

Mega-mergers of Public Sector Banks: An Efficiency Perspective

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Abstract

The paper analyses and explores the possibility of determining the usage of statistical models to aid decision-making during the merger of banks, especially in the forced merger of banks. We posit that using models such as Data Envelopment Analysis (DEA) could benefit and enhance informed decisions on bank mergers. We demonstrate the DEA model's efficacy for selecting partners in mergers and acquisitions using the context of bank mega-mergers in India in 2019. Using the semi-parametric Malmquist productivity index, we find that efficiency measured as a change in the total factor productivity (TFP) could not explain the selection of the target and

acquirer. Further, the study observes that other considerations such as capital, non-performing assets ratio, geographical dominance, IT platform, and bank size could not reasonably explain most of the merger combinations. This study shows that using statistical models in policy decision-making may enhance the quality of decisions.

Keywords: Bank mergers, forced mergers, total factor productivity change, Malmquist productivity index

1. Introduction

The financial services industry, including the banking sector, has seen significant transformation worldwide since the early 1980s, driven by technological advancement and globalization. A significant part of this process was consolidation, with many banks merging, amalgamating, or restructuring. The motives of consolidation depended on the characteristics of the entities, such as size and structure, across various segments. In developed countries with market-based financial system designs, market forces have mainly driven mergers and acquisitions (M&As). Globalization has caused a squeeze in the margins and, consequently, profitability. With competition becoming severe, banks have merged to reap the benefits of economies of scale and efficiency. Such mergers have generally been voluntary. However, in several developing economies with bank-based financial systems, mergers are driven by the government to consolidate and restructure the banking systems in the aftermath of a crisis or to prevent it. These mergers have been generally forced mergers or regulator-driven mergers. Previous research on bank mergers has majorly focused on voluntary mergers in developed nations with market-based financial system designs, while the case of forced mergers in developing countries like India, with bank-based financial system designs, are relatively less explored.

The Indian Banking sector too has witnessed some mergers, mostly out of compulsion and a few strategic. Through a conscious effort, weak and small banks have been allowed to merge, most often to protect the interest of the depositors and reap synergy benefits. While a few studies have thrown light on the previous episodes of bank mergers in India (see for example Jayadev & Sensarma, 2007 for an excellent coverage of the Indian experience of bank mergers till 2006), the latest episode of the mega mergers of public sector banks in 2019 is scarcely explored. In August 2019, the merger of 10 of the 16 PSBs (excluding SBI and Bank of Baroda) was announced by the government, which is considered the first of its kind in the context of a developing country.

There are several reasons to believe that the forced mergers in 2019 of public sector banks (PSBs) were driven by reasons different from those in the past. As stated by the Finance Minister of the Government of India, the motive is to create a strong bank to aid rapid economic growth. Strong banks can be created through mergers only by merging efficient and productive banks. It can also be noted that the merger of a less efficient bank with an efficient bank may not yield the intended result. Against this background, this paper examines whether the target and acquirer banks' pre-merger efficiency explains the partners' selection. A semi-parametric Malmquist productivity index method is applied to study the efficiency and productivity of these public sector banks.

Our study suggests that efficiency measured as a change in total factor productivity could not explain partner selection in mergers. The acquirer was less efficient than the target in three out of four mergers. Further, we explore the other possible factors which could explain partner selection. The extant literature indicates that besides efficiency, factors such as common equity tier-1 (CET1) ratio, net non-performing assets (NNPA) ratio, geographical dominance, information technology (IT) platforms, and size may also justify partner selection. We find that none of these factors could reasonably explain the merger combinations.

The rest of the paper is organized as follows. In section 2, we provide the contextual setting of the study and review the literature on bank mergers. Section 3 elaborates the data and methodology; section 4 discusses the results and section 5 concludes the paper.

2. Background and literature review

2.1 Contextual Setting

The Indian banking industry has played an important role in India's growth story. To understand the reasoning behind the current mega-mergers of Indian PSBs, we need to understand the landscape of the Indian Banking industry. In what follows, we provide a summary of the contextual setting based on facts compiled from various issues of statistical tables related to banks in India by the Reserve Bank of India (RBI).¹

The Indian Banking industry had its genesis in the indigenous bankers and moneylenders. Evidence of banking activities has been found in the Vedic texts. These indigenous banks are credited with the invention of an important financial instrument, the HUNDI, which is considered similar in functionality to the bill of exchange. The British businessmen who arrived in India in 1605 were responsible for introducing modern-day banking concepts. The first modern bank, the Bank of Hindostan, was established in Kolkata (erstwhile Calcutta) in 1770 by M/s Alexander and Company. Three presidency banks, namely Bank of Bengal (1809), Bank of Bombay (1840), and Bank of Madras (1843), were established in the nineteenth century. These banks served as banks of the English East India Company and, after 1857, that of the British Government in India,

¹ Website of the Reserve Bank of India (RBI). URL: <https://rbi.org.in/Scripts/AnnualPublications.aspx?head=Statistical%20Tables%20Relating%20to%20Banks%20in%20India>

performing the central bank's duties. In 1921, the Imperial Bank of India was created by merging these banks and later it got the name as the State Bank of India in 1955 (Desai, 1987).

The Swadeshi movement was launched in 1905, and the Swadeshi spirit influenced many Indian enterprises to start setting up banks in the country. Though India got its independence on 15th August 1947, banking was initially restricted to the classes and big cities. In addition, there was a clear concentration of power as 188 directors of the banks only held 1452 directorships in the industrial companies during that time). As of the end of March 1968, around two-thirds of the total credit given by the banks went to industry, and 25 percent to commerce. Only around 0.2 percent of credit went to agriculture even though agriculture accounted for around 50% of the Gross National Product (Goldsmith, 1983). In order to have equitable distribution of wealth and to broaden the services of the banks so as to make financial services available to the masses, the 14 largest private sector banks with deposits exceeding 50 crores were nationalized on 19th July 1969. India started seeing the regulated phase of banking with the setting up of RBI in 1935, and the enactment of the Banking Regulation Act of 1949 gained momentum with nationalization in 1969. The fifteen years following nationalization witnessed rapid branch expansion, with 50 percent of branches opening in unbanked areas. Priority sector lending (to the rural population and the disadvantaged sections) was a new concept that helped credit reach the masses. With this, the role of indigenous bankers and money lenders operating in these areas decreased, and their share of assets decreased sharply (RBI, 1976). A second round of nationalization of six banks took place on 15th April 1980. After nationalization, the Indian Banking industry was primarily under a regulatory regime. Banks' lending procedures were strengthened. These regulations were considered necessary for the equitable distribution of banking services. Though this objective was achieved, the Indian Banking industry was burdened with massive amounts of bad debts and low

profits. Reformation became inevitable, and it was set in motion by some significant measures of consolidation.

The process of consolidation of the banking sector began in 1985 following the report of the Chakrabarty Committee. There was a slowdown in branch expansion, and much attention was given to improving functions like housekeeping, credit management, balancing of books, and, above all, the profitability of banks. The macroeconomic crisis faced by the country in the 1980s paved the way for large-scale reforms in the financial sector. By 1990, there was a serious concern regarding the weak financial conditions of banks, especially that of the public sector banks. While the capital base of Indian Banks was quite low, there was a belief that with government ownership, there was less risk to worry about. However, despite the achievement in what is termed as social banking, the Indian banking sector, especially the public sector banks, still exhibited low levels of profits and inefficient operations. After recognizing the danger and directed by the World Bank, India went ahead to implement the Basel Accord (a capital accord in July 1988 titled 'International Convergence of Capital Measurement and Capital Standards' among economically advanced countries of the world, at Basel, Switzerland). The government set up a Committee on Financial System (1991), also known as the Narasimham Committee, which recommended remedial measures in order to improve the health of the financial system. One of the recommendations was to consolidate the banking sector into three or four major banks which could adhere to international standards. This led to many regulator-driven mergers, which has set the tone for our study.

2.2 Literature Review

The majority of past research on bank mergers has examined the case of developed nations with a market-based financial system design as opposed to developing countries like India, which has a

bank-based financial system design. In a market-based financial system, the financial assets are traded openly. This system relies on free market principles of supply and demand. There is very little government intervention, and prices reflect true market conditions. Investors make decisions based on the signals given by the market. Such a system encourages market players to innovate, take risk and allocate capital based on market forces. This type of market transparency and regulations ensures investor protection by encouraging fair practices. Thus, a market-based financial system facilitates capital formation, economic growth, and efficient resource allocation in an open and competitive marketplace.

On the other hand, in a bank-based financial system, banks play a crucial role in allocating capital and providing financial services. Acting as intermediaries, banks garner deposits from the savers and lend these funds to borrowers. In the process, they manage the risks, and they also provide liquidity. They facilitate investment and economic growth through their various financial offerings (products and services) such as loan and investment products and payment processing services. In this system, government regulations often oversee banks to ensure stability and protect depositors. Also, the government directly intervenes in the consolidation of the banking industry generally as a response to the economic crisis which would have weakened the banks prompting government intervention to prevent the systemic crisis.

Countries across the globe with majorly banks based financial systems have witnessed such regulator driven mergers or forced mergers during different time periods. The economic crisis of 1990s left the Japanese banks paralyzed. Hence, the government consolidated the banking industry through forced mergers (Halkos et al., 2016). Similarly, due to the Asian financial crisis of 1997, the Malaysian Government implemented a major restructuring of banks (Sufian & Kamarudin, 2017). More recently, the European sovereign debt crisis triggered the Spanish Government to

introduce banking reforms via mergers and acquisitions during 2011-12 (Blanco-Oliver, 2021). Previous research has evaluated such forced mergers, and the findings are mixed.

The findings of Chong et al. (2006) reveal that forced mergers destroy the firm value, and acquiring banks tend to gain at the expense of the target bank. Similarly, it is found that the banks created through forced mergers are more likely to fail than the predecessor banks (Shih, 2003). On the other hand, it was found that total factor productivity increased post-merger (Sufian & Kamarudin, 2017). Similarly, the cost efficiency of the acquirer bank is higher than the target bank (Sufian, 2010) and the acquiring banks are more productive than the target banks (Sufian & Habibullah, 2014). As we have mixed empirical findings, selecting appropriate partners for mergers becomes very important (Guru et al., 2004).

In Malaysia's forced bank mergers, the selection of banks for mergers was optimal (Guru et al., 2004). In Japan, the selection of partners was unsystematic (Halkos et al., 2016). The lessons from these cases reveal that efficiency should be one of the critical considerations in merger decisions.

The merger of PSBs is not a new phenomenon in India. There are two crucial reasons for the mergers of banks in India (Jayadev & Sensarma, 2007). First, restructuring of weak banks, where the government, through the Reserve Bank of India (RBI), intervenes in merging banks (a.k.a. forced mergers). There are several instances in the Indian context when the banks exhibiting the symptoms of failures, such as substantial increase in non-performing assets (NPA), alarmingly low capital adequacy ratio (CAR), or failure of corporate governance, are merged with strong banks. The RBI has the power to amalgamate or merge such weak banks with strong banks under section 45 of the Banking Regulation Act of 1949. For instance, for these reasons, Benarus State Bank Limited merged with Bank of Baroda in 2002 and Bharat Overseas Bank merged with Indian

Overseas Bank in 2007 (Reddy et al., 2013). Second, voluntary mergers are where banks voluntarily merge for strategic reasons. The banks may acquire or merge to expand the geographical presence or diversify the loan portfolio. For instance, ICICI Bank acquired Sangli Bank in 2007, and HDFC Bank acquired Centurion Bank of Punjab in 2008 for these reasons (Reddy et al., 2013).

In 1969, India saw the nationalization of 14 major Scheduled Commercial Banks (SCBs). Six more SCBs were nationalized in 1980. In both these instances, the primary objective was “to serve better the needs of development of the economy in conformity with national policy objectives²”. Though the bank nationalization helped channel the credit to small and marginal farmers in rural areas at lower interest rates (Basu, 2009), it also led to problems such as political interference and lower efficiency in PSBs. The study by Kumar (2020) shows that the Government uses the PSBs to influence the elections by increasing the flow of credit to farmers instead of manufacturing firms and waiving off the farmer loans. During the recent NPA crisis in the Indian Banking sector, the gross NPAs of PSBs were higher than the private sector banks³. Nidugala and Pant (2017) attribute the higher NPAs in PSBs due to politically induced lending, lobbying by fraudulent corporate groups, and corrupt officials.

Further, the PSBs are found to be less efficient in the utilization of branches and employees in comparison to private sector banks (Arun & Turner, 2002; Saha & Ravisankar, 2000). Due to all the above reasons, the pressure on Government to either privatize PSBs or merge them increased. Against this background, the Committee on Financial System, popularly known as Narasimhan Committee – 1991 was formed to propose banking sector reforms. One of the recommendations

² The purpose of nationalization as reported by RBI available on https://www.rbi.org.in/Scripts/chro_1968.aspx

³ For more details please refer Report on Trend and Progress of Banking in India available at https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/0RTP2020_F3D078985540A4179B62B7734C7B445C9.PDF

was to create three or four large banks of international standards. To begin with, Government of India merged the 5 associate banks with the State Bank of India (SBI) with effect from 1st April 2017, followed by Dena Bank and Vijaya Bank merging with Bank of Baroda with effect from 1st April 2019. On 30th August 2019, the Finance Minister of the Government of India announced that out of 18 PSBs (including SBI), ten would be merged to create four large banks. Andhra Bank and Corporation Bank were merged with Union Bank of India; Oriental Bank of Commerce and United Bank of India were merged with Punjab National Bank; Syndicate Bank was merged with Canara Bank, and Allahabad Bank was merged with Indian Bank.

At the beginning of the year 2019, there were 18 PSBs. The State Bank of India and Bank of Baroda completed their round of mergers and hence were not potential participants in this merger. Therefore, the Government had a pool of 16 PSBs to create strong banks. Though creating three or four large banks by merging the existing PSBs was on the cards, the choice of banks to be merged received several criticisms in the popular press. For instance, Saha (2019) pointed out that the selection of banks merged missed the geographical synergy. The Financial Stability Report⁴ revealed that the systemic risk of merged PSBs increased post-merger. Roy (2018), while commenting on the merger of Dena Bank and Vijaya Bank with Bank of Baroda, opined that the PSBs are merged mindlessly by the Government to create a few large banks, and Banerjee (2017) opined that the merger of PSBs might be detrimental to its efficiency. Against the backdrop of this, in August 2019, the finance minister formally announced the merger and the combination of target and acquirer banks. A total of 10 PSBs were merged to create four banks, and six were left out from the exercise. The stated purpose of the mega-merger of Indian banks is to increase the

⁴ For more details please refer Box 2.1 (pp. 58) of Financial Stability report, Issue 24 available at https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/FSRDEC2021_FULLL2D99E6548CD0478CA90EE717F2B85D45.PDF

national presence, enhance capacity, reduce cost of lending and so on⁵. It was also pointed out that the Government did not have the necessary bandwidth for re-capitalizing banks, which could lead to growth constraints. However, the process followed in partner selection remained opaque.

Against this backdrop, this paper attempts to answer two questions. First, can efficiency explain the partner selection? We examine the level of efficiency of all the PSBs to understand if efficiency was a criterion for the merger decisions. If the decision were to be made on efficiency alone, there are two possibilities, a) All efficient banks are merged to create a super-efficient bank and less efficient banks are left alone to be privatized in the future, b) less efficient banks are merged with the more efficient banks to increase the efficiencies of the former. Second, what are the other determinants which explain the partner selection?

3. Data and Methodology

3.1 Data Sources

At the time of the merger announcement on 30th August 2019, there were 18 PSBs. In this study, we include all the PSBs as listed in Table 1.

[Insert Table 1 here]

The financial data for the study is collected from the Basic Statistical Returns of Scheduled Commercial Banks in India published by RBI. The merger was announced during the financial year (FY) 2020. Hence, we have considered a period from FY 2017 to 2019 as the pre-merger period for our study. FY 2017 is selected as the beginning year since the Asset Quality Review

⁵ For more details, please see the presentation by Finance Minister of India available at <https://financialservices.gov.in/sites/default/files/Final%20Presentation%2030.8.2019%20FM%27s%20Conference.pdf>

(AQR) for banks conducted by the Regulator in FY 2016.⁶ The AQR exercise brought uniformity in the presentation of banks' performance.

3.2 Methodology

Data Envelopment Analysis

The study's objective is to show that using statistical models such as DEA by policymakers will enhance the quality of decisions. The data envelopment analysis (DEA), a non-parametric method, is a popular method used to measure the efficiencies of the bank (Azad et al., 2017; Dar et al., 2021). Efficiency is a performance measure of the decision-making units (DMUs). We consider the PSBs as DMUs. Using the DEAP software, we have applied the DEA-based Malmquist productivity index (MPI) to measure the change in productivity over time of DMU. DEA can be implemented by CRS (constant return to scale), the assumption that all DMUs are operating at optimal scale and there is no relationship between efficiency and scale of operations, or the VRS (variable return of scale) assumption that due to economies or diseconomies of scale, DMUs do not operate at most appropriate scales leading to the efficiency score being contaminated by scale efficiencies.

We provide total factor productivity change (TFP) as a measure of efficiency to indicate the change in the efficiency levels of the respective DMUs. TFP change index (M) indicates the level of total output growth in relation to the increase in financial inputs. It is the product of efficiency change (EFFCH) and technological change (TECHCH). EFFCH arises when there is improvement

⁶ The Asset Quality Review (AQR) for the banks was initiated in 2015 which brought uniformity in the presentation of banks' performance effective from 2016 (Rajan, 2016).
URL: https://www.rbi.org.in/SCRIPTS/BS_SpeechesView.aspx?Id=992

in management (Pure Technical efficiency) and improvement toward optimal size (scale efficiency), which takes the DMU closer to the efficient frontier. TECHCH is how much the benchmark frontier shifts at each bank's input mix. A value of more than 1 means the DMU is improving its efficiency, a value less than one means there is a decline in efficiency, and a value equal to 1 means the DMU is stagnant between two periods (t and t+1) (Isik & Hassan, 2003).

$$\begin{aligned}
 TFP(t, t+1) &= \underbrace{\frac{D_{t+1}^{VRS}(x_{t+1}, y_{t+1})}{D_t^{CRS}(x_t, y_t)}}_{PEFCH} \times \underbrace{\frac{D_{t+1}^{CRS} \frac{x_{t+1}, y_{t+1}}{D_{t+1}^{VRS}}(x_{t+1}, y_{t+1})}{D_t^{CRS} \frac{x_t, y_t}{D_t^{VRS}}(x_t, y_t)}}_{SECH} \\
 &\quad \underbrace{\times \frac{D_t^{CRS}(x_{t+1}, y_{t+1})}{D_{t+1}^{CRS}(x_{t+1}, y_{t+1})} \times \frac{D_t^{CRS}(x_t, y_t)}{D_{t+1}^{CRS}(x_t, y_t)}}_{EFFCH} \\
 &\quad \underbrace{\hspace{10em}}_{TECHCH}
 \end{aligned}$$

Selection of Input and Output variables

The DEA-based Malmquist Productivity Index (MPI) requires a selection of inputs and outputs, which has always been an arbitrary issue. In banking theory, there are two approaches- the production/ operating approach and the intermediation approach. Under the production approach, banks are viewed as producers of financial services like deposit taking, lending rather than mere

intermediaries. It emphasizes the importance of banks' operational efficiency, technology utilization, and service quality in delivering financial products to customers. Efficiency in these operations is crucial for banks to lower costs, offer competitive rates, and enhance customer satisfaction. Moreover, the operating approach highlights the significance of technology and innovation in banking services. The intermediation approach on the other hand considers banks as intermediaries that facilitate the flow of funds between savers and borrowers in the economy. Banks garner deposits from individuals and institutions seeking a safe place to store their money and provide these funds as loans to borrowers who require capital for various purposes. By functioning as intermediaries, banks contribute to the efficient allocation of resources, promote economic development, and support the overall functioning of the financial system. Furthermore, the intermediation approach highlights the importance of bank regulation and supervision to maintain financial stability, protect depositors' funds, and ensure the soundness of the banking system.

Past research has considered both the production (Bhattacharyya et al., 1997; Saha & Ravisankar, 2000) and the intermediation approach (Yue, 1992; Das et al., 2004) in the selection of the input and output variables. Our study has adopted the production approach considering banks as service companies using resources (inputs) to generate outputs. We use total factor productivity (TFP) change as a measure of efficiency. The TFP is a commonly used measure of efficiency in merger and acquisition literature (Rezitis, 2008; Schiffbauer et al., 2017).

The operation of the banking industry is considered as a complex process that usually includes sub-processes such as deposit producing and profit producing. Following previous studies (Zhu et al., 2021), we selected four inputs, two desirable and one undesirable. The four inputs are total

assets, employees, branch network and operating expenses. The two desirable outputs are interest and non-interest incomes, and the non-performing loans are the only undesirable output.

4. Results and Discussion

The efficiency of PSBs in India

Table 2 presents the TFP for the PSBs for the pre-announcement period. The table illustrates that while, in some cases, the acquirer banks were more efficient than the target banks, in other cases, the target banks were more efficient. We posit that the more efficient and productive banks should acquire the less efficient ones to improve the efficiency levels of the latter, or efficient banks should consider a merger to form a super-efficient bank. This is based on the reasoning that a bank which is more efficient and productive is considered to be well organized and would be having a management which is more capable. The logic is that if a less efficient and unproductive bank is taken over by a more efficient and productive bank, it will result in improving the performance of the less efficient and productive bank. This could be because of the transfer of the better management policy from the productive bank to the unproductive bank resulting in a more efficient and productive merged unit.

The findings in Table 2 suggest that the target bank was relatively more productive than the acquirer bank during the last observation period, the financial year ended 2019, in 3 out of 4 merger cases. Apart from Canara bank, the remaining three acquirers (Union Bank of India, Indian Bank, and Punjab National Bank) had exhibited TFP levels lower than at least one of the targets. The results seem to suggest that even though the TFP levels of Punjab National Bank (Acquirer) had improved by 9 percent, the TEPCH levels of Oriental Bank of Commerce (Target) had improved by 23 percent and were higher than that of its acquirer. Corporation Bank and Andhra banks (both

targets) had higher TEPCH levels than their acquirer (Union Bank of India). Similarly, the TPFCH level of Allahabad Bank (target) at 71 percent was higher than that of the Indian Bank (acquirer), where the TFP levels were 57 percent.

[Insert Table 2 here]

Our study reveals that DEA analysis cannot identify a pattern in the partner selection based on total factor productivity (TFP). However, other important factors may have been the basis for partner selection. For instance, the geographical dominance of a bank is also a logical reason for partner selection. The bank with a dominant presence in Northern parts of India, if merged with a bank with a dominant presence in Southern regions of India, will create a bank with a pan-India presence. Therefore, we examine important factors like capital adequacy, non-performing assets, geographical presence, and IT infrastructure.

The details are presented in Table 3. First, the deterioration in the asset quality adversely affected the capital adequacy of Indian banks in general and PSBs in particular. Hence, we conjecture that the banks with lower CET1 ratio may be merged with the bank with a better ratio. Contrary to this logic, we observe that the acquirer banks sometimes have a lower CET1 ratio than their respective target banks.

Second, the NPA ratio, a measure of asset quality, may also drive the partner selection decision. The banks with low NPA ratios need to be merged to create a strong bank. Our analysis of the NPA ratio reveals that NPA ratio may have been the basis for partner selection in a few cases. As presented in Table 3, SBI and Bank of Baroda had the least NPA ratio. Since the two banks had already concluded the merger deals, they did not form part of the current pool. The third and fourth

banks with the least NPA ratios were merged (Indian Bank and Allahabad Bank). However, such a pattern is not observed in the rest of the cases.

Third, we examined whether the partner selection resulted in the creation of banks with a national presence. The study finds that the merger of Indian Bank & Allahabad Bank will not create a presence in the western region; the merger of Syndicate Bank and Canara Bank will only increase their dominance in the southern region, merged PNB will not create a presence in the Southern region and merged Union Bank will not create dominance in the eastern region.

Fourth, the IT infrastructure is a key consideration in partner selection. There are only three core banking platforms used by Indian banks (Finacle, iFlex, and BaNCS). We observe that partner selection has ensured that the merged banks have a common platform. But the reason for excluding other banks with similar platforms is not explained.

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[Insert Table 3 here]

Finally, we examine the size variables. It can be argued that size can also be a factor that could create a strong bank. Despite India being the fourth largest economy, Indian banks do not feature in the S&P list to top 50 banks worldwide. Therefore, the merger of banks based on size could propel Indian banks to the global league. Table 4 presents the size of the Indian PSBs during 2019.

[Insert Table 4 here]

One of the common features of all the acquirer banks is that they all have significantly larger size, measured in terms of total assets. Similarly, the acquirer bank had a higher number of branches and employees except in one case (Indian Bank). But the reason for the exclusion of a few PSBs that tick all the boxes for a possible target/ acquirer is not explained. For example, the original goal of merging banks to create a few large banks would have been better met if some of the banks left out were considered in this round of mergers. The analysis provides sufficient information to conjecture that the decision of partner selection by the Government is not based on the factors listed above

5. Conclusion

The paper explores the possibility of determining the usage of academic models as a decision-making tool in partner selection during forced mergers of banks. We use total factor productivity (TFP) change as a measure of efficiency. The average total factor productivity index for all the public sector banks functional as of the announcement date is calculated using a non-parametric Malmquist Productivity Factor Index. The results suggest that three of the four acquirers have exhibited TFP levels lower than at least one of the targets. Further, banks with lower performance as measured TFP change have been left out of the exercise, and similarly, banks with a good performance in terms of TPF change have not been included. Thus, we conclude that efficiency

measured as a change in the total factor productivity could not explain the selection of the Target and Acquirer. Further, the study observes that other considerations such as capital, non-performing assets ratio, geographical dominance, IT platform, and size of the bank do not provide a reasonable rationale. We observe that the acquirer banks in some cases, have a lower CET1 ratio than their respective target banks. Further, even though the two banks in the available pool with the least NPA ratio (better asset quality) were merged, a similar pattern is not observed in the rest of the cases. The study finds that the partner selection has not created a bank of national presence even though it was cited as the objective of the merger exercise. Finally, while we observe that partner selection has ensured that the merged banks have a common core banking platform, the reason for excluding other banks with similar platforms is not explained. The analysis provides sufficient information to conjecture that the decision of partner selection in the forced merger announced in August 2019 is not based on any of these factors. We conclude that using academic models such as DEA could benefit and enhance informed decisions on bank mergers. Further studies can develop the models to estimate the potential gains from the mergers, which will aid policymakers in choosing the best partners for the mergers.

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Table 1: List of PSBs included in the study

Name	Status
Punjab National Bank	Acquirer
Oriental Bank of Commerce	Target
United Bank of India	Target
Canara Bank	Acquirer
Syndicate Bank	Target
Union Bank of India	Acquirer
Andhra Bank	Target
Corporation Bank	Target
Indian Bank	Acquirer
Allahabad Bank	Target
Bank of Maharashtra	Not considered for merger
Central Bank of India	Not considered for merger
Bank of India	Not considered for merger
UCO Bank	Not considered for merger
Indian Overseas Bank	Not considered for merger
Punjab and Sind Bank	Not considered for merger
Bank of Baroda	A merged entity
State Bank of India	A merged entity

Table 2: Pre announcement MPI Efficiency

Name of the Banks	Status	TFP
Panel A		
CANARA BANK	A	1.619
SYNDICATE BANK	T	1.184
Panel B		
INDIAN BANK	A	1.570
ALLAHABAD BANK	T	1.713
Panel C		
UNION BANK OF INDIA	A	1.111
ANDHRA BANK	T	1.679
CORPORATION BANK	T	1.676
Panel D		
PUNJAB NATIONAL BANK	A	1.173
ORIENTAL BANK OF COMMERCE	T	1.251
UNITED BANK OF INDIA	T	1.144
Panel E		
BANK OF BARODA	S	1.672
BANK OF INDIA	S	1.720
BANK OF MAHARASHTRA	S	1.736
CENTRAL BANK OF INDIA	S	1.753
DENA BANK	S	1.863
INDIAN OVERSEAS BANK	S	1.548
PUNJAB AND SIND BANK	S	1.260
UCO BANK	S	1.134
VIJAYA BANK	S	1.065

Note: A= Acquirer T = Target S= Standalone

Table 3: CET-1 ratio, Net NPA ratio, geographical dominance, IT infrastructure of PSBs

Name of the Banks	Status	CET1	NPA ratio (%)	Geographical dominance Pre-Merger	Geographical Dominance Post-merger	Technology platform
Panel A						
Canara Bank	Acquirer	5.50%	5.37%	South	No presence in the North, East or west	iFlex
Syndicate Bank	Target	9.31%	6.16%	South		iFlex
Panel B						
Indian Bank	Acquirer	7.38%	3.75%	East, North, Central	No presence in the West	BaNCS
Allahabad Bank	Target	9.72%	5.22%	South		BaNCS
Panel C						
Union Bank of India	Acquirer	8.39%	6.85%	North	No presence in the East	Finacle
Andhra Bank	Target	8.42%	5.72%	South		Finacle
Corporation Bank	Target	9.23%	5.71%	South & west		Finacle
Panel D						
Punjab National Bank	Acquirer	7.45%	6.55%	North, West & East	No presence in south	Finacle
Oriental Bank of Commerce	Target	7.46%	8.67%	Central & North		Finacle
United Bank of India	Target	8.39%	5.92%	East		Finacle
Panel E						
Bank of Baroda		10.38%	3.33%	Central, South and West		Finacle
Bank of India		11.01%	5.61%	Central		Finacle
Bank of Maharashtra		7.37%	5.52%	West		BaNCS
Central Bank of India		7.37%	7.73%	Central		BaNCS

Indian Overseas Bank	7.38%	10.84%	South	Finacle
Punjab and Sind Bank	7.60%	7.22%	Central	Finacle
State Bank of India	7.82%	3.10%	PAN India	BaNCS
UCO Bank	8.64%	9.72%	North west and North East	Finacle

Table 4: Measures of PSBs Size

Name of the Banks	Status	Total Assets (INR in billions)	No. of branches	No. of employees
Panel A				
Canara Bank	Acquirer	69.48	10,342	58,350
Syndicate Bank	Target	31.13	3,933	31,535
Panel B				
Indian Bank	Acquirer	28.01	2,872	19,604
Allahabad Bank	Target	24.86	3,245	23,210
Panel C				
Union Bank of India	Acquirer	49.40	9,200	76,000
Andhra Bank	Target	24.93	2,904	21,403
Corporation Bank	Target	21.36	2,432	17,776
Panel D				
Punjab National Bank	Acquirer	77.49	11,108	103,000
Oriental Bank of Commerce	Target	27.22	2,087	13,804
United Bank of India	Target	15.15	2,251	21,729
Panel E				
Bank of Baroda		78.10	9,500	85,000
Bank of India		62.52	4,892	48,807
Bank of Maharashtra		16.45	1,900	12,913
Central Bank of India		33.07	4659	35,675
Indian Overseas Bank		25.00	3615	23,579
Punjab and Sind Bank		10.90	1559	8,862
State Bank of India		368.09	23,475	257,252
UCO Bank		23.05	3,000	22,012

