38	-0.13	-0.86	-0.43	0.03	0.07	0.17	0.09	0.17
Tax Burden	0.52	0.59	0.64	0.71	0.75	0.71	1.86	0.84	0.34	-0.20	1.04	1.19	0.28	0.55	0.42	0.63	0.62
Total Assets Turnover	0.12	0.13	0.12	0.08	0.09	0.10	0.09	0.09	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.07	0.07
Equity Multiplier	17.66	18.06	17.64	18.28	16.95	14.41	14.92	14.93	17.05	16.99	18.34	17.15	13.33	13.83	13.72	14.52	14.34
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

It can be inferred from Table 10 and Table 11 that the net profit margin of PNB varied during the years and became negative in the period between 2016 and 2019, slowly recovering in the post-merger period in the case of the 3-point Du-Pont analysis. The total asset turnover did not change much during this period, but the equity multiplier, a measure of financial leverage of the bank, dropped slightly following the merger. All these factors contributed to the total ROE that reflected the fluctuations in profitability, efficiency of asset utilization, and leverage. The 5-step DuPont model analysis indicates that operating margin, interest burden, tax burden, asset turnover, and equity multiplier contributed to ROE. The model shows that there were times when PNB encountered a big challenge in terms of interest and tax expenditures, which weighed down on profitability. Nonetheless, this did not drastically reduce the operating margin of the bank, and with increases in the asset efficiency as well as leverage, the ROE bounced back slowly following the merger. On the whole, analysis has revealed that PNB has been striving to strengthen its financial health by controlling operational and financial aspects of transitioning to the merger.

Overall, the financial performance of PNB indicates that it has huge difficulties in sustaining profitability and ROE after the merger. Despite the indicators of recovery by the year 2024, the bank is still performing worse compared to the pre-merger period, and it should continue to make efforts to stabilize its profitability and leverage.

Analysis & Interpretation of Union Bank of India (UBI)

This section presents DuPont analysis for Union Bank of India. It can be seen from Table 1 that two public sector banks, i.e., Andhra Bank and Corporation Bank, were merged with UBI. Like other banks, this merger had an impact on the performance of UBI. The data and analysis are presented in Tables 12 and 13 for UBI.

Table 12:

ROE Analysis of Union Bank of India Using 3 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net Profit Margin	0.09	0.09	0.09	0.11	0.08	0.08	0.05	0.05	0.04	0.01	-0.14	-0.07	-0.07	0.03	0.06	0.09	0.14
Total Asset Turnover	0.13	0.12	0.11	0.07	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	22.10	22.87	22.20	23.16	19.86	17.95	18.94	19.28	17.67	19.33	19.45	18.58	16.34	16.72	16.85	16.35	14.35
ROE	0.25	0.24	0.24	0.19	0.13	0.12	0.09	0.09	0.06	0.02	-0.21	-0.11	-0.09	0.04	0.07	0.11	0.14
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Table 13:

ROE Analysis of Union Bank of India Using 5 step DuPont Model: Pre-Merger, Base Year, and Post-Merger

Variables	Pre- Merger									Base Year	Post Merger						
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Margin	0.53	0.52	0.53	0.68	0.72	0.74	0.72	0.73	0.71	0.63	0.44	0.51	0.50	0.56	0.60	0.61	0.77
Interest Burden	0.42	0.37	0.36	0.31	0.20	0.20	0.00	0.09	-0.23	-0.20	-0.28	-0.07	-0.10	0.10	0.21	0.20	0.28
Tax Burden	0.40	0.44	0.49	0.54	0.52	0.52	42.04	0.73	-0.23	-0.12	1.10	2.25	1.43	0.61	0.51	0.69	0.64
Total Assets Turnover	0.13	0.12	0.11	0.07	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.07
Equity Multiplier	22.10	22.87	22.20	23.16	19.86	17.95	18.94	19.28	17.67	19.33	19.45	18.58	16.34	16.72	16.85	16.35	14.35
ROE	0.25	0.24	0.24	0.19	0.13	0.12	0.09	0.09	0.06	0.02	-0.21	-0.11	-0.09	0.04	0.07	0.11	0.14
ROA	1.12	1.07	1.06	0.84	0.67	0.68	0.47	0.46	0.33	0.12	-1.06	-0.59	-0.55	0.26	0.44	0.65	0.98
Adapted from (Top Stock Research, n.d.; Money Control, n.d.; Annual Report of the bank, n.d.)																	

Tables 12 and 13 show the Return on Equity (ROE) analysis of Union Bank of India with 3-step and 5-step DuPont models for the period of pre-merger, base year, and post-merger, 2008 to 2024. The 3-step DuPont model indicates that the net profit margin of the Union Bank of India was relatively constant in the pre-merger years but became negative in the year 2018 and 2019 before showing a slow rise during the post-merger years. The turnover of total assets decreased marginally yet remained rather steady. The financial leverage of the bank, as embodied by the equity multiplier, started declining gradually following the merger, implying a more conservative capital structure. All these contributed to the change in the ROE, and it reflected these changes by decreasing during the base year and increasing after the merger. The 5-step DuPont model is more detailed in that it decomposes ROE into operating margin, interest burden, tax burden, total asset turnover, and equity multiplier. This analysis identifies years where the bank incurred difficulties with regard to the interest and taxation costs, especially from 2016 to 2019, which had a negative impact on the profitability. Nevertheless, Union Bank has had a good operating margin and has, in the post-merger years, enhanced its ROA and ROE due to improved operational efficiency and financial leverage management. On the whole, the analysis demonstrates that Union Bank of India has tried to stabilize and strengthen its financial performance by going through the merger process.

Overall, Union Bank of India faced significant challenges in profitability and leverage post-merger but showed notable recovery by 2024. Improvements in Operating Margin and ROA suggest better efficiency and cost management, though continued focus on stabilizing profitability and reducing financial volatility will be critical.

Financial Performance of the Six Banks After Pre-Post-Merger Period

This section presents data and its analysis for all six banks studied as part of this research. The analysis is presented in tables 14 to 19. The analysis includes deposits and deposits in Current Account and Saving Account (CASA), Advances & Credit, NPAs, Profitability, Capital Adequacy, and Operational Metrics. The analysis for different banks is presented in the following sections.

State Bank of India (SBI) – Pre & Post-Merger (2017)

It can be seen from the data given in Table 14 that prior to the merger, SBI enjoyed an impressive deposit base of USD 319,441.59 million and a CASA ratio of 45.58%, which is a strong indicator of its dependence on low-cost deposits, which is vital to profits. After the merger, as associate banks were absorbed, there was a significant rise in the deposit base to USD 403,754.80 million. The CASA ratio, however,

decreased by a margin to 44.4%, indicative of the absorption of banks with a lower CASA ratio. In spite of this, SBI continued to have a solid base of cheap funding. There were also operational efficiencies as the merger created a rationalized network of branches and reduced the number of staff, which dropped from 2,79,803 in 2017 to 2,32,296 by 2024, resulting in a better allocation of resources and saving costs. The indicators of profitability were also better in the long run, with the net interest margin (NIM) rising from 2.93% in 2017 to 3.47% by 2024, and the cost-to-income ratio stabilized at 49.54 percent. This indicates effective cost control and better revenues through the lending activities. Altogether, the merger enabled SBI to secure its market share, optimize its operations, and increase profitability, even though the first integration proved to be difficult.

Table14:

Financial and Operational Performance of SBI: Pre- and Post-Merger Analysis

Category	Metric	March 2017 (SBI)	March 2017 (ABs)	April 2017 (Merged)	Mar-24
Deposits & CASA	Total Deposits (USD million)	3,19,441.59	84,313.21	4,03,754.80	9,16,167.74
	CASA Ratio (%)	45.58	40.1	44.4	41.11
	Market Share (Deposits %)	18.13	5.04	23.17	-
Advances & Credit	Gross Advances (USD million)	3,03,399.18	60,846.46	3,64,245.64	7,09,724.99
	Market Share (Advances %)	17.11	4.15	21.26	-
NPAs	Gross NPA Ratio (%)	6.9	20.15	9.11	2.24
	Net NPA Ratio (%)	3.71	12.99	5.19	0.57
	Provision Coverage Ratio (%)	65.95	52.18	61.53	91.89
	Slippage Ratio (%)	2.59	17.87	5.78	0.43
	Credit Cost (%)	2.14	5.77	2.9	0.37
Profitability	Cost-to-Income Ratio (%)	47.75	57.66	49.54	49.54
	Cost of Deposits (%)	5.79	6.31	5.84	4.81
	Yield on Advances (%)	9.42	8.98	9.32	11.61
	NIM (Domestic) (%)	3.11	2.35	2.93	3.47

Capital Adequacy	CET 1 (%)	9.82	-	9.41	10.36
	Tier 1 (%)	10.35	-	10.05	11.93
	CAR (%)	13.11	-	12.85	14.28
Operational Metrics	Number of Branches (Million)	17,170	6,847	24,017	22,542
	Total Staff (Million)	2,09,572	70,231	2,79,803	2,32,296
	Number of Customers (millions)	337.5	82.9	420.4	500
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)					

Bank of Baroda (BOB) – Pre & Post-Merger (2019)

It can be inferred from the analysis given in Table 15 that pre-merger, Bank of Baroda had deposits of USD 91,940.77 million and a CASA ratio of 40.24%, indicating a moderately strong low-cost deposit base. Post-merger, with the integration of Vijaya Bank and Dena Bank, deposits increased significantly to USD 131,747.05 million, though the CASA ratio declined slightly to 37.25% due to the inclusion of banks with weaker CASA contributions. By 2024, BOB managed to stabilize the CASA ratio at 38.76%, reducing funding costs. Operationally, the bank achieved significant efficiencies by rationalizing branches and reducing staff from 84,781 in 2019 to 81,369 in 2024. This helped bring down the cost-to-income ratio to 47.21%. Initially, the merged entity faced pressure from Dena Bank's high NPAs, pushing the gross NPA ratio to 10.02%, but effective provisioning and recovery efforts reduced it to 2.99% by 2024. Profitability improved as the NIM increased from 2.84% to 3.33%, reflecting better lending returns. The merger allowed BOB to expand its scale while achieving operational and financial stability.

Table 15:

Financial and Operational Performance of BOB: Pre- and Post-Merger Analysis

Category	Metric	March 2019 (BOB) (USD Million)	March 2019 (VB) (USD Million)	March 2019 (DB) (USD Million)	April 2019 (Merged) (USD Million)	Mar-24 (USD Million)
Deposits & CASA	Total Deposits (USD million)	91,940.77	25,316.71	14,491.10	1,31,747.05	1,91,016.62
	CASA Ratio (%)	40.24	25.19	42.96	37.25	38.76
Advances & Credit	Gross Advances (USD million)	67,520.34	18,798.78	7,480.02	93,757.68	1,53,386.22
NPAs	Gross NPA Ratio (%)	9.61	6.58	10.91	10.02	2.99
	Net NPA Ratio (%)	3.33	3.08	4.8	3.65	0.89
Profitability	Cost-to-Income Ratio (%)	45.56	61.32	94.26	53.19	47.21
	Cost of Deposits (%)	5.33	5.8	5.34	5.43	4.92
	Yield on Advances (%)	8.67	9.02	7.63	8.62	8.53
	NIM (Domestic) (%)	2.93	2.96	2.25	2.84	3.33
Operational Metrics	Number of Branches (Million)	5,553	2,119	1,775	9,447	8,179
	Total Staff (Million)	55,754	15,882	13,334	84,781	81,369
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)						

Canara Bank – Pre & Post-Merger (2020)

It can be seen from the analysis presented in Table 16 that before the merger, Canara Bank's deposits stood at USD 8,133.79 million, with a CASA ratio of 32.59%, indicating a reliance on higher-cost funding. Post-merger with Syndicate Bank, the deposit base increased to USD 11,791.81 million, while the CASA ratio marginally improved to 33.36%. By 2024, CASA reached 38.76%, reducing the cost of deposits

and ensuring a stronger funding base. Operational synergies were evident, as staff numbers reduced from 90,002 in 2020 to 82,638 by 2024, and the cost-to-income ratio decreased from 58.81% to 47.71%, reflecting improved operational efficiency. However, the gross NPA ratio, which was 8.21% pre-merger, initially spiked to 9.39% due to the weaker portfolios inherited from Syndicate Bank. Over time, effective provisioning and recovery efforts brought the gross NPA down to 4.23% by 2024. Profitability improved with NIM rising from 2.69% to 3.05%, indicating better returns from lending. The merger enabled Canara Bank to enhance its scale, improve asset quality, and achieve operational stability.

Table 16:

Financial and Operational Performance of Canara Bank: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (Canara)	March 2020 (Syndicate)	April 2020 (Merged)	Canara (March 2024)
Deposits & CASA	Total Deposits (USD million)	8,133.79	3,658.02	11,791.81	17,066.11
	CASA Ratio (%)	32.59	35.09	33.36	38.76
Advances & Credit	Gross Advances (USD million)	5,870.88	2,601.55	8,472.43	12,494.73
NPAs	Gross NPA Ratio (%)	8.21	12.04	9.39	4.23
	Net NPA Ratio (%)	4.22	4.61	4.34	1.27
	Provision Coverage Ratio (w/TWO) (%)	75.86	79	76.95	93.3
	Provision Coverage Ratio (w/o TWO) (%)	50.73	64.69	56.23	89.1
	Slippage Ratio (%)	3.71	5.74	4.29	0.34
	Credit Cost (%)	2.46	3.26	2.8	0.96
Profitability	Cost-to-Income Ratio (%)	55.3	66.01	58.81	47.71
	Cost of Deposits (%)	5.57	5.09	5.42	5.5
	Yield on Advances (%)	8.18	8.33	8.22	8.71
	NIM (Domestic) (%)	2.5	3.13	2.69	3.05
Operational Metrics	Number of Branches (Million)	6,329	4,062	10,391	9,604
	Total Staff (Million)	57,918	32,084	90,002	82,638
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)					

Indian Bank – Pre & Post-Merger (2020)

It is evident from the analysis presented in Table 17 that Indian Bank had a CASA ratio of 41.20% pre-merger, reflecting a strong low-cost deposit base. Following its merger with Allahabad Bank, deposits grew to USD 4,893.98 million, but the CASA ratio slightly weakened to around 44% due to the integration of Allahabad Bank's portfolio. By 2024, the CASA ratio stabilized at 40.77%, maintaining affordable funding for lending activities. Operational efficiency improved gradually, with staff numbers decreasing from ~41,800 in 2020 to 40,251 by 2024, and branch rationalization contributing to better resource management. The gross NPA ratio, which was around 9.21% pre-merger, rose to approximately 12% post-merger due to Allahabad Bank's weaker portfolio but improved significantly to 3.95% by 2024 through aggressive provisioning and recovery efforts. Profitability also improved, with NIM rising from approximately 2.85% to 3.54%, reflecting better income from loans. The merger allowed Indian Bank to strengthen its financial stability and scale despite short-term integration challenges.

Table 17:

Financial and Operational Performance of Indian Bank: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (Indian)	March 2020 (Allahabad)	April 2020 (Merged)	March 2024 (Indian Bank)
Deposits & CASA	Total Deposits (USD Million)	3,303.43	1,590.54	4,893.98	5,261.03
	CASA Ratio (%)	41.20%	47.10%	~44%	40.77%
Advances & Credit	Gross Advances (USD Million)	2,844.62	1,124.09	3,968.71	4,081.68
NPAs	Gross NPA Ratio (%)	9.21%	16.77%	~12%	3.95%
	Net NPA Ratio (%)	3.13%	5.52%	~4.2%	0.43%
	Provision Coverage Ratio (w/TWO) (%)	76%	64%	~70%	85.65%
	Slippage Ratio (%)	3.80%	4.10%	~3.9%	1.49%
Profitability	Cost of Deposits (%)	4.98%	5.37%	~5.1%	4.88%
	Yield on Advances (%)	8.90%	8.30%	~8.6%	8.72%
	NIM (Domestic) (%)	2.90%	2.80%	~2.85%	3.54%
Operational Metrics	Number of Branches (Million)	2,877	3,227	~6,104	5,851
	Total Staff(Million)	19,604	22,196	~41,800	40,251
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)					

Punjab National Bank (PNB) – Pre & Post-Merger (2020)

It is evident from the analysis given in Table 18 that pre-merger, PNB had deposits of USD 5,169.49 million and a CASA ratio of 44.30%, reflecting a moderate reliance on low-cost deposits. Post-merger with Oriental Bank of Commerce and United Bank of India, deposits increased significantly to USD 7,992.09 million, and the CASA ratio improved slightly to 40.50%. By 2024, the CASA ratio further strengthened to 42%, reducing the cost of funding. Operational efficiencies were achieved through branch rationalization and workforce optimization, reducing the cost-to-income ratio from 52% in 2020 to 48% in 2024. The merger initially increased the gross NPA ratio to 14.18%, but focused recovery efforts brought it down to 12.50% by 2024. Profitability improved, with the NIM rising from 2.60% to 2.90%, indicating enhanced lending efficiency. The merger enabled PNB to expand its market share and stabilize its financial metrics despite inheriting significant challenges related to NPAs.

Table 18:

Financial and Operational Performance of PNB: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (PNB)	March 2020 (OBC)	March 2020 (UBI)	April 2020 (Merged)	March 2024 (PNB)
Deposits & CASA	Total Deposits (USD Million)	5,169.49	1,795.01	1,027.59	7,992.09	9,176.21
	CASA Ratio (%)	44.30%	30.50%	36.50%	40.50%	42%
	Market Share (Deposits %)	5.20%	1.80%	1%	8%	8.50%
Advances & Credit	Gross Advances (USD Million)	3,976.36	1,376.43	764.68	6,117.47	7,264.50
	Market Share (Advances %)	5%	1.70%	0.90%	7.60%	7.80%
NPAs	Gross NPA Ratio (%)	14.21%	12.66%	16.77%	14.18%	12.50%
	Net NPA Ratio (%)	5.78%	5.91%	8.67%	5.90%	4.50%
	Provision Coverage Ratio (w/TWO) (%)	74.50%	77%	65%	75%	78%
	Provision Coverage Ratio (w/o TWO) (%)	62%	60%	55%	61%	65%
	Slippage Ratio (%)	2.50%	3%	4%	2.80%	2.20%
	Credit Cost (%)	2%	2.50%	3%	2.30%	1.80%

Profitability	Cost-to-Income Ratio (%)	50%	55%	60%	52%	48%
	Cost of Deposits (%)	5%	5.50%	6%	5.30%	5.20%
	Yield on Advances (%)	8%	8.50%	9%	8.30%	8.50%
	NIM (Domestic) (%)	2.50%	2.70%	2.20%	2.60%	2.90%
Operational Metrics	Number of Branches (Million)	7.0	2.4	2.0	11.4	11.5
	Total Staff (Million)	70.0	21.0	13.0	104.0	100.0
	Number of Customers (Million)	18.0	5.0	4.0	27.0	28.0
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)						

Union Bank of India – Pre & Post-Merger (2020)

Table 19 analysis supports that Union Bank of India's deposits grew significantly from USD 54,220 million pre-merger to USD 108,230 million post-merger after integrating Andhra Bank and Corporation Bank. However, the CASA ratio remained relatively stable, slightly declining from 34.40% to 33.50%, which could increase funding costs. By 2024, the CASA ratio improved to 34.00%, stabilizing funding pressures. Operational efficiency improved as redundancies were addressed, with staff numbers reducing from 76,900 in 2020 to 75,900 in 2024. This led to a decline in the cost-to-income ratio to 47%, indicating better resource utilization. The gross NPA ratio spiked to 15.34% post-merger due to weaker portfolios, but was reduced to 7.50% by 2024 through provisioning and recovery efforts. Profitability also improved, with NIM increasing to 2.90%, reflecting better returns on lending. The merger allowed Union Bank of India to address significant challenges while leveraging its expanded scale for improved operational and financial performance.

Table 19:

Financial and Operational Performance of Union Bank of India: Pre- and Post-Merger Analysis

Category	Metric	March 2020 (Union Bank of India)	March 2020 (Andhra Bank)	March 2020 (Corporation Bank)	April 2020 (Merged)	March 2024 (Union Bank)
Deposits & CASA	Total Deposits (USD billion)	54,220	27,800	26,210	108,230	146,460
	CASA Ratio (%)	34.40%	34.55%	31.40%	33.50%	34.00%
	Market Share (Deposits %)	5.70%	2.90%	2.70%	11.30%	6.50%
Advances & Credit	Gross Advances (USD billion)	43,660	23,370	19,710	86,740	99,970
	Market Share (Advances %)	5.10%	2.70%	2.30%	10.10%	5.60%
NPAs	Gross NPA Ratio (%)	14.15%	16.77%	15.35%	15.34%	7.50%
	Net NPA Ratio (%)	5.49%	5.73%	5.25%	5.49%	2.10%
	Provision Coverage Ratio (w/TWO) (%)	67.21%	65.00%	70.00%	67.40%	88.00%
	Provision Coverage Ratio (w/o TWO) (%)	52.00%	50.00%	55.00%	52.30%	70.00%
	Slippage Ratio (%)	3.50%	4.00%	3.80%	3.70%	1.80%
	Credit Cost (%)	2.50%	2.80%	2.60%	2.63%	1.50%
Profitability	Cost-to-Income Ratio (%)	51.00%	53.00%	52.00%	52.00%	47.00%
	Cost of Deposits (%)	5.20%	5.50%	5.40%	5.37%	4.00%
	Yield on Advances (%)	8.50%	8.70%	8.60%	8.60%	7.40%
Operational Metrics	Number of Branches (million)	0.0043	0.0029	0.0024	0.0096	0.0085
	Total Staff (million)	0.0372	0.0207	0.0189	0.0769	0.0759
	Number of Customers (million)	0.09	0.05	0.045	0.185	0.153
Adapted from (Annual Report of the bank, n.d.; & Press release of Bank, n.d.)						

Summary of Key Parameters of Six Banks

Table 20 (Descriptive Statistics) gives the detailed analysis of the 17-year history of the 6 major banks (SBI, BOB, Canara Bank, Indian Bank, PNB, and Union Bank), financial performance. In the case of SBI, the ROE average was 10.34 percent, and the standard deviation was 0.05872, which implies steady performance. The ROA average of 0.61%showed the steady use of assets and an enormous rise in profitability and financial soundness after the merger. The average ROE of BOB was 9.18 percent with a standard deviation of 0.09021, which demonstrates moderate variability, and the average ROA was 0.57 percent, which has significant changes (standard deviation: 0.55502). Canara Bank performed below benchmark, with an average ROE of 7.8% (standard deviation: 9.56%) and a mean ROA of 0.41% (standard deviation: 0.51%), though its performance improved over time after the merger, even though it was unstable in the beginning. The average ROE of Indian Bank was 11.51 percent (standard deviation: 6.71 percent), which is close to the industry averages, and the ROA that stands at 0.83 percent (standard deviation: 0.47 percent) indicates moderate asset utilization and stable recovery by 2024. Conversely, PNB showed great fluctuation, whereby its average ROE and ROA stood at 5.6% (standard deviation: 14.89%) and 0.35% (standard deviation: 0.84698), respectively, underscoring volatility following the merger. Finally, Union Bank had a mean ROE of 8.21 percent (standard deviation: 12.58 percent) and a mean ROA of 0.41 percent (standard deviation: 0.62), which depicts a moderate level of deviation in profitability and more variation in asset utilization.

Table 20:

Descriptive Statistics of Banks

Bank	Variables	N	Mean	SE (Mean)	Std. Deviation
SBI	ROA	17	0.609	0.084	0.35
	ROE (3 step)		0.103	0.014	0.058
	ROE (5 step)		0.103	0.014	0.058
BOB	ROA		0.567	0.135	0.555
	ROE (3 step)		0.092	0.022	0.09
	ROE (5 step)		0.092	0.022	0.09
Canara Bank	ROA		0.411	0.123	0.507
	ROE (3 step)		0.078	0.023	0.096

Bank	Variables	N	Mean	SE (Mean)	Std. Deviation
	ROE (5 step)		0.078	0.023	0.096
Indian Bank	ROA		0.826	0.114	0.47
	ROE (3 step)		0.115	0.0162	0.067
	ROE (5 step)		0.115	0.0162	0.067
PNB	ROA		0.352	0.205	0.846
	ROE (3 step)		0.056	0.036	0.148
	ROE (5 step)		0.056	0.036	0.148
Union Bank	ROA		0.409	0.151	0.626
	ROE (3 step)		0.082	0.03	0.125
	ROE (5 step)		0.082	0.03	0.125

Wilcoxon Test Results for PSBs

This section presents the outcome of testing of hypotheses based on the Wilcoxon Test, z-values, and p-values of ROA and ROE for all six banks. The results are shown in Tables 21 and 22 and Figures 3 and 4.

Table 21:

Wilcoxon Test Analysis of PSBs for Return on Assets (ROA)

Name of Banks	Z-value (Pre-merger & Post merger)	P-value
State Bank of India (SBI)	-1.4	0.161
BOB (Bank of Baroda)	-0.734	0.463
Canara Bank (CNBK)	-2.023	0.043
Indian Bank	-0.674	0.500
Punjab National Bank (PNB)	-1.483	0.138
Union Bank	-0.944	0.345

Figure 3:

Z-value (Pre-merger & Post-merger)

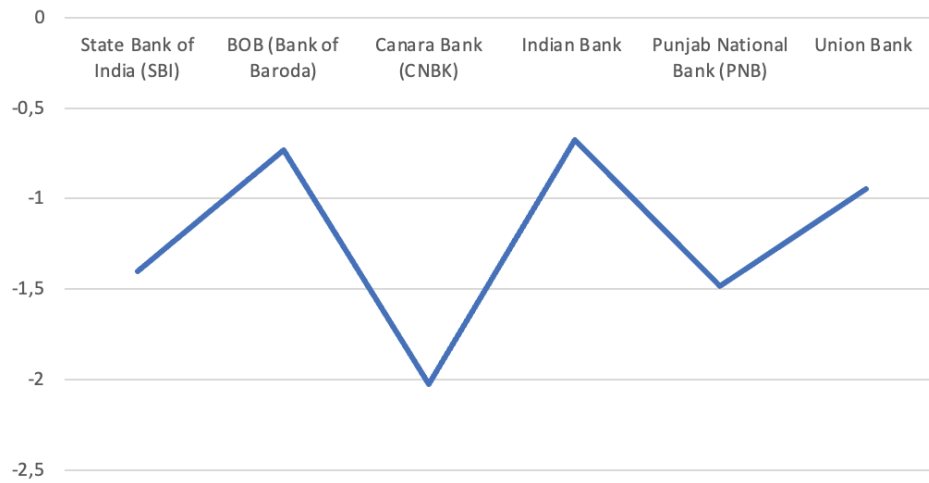


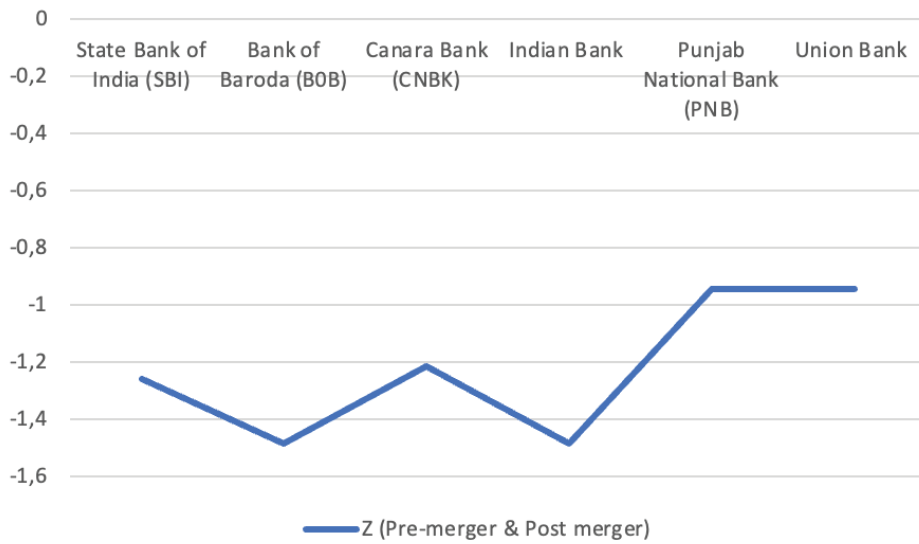
Table 22:

Wilcoxon Analysis of PSBs for Return on Equity (RoE)

Name of Banks	**Z (Pre-merger & Post merger)**	**P- value**
State Bank of India (SBI)	-1.26	0.208
Bank of Baroda (B0B)	-1.483	0.138
Canara Bank (CNBK)	-1.214	0.225
Indian Bank	-1.483	0.138
Punjab National Bank (PNB)	-0.944	0.345
Union Bank	-0.944	0.345

Figure 4:

Z-value (Pre-merger & Post-merger)



It is evident from the Z-values and corresponding p-values of the Wilcoxon Signed Rank Test stated in Table 21 that, except for Canara Bank, there is no statistically significant difference in banking performance before and after the merger in terms of Return on Assets (ROA). For State Bank of India, Bank of Baroda, Indian Bank, Punjab National Bank, and Union Bank of India, the p-values range between 0.138 and 0.500, all of which exceed the 5% level of significance, indicating that the observed changes in ROA during the post-merger period are statistically insignificant.

However, Canara Bank records a Z-value of –2.023 with a p-value of 0.043, which is statistically significant at the 5% level. This result indicates a significant change in ROA in the post-merger period, suggesting that the merger had a meaningful impact on the operational performance of Canara Bank. The lack of significant improvement in ROA for the remaining banks may be attributed to factors such as delayed realization of merger synergies, challenges associated with post-merger integration, or the influence of external market and macroeconomic conditions. In contrast, the significant improvement observed in Canara Bank reflects a more effective and timely integration process, highlighting the heterogeneous and bank-specific nature of merger outcomes.

Table 22 presents the Wilcoxon Signed Rank Test results for Return on Equity (ROE) of the selected banks in the pre- and post-merger periods. Although an improvement in ROE is observed across all banks following the mergers, the statistical results indicate that these changes are not significant, as all p-values exceed the 0.05 threshold. This suggests that the observed post-merger improvements in ROE cannot be conclusively attributed to the merger activity.

In particular, State Bank of India exhibits a marginal improvement in ROE, with a Z-value of –1.26 and a p-value of 0.208, implying that the change may be due to random variation rather than merger-related effects. Similar positive trends are observed for Bank of Baroda, Canara Bank, Indian Bank, Punjab National Bank, and Union Bank of India; however, the corresponding p-values, ranging from 0.138 to 0.345, indicate that these improvements are statistically insignificant. Overall, while ROE shows a positive movement in the post-merger period, the absence of statistically significant results suggests that the mergers did not exert a meaningful impact on the profitability of the banks, and the observed changes may be coincidental rather than merger-induced.

Hypothesis Test According to Wilcoxon Analysis

State Bank of India (SBI)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in SBI's Return on Assets (ROA) before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in SBI's ROA before and after the merger.

The p-value of 0.161 is greater than 0.05, leading to the rejection of the null hypothesis. This indicates that there is no statistically significant change in SBI's ROA post-merger, implying the merger did not have a noticeable impact on the bank's operational performance.

Bank of Baroda (BOB)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in BOB's ROA before and after the merger.

2. Alternative Hypothesis (H_1): There is a significant difference in BOB's ROA before and after the merger.

With a p-value of 0.463, which is considerably greater than 0.05, we fail to reject the null hypothesis. This suggests that there was no significant change in Bank of Baroda's ROA post-merger, meaning the merger did not result in a significant improvement or decline in performance.

Canara Bank (CNBK)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in Canara Bank's ROA before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in Canara Bank's ROA before and after the merger.

The p-value of 0.043 is less than 0.05, leading us to reject the null hypothesis. This indicates that there was a statistically significant change in Canara Bank's ROA following the merger, suggesting the merger had a measurable impact on the bank's operational performance.

Indian Bank

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in Indian Bank's ROA before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in Indian Bank's ROA before and after the merger.

The p-value of 0.5, which is much greater than 0.05, we fail to reject the null hypothesis. This indicates that there was no significant change in Indian Bank's ROA post-merger, implying the merger did not affect the bank's performance.

Punjab National Bank (PNB)

Hypothesis:

1. Null Hypothesis (H_0): There is no significant difference in PNB's ROA before and after the merger.

2. Alternative Hypothesis (H_1): There is a significant difference in PNB's ROA before and after the merger.

The p-value of 0.138 is greater than 0.05, so we fail to reject the null hypothesis. This suggests that there was no significant change in PNB's ROA post-merger, and the merger did not have a meaningful impact on the bank's operational performance.

Union Bank of India

Hypotheses:

1. Null Hypothesis (H_0): There is no significant difference in Union Bank's ROA before and after the merger.
2. Alternative Hypothesis (H_1): There is a significant difference in Union Bank's ROA before and after the merger.

With a p-value of 0.345, which is greater than 0.05, we fail to reject the null hypothesis. This indicates that there was no significant change in Union Bank's ROA post-merger, meaning the merger did not significantly alter the bank's performance.

Overall, Canara Bank is the only bank that indicates a statistically significant change in ROA with a p-value of 0.043 after the merger. But in all other banks (SBI, BOB, Indian Bank, PNB, and Union Bank of India), p-values are above 0.05, which means that there was no significant difference in ROA of these banks' pre-merger and post-merger. This implies that in the case of these banks, the mergers did not affect their performance in operations.

Differences Between ROA & ROE

Overall, as illustrated in Table 21, Canara Bank experienced a statistically significant improvement in Return on Assets (ROA) in the post-merger period, indicating that the bank's operational performance benefited from the merger. However, as reported in Table 22, although all the banks exhibited an increase in Return on Equity (ROE) after the merger, these changes were not statistically significant. This suggests that while mergers may have resulted in certain favourable changes in the profitability of some banks, such improvements were not strong enough to be considered statistically significant and may be attributable to external factors rather than the merger itself.

Conclusion

The case study of Indian Public Sector Banks (PSBs) in the pre- and post-merger periods is important for understanding the effectiveness of consolidation policies in the context of the hypotheses tested for Return on Assets (ROA) and Return on Equity (ROE). Mergers, which are envisaged as a mechanism to enhance financial stability, operational performance, and address systemic weaknesses, have produced mixed outcomes, as reflected in the hypothesis testing results.

Banks such as the State Bank of India (SBI) and Bank of Baroda (BOB) illustrate that mergers can lead to operational and financial improvements when post-merger integration is effectively managed. SBI recorded an improvement in profitability, with Return on Equity (ROE) increasing to approximately 16% by 2024, reflecting better operational efficiency. However, consistent with the hypothesis testing results, the change in Return on Assets (ROA) for SBI was not statistically significant, leading to the acceptance of the null hypothesis. Similarly, Bank of Baroda experienced a substantial improvement in asset quality, with gross Non-Performing Assets (NPAs) declining to 2.99% by 2024 from 10.02% in 2019; however, the hypothesis results indicate that the changes in ROA were not statistically significant.

SBI was able to leverage the merger to expand its scale of operations, rationalize processes, and stabilize key financial indicators such as Net Interest Margin (NIM) and ROE. Nevertheless, in line with the ROE hypothesis results, the observed improvement in ROE was not statistically significant. Similarly, although Bank of Baroda achieved notable reductions in NPAs and improvements in operational efficiency, these gains did not translate into statistically significant changes in either ROA or ROE.

In contrast, banks such as Punjab National Bank (PNB) and Union Bank of India faced considerable challenges in the post-merger period. Consistent with the hypothesis testing results, these banks did not exhibit statistically significant improvements in ROA or ROE, largely due to difficulties related to operational inefficiencies, absorption of weaker institutions, and post-merger integration challenges. Issues associated with cultural and procedural integration further constrained performance, highlighting the complexity of merging heterogeneous organizational structures.

Overall, the findings derived from hypothesis testing indicate that mergers are not a universal solution to the challenges faced by PSBs. While selective improvements in operational and financial indicators are observed, statistically significant chang-

es in ROA and ROE are limited and bank-specific. The effectiveness of mergers, therefore, depends on governance quality, integration strategies, and sustained efforts to enhance asset quality and profitability rather than the merger event itself.

In conclusion, although mergers may contribute to scale expansion and financial resilience, the hypothesis-based evidence suggests that their impact on ROA and ROE remains limited and uneven across banks. Long-term strategic execution, continuous monitoring, and adaptive management are essential for ensuring sustainable growth and financial stability in Indian PSBs.

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