COST EFFICIENCY OF MERGED COMMERCIAL BANKS IN INDIA: AN EMPIRICAL ANALYSIS

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Abstract- The Rapid advances in computer and Communication technology have led to the development of new banks services and financial instruments. Therefore, the economies of world have experienced a revolutionary change in the environment of banking sector. The competition among the bank at domestic and global level has increased and it has compelled the banking industry to improve their efficiency and productivity. Moreover, the government and policy makers have adopted various policies and measure out of which consolidation of banks emerged as one of the most preferable strategy. The present research paper attempts to know the effect of mergers and acquisitions on the cost efficiency of merged commercial banks in India.

I. INTRODUCTION

Banks as financial intermediaries play a significant role in economic growth, provide funds for investment, and keep the cost of capital low. During the last few decades, structure of banking sector has returned from air control system into liberalized one. The efficiency of banks, which reflects the ability of banks in transforming its resources to output by making it best allocation, is essential for the growth of an economy. However, due to the major role played by fans in the development of economy, the banking sector has been one of the major sectors that have received renewed interest from researchers and economists.

The Rapid advances in computer and Communication technology have led to the development of new banks services and financial instruments. Therefore, the economies of world have experienced a revolutionary change in the environment of banking sector. The competition among the bank at domestic and global level has increased and it has compelled the banking industry to improve their efficiency and productivity. There are diverse ways to consolidate the banking industry the most commonly adopted by banks is merger. Merger of two weaker banks or one healthy bank with one weak bank can be treated as the faster and less costly way to improve profitability than spurring internal growth.

Review of Literature:

More than ever, today mergers and acquisitions is an area of immense research potentials to both academicians and practicing managers for over three decades. Economic globalization has created a sense of urgency among companies resulting in an acute significance of examining the effect of corporate restructuring and change initiatives on the organizational performances. Studies on M& A in India such as Beena P.L. (2000), Malhotra, I.S(2000), Pawaskar (2001), Pramod Mantravadi & Vidyadhar Reddy (2007), Varsha Virani (2007) suggests a wider framework for understanding the implications of merger from varied perceptions. From the existing literature, it was observed that major studies focused on performance and the resultant implications of M&A. Most importantly, in an industry where "size" determines sustenance ability, the merger should place the banks on a better footing. Today, more than ever, merger in the Indian banking sector have gained considerable momentum for achieving consolidation. In limited, there exists limited research examining the financial ratio such as liquidity ratio, probability ratio and turnover ratio for appreciating and understanding the real performances of the merged banks.

Need of the study:

The review of existing literature clearly divulges that very few studies have been conducted with the motive of examining the cost efficiency of merged Indian Commercial banks and the impact of merger on the cost efficiency of commercial banks in India. Therefore, the present study makes notable contribution to the existing literature on banking efficiency in India.

Objective:

The present is mainly aimed at measuring the cost efficiency of select commercial banks operated in India and to study the impact of mergers on cost efficiency of merged banks.

Hypothesis:

H_0: Merger has no impact on the cost efficiency of merged commercial banks in India.

Methodology

Data: The study is primarily based on secondary data. The data has been collected from various secondary sources mainly from the official dictionary and the database of Centre for monitoring Indian economy (CMIE) namely PROWESS. The data was also collected from published annual reports of the selected banks accessed from related websites magazines and journals on finance have also been used as a data for the study.

Scope of the study: Indian banking industry has witnessed many mergers during last three decades. In order to carry out the study 9 merged commercials banks have been consider and the list of the same given in the following table-1.

Table-1: List of the merged commercial banks considered for the study

Sl. No.	Name of the Bank	Target Bank	Date of merger
1	State Bank of India (SBI)	Kashinath Seth Bank	01-04-95
2	Bank of Baroda (BOB)	Bareilly Co-operative Bank	01-06-98
3	HDFC Bank Ltd. (HDFC)	Times Bank	26-11-99
4	Union Bank of India (UBI)	Sikkim Bank Ltd.	01-12-99
5	ICICI Bank Ltd. (ICICI)	Bank of Madura	11-12-00
6	Punjab National Bank (PNB)	Nedungadi Bank Ltd.	20-11-02
7	Oriental Bank of Commerce (OBC)	Punjab Co-operative Bank Ltd.	26-07-04
8	Federal Bank (FB)	Ganesh Bank of Kurandwad	06-01-06
9	Indian Overseas Bank (IOB)	Bharat Overseas Bank Ltd.	07-04-07

Period of the study: The study covers a period of 10 years and is equally divided into two categories as before merger and after merger. The overall period of the study was ranged from 1991 to 2012.

Data analysis: In order to measure the efficiency of the merged banks, all possible efforts have been made to produce appropriate results which meet the objectives of the study. Appropriate statistical tools such as mean, standard deviation, percentage, etc. have been used to analyze the data. Paired sample T-test has also been used to compare the efficiency of the banks before and after merger. In connection to measure the technical, allocative and cost efficiency of the bank Data Envelopment Analysis have been used.

Data Envelopment Analysis (DEA): it is the non-parametric mathematical programming approach to frontier estimation. It computes the efficiency of banks on the basis of estimated piecewise linear frontier made up by a set of efficient banks. The banks that lie on the frontier are treated as best practice banks and obtain efficiency score equal to one whereas the banks that do not lie on the frontier are relatively inefficient and their efficiency score lie in the range of zero and one. The DEA approach decomposed the Cost efficiency (CE) into its two different components, technical efficiency (TE) and allocative efficiency (AE).

Technical efficiency reflects the ability of a firm to maximize output from a given set of inputs whereas allocative efficiency reflects the ability of the firm to use these inputs in optimal proportions, given their respective prices where the cost of production is at minimum. Technical efficiency implies that there is no waste in using inputs to produce specific quantity of output. A firm is said to be technically efficient when it cannot increases any output or decreases any input without reducing the quantities of other outputs or inputs. The overall cost efficiency can be expressed as a product of technical and allocative efficiency measures. Therefore, the allocative efficiency of the DMUq can be calculated as ratio of overall cost efficiency(CEq) to input-oriented technical efficiency (TEq). These three measures (technical, allocative and overall cost efficiency) can take values ranging from zero to one, where a value of one in case of TE, AE and CE indicates full efficiency. If production unit is fully technically efficient (TEq = 1) and displays allocative efficiency (AEq = 1); it is also overall cost efficient (CEq = 1). This production unit uses minimum amount of inputs for producing of given outputs, while the proportion of inputs will guarantee the minimum possible costs. The production unit which is technically efficient (TEq = 1) but does not demonstrate allocative efficiency (AEq<1) is not also overall cost efficient (CEq<1).

This production unit uses minimum amount of inputs for producing the given outputs, but the proportion of inputs will not guarantee the minimum possible costs. The production unit which reaches allocative efficiency (AEq = 1), but does not reach technical efficiency (TEq<1) cannot be marked as overall cost efficient (CEq<1). The proportion of inputs will guarantee the minimum possible costs, but this combination of inputs is not minimal fora producing of given outputs. If the production unit fails to demonstrate any of these three types of efficiency (TEq<1; AEq<1; CEq<1), then the value of overall cost efficiency can be interpreted as a potential costs saving that can be achieved if the production unit uses the inputs in optimal combination. Potential costs saving can be calculated by subtracting the value of overall cost efficiency from the number one. To calculate cost efficiency of banks a CRS cost efficiency DEA model (by Coelli and et al., 2005) has been used and the results have been obtained.

Cost minimization DEA

$$\min_{\lambda, x_i^*} \; w_i' x_i^*$$

$$\text{st} \quad -\square_i + Q\lambda \geq 0$$

$$x_i^* - X\lambda \geq 0$$

$$I1'\lambda = 1$$

$$\lambda \geq 0$$

Where,

w_i is the vector of input prices faced by the i-th firm and x_i* is the cost-minimising vector of input quantities, given the input prices w_i and the output levels y_i. That is, the input quantities (x_i*) are the decision variables in this LP.

The cost efficiency (CE) is calculated as:

$$CE = w_i'x_i^*/ w_i'x_i$$

Selection and specification of variables

It is evident from the literature that, the choice of variables plays a crucial role while determining the efficiency level of a bank. For the purpose of present study, Deposits, Net fixed assets and Labors (measured in terms of number of full time employees) have been taken as input variables and advances, interest income and other income of the banks were taken as output variables. The unit price of each input variable was also calculated. The unit price of deposit was calculated by dividing total interest expenses with deposits of the bank, whereas, the unit price of net fixed asset was calculated by dividing operating expenses with net fixed assets of the bank and the unit price of labour was calculated by dividing amount of compensation of employees with the number of employees of the respective bank.

Results and discussion:

Table-2: Descriptive statistics of Inputs, outputs and price of inputs

Bank	Statistic	Variables								
		Deposits	Net fixed assets	Labor	Advance	Interest income	Other income	Price of deposit	Price of NFA	Price of labor
SBI	Mean	104046.25	896.42	231881.80	58128.03	11766.66	3797.22	0.087	0.040	0.012
	SD	48572.98	708.60	6568.57	19360.17	5080.87	2986.53	0.010	0.011	0.005
BOB	Mean	42726.56	592.12	44681.20	21754.94	3933.07	1255.14	0.071	0.036	0.018
	SD	15337.61	76.52	2748.49	8089.46	1588.20	695.37	0.006	0.009	0.007
HDFC	Mean	9823.81	242.11	2160.00	4765.23	881.64	208.80	0.059	0.084	0.024
	SD	10513.11	208.22	1994.70	5859.29	885.20	210.39	0.024	0.073	0.008
UBI	Mean	30558.54	684.39	29575.30	15316.52	2875.93	633.81	0.069	0.020	0.019
	SD	11876.23	216.30	3026.50	7870.42	1226.88	495.87	0.007	0.020	0.007
ICICI	Mean	28520.35	1752.41	5798.00	26439.37	3270.87	1148.11	0.084	0.038	0.025
	SD	33714.36	2021.88	6395.36	32744.37	4160.58	1488.71	0.035	0.016	0.011
PNB	Mean	77012.99	814.23	59790.00	43440.74	6873.21	1566.31	0.059	0.027	0.027
	SD	35138.97	153.97	2947.59	26762.21	2636.57	712.34	0.014	0.008	0.010
OBC	Mean	47901.60	353.88	14239.90	29599.90	4340.15	622.70	0.064	0.037	0.030
	SD	25314.65	378.26	593.96	20185.49	2049.07	253.22	0.013	0.010	0.010
FB	Mean	18978.04	195.27	6713.00	12435.96	1741.13	405.22	0.063	0.045	0.032
	SD	9786.17	55.30	581.82	8010.15	1086.70	216.74	0.015	0.018	0.010
IOB	Mean	86059.13	939.96	25107.10	61161.20	7904.59	1088.79	0.058	0.010	0.045
	SD	47820.51	655.97	1180.22	41062.44	4651.70	406.92	0.009	0.004	0.015

Table-2 depicts descriptive statistics pertaining to the inputs (deposits, net fixed assets and labor), outputs (advances, interest income and other income) and the price of all the input variables considered for the study.

Table-3: Technical, allocative and Cost efficiency of merged commercial banks

Name of the bank	Year and Efficiency										
SBI	YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	AE	0.883	1.000	1.000	0.864	0.931	1.000	1.000	0.937	0.680	0.898
	CE	0.883	1.000	1.000	0.864	0.931	1.000	1.000	0.937	0.680	0.898
BOB	YEAR	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
	TE	0.908	0.877	1.000	1.000	1.000	1.000	1.000	1.000	0.980	1.000
	AE	0.665	0.928	0.984	0.968	1.000	1.000	0.839	0.476	0.662	0.784
	CE	0.604	0.814	0.984	0.968	1.000	1.000	0.839	0.476	0.649	0.784
HDFC	YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	TE	0.512	1.000	1.000	1.000	1.000	1.000	1.000	0.965	0.957	0.848
	AE	0.689	1.000	1.000	1.000	1.000	0.954	1.000	0.549	0.726	0.968
	CE	0.353	1.000	1.000	1.000	1.000	0.954	1.000	0.530	0.695	0.820
UBI	YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	TE	1.000	0.758	0.941	1.000	0.966	1.000	1.000	0.887	0.890	0.852
	AE	0.554	0.917	0.970	0.943	0.965	0.992	0.870	0.514	0.725	0.909
	CE	0.554	0.695	0.913	0.943	0.933	0.992	0.870	0.456	0.646	0.774

ICICI	YEAR	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	TE	1.000	1.000	1.000	1.000	1.000	0.890	1.000	1.000	1.000	1.000
	AE	1.000	1.000	1.000	1.000	0.890	0.904	1.000	1.000	1.000	1.000
	CE	1.000	1.000	1.000	1.000	0.890	0.805	1.000	1.000	1.000	1.000
PNB	YEAR	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
	TE	1.000	0.790	0.912	0.932	1.000	0.999	0.999	0.865	0.995	1.000
	AE	1.000	0.774	0.929	0.855	0.895	0.960	0.851	0.509	0.597	0.698
	CE	1.000	0.611	0.847	0.797	0.895	0.960	0.850	0.440	0.594	0.698
OBC	YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	TE	1.000	1.000	1.000	1.000	1.000	0.822	1.000	1.000	1.000	0.946
	AE	0.683	0.775	1.000	1.000	0.992	0.995	0.849	0.663	0.811	0.959
	CE	0.683	0.775	1.000	1.000	0.992	0.818	0.849	0.663	0.811	0.907
FB	YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	TE	1.000	1.000	1.000	1.000	0.847	0.930	1.000	1.000	1.000	1.000
	AE	0.704	0.949	0.999	1.000	0.960	0.978	0.866	0.701	0.803	1.000
	CE	0.704	0.949	0.999	1.000	0.813	0.909	0.866	0.701	0.803	1.000
IOB	YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.957	1.000	1.000
	AE	0.546	0.747	1.000	1.000	1.000	1.000	1.000	0.676	0.877	1.000
	CE	0.546	0.747	1.000	1.000	1.000	1.000	1.000	0.646	0.877	1.000

Table-3 describes the year-wise technical, allocative and cost efficiency scores recorded by Indian commercial banks selected for the study. Most of the banks were found to be technically efficient throughout the study period. The banks have recorded technical efficiency score ranged between 51.20% to 100 %(i.e. 0.512 to 1.00).

Among the selected merged commercial banks, State Bank of India was found to be the only bank to attain 100% technical efficiency score throughout the period of the study. The allocative efficiency scores of selected merged commercial banks was ranged from 47.60% to 100% (i.e. 0.476 to 1.000). In order to be fully cost efficient, every bank has to achieve a full technical and allocative efficiency. The cost efficiency scores of merged commercial banks was falling between the ranges of 35.30% to 100% (i.e. 0.353 to 1.000). It indicates that, the banks have failed to achieve full cost efficiency throughout the study period.

Impact of Merger on the Cost of efficiency of commercial banks

Table-4: Average efficiency scores: before & after the merger

Name of the Bank	Technical Efficiency		Allocative Efficiency		Cost Efficiency	
	Before Merger	After Merger	Before Merger	After Merger	Before Merger	After Merger
State Bank of India	1.000	1.000	0.936	0.903	0.936	0.903
Bank of Baroda	0.957	0.996	0.909	0.752	0.874	0.750
HDFC Bank Ltd.	0.902	0.954	0.938	0.839	0.871	0.800
Union Bank of India	0.933	0.926	0.870	0.802	0.808	0.748
ICICI Bank Ltd.	1.000	0.978	0.978	0.981	0.978	0.961
Punjab National Bank	0.927	0.972	0.891	0.723	0.830	0.708
Oriental Bank of Commerce	1.000	0.954	0.890	0.855	0.890	0.810
Federal Bank	0.969	0.986	0.922	0.870	0.893	0.856
Indian Overseas Bank	1.000	0.991	0.859	0.911	0.859	0.905

Table-4 shows the average efficiency scores of merged commercial banks before and after the merger. It clearly describes that, after the merger, majority of the banks have witnessed a gain in its technical efficiency scores. It indicates that, the banks have improved their technical efficiencies after merger. On the other hand, allocative efficiency of all the merged commercial banks has decreased except Indian Overseas Bank. It indicates that, banks fail to obtain allocative efficiency from the merger of its bank with other. A negative relationship was recorded between the changes in technical and allocative efficiency of merged commercial banks after the merger. Any deficiencies in technical or allocative

efficiency leads to adverse effect on cost efficiency. It could be clearly observed from the above table. The cost efficiency of commercial banks have decreased after its merger. From the table-4, it is evident that, the cost efficiency of commercial banks have impacted by the merger. In order to analyze the impact of merger on the cost efficiency of commercial banks in India, paired sample t-test has been used and the results of the same have been shown in table-5.

Table-5: Results of Paired Sample t-test

Particular		Paired Differences			t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Errort Mean			
Cost efficiency	Before merger - After merger	.055333	.053160	.017720	3.123	8	.014

Table-5 shows the results of paired sample t-test of cost efficiency of commercial banks in India. From the table it is evident that, the significance value is < 0.05 i.e. 5% level of significance.

Therefore, the null hypothesis (H_0) is rejected and it is concluded the merger has a significant impact on the cost efficiency merged commercial banks in India.

CONCLUSION

From the analysis it is evident that, the cost efficiency of the commercial banks is impacted by its merger. Mergers and acquisitions have proven to be a significant and increasingly popular means for achieving corporate diversity and growth.

It is suggested that a successful merger involves not only thorough financial and strategic analysis and planning, but also planning regarding congruence between the two companies' preferences about the implementation strategy for the merger.

Prior to make any merger decision, every banker must take proper measures to maintain its technical and allocative efficiency to be cost efficient after its merger.

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