*Quest Journals*
*Journal of Research in Business and Management*
*Volume 13 ~ Issue 1 (2025) pp: 30-35*
*ISSN(Online):2347-3002*
www.questjournals.org

**Research Paper**

# Evaluating Credit Risk Efficiency in Indian State-Owned Banks: Pre-Merger vs. Post-Merger Perspectives

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***ABSTRACT***
*Indian banks are increasingly engaging in mergers, combining resources under a unified charter to enhance efficiency, expand operations, and strengthen credit risk management. This study assesses the impact of mergers on the credit risk performance of Indian state-owned banks, focusing on Canara Bank, Punjab National Bank (PNB), and Bank of Baroda (BOB). Using secondary data, key credit risk indicators such as operational efficiency, management efficiency, capital adequacy ratio, return on assets, liquidity, CASA ratio, and non-performing assets (NPA) ratio are analysed. The paired t-test methodology evaluates pre- and post-merger performance. Findings reveal a decline in NPAs across all banks in the post-merger period, a significant factor driving mergers. Notably, Canara Bank and PNB demonstrated improved performance across all parameters, while BOB experienced a decline in competency post-merger.*
***Keywords-*** *Bank of Baroda, Canara Bank, Credit risk Productivity, Punjab National Bank, Non-performing ratio, Capital Adequacy ratio.*

***R****eceived 02 Jan., 2025;* ***R****evised 11 Jan., 2025;* ***A****ccepted 13 Jan., 2025* *© The author(s) 2025.*
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## I. INTRODUCTION

In recent decades, the banking industry in India has experienced substantial improvements. The "scheduled commercial banks registered under Schedule II of the Reserve Bank of India are separated into three categories: public sector, private sector, and foreign banks". The government holds more than 50% of the shares in public sector banks.14 large Indian banks that accounted for nearly 80% of all bank accounts were nationalised by the government in 1969. Six more banks had their names approved by the government in 1980. (Kausingh and Sridharan, 2019). After the start of liberalization in 1991, mergers of banks became very trendy. Many small banks have amalgamated with larger banks primarily to safeguard depositor interests. Later, in 1993, the government turned to bank mergers as another step towards financial stability. The PNB and the New Bank of India were merged. This was the first merging of nationalised banks in Indian history, which caused the country's total number of banks of this kind to drop from twenty to nineteen, where it is still today (Ishwarya, 2019).

The central government recently planned to establish three to four banks with worldwide reach. As a result, 10 public sector banks (PSBs) are combined into four. This paper describes three of them:

*1.1 Merger of "Punjab National Bank, Oriental Bank of Commerce and United Bank"*

The merged bank began operations on April 1st, 2020, under a new identity and logo. Creating a worldwide bank, better risk management and credit policies, and oversight of major loans to prevent fraud were reasons for this merger. On 30th August 2019, India's Finance Minister Nirmala Sitharaman announced the merger of the "United Bank of India and Oriental Bank of Commerce into Punjab National Bank". The position of these three banks as of 31st March 2019 was as follows:

**Table No. 1: Financial position as of 31st March 2019**

| | Punjab National Bank | Oriental Bank of Commerce | United Bank of India |
|---|---|---|---|
| **Headquarters** | New Delhi | Gurgaon | Kolkata |
| **Type** | Public | Public | Public |

| Founded | 19 May 1894 | 19 Feb 1943 | 1950 |
|---|---|---|---|
| Total Business (in Crore Rs) | 11,82,225 | 4,04,194 | 2,08,105 |
| Deposits (in Crore Rs) | 6,76,030 | 2,32,645 | 1,34,983 |
| Net NPA ratio | 6.55 | 5.93 | 8.67 |
| CASA ratio | 42.16 | 29.40 | 51.45 |
| CRAR ratio | 9.73 | 12.73 | 13.00 |

*1.2 Merger of "Bank of Baroda, Vijaya Bank and Dena Bank"*

The merged bank began operations on April 1st, 2019. Following this merger, it became the third-largest bank in India. Since "Dena Bank and Vijaya Bank" had a greater regional focus than BOB, this merger improved network coordination, low-cost deposits, and subsidiaries (Botta, 2018). The Main justification for merging the banks is to address the increasing number of bad loans. Their financial Position as of 31st March 2018 is as follows:

**Table No. 2: Financial Position as of 31st March 2018**

| | "Bank of Baroda" | "Vijaya Bank" | "Dena Bank" |
|---|---|---|---|
| Headquarters | Vadodara | Bengaluru | Mumbai |
| Type | Public | Public | Public |
| Founded | 20th July 1908 | 23rd October 1931 | 26th May 1938 |
| Total Business (in Crore Rs) | 7,19,999 | 1,77,632 | 1,92,315 |
| Deposits (in Crore Rs) | 5,91,314 | 1,57,288 | 1,06,130 |
| Net NPA ratio | 5.49 | 4.32 | 11.95 |
| CASA ratio | 41.20 | 25.04 | 40.03 |
| CRAR ratio | 12.13 | 13.90 | 11.09 |

*1.3 Merger of "Canara Bank with Syndicate Bank"*

The merger of these two banks took place on 1st April, 2020, resulting in the formation of the fourth-largest public-sector bank, with a combined revenue of Rs. 15.2 trillion. The central government believed that merging banks would assist in recovering and minimising problematic NPAs. The financial application that both "Syndicate Bank and Canara Bank" use, iflex, helped the two banks come together. Their financial position as of 31st March 2019 was as follows:

**Table No. 3: Financial position as of 31st March 2019**

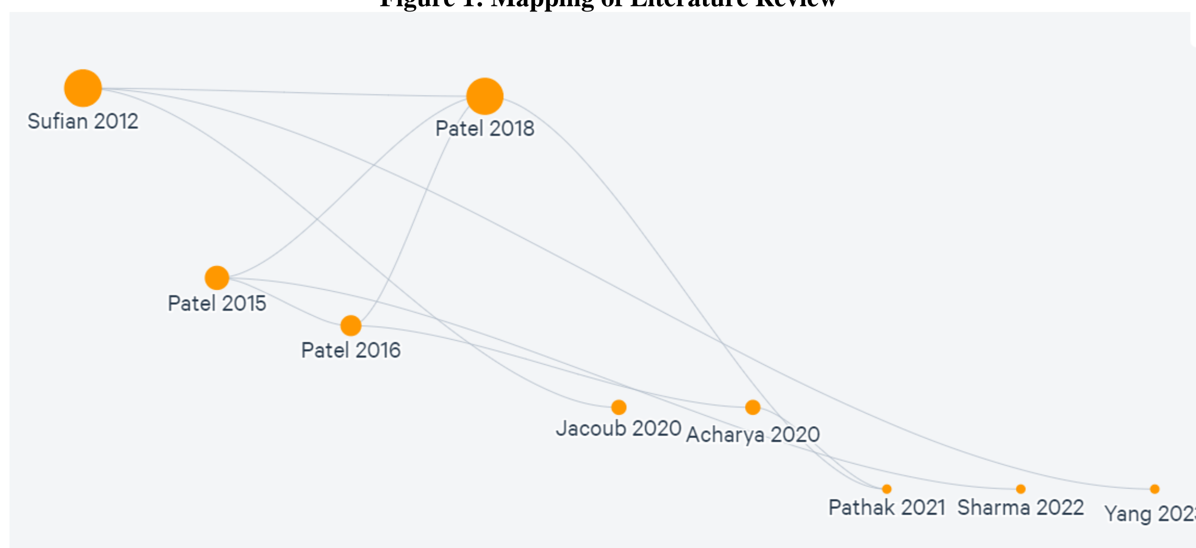
| | Canara Bank | Syndicate Bank |
|---|---|---|
| Headquarters | Bengaluru | Manipal |
| Type | Public | Public |
| Founded | 1st July 1906 | 1925 |
| Total Business (in Crore Rs) | 6,94,766 | 3,11,278 |
| Deposits (in Crore Rs) | 5,99,033 | 2,59,896 |
| Net NPA ratio | 5.37 | 6.16 |
| CASA ratio | 30.86 | 36.77 |
| CRAR ratio | 11.90 | 14.23 |

This paper is arranged as follows: An overview of empirical research on bank mergers is provided in the next section. Section III indicates the research gap which the researcher found after looking at the literature. Section IV outlines the objective that this research attempts to accomplish. In section V, the research methodology is discussed. Section VI presents the data analysis of the selected financial parameters. The paper concludes in section VII.

## II. LITERATURE REVIEW

**Yang and Effah (2023)** examined the effects of acquisition through purchased and assumption agreements held on companies from the Ghana stock exchange between the period from 2015 to 2019 and assessed that efficiency levels did not increase throughout the process. **Sharma & Mahapatra (2022)** highlighted the growth of mergers in the banking industry particularly in Indian state-owned banks through the thematic study of literature. **Pathak (2021)** examined 22 mergers between 48 financial institutions that occurred between the years 2004 and 2013 and found that Nepali financial institutions merged solely to boost capital bases without creating any synergistic effects. Conversely, **Acharya (2020)** noted positive post-merger indicators for Nepal Rastra Bank, including enhanced employee benefits and improved credit flow, suggesting that some mergers can yield favourable outcomes in specific contexts. **Jacoub et al. (2020)** found in their study held on 24 local private banks in Indonesia between the period 2002 and 2017 that credit quality improved where the NPL ratio decreased after the merger process. **Ishwarya (2019)** examined merger and acquisition trends in the banking sector, in India and observed that these activities predominantly target the restructuring of weaker banks, which reflects a strategic response to systemic vulnerabilities. **Singh and Das (2018)** further explored the role of procedural, physical, and sociocultural factors in the post-merger integration process, asserting that these elements significantly influence the success of M&A endeavours. **Patel (2018)** discovered that the performance was somewhat enhanced. In comparing the long-term profitability of some Nationalized banks in the before and post-merger scenario, **Patel (2016)** discovered that while "earnings per share (EPS), profit per employee, and business per employee" showed a positive change after the merger but the merger had a negative effect on "return on assets (ROA), return on equity (ROE), net profit ratio, yield on advance, and the yield on investment". whereas **Patel (2015)** undertook a study on 4 selected banks for 5-year pre and 5-year post-data and found that mergers had a positive effect on the Indian banking sector. **Sufian et al. (2012),** in their examination of Malaysian banks from 1996 to 2009, found no significant changes in financial performance post-merger, attributing discrepancies in findings to factors such as sample selection, financing methods, and the temporal gap between merger completion and realization of benefits.

**Figure 1: Mapping of Literature Review**




## III. RESEARCH GAP

There is a need to compare the credit risk efficiency of the leading Government banks after acquiring other banks by taking into account additional variables related to the banking business could be a research gap based on the literature evaluation. There is a void in the literature regarding a comparative examination of several banks in terms of credit risk performance after a merger. Additionally, by adding new variables such as the CAR, casa ratio, management efficiency, and NPA ratio, among others, it is possible to have a deeper picture of how these banks' post-merger credit risk performance has evolved indicating a research gap.

## IV. OBJECTIVE

The study's main goal is to analyse banks' post-merger scenarios in terms of an increase in their productivity in managing credit risk.

**Hypothesis**

Null hypothesis- The credit risk productivity of selected banks is not significantly impacted by mergers.

## V. RESEARCH METHODOLOGY

The main aim of this study is to appraise the credit risk productivity of three recently merged banks – *"Bank of Baroda, Punjab National Bank, and Canara Bank"* - using secondary data. The study spans four financial years*, with two years prior to and two years following the merger.* The researchers employed *paired t-tests* to compare the credit risk productivity before and following the merger. In the past, many researchers, including Ghosh and Dutta (2014), Patel and Patel (2015) and Duggal (2015) have employed the paired t-test to evaluate comparative analysis. Additionally, mean difference and percentage were also used.

## VI. DATA ANALYSIS AND INTERPRETATION

The credit risk performance of selected PSBs is assessed through multiple indicators of credit risk. For the same, data were collected for four financial years for each selected bank in which two financial year data were from the pre-merger period and the following two-year data were from the post-merger period. For measuring the indicators, different formulas were used which are as follows:

**Table No. 4: Credit risk productivity variables with their formulas**

| Variables | Formula |
|---|---|
| Operating efficiency ratio | Operating Expenses to Total Assets |
| Managerial Efficiency ratio | Net Interest Income to Total Assets |
| Capital Adequacy ratio | (Tier 1 + Tier 2) Capital to Risk-weighted assets |
| Bank's Profitability | Net profit after tax to Total assets |
| Bank's Liquidity ratio | Total Loans or Credit to Total deposits |
| CASA ratio | Domestic casa to domestic deposit |
| Net NPA ratio | Net non-performing loans to net total loans |

**Table No. 5: Statistics of different ratios for selected banks**

| Indicator | "Bank of Baroda" | | "Punjab National Bank" | | "Canara Bank" | |
|---|---|---|---|---|---|---|
| | Differences in pre- and post-merger mean | % change | Differences in pre- and post-merger mean | % change | Differences in pre- and post-merger mean | % change |
| Operational Efficiency | 0.25 | 17.19 | 0.11 | 7.51 | 0.10 | 6.15 |
| Managerial Efficiency | 0.15 | 5.63 | 0.15 | 6.73 | 0.45 | 18.29 |
| Capital Adequacy Ratio | 1.37 | 10.72 | 2.48 | 20.74 | 1.27 | 9.90 |
| Bank's Profitability | 0.20 | 142.86 | 0.81 | 133.88 | 0.49 | 373.08 |
| Bank Liquidity | (1.20) | (1.52) | (5.18) | (7.68) | (6.26) | (8.90) |
| casa ratio | 0.28 | 0.70 | 2.68 | 6.11 | 3.38 | 10.65 |
| NPA ratio | (1.30) | (29.48) | (0.90) | (14.67) | (1.56) | (32.53) |

*Source- Author's calculation through data collected from "annual reports of selected banks"*

In Table No.5, the researcher has mentioned the mean difference and percentage growth for all selected banks. The mean difference is computed by subtracting the pre-merger mean from the post-merger mean. Additionally, the percentage is computed as follows: (post-merger mean minus pre-merger mean)/pre-merger mean*100. In this table, many variables are covered which are indicators of "credit risk productivity". Operational efficiency has a mean difference of 0.25 and a percentage change of 17.19 % for of Bank of Baroda which is the highest among all three banks is a negative sign of better performance and it could be mainly due to inadequate training or supervision of employees after the process of merger. The managerial efficiency is higher in the case of Canara Bank having a mean difference of 0.45 counted as an 18.29 % increment from the pre-merger period but still, the managerial efficiency has not improved very much in all three banks showing less competency of managers policies, managers may experience a considerable deal of ambiguity and confusion as a result of mergers and the roles and responsibilities may not be clearly defined as a result, which could hinder efficiency. Capital adequacy has increased in all three banks but it is maximum in Punjab National Bank which has a mean difference of 2.48 and has increased at 20.74 %, it is a measure to ensure that they can absorb potential losses or shocks to the system. If a bank falls short of these requirements, it could be needed to raise additional funds. A bank may need to raise its capital adequacy in the event of a merger or acquisition in order to satisfy regulatory requirements or to support the higher risk brought on by the merger. Banks profitability which has been measured through

return on assets showed tremendous percentage increases in all three banks i.e. 142.86 %, 133.88% and 373.08% in the “Bank of Baroda, Punjab National Bank and Canara Bank” respectively which could be due to reason of an increase in market share, which allows the merged entity to generate more revenue. With a larger customer base and expanded product offerings, the merged entity may be able to generate more revenue per customer and increase its overall market share. Bank’s liquidity here is measured through the credit deposit ratio (CDR) which is showing a decreasing trend in all banks. Overall, if a low CDR following a merger is the result of prudent lending practices or integration difficulties that can be resolved over time, it may not necessarily be a cause for concern. However, if it arises from the loss of customers or other issues that restrict the merged entity's ability to grow, it can be cause for concern. CASA ratio is higher in the case of Canara Bank having a mean df of 3.38 and a percentage increase of 10.65 %, the merger provides the bank with a larger customer base, better bargaining power, and cost synergies, all of which contribute to an increase in the CASA ratio. The last and major indicator is the NPA ratio which signifies the ratio of non-performing loans (NPAs) to total loans and is the main reason which is by two banks merge because it ultimately nullifies the NPAs of smaller Indian public sector banks. And by reviewing the data of the three banks they all succeeded in reducing their NPAs after the merger by reducing more than 10 % of their NPAs and Canara Bank surpassed both banks in reducing their NPAs at the rate of 32.53 %.

**Table No. 6: Significance level of different variables in Chosen Banks**

| **Indicators** | **“Bank of Baroda”** | | **“Punjab National Bank”** | | **“Canara Bank”** | |
|---|---|---|---|---|---|---|
| | **p-value** | **Significant/ not significant** | **p-value** | **Significant/ not significant** | **p-value** | **Significant/ not significant** |
| Operational Efficiency | 0.021 | “significant” | 0.054 | “significant” | 0.054 | “significant” |
| Managerial Efficiency | 0.521 | “Not significant” | 0.268 | “Not significant” | 0.112 | “Not significant” |
| CAR | 0.034 | “significant” | 0.047 | “significant” | 0.008 | “significant” |
| Bank's Profitability | 0.484 | “Not significant” | 0.042 | “significant” | 0.367 | “Not significant” |
| Bank Liquidity | 0.602 | “Not significant” | 0.19 | “Not significant” | 0.189 | “Not significant” |
| casa ratio | 0.924 | “Not significant” | 0.047 | “significant” | 0.017 | “significant” |
| NPA ratio | 0.435 | “Not significant” | 0.053 | “significant” | 0.004 | “significant” |

*Source- Author’s calculation through SPSS*

Table No. 6 displays the level of significance for various variables across all three banks for which the researcher tested the hypothesis using a paired t-test computed through SPSS. The *difference is significant if the p-value for the t-statistic is less than 0.05, and if it is greater than 0.05, it is not significant.* Operational efficiency significantly differs negatively in each of the three banks, with p-values for “Bank of Baroda, Punjab National Bank, and Canara Bank” being 0.021, 0.054, and 0.54, respectively. The merger significantly improved the level of capital adequacy in each bank. Only in the case of Punjab National Bank did the merger significantly improve the bank's profitability, while only Punjab National Bank and Canara Bank experienced significant positive effects from the casa ratio and NPA ratio.

## VII. CONCLUSION

The period under investigation suggests that the overall merger activity seems to have contributed less value than anticipated to the acquiring business. Comparing Canara Bank and Punjab National Bank using the mean difference and percentage change in several variables showed that Canara Bank has fared better overall, but Punjab National Bank has come close to matching it. Bank of Baroda has trailed behind in this comparison. This could be because of a variety of factors, including the macroeconomic situation and the merger's objective from the standpoint of the acquiring bank. Overall, the results are not very significant which is in line with the previous studies that happened in this area but still, Punjab National Bank has the most significant results in different variables compared to the other two banks. The reason why the results are not significant is that pre- and post-

year understudy were restricted for pre-2 years and post-2 years but long-term studies can be conducted to examine the effects over time which is a research limitation for this study.

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