Public Sector Banks Amalgamation in India: An Empirical Evidence

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Abstract

Public sector banks are an important vehicle of financial penetration in India right from nationalization of banks in 1969 when the government of India has taken ownership of banks in the public interest. During the last decade, there are questions arising about the operation and efficiency of public sector banks in India. In 2018 public sector NPAs hit a record level after the government of India has taken much forward step in form of amalgamation of banks in India. The government has reduced the number of public sector banks, twelve (12) in 2020 and it was twenty-seven (27) in 2017. The government has claimed that amalgamation will improve the health and operational efficiency of public sector banks they also put the argument that after amalgamation the size of assets, deposits, and capital will be increased and that will improve the profitability of banks and also cut the cost of banks. In this paper, we will examine this argument by considering an assumption that if the amalgamation exercise done by the government in 2005 and how would that affect the bank's specific factors and will compare that with without amalgamation. Firstly, we have examined the public sector bank's bank-specific indicator scenario after that we have applied econometric analysis to check the empirical evidence of the amalgamation of banks in India.

Keywords: Amalgamation, Non-performing assets (NPAs), Profit, Expenses, Income, Capital, Deposit Assets etc.

Introduction

Government of India has entered into banking business in 1955 when Imperial bank of India was nationalised and it renamed as State Bank of India. The Social Control Act of 1968 has brought the banking industry in India under the purview of social banking. In 1969, fourteen private banks were nationalized and six more banks were nationalized in 1980, the major banking segment has come under government ownership. Social banking got started in name of banks' lending in the priority sector which consists of sectors like agriculture, small-scale industry, marginal and small farmer, and banking coverage to the vulnerable section of society. In the mid-1991 government of India has to introduced financial sector reform in tune with the liberalization and privatization wave trending across the world. The main aim of financial reform was to address the rigidity, weakness, and stability of the financial and banking system along with promoting efficiency, the diversified culture of management, competition, and cooperation. Priority sector lending was introduced in 1969 and by end of mid 1990 it eroded the profitability and efficiency of public sector banks in India. The first committee of financial reform in 1991, known as the Narasimham Committee, initiated the bank and financial reforms in India. As per the recommendation of the committee, the poor financial health and low efficiency of commercial banks were due to the excessive magnitude of the central direction of their operations and management regarding branch expansion, investment, credit disbursement, and excessive degree of political interference resulting into banks in the framework of internal economy. Private Sector Banks had been allowed to enter the industry to infuse competition into the banking system. Non-bank financial companies (NBFCs) also emerged as a competitive force. Competition in the banking sector had been increased by laying down entry norms for private sector banks. Several private and foreign had come up and started business and operations from 1991-92 onwards. Entry of all these players have given competition to public sector banks in banking business. In 1992-93 RBI has introduced the Capital Adequacy Ratio (CAR) to improve the bank's base capital and absorb the losses. Since banks are exposed to risks and highly leveraged, the capital adequacy requirement has provided them with the financial cushion to deal with the adverse and downward effects on their portfolio. As a result of the inclusion of capital adequacy norms the government had to move a large number of funds and resources to public sector banks for achieving the required capital adequacy ratio. The global financial crises of 2008 has badly hit the banking industry across the globe, Indian banking system could not save from this crises and public sector banks were badly impacted from the crises. The twin balance sheet problem has brought the public sector banks under severe stress and by 2018 the level of NPAs has reached at 14.58 percent of gross advances of public sector banks. Government of India has stepped in and put recapitalisation plan for banks and also do amalgamation of banks exercise. Oriented Bank of Commerce and United Bank of India are amalgamated with Punjab National Bank, Syndicate Bank amalgamated with Canara Bank, Andhra Bank and Corporation Bank are amalgamated with Union Bank of India, Dena Bank and Vijay Bank are amalgamated with Bank of Baroda while State Bank of Bikaner and Jaipur, State Bank of Hyderabad, State Bank of Mysore, State Bank of Patiala, State Bank of Travancore and Bharatiya Mahila Bank are amalgamated with State Bank of India. In this paper, we have examined the public sector banks business indicators and also have looked into the argument of banks amalgamation for achieving better efficiency and profitability. To predict banks amalgamation is right or wrong, we have supposed a condition where government has done same amalgamation exercise back in 2005 with same individual banks because these banks are operational in 2005. Based on this assumption we have predicted the right and wrongness of amalgamation. We have also compared supposed condition (with amalgamation) results with banks without amalgamation results. In econometrics, we test these condition based on the claim of government regarding the amalgamation of banks will increase the size of assets, deposits, and capital of banks which will further improve the profitability of banks and also cut the expenses of banks.

Literature Review
Kakani et al. (2006) revealed that the banking industry in India would slowly but moving from a large number of small banks to a small number of large banks. The primary target of this study was to find out the actual reason for mergers and acquisitions (M&A) in the Indian banking system. The study suggested various reasons for M&A like adhering to Basel norms, internal financial stability and bankruptcy risk, and regulatory framework. It also concluded the prime reason for M&A was to create universal banks or financial super market in the Indian banking sector.

Murthy (2007), had examined the M&A of five (5) commercial banks. It considered the case of New Bank of India and Punjab National Bank, Bank of Madura and ICICI Bank, ICICI Ltd. and ICICI Bank, Oriental Bank of Commerce and Global Trust Bank, and Centurion Bank with Bank of Punjab. The study revealed that M&A was an important exercise for improving the bank's financial indicators like strengthening the branch network, and technology advancement, widening the customer base, and creating a stronger operational structure. It also concluded various other bank parameters like human resource management.

Bansal and Kumar (2008) focus on evaluating the claims made by the corporate sector when the firm moves to M&A and check whether it is achieved or not achieved in the Indian context. They conclude that the management of the company or firm does operating and financial strategies in different ways while going toward acquisition and merging. They have used secondary data from firms and applied correlation, and ratio analysis.

Sufian et. al. (2009) examined the technical efficiency score of Malaysian banking from 1997 to 2003 after the merger of banks. The study revealed improvements in the technical efficiency score of banks after the merger. This study concluded that Malaysian domestic banks had been forced to merge due to some economic reasons.

Kaushik K.P. and Sinha Neena (2010) study the financial health of companies after M&A during 200-08 by using the ratio approach and examined the change in portfolios. The study has also estimated the pre-merger and post-merger efficiency of companies by using Wilcoxon signed rank. The researcher found that there is a significant change in shareholder earning but no significant change in the liquidity position of the firms. They also conclude that there is a significant correlation exists between M&A deals and financial performance in long run.

Raiyani J.R. (2010), evaluated the financial indicators of some of the banks and found gains in indicators post-merger. Private sector banks(PVS) were found more efficient the public sector banks(PSB). The researcher had taken six (6) banks for study namely PNB, BOB, OBC, CBOP, HDFC, and ICICI bank. Data was taken from annual reports of respective banks, PROWESS, and corporate database. The study applied CAMELS Model and used the student t-test for estimating financial indicators based on CAMELS Model.

Ravichandran et al. (2010) analyzed the bank's financial indicators pre and post-merger. The study had been done by applying the CAMELS variable and using factor and regression analysis. The researcher concluded that the merger had not empowered the efficiency and productivity of the banks and did not show any significant difference. It was also suggested that the primary reason for M&A was the problem in bank operations and banks were focused on their retail operations.

Krishnamurthy (2010) estimated the bank's performance and found that banks were extending high-interest rates and concentrated on income-generating activities post-merger. The study applied the CRAMEL model and selected CAMELS-type indicators. Factor analysis and T-test were used by the researcher for analysis. The study concluded that profit margin, capital adequacy ratio, and profitability were found significant effects on the bank's efficiency post-merger.

Sinha Pankaj & Gupta Sushant (2011) have studied a pre and post-merger and acquisitions analysis of firms. They find positive effects of mergers and acquisitions on profitability and deteriorated effects on most of the firms. It also found positive effects on earnings before Interest and Tax (EBIT), cost efficiency, return on shareholder funds, interest coverage, profit margin, interest coverage, etc. after M&A.

Tlha, Sallehuddin (2011) has studied the Malaysian banking sector after M&A and found improvement in the debt ratio. They have used the theoretical framework of efficiency theory which is the principle side of acquisition explanation. The study was focused on the financial strategies obtained by the ten (10) Malaysian Banks in the year 2000 after the M&A program. The efficiency theory includes three elements i.e., managerial synergy, operation synergy, and financial synergy. The study has mainly focused on the analysis of the management of debt.

Kouser and Irum (2011) analyzed ten (10) post-merger banks and checked their impact on acquirer banks. They analyze the bank's gross profit margin, return on capital, debt-equity ratio, return on net worth, and net profit margin for measuring the impact. The study found significant results for only a few parameters after post-merge.

Jalandhar, et al. (2011) evaluated the performance in total assets and deposits, investment, profitability, and revenue of the Indian commercial banks. He argued that banks merge was not just about merging two banks' balance sheets but the main challenge after a merger to managing the customer and employee relationship. The researcher also concluded that the prime or actual benefits of the merging program are coming from the advancement in technology, the increase in capital adequacy ratio which mitigates the risk default, and the imperative of international risk management practices.

Khan A. A. (2011) studied two banks' performance before and after the merger and concluded the performance and efficiency of the banks increased after the merger. In the research, he checked whether merging leads to profitability or not. For this researcher compared the pre and post-performance of banks in terms of net interest margin, return on capital and return on equity. The researcher took three years before and after merging data. The independent t-test had been used by the researcher for measuring the pre and post-merger efficiency.

Sinha P. and Gupta S. (2011) have studied eighty cases of M&A form 1993-2010. The study finds that profit before depreciation and profit after tax, tax, and Interest are positively related after the merger but there is a decline in the current ratio which represents the liquidity position. It came to find that firms may be able to leverage the synergies arising out of merger and acquisition that have not been managed to their liquidity position.

Joshua (2011) studied the banks of Nigeria and check the empirical impact of mergers and acquisitions (M&A) on financial performance and efficiency. The study was based on secondary data and used multiple financial indicators like assets of banks,
gross earnings, and profit after tax. The researcher applied a t-test and SPSS software. The results concluded that after the merger financial indicators had shown improvement in the bank's efficiency. The t-test result has registered an improvement in the combined mean of banks for gross and net earnings but meanwhile, profit after tax depicted a decline.

**Goyal et al. (2012)** revealed that mergers and acquisitions (M&As) were an important instrument for corporate sector restructuring which reflected in an organization to create effectiveness, and synergy and maintain a sustainable competitive advantage in the business environment. He had considered ICICI Bank Ltd study purpose which is the largest private sector bank in India and had acquired nine (9) business firms. The basic focus of this study was to estimate the growth indicator of ICICI Bank Ltd through amalgamation, mergers, and acquisitions. It also suggested that the firms must adopt the devised strategy in three (3) phases manner i.e. pre-merger, acquisition, and post-merger phase.

**Bihari (2012)** investigated two banks and examined four mergers since 1999 and check the short-run wealth creation of bank shareholders. It had also been examined that the target bank was in a gainful position while the bidder bank groups have lied in a losing position. The author concluded that merger and acquisition (M&A) might have both directional positive and negative impacts on shareholder’s wealth.

**Kouser and Saba (2012)** the study estimated the CAMEL model. The study suggested that the CAMEL model was appropriate for measuring the financial indicators of banks. ANOVA statistical technique had been applied to estimate the significant difference between the before and after merger period.

**Prasad and Ravinder (2012)** estimated the efficiency of banks on the CAMEL model which evaluated the performance and efficiency of banks post-merger. It examined important financial indicators like asset quality, capital adequacy, management efficiency, liquidity, and earning quality. The study considered twenty (20) nationalized banks.

**Deverajappa (2012)** found various reasons for the merger program in the Indian banking industry. The has estimated pre and post-merger performance of the Indian banks by considering various financial indicators like operating profit margin, gross profit margin, net profit margin, return on capital employed, and debt-equity ratio. The study applies an independent T-test to find the level of significance. The results show that after the merger the financial indicators have increased.

**Khan A. A. (2012)** studies two cases for evaluating merging programs. Case I – Global Trust Bank and Oriental Bank of India) OBC and Case II- Bank of Baroda and South Gujarat Local Area Bank Ltd. The researcher considers various ratios parameters like net profit margin and operating profit margin in pre and after-merging programs. He uses T-test for comparing ratios after pre and after-merging. This study has concluded that M&A is the best useful mechanism of growth and development in the Indian banking industry.

**Tanwar N. (2013)** evaluates the growth profile of merged banks before and after the merger period. It has compared pre and post-merger indicators based on various ratios parameters like return on equity, and return on capital employed. net profit margin, debt-equity ratio, gross profit margin, etc. The result indicates that after the merger the efficiency of banks increased.

**Kumar S. (2013)** study the pre-merger and post-merger analysis of the banks after the implementation and execution of reform. There have been significant changes in the perception, working, and ideas of commercial banks in India. The author investigates the pre-merging and post-merging performance of India Overseas Bank and Bharat Overseas Bank. He also measures and compares their efficiency indicators like profit per employee, business per employee, returns on assets, etc. The study has concluded that larger banks are more efficient and have less risk than smaller banks. Although individual bank branches find it too effective but the combined technology and assets platform of the parent firm will be effective in reducing the risk, which individual banks cannot do.

**Bhardwaz M. (2014)** has concluded clearly that on average there is found statistically significant improvement in the performance or the efficiency of banks after the merger program. The author has concluded that the magnitude of M&A in India increased two-fold in 2009 from 2008 and four times as compared to the year 2007.

**Chellasamy and Ponsabariraj (2014)** have studied the efficiency and performance estimation of mergers and acquisitions (M&A) of commercial banks in India. The study evaluated the before and after merger financial indicators and performance of the banks which have been merged based on various bank’s specific parameters namely, return on equity, current ratio, profitability, etc. The study includes the period from 1999-2000 to 2010-11. For comparing the pre and post-M&A a paired T-test has been used and find a significant relationship between liquidity and profitability performance before and after the merger. The study also investigates that there have been not many changes come after the merger, in the financial performance of banks.

**Fatima T. and Shahzad A. (2014)** have examined the bank’s profitability in pre and post-merger exercises and also suggest the best input for awareness. The authors have focused on six financial ratios i.e. return on twenty-four assets, profit after tax, debt to equity ratio, deposit to equity ratio, EPS, and return on equity. For the study, ten (10) commercial banks were selected which had been merged between 2007-2010. The data had been collected three years pre-merger and three years post-merger of all ten (10) banks and their averages were compared. This study concluded that there were only significant results for return on equity that was affected by M&A other parameters had not shown any significant result. For ratios analysis, a paired T-test had been applied.

**Alam et al. (2014)** evaluated various financial indicators which affect the business of the banks post-acquisition. The researcher considered forty-seven (47) acquired banks and thirty-three (33) acquiring banks from the ASEAN region. The study considered data from 2003 to 2011 by using a matching strategy and it was taken from World Bank, bank scope. The CAMEL model had been used to select explanatory variables. It had concluded that pre-financial crises, the acquired banks were indicated to have higher loan activities. The study suggested that financial crises had brought some indicators which affected the efficiency post-acquisition.

**Meena S. and Kumar P. (2014)** concluded that financial parameters trends in Indian banking have been restricted to the restructuring of inefficient banks. It had also been examined that the Indian banking sector needs giant banks to amalgamate the weak banks and also suck the risk of default. M&A programs should be framed in a manner that gave opportunities to create economies of scope and scale in the banking sector.
Knapp et al. (2014) estimated the after-merger difference in the credit risk scenario of merger banks holding companies. A researcher tested the change in credit risk post-merger due to a change in the loan portfolio. Markowitz's procedure had been applied to find the standard deviation of an investment portfolio of banks. The author has investigated the significant difference between non-performing assets (NPAs) and the variability of loan charge-offs. This also concluded that there were significant changes in loan categories post-merger.

Gupta K. (2015) examined the bank's indicators i.e. efficiency, profitability, and performance before and after merger and accusation (M&A). He had taken two cases one was the merger of CBOP and HDFC and the second one was the merger of ICICI bank and BOR bank. The results indicated that the merger between BOR and ICICI Bank had found a significant gain in the performance and efficiency of banks in terms of capital adequacy ratio, net interest margin, return on assets, net profit margin, return on assets, net interest margin but there was no significant improvement seen in the credit-deposit ratio, return on equity. In the merger between HDFC and Centurion Bank of Punjab (CBOP) Banks, there was a significant gain in terms of credit deposit ratio, net profit margin, return on equity return, the cost to income ratio, return on assets, return on equity but no improvement had been seen in capital adequacy ratio while net interest margin showed a decline after merger period.

Ramakrishnan (2015) studied the pre and post-merger performance of HDFC and Centurion Bank of Punjab in India. The performance of these banks had been analyzed on various financial indicators i.e. return on capital, gross profit margin, debt-equity ratio, net profit margin, and return on equity. To analyze the difference in financial indicators pre and post-merger of banks researcher has applied the paired t-test. The results indicated that there was a significant difference between before and after the merger period in terms of net profit margin, debt-equity ratio, gross profit margin, equity ratio, and operating profit margin.

Patel (2015) evaluated four (4) banks to check the gain in financial performance post-mergers. A comparison had been done between before and after the merger in terms of return on net worth, net profit margin, and some other financial parameters had been considered. For analysis, a paired sample T-test had been applied. The author had also shown the impact of M&A on the Indian banking sector had been found significant and positive but on individual banks it was insignificant.

Ghosh and Dutta (2015) revealed that mergers and acquisitions (M&A) were an important tool for corporate restructuring. The researcher examined the M&A in banking from all possible angles. The study targeted twenty (20) M&A deals during 2000-10 in Indian banking. The study was based on before and after merger comparison of financial indicators. Shapiro–walk normality test and ratio analysis have been applied for results estimation. The results had shown a significant improvement in NPAs after the merger.

Joash et al. (2015) studied Kenya banks merging with other banks to gain improvement in financial indicators. The study investigated the bank's performance that merged between 2000 to 2014. The main target of the study was to measure the effect of M&A on profitability and shareholders. The study was conducted on primary data. The researcher concluded that the M&A scheme increased the shareholders' value through increasing demand and price of shares in the market.

Anderobom and Samuila (2015) studied the impact of Mergers and acquisitions (M&A) on the efficiency and performance of scheduled commercial banks in Nigeria. The researcher kept primarily focused on Africa (UBA) Plc and applying CAMEL Approach. Secondary data had been used and collected from financial reports on banks. The researcher used before and after merger data and applied a paired t-test statistic. The study concluded that M&A had a significant and positive effect on the efficiency and performance of scheduled commercial banks in Nigeria.

Raja Abhay (2016) examined the power of mergers and acquisitions (M&A) in Indian banks. The analysis had been done on basis of five years of pre and five years of post-merger data. The effectiveness of the merger had been investigated by considering various financial indicators like liquidity, solvency ratios of banks, and profitability. The author found significant improvement in the post-merger period.

Rathinamand (2016) examined the after-M&A profile of commercial banks based on financial parameters where he applied the ratio approach. Financial parameters like liquidity, profitability, and solvency parameters and overall twenty-five (25) parameters had been used for analysis. It was found that a small improvement in liquidity leads to a significant gain in the earnings of the shareholders of banks and the overall efficiency of the bank improved during after merger period 2008-2013.

Tamragundi and Devarajjappa (2016) had done a study title “Impact of mergers on Indian Banking sector: A comparative study of Public and Private sector Banks” investigated the effect of financial indicators like share price and physical parameters on merged banks. Six (6) scheduled commercial banks of the Indian banking sector had been considered for study purposes. Out of these banks, three were public banks and three were private sector banks and they were merged into the public and private sectors respectively. The CAMEL model had been used and various statistical tools like t-test, mean and standard deviation were applied. The study concluded that merger was an effective exercise for improving business growth and expanding the operation of banks.

Nidhi T. (2017) applied the CAMEL model to investigate the financial parameters of banks and evaluate the efficiency of banks merged after the liberalization period. The study considered secondary 2001-14. The author revealed that a partially M&A scheme was beneficial for the Indian banking system.

Data Sources, Measurement of Variables and Period of the Study
In this study data has been taken from RBL statistical table related to banking. The study has covered the time period from year 2005-2020. Profit, expenses, income, and gross and net non-performing assets of banks have been considered as dependent variable while banks total deposit, cost and assets were taken as independent variables in this study.

Methodology
Econometric Analysis
In this section, we have examined the empirical analysis of amalgamation in public sector banks by applying the econometric model which we have mentioned in equation (1) and equation (2). For measuring the impact of bank-specific variables on a bank's performance and efficiency we have taken profit, expenses, income, and gross and net non-performing assets as dependent variables on the other hand bank deposit, capital, and assets as the independent variable.
Public Sector Banks without Amalgamation models from M₁ to M₆

\[ M_1: \quad P_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M_2: \quad E_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M_3: \quad Y_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M_4: \quad I_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M_5: \quad GNPA_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M_6: \quad NNPA_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]  

..... (1)

Public Sector Banks with Amalgamation models from M'₁ to M'₆

\[ M'_1: \quad P'_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M'_2: \quad E'_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M'_3: \quad Y'_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M'_4: \quad I'_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M'_5: \quad GNPA'_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]
\[ M'_6: \quad NNPA'_{ij} = F + a_1(D) + a_2(C) + a_3(A) \]  

..... (2)

Where \( P \) is defined as the profit of the bank during the year, \( E \) is expenses measure the income bank \( i \) is the investment of banks, \( GNPA \) is gross non-performing assets of banks, \( NNPA \) is net non-performing assets of the bank, \( D \) is defined as deposit held by the bank, \( C \) is total capital of the bank, \( A \) is defined as total assets of bank and \( F \) is intercept or constant in the model while \( i \) and \( j \) are indicating the year and bank respectively.

In without amalgamation scenario, we have taken all individual public sector banks data from 2005 to 2020 and in with amalgamation scenario we have combined the amalgamated banks data with anchor banks i.e Syndicate Bank amalgamated with Canara Bank we have added Syndicate Bank data in Canara Bank data right from 2005 to 2020 and considered Canara Bank as anchor bank the same thing, we have done with all other amalgamated banks and suppose the condition of amalgamation exercise happened in 2005.

For estimating regression equation in panel data we, have applied two most popular panel regression models called Fixed Effect (FE) model and Random Effect (RE) model based on results of Hausman Test which is mention as follow.

**Hausman Test**

The Hausman test has been applied to decide which one of the two-panel models is more suitable for our dataset. We would test the following hypothesis in this regard:

- \( H_0: \) Random effect model is appropriate.
- \( H_1: \) Fixed effect model is appropriate.

The results of the Hausman test run on our dataset for the panel regression models are given in Table 7.3 and Table 7.4 the results presented in the tables show that the \( H_0 \) hypothesis is rejected for leverage models with a significance level of 5%. If the p-value is greater than 5% we will use the random effect model and if it is less than 5%, we go with the fixed effects model. The \( H_0 \) hypothesis which says that the random effects model is effective will be rejected when the p-value is less than 5%.

**Results**

**Trends in Public Sector Banks**

**Non-Performing Assets (NPAs) of Public Sector Banks**

NPAs have surged as a major threat to public sector banks right from the financial crisis of 2008 which can be seen in figure-1 where the net and gross NPAs has been increased after 2008 and high surged from 2015. Banks have had to increase write-offs since 2013 to reduce the level of NPAs there is the same trend in NPAs, write-offs, and reduction of NPAs. The same trend has been observed from in figure-2 and figure-3 where NPA is calculated as a proportionate of advances and income.
Public Sector Banks NPAs in India

Figure 1. Public Sector Banks NPAs
Source: RBI Data

Public Sector Banks: NPAs as Proportionate of Advances

Figure 2. Public Sector Banks: NPAs as Proportionate of Advances
Source: Researcher Calculation from RBI Data
Figure 3. Public Sector Banks: NPA as Proportionate of Income
Source: Researcher Calculation from RBI Data

Profit of Public Sector Banks
Profit is the main determinant for banks to do business and operation in the market from the last few years it has declined in public sector banks since 2016, it is coveted into the loss which is seen in figure-4 where it is negative right from 2016. The decline in banks' profit has risen questions on the efficiency and performance of public sector banks and this forced government to take major steps like bank recapitalization, prompt corrective action (PCA), and banks amalgamation to control the damage of loss in public sector banks.

Figure 4. Profit of Public Sector Banks
Source: Researcher Calculation from RBI Data
Expenses of Public Sector Banks
Banks expenses are an ideal measure of banks cost has been increased in public sector banks since 2005 and there is a rising trend of this in figure-5 which is shown in three different ways expenses as proportionate of assets, income, and investment. An increase in banks’ costs would reflect lead to decking in profit and income which also leads to bringing in the efficiency of banks.

Figure 5. Expenses of Public Sector Banks
Source: Researcher Calculation from RBI Data

Econometric Empirical Results

Table 1. Statistical Summary Public Sector Banks without Amalgamation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit</td>
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<td>400.3029</td>
<td>2799.574</td>
<td>-12282.8</td>
<td>14488.11</td>
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<tr>
<td>Deposits</td>
<td>411</td>
<td>205778.9</td>
<td>328252.8</td>
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<tr>
<td>Capital</td>
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<td>906.888</td>
<td>1414.52</td>
<td>17.25</td>
<td>16436.99</td>
</tr>
<tr>
<td>Expenses</td>
<td>411</td>
<td>16221.06</td>
<td>25374.03</td>
<td>26.3602</td>
<td>234412.5</td>
</tr>
<tr>
<td>Income</td>
<td>411</td>
<td>20335.5</td>
<td>32564.36</td>
<td>45.294</td>
<td>302545.1</td>
</tr>
<tr>
<td>Assets</td>
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<td>248872</td>
<td>415078</td>
<td>1117.445</td>
<td>3951394</td>
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<tr>
<td>GNPA</td>
<td>411</td>
<td>11378.25</td>
<td>21964.95</td>
<td>0</td>
<td>223427.5</td>
</tr>
<tr>
<td>NNPA</td>
<td>411</td>
<td>5512.103</td>
<td>10194.79</td>
<td>0</td>
<td>110854.7</td>
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<tr>
<td>Investment</td>
<td>411</td>
<td>65410.19</td>
<td>109624.3</td>
<td>413.3352</td>
<td>1060987</td>
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</tbody>
</table>

Source: Author Calculation using Stata and Data from RBI
Table 1. Statistical Summary Public Sector Banks with Amalgamation in 2005

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>Profit</td>
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<td>884.9425</td>
<td>4808.044</td>
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<td>17783.34</td>
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<tr>
<td>Deposit</td>
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<td>428342.3</td>
<td>515255.5</td>
<td>14170.66</td>
<td>3241621</td>
</tr>
<tr>
<td>Capital</td>
<td>192</td>
<td>1851.581</td>
<td>2064.276</td>
<td>243.056</td>
<td>16436.99</td>
</tr>
<tr>
<td>Expenses</td>
<td>192</td>
<td>32603.62</td>
<td>39295.65</td>
<td>1151.977</td>
<td>244163.3</td>
</tr>
<tr>
<td>Income</td>
<td>192</td>
<td>40918</td>
<td>50005.55</td>
<td>1419.574</td>
<td>314123.5</td>
</tr>
<tr>
<td>Assets</td>
<td>192</td>
<td>518631.4</td>
<td>653010.3</td>
<td>15717.52</td>
<td>3951394</td>
</tr>
<tr>
<td>GNPA</td>
<td>192</td>
<td>36407.15</td>
<td>56202.34</td>
<td>1419.574</td>
<td>314123.5</td>
</tr>
<tr>
<td>NNPA</td>
<td>192</td>
<td>246927.7</td>
<td>647744.2</td>
<td>308.2</td>
<td>3951394</td>
</tr>
<tr>
<td>Investment</td>
<td>192</td>
<td>135010.7</td>
<td>169895.4</td>
<td>6693.083</td>
<td>1060987</td>
</tr>
</tbody>
</table>

Source: Author Calculation using Stata and Data from RBI

Hausman Test

Table 2. Hausman Test Result Public Sector Banks without Amalgamation

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi²</th>
<th>p-value</th>
<th>FE/RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>M₁</td>
<td>125.4</td>
<td>0</td>
<td>FE</td>
</tr>
<tr>
<td>M₂</td>
<td>4.67</td>
<td>0.197</td>
<td>RE</td>
</tr>
<tr>
<td>M₃</td>
<td>15.69</td>
<td>0</td>
<td>FE</td>
</tr>
<tr>
<td>M₄</td>
<td>7.2</td>
<td>0.065</td>
<td>RE</td>
</tr>
<tr>
<td>M₅</td>
<td>79.66</td>
<td>0</td>
<td>FE</td>
</tr>
<tr>
<td>M₆</td>
<td>48.58</td>
<td>0</td>
<td>FE</td>
</tr>
</tbody>
</table>

Source: Author Calculation using Stata and Data from RBI

Table 3 Hausman Test Result Public Sector Banks with Amalgamation
The result in table -5 shows the impact of deposits, capital, and assets on the bank profitability in two cases without banks amalgamation and with amalgamation. It is clear from the regression result that no evidence supports the argument of an increase in the size of the deposit and capital increases the profitability of banks in both cases but in case of without amalgamation, there is evidence that shows the increase in asset size will increase the profitability of public sector banks. Most of the results are moving in the opposite direction which is a concern to the public sector bank's profitability.

**Table 4. Econometric Result Models M1 and M1’**

<table>
<thead>
<tr>
<th>Public Sector Banks without Amalgamation</th>
<th>Public Sector Banks with Amalgamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit Dependent Variable</td>
<td>Profit Dependent Variable</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Deposit</td>
<td>-0.021**</td>
</tr>
<tr>
<td>Capital</td>
<td>-0.712*</td>
</tr>
<tr>
<td>Assets</td>
<td>0.016**</td>
</tr>
<tr>
<td>Constant</td>
<td>1519.51</td>
</tr>
</tbody>
</table>

**R²**

- within 0.209
- between 0.018
- overall 0.079

**F-statistic**

- 33.53’

**Number of Groups**

- 29

**Number of Observation**

- 411

**R²**

- within 0.302
- between 0.571
- overall 0.026

**F-statistic**

- 25.62’

**Number of Groups**

- 12

**Number of Observation**

- 192

**Note:** 1%, 5%, 10% significance level are shown by *, **, *** respectively
Source: Author Calculation using STATA and Data from RBI

**Expenses Results**

Bank's cost is measured in bank expenses the result in table 6 highlight the impact of deposit, capital, and assets on the bank expenses. In the first case without amalgamation of banks, only assets show a positive and significant impact on the bank expenses which is in opposite direction and conveys an increase in bank cost. In the second case with amalgamation, only the capital coefficient is significant and positive which leads to a decrease in bank expenses due to an increase in bank capital putting evidence in favour of banks amalgamation in public sector banks in India but the deposit coefficient going in other direction where it showing if banks will attract more deposit in the market it will increase the banks cost.

**Table 5. Econometric Result Models M2 and M2′**

<table>
<thead>
<tr>
<th>Public Sector Banks without Amalgamation</th>
<th>Public Sector Banks with Amalgamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenses Dependent Variable</td>
<td>Expenses Dependent Variable</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Deposit</td>
<td>-0.006</td>
</tr>
<tr>
<td>Capital</td>
<td>0.032</td>
</tr>
<tr>
<td>Assets</td>
<td>0.065*</td>
</tr>
<tr>
<td>Constant</td>
<td>1099*</td>
</tr>
</tbody>
</table>

| R²                                      | within       | 0.984        | within       | 0.987       |
|                                        | between      | 0.997        | between      | 0.997       |
|                                        | overall      | 0.992        | overall      | 0.992       |
| Wald Chi²                               | 35406.98*    | F-statistic  | 4623.73*     |
| Number of Groups                        | 29           | Number of Groups | 12    |
| Number of Observations                  | 411          | Number of Observations | 192  |

**Note:** - 1%, 5%, 10% significance level are shown by *, **, *** respectively

Source: Author Calculation using STATA and RBI Data

**Income Results**

Bank’s income consists of interest and non-interest earnings which decide the profit and loss scenario of banks in the market. Table-7 has shown the econometric result of public sector banks in two scenarios without amalgamation and with amalgamation. In the first scenario, the independent variable deposit and assets are significant, the deposit coefficient is negative and the assets coefficient is positive. On the other side, a bank's amalgamation deposit and capital coefficients are significant but the deposit coefficient is positive and the capital coefficient is negative which gives a signal of an increase in deposits will increase the bank's income while assets in without amalgamation is giving the same direction.

**Table 6. Econometric Result Models M3 and M3′**

<table>
<thead>
<tr>
<th>Public Sector Banks without Amalgamation</th>
<th>Public Sector Banks with Amalgamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Dependent Variable</td>
<td>Income Dependent Variable</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Deposit</td>
<td>-0.019**</td>
</tr>
<tr>
<td>Capital</td>
<td>-0.036</td>
</tr>
<tr>
<td>Assets</td>
<td>0.091*</td>
</tr>
<tr>
<td>Constant</td>
<td>1537.74*</td>
</tr>
</tbody>
</table>

| R²                                      | within       | 0.989        | R²          | within       | 0.990       |
Investment Results

Investment is an important component of generating income for banks and it also circulates the bank's deposit and capital in the market. Table-8 has highlighted the empirical regression result of deposit, capital, and assets of banks without and with amalgamation in public sector banks. In the case of without amalgamation capital and assets are significant and positive which gives evidence of increasing capital and deposit will increase the bank investment. In the case of banks with amalgamation deposit and assets shows a positive and significant impact on the investment of banks.

Table 7. Econometric Result Models M4 and M4′

<table>
<thead>
<tr>
<th>Public Sector Banks without Amalgamation</th>
<th>Public Sector Banks with Amalgamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Dependent Variable</td>
<td>Investment Dependent Variable</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Deposit</td>
<td>-0.675</td>
</tr>
<tr>
<td>Capital</td>
<td>1.478*</td>
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<tr>
<td>Assets</td>
<td>0.316*</td>
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<tr>
<td>Constant</td>
<td>-882.616</td>
</tr>
<tr>
<td>R²</td>
<td></td>
</tr>
<tr>
<td>within</td>
<td>0.959</td>
</tr>
<tr>
<td>between</td>
<td>0.994</td>
</tr>
<tr>
<td>overall</td>
<td>0.981</td>
</tr>
<tr>
<td>F-statistic</td>
<td>3026.64*</td>
</tr>
<tr>
<td>Number of Groups</td>
<td>29</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>411</td>
</tr>
</tbody>
</table>

Note: 1%, 5%, 10% significance level are shown by *, **, *** respectively

Source: Author Calculation using Stata and Data from RBI

Non-Performing Assets(NPA) Results

Table-9 and table-10 show the empirical result of deposit, capital and assets impact on gross and net non-performing assets in banks amalgamation and without amalgamation. In the case of the banks without amalgamation capital and assets coefficients is a positive and significant impact on gross and net non-performing assets, if banks will increase their capital and assets they will accumulate more NPAs in individual banks. Public sector banks with amalgamation results show a positive and significant relation relationship on gross non-performing assets while net non-performing assets are positively and significantly impacted by deposit, capital, and asset size. In both scenarios, there is no empirical evidence that shows an increase in deposits, capital, and assets will reduce the bank's non-performing assets.
Table 8. Econometric Result Models Ms and M_s'

<table>
<thead>
<tr>
<th>Public Sector Banks without Amalgamation</th>
<th>Public Sector Banks with Amalgamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNPA Dependent Variable</td>
<td>GNPA Dependent Variable</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td><strong>z-statistics</strong></td>
<td><strong>Independent Variables</strong></td>
</tr>
<tr>
<td><strong>z-statistics</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td><strong>t-statistics</strong></td>
<td><strong>t-statistics</strong></td>
</tr>
<tr>
<td>Deposit</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>1.30</td>
</tr>
<tr>
<td>Capital</td>
<td>2.135*</td>
</tr>
<tr>
<td></td>
<td>5.77</td>
</tr>
<tr>
<td>Assets</td>
<td>0.019*</td>
</tr>
<tr>
<td></td>
<td>0.65</td>
</tr>
<tr>
<td>Constant</td>
<td>-5640.58*</td>
</tr>
<tr>
<td></td>
<td>-8.10</td>
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</table>

R^2

<table>
<thead>
<tr>
<th>within</th>
<th>0.763</th>
<th>within</th>
<th>0.779</th>
</tr>
</thead>
<tbody>
<tr>
<td>between</td>
<td>0.968</td>
<td>between</td>
<td>0.313</td>
</tr>
<tr>
<td>overall</td>
<td>0.800</td>
<td>overall</td>
<td>0.460</td>
</tr>
</tbody>
</table>

F-statistic

<table>
<thead>
<tr>
<th>within</th>
<th>407.65*</th>
<th>within</th>
<th>797.65*</th>
</tr>
</thead>
<tbody>
<tr>
<td>between</td>
<td>0.968</td>
<td>between</td>
<td>208.40*</td>
</tr>
<tr>
<td>overall</td>
<td>0.800</td>
<td>overall</td>
<td>0.460</td>
</tr>
</tbody>
</table>

Number of Groups

| 29 | 12 |

Number of Observations

| 411 | 192 |

Note: - 1%, 5%, 10% significance level are shown by *, **, *** respectively

Source: Author Calculation using Stata and Data from RBI

Table 9 Econometric Result Models M_6 and M_s'

<table>
<thead>
<tr>
<th>Public Sector Banks without Amalgamation</th>
<th>Public Sector Banks with Amalgamation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNPA Dependent Variable</td>
<td>NNPA Dependent Variable</td>
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<tr>
<td><strong>Independent Variables</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td><strong>z-statistics</strong></td>
<td><strong>Independent Variables</strong></td>
</tr>
<tr>
<td><strong>z-statistics</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td><strong>z-statistics</strong></td>
<td><strong>z-statistics</strong></td>
</tr>
<tr>
<td>Deposit</td>
<td>-0.028</td>
</tr>
<tr>
<td></td>
<td>-1.36</td>
</tr>
<tr>
<td>Capital</td>
<td>0.640*</td>
</tr>
<tr>
<td></td>
<td>3.08</td>
</tr>
<tr>
<td>Assets</td>
<td>0.049*</td>
</tr>
<tr>
<td></td>
<td>2.89</td>
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<tr>
<td>Constant</td>
<td>-1473.564*</td>
</tr>
<tr>
<td></td>
<td>-3.77</td>
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</tbody>
</table>

R^2

<table>
<thead>
<tr>
<th>within</th>
<th>0.657</th>
<th>within</th>
<th>0.071</th>
</tr>
</thead>
<tbody>
<tr>
<td>between</td>
<td>0.949</td>
<td>between</td>
<td>0.038</td>
</tr>
<tr>
<td>overall</td>
<td>0.724</td>
<td>overall</td>
<td>0.00</td>
</tr>
</tbody>
</table>

F-statistic

| 242.85* | 0.071 |
| 13.22*   | 0.00  |

Number of Groups

| 29 | 12 |
Significant evidence exists of raising the level of non-performing assets (NPAs) reached the highest level as well as there is a huge loss of profit in public sector banks, and the government of India has launched banks recapitalization plan and took a historic decision to the amalgamation of public sector banks in India. In our empirical finding to check whether the amalgamation exercise is supported by empirical evidence or not, we have run econometric regression models in two situations, first banks without amalgamation and second banks with amalgamation happened in the 2005 hypothetical scenario. In the case of profitability, only asset size has shown a positive relationship without amalgamation situation while there is no evidence in the case of banks with amalgamation. The impact of capital size in the case of banks with amalgamation has shown a negative impact while reducing banks’ expenses. On the income side, there is also a significant result rise in the bank’s income in both cases with and without amalgamation in increasing the level of deposits and assets respectively. On the Investment side, there is significant evidence exists of raising the level of investment in both scenarios. But here is only empirical result in the case of banks with amalgamation which shows the increase in asset size will reduce the level of non-performing assets in public sector banks. The empirical results in this study support the banks’ amalgamation move of the government of India to bring them on their performing track.

BIBLIOGRAPHY


<table>
<thead>
<tr>
<th>Number of Observations</th>
<th>411</th>
<th>Number of Observations</th>
<th>192</th>
</tr>
</thead>
</table>

Note: 1%, 5%, 10% significance level are shown by * , ** , *** respectively

Source: Author Calculation using Stata and Data from RBI

Conclusion

It is clear and obvious that public sector bank’s non-performing assets have been raised since the financial crisis of 2008, in 2018 the non-performing assets (NPAs) reached the highest level as well as there is a huge loss of profit in public sector banks, and the government of India has launched banks recapitalization plan and took a historic decision to the amalgamation of public sector banks in India. In our empirical finding to check whether the amalgamation exercise is supported by empirical evidence or not, we have run econometric regression models in two situations, first banks without amalgamation and second banks with amalgamation happened in the 2005 hypothetical scenario. In the case of profitability, only asset size has shown a positive relationship without amalgamation situation while there is no evidence in the case of banks with amalgamation. The impact of capital size in the case of banks with amalgamation has shown a negative impact while reducing banks’ expenses. On the income side, there is also a significant result rise in the bank’s income in both cases with and without amalgamation in increasing the level of deposits and assets respectively. On the Investment side, there is significant evidence exists of raising the level of investment in both scenarios. But here is only empirical result in the case of banks with amalgamation which shows the increase in asset size will reduce the level of non-performing assets in public sector banks. The empirical results in this study support the banks’ amalgamation move of the government of India to bring them on their performing track.


