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Mergers and efficiency gains: a case of Indian banks

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ABSTRACT

This paper reflects an attempt to measure the effect of mergers on efficiency of banks in India. Five major merger cases in India during 2000 to 2005 were examined to measure the pre- and post-merger efficiency to achieve the purpose of this study. Secondary data were obtained from bulletins and reports of the Reserve Bank of India (RBI) and Data Envelopment Analysis (DEA) was employed to calculate efficiency. The study found efficiency gains in four merger cases except the merger of the Oriental Bank of Commerce with the Global Trust Bank. The findings of the study suggest that market driven mergers boost and forced mergers lead to a decline in the efficiency of banks.

Contribution/ Originality
This study compared the post and pre-merger performance of the Indian commercial banks, particularly the analysis is based on five main mergers of banking industry. The results are mixed in the terms of market driven mergers and forced mergers.

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1. INTRODUCTION

Merger and acquisition (M&A) have become a well-liked research topic in the corporate field. Hence, the banking sector has also used M&A to boost its growth and expansion. The issue of merger and acquisition of banks has occupied an important place in the Indian banking system in recent years. The need for M&A in the Indian banking sector has been getting impressive attention. Merger mania is sweeping the equilibrium structure of the Indian banking industry (Barman, 2007). After 2001 some big mergers have happened in the Indian banking industry, such as the merger of IDBI with its banking arm IDBI Bank Ltd., the merger of ICICI Ltd. with the banking arm ICICI Bank Ltd., and the merger of the Global Trust Bank with the Oriental Bank of Commerce (OBC). Globalization, liberalization, market deregulation, and technological change have driven the wave of M&A across the globe. Liberalization and deregulation in India started since 1991-92 and has been a major change in the banking system (RBI, 2008a). Globalization would gain faster speed in the coming years particularly on account of expected opening of financial services under WTO.

M&A gained momentum in the Indian banking industry due to consolidation strategy of the Reserve Bank of India (RBI). The Indian banking sector has been divided into the broad classification of public sector banks, private sector banks, foreign sector banks, co-operative banks, regional rural banks, multistate co-operative banks, local area banks, and many others. Hence, the Narasimham Committee (1991, 1998) has also suggested consolidation of all 27 public sector banks to 3-4 global entities and 5-6 national entities (RBI, 2008a). Table 1 shows the major banking mergers after the 1991 period of economic reforms.

Table 1: Bank mergers in India in the postreform era

Year	Anchor Bank	Target Bank	Aim of Merger	Nature of Merger
1993	Punjab National Bank	New Bank of India	ROWB	FM
1993	Bank of India	Bank of Kerala Ltd	ROWB	FM
1995	State Bank of India	Kashinath Seth Bank	ROWB	FM
1997	Oriental Bank of Commerce	Bari Doab Bank Ltd.	ROWB	FM
1999	Union Bank of India	Sikkim Bank Ltd.	ROWB	FM
2000	HDFC Bank	Times Bank	ASOE	VM
2001	ICICI Bank	Bank of Madurai	ASOE	VM
2002	ICICI Bank	ICICI Limited	AOUB	VM
2003	Bank of Baroda	Benares State Bank Ltd.	ROWB	FM
2004	Bank of Baroda	South Gujarat Bank	ROWB	FM
2004	Oriental Bank of Commerce	Global Trust Bank	ROWB	FM
2005	Centurion Bank	Bank of Punjab	ASOE	VM

Note: ROWB- Restructuring of weak Bank, FM- Forced Merger, VM- Voluntary Merger, ASOE- Achieve Scale of Economies, AOUB- Achieve the Objective of Universal Banking
Source: RBI, 2008b

This study evaluates the impact of M&A on the Indian banking industry. The authors have considered the impact of only five mergers between 2000 and 2005.

- Merger of the target bank the Times Bank Ltd. with the anchor HDFC Bank Ltd. in 2000
- Merger of the target Bank of Madurai with the anchor ICICI Bank Ltd. in 2001
- Merger of the target Benares State Bank Ltd. with the anchor Bank of Baroda in 2003
- Merger of the target Global Trust Bank with the anchor Oriental Bank of Commerce in 2004
- Merger of the target Bank of Punjab with the Centurion Bank in 2005.

The major objective of this study is to measure the pre- and post-efficiency gains of M&A of the five banks. To pursue the objective the study has been divided into five sections. The first section is the

introduction. The empirical survey of literature on M&A in the banking industry has been discussed in Section 2. The procedure of calculating efficiency gains in the Indian banking industry due to M&A has been discussed in section 3. The empirical results have been presented and discussed in section 4. Section V concludes the study and provides noteworthy policy implications.

2. REVIEW OF LITERATURE

The empirical survey of various empirical studies on mergers and acquisitions in the banking industry will be presented and discussed in this section. The wave of M&A has expanded scope for growth, particularly for the Indian banking sector. Walleghem and Willis (1998) measured the cost efficiency of a merger of 19 community banks in the United States. They found that cost efficiency increased in all cases. Garden and Ralston (1999) studied 16 Australian bank merger cases and observed that most of the mergers did not boost efficiency. Only 3 banks reported gains in efficiency. Avkiran (2000) attempted to measure efficiency gains after a merger by applying DEA analysis. He used a small sample of four public sector merger cases. The study found that the efficiency of the acquirer banks more or less remained the same after merger. Liu and Tripe (2002) studied 6 New Zealand bank merger cases and observed that 5 banks showed post-merger efficiency gains. Kim (2004) investigated pre- and post-merger branch efficiency of Canadian banks. They found that almost all merger cases led to efficiency gains. There are many studies which measure merger gains in Asian countries, such as Sufian (2004) which gauged post-merger efficiency in Malaysian commercial banks and found gains in efficiency and performance of banks. Randhawa and Lim (2005) measured the post-merger efficiency in 7 Hong-Kong and Singaporean banks. They reported that large banks benefited more from the merger in efficiency than small banks. Gourlay and Ravishankar (2006) measured merger gains in the Indian banking system. They reported a significant impact of merging on the efficiency of the merged banks. Joshua (2011) measured the postmerger efficiency gains in three Nigerian banks and observed that merger brought efficiency gains in all cases. Rasiah *et al.* (2014) measured the pre- and post-merger efficiency of Malaysian domestic banks from 2005 to 2009 and found that efficiency grew during the first year after the merger.

Most studies report that M&A have been successful in most Asian countries. However, in other countries the results have been mixed and do not provide a clear picture. Some studies also provide conflicting results of the succession of M&A in the Indian banking industry. To resolve this conflict, section IV empirically examines the impact of M&A in the Indian scenario.

3. DATA AND METHODOLOGY

This section enlightens the methodology applied and the database used. Secondary data were required and extracted from reports published by the RBI. The study utilized two output variables:

i) nterest earned minus interest expanded and ii) noninterest income (Drake and Hall, 2003; Sufian, 2006).

Whereas the input variables used for computing cost efficiency are:

i) fixed assets, ii) staff, and iii) deposits + borrowings.

A nonparametric linear programming based on data envelopment analysis was employed to obtain the efficiency score. To calculate cost efficiency and its components required following procedure due to Kumar and Gulati (2010). We firstly calculated *T_E* as introduced by Charnes *et al.* (1978). We assume that there are *K* banks; to produce *M* output each bank uses *N* input.

Where $i = 1, \ldots \ldots K$ input quantities by $x_{ni}, n = 1, \ldots . . N$ and $m = 1, \ldots \ldots M$ output quantities by $Y_{mi}$with $x_{ni} > 0$ and $x_{mi} > 0$.

$$\min_{\theta_i \lambda_i} TE_i^{CRS} = \theta_i$$

Subject to

$$\begin{aligned} Y\lambda_i &\geq Y_i \\ X\lambda_i &\leq \theta_i x_i, \\ \theta_i &\geq 0 \end{aligned} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Secondly we calculated cost efficiency by referring to Fare and Grosskopf (1985) and Ferrier *et al.* (1993).

$$\min_{x_i \lambda_i} \quad w_i x_i$$

Subject to

$$\begin{aligned} Y\lambda_i &\geq Y_i \\ X\lambda_i &\leq \theta_i x_i, \\ x_i\, &free \\ \lambda_i &\geq 0 \end{aligned} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

By solving model (2) we obtain cost efficiency as

$$C\_E_i^{CRS} = \frac{w_i\, x_i^{CRS}}{w_i\, x_i}$$

Thirdly the study obtains allocative efficiency by dividing cost efficiency of Farrell input-oriented measure of technical efficiency. Thus the allocative efficiency is:

$$A\_E_i^{CRS} = \frac{C\_E_i^{CRS}}{T_i\_E_i^{CRS}}$$

The cost efficiency can be further decomposed as $C\_E_i^{CRS} = T_i\_E_i^{CRS} \times A\_E_i^{CRS}$ where the value of C_E, T_E and A_E ranges between 0 and 1. The computer program Data Envelopment Analysis Program (DEAP) developed by Tim Collie has been utilized.

4. RESULTS AND DISCUSSION

To analyze the impact of merger on an efficient performance of anchor bank we have used four distinct measures of operational efficiency. These measures are Cost Efficiency (*C_E*), Allocative Efficiency (*A_E*), Technical Efficiency (*T_E*) and Pure Technical Efficiency (*P_E*). Table 2 provides the pre- and post-merger summary of the anchor bank (HDFC Bank Ltd.) and the efficiency summary of the target bank (Times Bank Ltd.) before the merger.

The *C_E* of the target bank before merging is 0.83 which means that *C_E* has declined by 16.7% whereas the Pure technical efficiency of 0.46 discloses the apathetic health performance of the Time Bank Ltd. before merging. Such low pure technical-efficiency depicts the existence of 53.4% pure technical inefficiency in the target bank. The efficient performance of the anchor HDFC Bank Ltd. is also in line with its target bank. There is about 19.9% cost inefficiency in the HDFC Bank Ltd. before merging.

Table 2: Efficiency performance of HDFC bank ltd

Panel A: Efficiency performance of times bank ltd (Target Bank)										
Efficiency measure	Pre-merger years				Merger year	Post -merger years				Average efficiency gains/losses (%)
	1997	1998	1999	Average	2000	2001	2002	2003	Average	
C_E	0.824	0.893	0.782	0.833						
A_E	0.911	0.978	0.946	0.945						
T_E	0.905	0.914	0.827	0.882						
P_E	0.389	0.604	0.406	0.466						
Panel B: Efficiency performance of HDFC Bank Ltd (Anchor Bank)										
C_E	0.816	0.765	0.823	0.801	0.877	0.760	0.770	0.815	0.781	-2.0
A_E	0.934	0.866	0.835	0.878	0.933	0.844	0.849	0.859	0.850	-2.8
T_E	0.874	0.884	0.985	0.914	0.940	0.900	0.907	0.949	0.918	0.4
P_E	0.479	0.465	0.493	0.479	0.377	0.487	0.384	0.615	0.495	1.6

Source: Author's own calculations

After the target Times Bank Ltd. merging with the HDFC Bank Ltd. a rising trend has been observed in four components of efficiency performance during the years 2001, 2002, and 2003. However, there is a negative gain in average cost efficiency and allocative efficiency. The technical efficiency and pure technical efficiency have increased by 0.4 and 1.6% after merging.

Table 3: Efficiency performance of the ICICI bank ltd

Panel A: Bank of Madura (Target Bank)										
Efficiency measure	Pre-merger years				Merger year	Post -merger years				Average efficiency gains/losses (%)
	1998	1999	2000	Average	2001	2002	2003	2004	Average	
C_E	0.712	0.707	0.751	0.723						
A_E	0.900	0.871	0.863	0.878						
T_E	0.791	0.812	0.870	0.824						
P_E	0.404	0.242	0.427	0.357						
Panel B: ICICI Bank Ltd (Anchor Bank)										
C_E	0.738	0.910	0.658	0.768	0.733	0.867	0.972	0.927	0.922	15.4
A_E	0.923	0.910	0.921	0.918	0.869	0.867	0.972	0.927	0.922	0.4
T_E	0.799	1.000	0.714	0.837	0.843	1.000	1.000	1.000	1.000	16.3
P_E	0.500	1.000	0.279	0.593	0.362	1.000	1.000	1.000	1.000	40.7

Source: Author's own calculations

Table 3 gives information about the pre- and post-merger performance of the anchor ICICI Bank Ltd. and premerger performance of the target Bank of Madura. We observed that there is 27.7 cost inefficiency, 12.2 allocative efficiency, 17.6 technical efficiency, and 64.3% pure technical efficiency. Thus the Bank of Madura was affected by pure technical inefficiencies. The ICICI Bank Ltd. has shown better performance than the target bank before merging. The average cost efficiency was 0.76; the average allocative efficiency was 0.91. The ICICI Bank Ltd. shows tremendous performance after merging. There was significant increase in technical efficiency and pure technical efficiency. This shows 16.3% and 40.7% average efficiency gains.

Table 4: Efficiency performance of the bank of Baroda

Panel A: Benares state bank ltd (Target Bank)										
Efficiency measure	Pre-merger years				Merger year	Post -merger years				Average efficiency gains/losses (%)
	2000	2001	2002	Average	2003	2004	2005	2006	Average	
C_E	0.718	0.674	0.713	0.713						
A_E	0.874	0.789	0.910	0.857						
T_E	0.822	0.853	0.784	0.819						
P_E	0.013	-0.190	0.367	0.063						
Panel B: Bank of Baroda (Anchor Bank)										
C_E	0.706	0.675	0.740	0.707	0.859	0.835	0.777	0.700	0.770	6.3
A_E	0.881	0.836	0.848	0.855	0.965	0.922	0.847	0.810	0.859	0.4
T_E	0.801	0.808	0.872	0.827	0.890	0.905	0.917	0.865	0.895	6.8
P_E	0.274	0.246	0.342	0.287	0.525	0.657	0.479	0.416	0.517	23.0

Source: Author's own calculations

Table 4 analyzed the premerger performance of the target Benares State Bank Ltd. and also the pre- and post-merger performance of the Anchor Bank of Baroda. We found that the average cost efficiency of the target bank was 0.71, in other words there is 28.7% cost inefficiency. Allocative efficiency was 0.85, technical efficiency was 0.81, and pure technical efficiency was 0.06. It was clear that the Benares State Bank faced pure technical inefficiency of 93.7%. Thus it was imperative to restructure the functioning of this bank with the help of the M&A strategy. Panel B shows the pre- and post-merger efficiency performance of anchor bank - the Bank of Baroda. The post-merger years show better performance than the years before merging. We observed that the four components of efficiency increased after the merger of Benares State Bank Ltd. with the Bank of Baroda. The average cost inefficiency, allocative inefficiency, and technical efficiency do not shows higher gains, but the average pure technical efficiency measured 23% gains. Technical efficiency measured 23% gains.

Table 5: Efficiency performance of OBC bank

Panel A: Global trust bank ltd (Target Bank)										
Efficiency measure	Pre-merger years				Merger year	Post -merger years				Average efficiency gains/losses (%)
	2002	2003	2004	Average	2005	2006	2007	2008	Average	
C_E	0.848	1.000	0.668	0.839						
A_E	0.905	1.000	0.668	0.858						
T_E	0.937	1.000	1.000	0.979						
P_E	0.622	1.000	1.000	0.874						
Panel B: Oriental bank of commerce (Anchor Bank)										
C_E	0.856	0.945	0.931	0.910	0.793	0.746	0.891	0.912	0.849	-6.1
A_E	0.935	0.996	0.982	0.971	0.922	0.854	0.970	0.975	0.933	-3.8
T_E	0.916	0.949	0.948	0.937	0.860	0.874	0.919	0.936	0.909	-2.8
P_E	0.574	0.761	0.849	0.728	0.491	0.423	0.410	0.498	0.443	-28.5

Source: Author's own calculations

The results in Table 5 contrast to the results in the four other tables. In this case the impact of the merger on the efficiency performance of the anchor bank OBC is negative during the three years after merging; the average efficiency has declined for the anchor bank after merging. However, in this case the target Global Trust Bank Ltd. gained cost efficiency and allocative efficiency. The target bank lost technical efficiency and pure technical efficiency. Both of these efficiencies declined

after merging. Thus it can be concluded that the merger of OBC and Global Trust Bank Ltd. was not successful compared to the other four mergers discussed in the study.

Table 6: Efficiency performance of the centurion Bank of Punjab

Panel A: Bank of Punjab (Target Bank)										
Efficiency Measure	Pre-merger years				Merger year	Post -merger years				Average Efficiency gains/losses (%)
	2002	2003	2004	Average	2005	2006	2007	2008	Average	
C_E	0.770	0.802	0.792	0.788						
A_E	0.860	0.836	0.813	0.836						
T_E	0.895	0.959	0.974	0.942						
P_E	0.543	0.785	0.699	0.675						
Panel B: Centurion Bank of Punjab (Anchor Bank)										
C_E	0.630	0.637	0.633	0.633	0.599	0.628	0.663	0.813	0.701	6.8
A_E	0.788	0.857	0.776	0.807	0.686	0.702	0.716	0.824	0.747	6.0
T_E	0.895	0.743	0.815	0.817	0.873	0.894	0.927	0.986	0.935	11.8
P_E	0.162	0.245	0.310	0.239	0.346	0.448	0.455	0.661	0.521	28.2

Source: Author's calculations

Table 5 exhibited the pre- and post-merger efficiency of the Centurion Bank and the efficiency of the target Bank of Punjab. The cost efficiency of the target bank before merging is 0.78 - there are cost inefficiencies of 21.2%. We also accessed the allocative efficiency score of the target bank of 0.83 (16.4% inefficiency), technical efficiency score of 0.94 (5.8% inefficiency), and pure technical efficiency score of 0.67 (32.5% inefficiency). The efficiency performance of the anchor Centurion Bank of Punjab shows nearly the same figures as the target bank. There is about 36.7% cost inefficiency, 19.3% allocative inefficiency, and 8.3% technical inefficiency before merging. Moreover, over 70% (i.e. 76.1%) pure technical inefficiency existed in the operation of the Centurion Bank of Punjab before merging. However, post-merger years show an increasing trend in efficiency except allocative efficiency which decreased.

5. CONCLUSION AND POLICY IMPLICATIONS

The overall conclusion of this analysis is that improvement in the efficiency of anchor and target banks has been observed except the merger of the Oriental Bank of Commerce. The four mergers in which efficiency improvements have been observed are market oriented mergers whereas the merger of the Oriental Bank of Commerce with the Global Trust Bank Ltd. was forced under section 43 of the RBI Bank Regulation Act 1949, not a market oriented one. Hence the efficiency of the Oriental Bank of Commerce has worsened after merging. In sum, market oriented mergers are always beneficial, while forced mergers reduce productive efficiency in the Indian banking sector. Thus to reap the benefits of mergers financial regulatory bodies should avoid obligatory merging and leave the decision of merging to the banks.

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