Post-Merger Financial Performance of Indian Banks: Camel Approach

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Abstract

The fact that India could well be the next financial hub of the globe, and the fact that the banking sector will play a major role in facilitating this transformation, served as the motivation for the study. Post liberalisation, the sector has seen a lot of mergers and acquisitions in the country. However, to add value, M&A must lead to improved financial performance of the merged entity. This research paper analyzes the post-merger financial performance of private and public sector banks, and also compares the same. The study reveals that, individually, private and public sector banks have shown post-merger improvement in financial performance with respect to a few parameters of the CAMEL model. However, overall there is no statistically significant improvement in the financial performance of the banks, post-merger. Also, there is no significant difference when the post-merger financial performance of private sector banks is compared to that of public sector banks.

Keywords: Merger and Acquisition, Post-Merger Financial Performance, Private Sector Banks, Public Sector Banks, CAMEL Model, Ratio Analysis

JEL Classification: G21, G34

Introduction

World economy has seen multiple mergers in the last couple of decades. These mergers have produced mixed results. Hitt, Harrison and Ireland (2001) found in several studies that, on average, firms create little or no value through mergers and acquisitions (M&A). King, Dalton, Daily and Covin (2004) expressed that even though a lot of research has been done on M&A, the reasons for their outcomes are varied and most of these studies have not been able to agree upon something concrete. In the Indian context, Rukmini Parthasarathy (1998) analyzed merger economics, bank merger milestones, and Narshimha Committee Reports. The researcher opined that mergers result in loading stronger banks with huge non-performing assets, ultimately eroding the profitability of the bank.

Kannan (1998) found that banks cannot survive on the basis of the traditional product mix; they need to diversify and enhance their product portfolio to include other fund and non-fund based activities. Mergers and acquisitions offer a faster option to diversify, compared to organic growth. Gelli (1998) concluded that higher levels of financial backing, which is required, can be achieved by means of M&A. Later, in a study by researchers Ravichandran et al. (2010), scaling-up of operations was stated to be the major reason for mergers. They also found that post-merger the banks were becoming more focused on their high net-interest-income activities. Sinha et al. (2010), in their study, indicate that in most cases the acquiring firms did generate value in some form or the other, along with a positive trend in profit before tax, but they also observed that sixty percent of cases showed increased debt to equity ratio. Insan and Warne (2011) found that Indian banks fared well on some parameters, but lessons can be learned from banks in western countries with regard to management of asset quality. The study revealed that the development in IT has revolutionized the banking

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sector, and the future of banking is closely associated with economic development. To maintain the financial health of a country the banking sector is poised to play a major role. Natarajan et al. (2011) were of the opinion that post-merger performance of private sector banks was not very encouraging. The net earnings of the public sector banks improved post-merger, while the element of liquidity showed no improvement. Antony (2011) found that profitability of banks under study increased post-merger due to the increase in employee turnover and reduction in operating expenses. The study concluded that M&A in Indian banks is good, if the benefits can be passed on to all stake holders.

Studies have been done to check the success of mergers, with contradictory outcomes. The present study assesses whether there is improvement in the financial performance of private and public sector banks, post-merger. The study also tries to understand banks in which sector have shown better performance, post-merger.

Literature Review

Studies on the impact of mergers on the performance of banks have come up with different conclusions. Some have led to identifying improvements in the performance, while others have led to suggestions that have policy implications.

Berger et al. (1998) examined the effects of bank M&A on small businesses, lending data of over 6,000 recent US bank M&A. The study found that the static effects of consolidation reduce small business lending, but are mostly offset by the reactions of other banks, and in some cases, also by refocusing efforts of the consolidating institutions themselves. Beena (2000) argued that though the merger movement in the early 1990s might have contributed to an increase in product or asset concentration measured on a firm-wise basis, it could not have contributed to an increase in concentration as measured by relative shares of business groups. The study concluded that the merger wave in the early 1990s was more a means of internal restructuring rather than an instrument to further product market or asset share. Shobhana and Deepa (2001) compared the pre- and post-merger technical efficiency (ratio of output to input) and

found that both public and private sector banks in India showed an improvement post-merger. Aluko and Amidu (2005), in their paper titled 'Corporate Business Valuation for Mergers and Acquisitions', found that the role of the valuer is more of an interpreter of financial and physical information. They also found that physical assets play a role in valuation and the valuer needs to be more than an accountant. The valuer also needs to have comprehensive knowledge of the business being considered for valuation. They must also take into cognizance the competition, statutory requirements, vocational potential, and so on. Reddy (2005) focused on banking sector reforms and Basel II norms in India. He concluded that in the current scenario, banks are constantly pushing the frontier of risk management. Compulsion arising out of increasing competition, as well as agency problems between management, owners, and other stakeholders, are forcing banks to look at newer avenues to augment revenues, while trimming cost. Gourlay et al. (2006) found that bank mergers in the post reform period possessed considerable potential efficiency gains, stemming from harmony gains. The study revealed that the efficiency advantages was gained by merged banks, but the same failed to provide the merging banks with a competitive advantage vis-à-vis their non-merging counterparts. Jayadev and Sensarma (2007) in the study on trends found that the consolidation has been done primarily for restructuring weak banks. The researchers believe that future consolidations will be driven by widening financial services and the need for large investment banks. Bajaj (2009) examined the importance of cultural factors in Mergers and Acquisitions. The study found that the threat of cultural conflict is very high because of cultural differences while merging with different banks and a high degree of integration is required. Singh (2009) analysed the profit efficiency and cost efficiency of the acquiring bank and found that mergers do not seem to impact the cost and profit efficiency in an adverse manner, and any initial loss was recovered quickly. Mylonakis (2006) observed that the M&A carried out in the Hellenic Bank market have resulted in lower operating profits per employee and the outsourcing of non-core jobs, resulting in the loss of jobs. Kar and Soni (2008) did a study on the trends in M&A in India. Their study revealed that there were two phases: the first phase was from 1990-91 to 1995-96, and the second was from 1996-97 to 2000-01. The first phase saw only

68 mergers, while the second phase saw a total of 1,318 M&As. These mergers have been beneficial because the companies grew in size and attained better market share. This period saw vertical and horizontal mergers. The study also revealed that this led to the realization of synergistic benefits. Sharma (2009), in his study 'M&A in India: Retrospect & Prospects', found that, overall, both the size and number of M&A deals shrunk at a significant pace as the impact of rapidly slowing global economy took its heavy toll on the Indian Inc. The aggregate size of M&A deals plunged more than 70 percent in the first quarter of the calendar year 2009, compared to the last quarter of the previous year. The number of deals also declined from 58 to 45 during the same period. Khan (2011), in his work on the banking sector, studied two mergers and tried to compare the pre- and post-merger performance. He found that the overall profitability of the banks increased post-merger and various ratios like Return on Capital Employed, GP margin, Debt Equity ratio, and so on, showed considerable improvement. Kaur and Kaur (2010) concluded that post-merger the cost efficiency of merging banks improved. The study suggested that if strong banks are merged with other strong banks instead of weak ones, then efficient and stronger banks can be formed, which can take on competition from foreign banks. Goyal and Joshi (2011) suggested, on the same lines, that M&A has been used for protecting weak banks by merging them with larger banks. The primary reason is their difficulty in facing the global impact. Chadamiya et al. (2012) found that return on total assets, return on capital employed, return on equity, and so on, of ICICI and HDFC Banks were not affected by M&A. However, net profit and shareholders' equity to total assets were significantly impacted. Saluja et al. (2012) studied the performance of HDFC Bank post-merger. They found that all the parameters of the CAMEL model showed improvement in the post-merger performance of HDFC Banks. Gandhi et al. (2018) compared the pre- and post-merger financial and operating performance of banks that merged in post reforms period. They concluded that acquisition activities led to significant change in liquidity, which further led to under-performance during the post-acquisition period. Ayadi and Pujals (2005), in their work titled 'Banking Mergers and Acquisitions in The EU: Overview, Assessment and Prospects', found that domestic banking mergers contribute to an improvement in the cost efficiency of the consolidated bank, but the impact on profitability was not significant. The study further revealed that the cost reduction is mainly realized through interest expenses savings. On the other hand, cross-border mergers were not able to cut costs, but were profit-efficient through better exploitation of potential revenue synergies.

Methodology

Many researchers like Saluja et al. (2012) and Raiyani (2010) have used the CAMEL model for studying the mergers of various banks. In this study, the same model has been used. Various ratios under each parameter of the CAMEL model have been used to study the post-merger financial performance of public and private sector banks. The sample comprises nine public sector mergers and ten private sector mergers.

In this study, all relevant ratios under each parameter of the CAMEL model have been considered. The capital adequacy parameter shows whether the banks' capital is sufficient to tide over the liquidity crisis. Under this parameter, capital adequacy ratio (CAR), debt equity ratio, proprietary ratio, total advances to total asset ratio, and government securities to total investment ratios have been considered. The asset quality parameter measures the degree of financial strength. The most important ratio considered is of non-performing assets (NPAs) as a percentage of the total assets. Total investments to total assets is the second ratio considered, which shows the percentage of assets funded in investments other than advances. The management efficiency parameter of the CAMEL model studies the degree of efficiency with which the business is being conducted. The ratios in this segment include expenditure to income ratio, total advances to total deposit ratio, asset turnover ratio, earning per employee, and business per employee. The earning quality parameter reflects the quality of a bank's profitability and its ability to earn consistently. It includes ratios return on assets (ROA), return on equity (ROE), spread ratio, net interest margin, operating profit to working fund ratio, and interest income to total income ratio. The last parameter under the CAMEL model is liquidity, which is very important for any organization dealing with money. Liquidity is a crucial aspect for banks, as it represents the banks' ability

to meet its financial obligations. Four ratios considered under the liquidity parameter are liquid asset to total asset ratio, liquid asset to total deposit ratio, government securities to total asset ratio, and liquid asset to demand deposit ratio.

The Differenced mean of each ratio under each parameter is calculated for private and public sector banks to find if there is significant improvement in post-merger financial performance. Pre-merger and post-merger mean values of each ratio under the CAMEL model is calculated based on three years' pre-merger and post-merger data. Differenced mean is then calculated by deducting pre-merger mean from post-merger mean.

The same is done separately for each bank and the none sample single tail students' t-test with level of significance at 5% ($\alpha = 0.05$) is applied for testing the statistical significance.

Scores are assigned to the ratios based on the significance and non-significance of the ratio, as determined statistically. A score of '1' is assigned to the ratio found to be statistically significant and a score of '0' is assigned to a statistically non-significant ratio. Subsequently, weighted score (WS) of each ratio is calculated using the weights assigned to each ratio. These weights are based on the relative importance and criticality of the ratio being considered, (Reddy, 2012). Further, weighted average score (WAS) is calculated for each parameter under the CAMEL model by summing up the weighted scores of the ratios under the parameter. A parameter is considered as improved significantly only when the WAS is 0.50 or more, (Reddy, 2012). If the parameter has improved significantly then a score of '1' is given to it, else a score of '0' is given.

Finally, cumulative weighted average score (CWAS) is calculated by assigning each parameter a weight and adding up the weighted scores of the parameters. The parameters under the CAMEL model are equally weighted, i.e., 20% for each, since each parameter is equally important for the financial health of the bank, (Reddy, 2012). A merger is considered as leading to significant improvement in financial performance only when the CWAS is 0.50 or more (Reddy, 2012).

Apart from finding whether there is significant improvement in post-merger financial performance of banks in both sectors, the post-merger financial performance of private sector banks is compared with that of public sector banks to assess whether there is any significant difference between the performances of the banks in the two sectors. Two sample t-tests assuming equal variance is used to find whether there is a statistically significant difference in the performance of private and public sector banks at 5% level of significance ($\alpha = 0.05$).

Objective of Study

The objective of the study is to analyze the post-merger financial performance of private and public sector banks, and compare the same.

Hypothesis

H1: There is significant improvement in the post-merger financial performance of private as well as public sector banks.

H2: There is significant difference between the post-merger financial performances of private sector banks and public sector banks.

Data Analysis

Significant Improvement in the Post-Merger Financial Performance of Private as well as Public Sector Banks

Differenced Mean

Differenced mean is calculated for each ratio under the CAMEL model. The same is done separately for each bank and then t-test is applied to check for statistical significance, if any.

Table 1 shows calculations for one such ratio – Capital Adequacy Ratio.

Table 1: **Capital Adequacy Ratio (CAR)**

Capital Adequacy				
Sr. No.	*Name of Bank*	*Private*	*Name of Bank*	*Public*
1	ICICI Bank	-3.01%	Bank of Baroda	1.32%
2	ICICI Bank	-3.76%	Bank of Baroda	0.70%
3	ICICI Bank	2.47%	Bank of Baroda	-0.13%
4	ICICI Bank	6.01%	Punjab National Bank	2.86%
5	HDFC Bank	-1.05%	SBI	-0.46%
6	Centurion Bank	7.86%	SBI	1.60%
7	Centurion Bank	9.10%	Oriental Bank of Commerce	-1.28%
8	IndusInd Bank	-0.80%	IOB	0.67%
9	HDFC Bank	3.99%	Union Bank of India	0.96%
10	Federal Bank	7.79%		
	N	10	N	9
	Mean	2.86%	Mean	0.69%
	Standard Deviation	4.79%	Standard Deviation	1.22%
	t-Calculated	1.89	t-Calculated	1.71
	t-Critical @ 5%	1.83	t-Critical @ 5%	1.86
	p-Value	0.05		0.06
		Reject Null		Fail to Reject Null

Table 1 denotes the differenced means of individual banks in private and public sectors. Students' t-test is conducted to find whether there is any significant improvement in the post-merger financial performance. The differenced mean value of private sector banks (2.86%) shows that the CAR of such banks has improved by 2.86% post-merger. On the other hand, improvement in public sector banks is only 0.69%. For proving the improvement statistically, the p-value should be equal to or less than 0.05. As the table shows, the p-value is 0.05 in the case of private sector banks and is 0.06 in public sector banks. Thus, considering the level of significance at 5%, there is statistically significant improvement in CAR in the case of private sector banks, but not public sector banks, post-merger.

Table 2 summarises the results of t-test conducted on differenced means of each of the ratios under five parameters of the CAMEL model.

Continuing with capital adequacy parameter of the CAMEL, debt-equity ratio shows the proportion of debt (leverage) with respect to equity. Lower the ratio, better the capital adequacy. The debt equity ratio of public sector banks post-merger, on an average, is 1.50 times less than it was pre-merger (Table 2). On the other hand, in private

sector banks, it is 5.72 times more, post-merger, than it was pre-merger. Thus, the debt equity ratio has improved in the case of public sector banks, but not private sector banks. Statistically also, there is significant improvement in public sector banks (p-value 0.05), but not in the case of private sector banks (p-value 0.83).

Proprietary ratio shows the proportion of equity to total assets. Higher the ratio, better the capital adequacy. In banks in both sectors, there is improvement in proprietary ratio, as the differenced means have increased. However, the improvement can be proved statistically significant only in the case of public sector banks (p-value 0.01). In the case of private sector banks, the improvement cannot be proved statistically significant (p-value is 0.22).

Total advances to total assets ratio shows that the total advances of the banks as a percentage of total assets has improved post-merger. This is true for both the sectors. Also, the improvement is proved statistically as is evidenced by the p-values (0.00 and 0.00 for private and public sector banks, respectively).

Government securities are one of the safest investment avenues. Higher proportion of government securities indicates lesser risk in investment portfolio. The

percentage of government securities in total investments has gone up by 1.51% in the case of private sector banks and 4.95% in the case of public sector banks. In the case of private sector banks, the improvement cannot be proven statistically (p-value 0.34). As is evidenced by the differenced mean, in the case of public sector banks, the improvement is proved statistically as well (p-value 0.04).

Under the 'Asset Quality' parameter, the ratios considered for testing improvement in financial performance are Net NPA to net advances ratio and total investments to total assets ratio. Net NPA to net advances ratio indicates the percentage of net loans and advances that have become bad and doubtful. Post-merger, fall in this ratio would depict improved financial performance. In the case of public sector banks, post-merger, the ratio has decreased by 1.99%, compared to pre-merger ratio. This ratio has decreased in the case of private sector banks also, but only marginally. Statistically also, significant improvement can be proved only for public sector banks (p-value 0.01), and not in the case of private sector banks (p-value 0.20).

A higher total investments to total assets ratio shows that a higher amount is kept in investments, as a safeguard against NPAs. There is fall in this ratio in banks of both sectors, thereby displaying that this cushion has reduced. This decrease is more in public sector banks. As is evident from differenced means, statistically there is no significant improvement in this ratio, post-merger (p-values 0.52 and 0.86 for private and public sector banks, respectively).

Under the 'Management Efficiency' parameter, expenditure to income ratio shows the percentage of income which is used to meet the expenses incurred to earn such income. This ratio should decrease post-merger to show improvement in financial performance. This ratio has decreased in the case of private sector banks, but not public sector banks. Though the differenced mean shows that there is improvement in private sector banks, it cannot be statistically proved (p-value 0.17).

Total advances to total deposits ratio shows efficiency in conversion of deposits into loans and advances. A higher ratio indicates better utilization of deposits. This ratio shows significant improvement in banks in both sectors, which is proved statistically also (p-values 0.01 and 0.00 for private and public sector banks, respectively).

Asset turnover ratio measures how efficiently the assets are utilized to generate revenue. A higher ratio portrays better utilization. However, in banks in both sectors, this ratio has decreased post-merger. Obviously, statistical computations also show no significant improvement (p-values 0.85 and 1.00 for private and public sector banks, respectively).

There is increase in earning per employee and business per employee in banks in both sectors. Public sector banks have performed better than their private sector counterparts. Also, statistically, the ratios show significant improvement in the case of public sector banks (p-values of 0.00 and 0.00 for earning per employee and business per employee, respectively).

Earning efficiency ratios show the profitability of the bank and its ability to earn consistently. Return on assets ratio shows annual earnings as a percentage of total assets. Post-merger this ratio has decreased in banks in both sectors, thereby displaying no improvement. The same is depicted by statistical computations (p-values 0.55 and 0.61 for private and public sector banks, respectively).

Return on equity ratio shows Net Profit as a percentage of Net Worth. This ratio has marginally improved in the case of private sector banks and has decreased in public sector banks. Statistically, no significant improvement is found in banks in both sectors (p-values 0.44 and 0.80 for private and public sector banks, respectively).

Spread ratio is computed by deducting interest expended to liabilities ratio from interest earned to assets ratio. Higher the spread, higher the profitability. This ratio has improved in banks in both sectors, post-merger. However, the improvement cannot be proved statistically in either case (p-values 0.33 and 0.34 for private and public sector banks, respectively).

Net interest margin (NIM) shows the net interest income as percentage of total assets. In banks in both sectors, the NIM has decreased, thereby displaying deterioration in interest margins post-merger. The p-values of 0.52 (private sector banks) and 0.97 (public sector banks) also prove that there is no significant improvement.

Operating profit to working fund ratio indicates how efficiently the working funds are utilized to generate operating profits. A higher ratio indicates better utilization. There is no statistically significant improvement in the case of banks in either sector (p-values 0.98 and 0.40 for private and public sector banks, respectively).

Interest income to total income ratio shows how much interest income, which is earned from core activities of the bank, has contributed to the total income. Here also, there is no statistically significant improvement in the case of banks in either sector (p-values 0.48 and 0.93 for private and public sector banks, respectively).

The liquidity parameter examines the ability of the banks to convert assets into cash without much price concession. Higher liquidity shows that the bank has sufficient money to pay off the liabilities. Higher the ratios considered under this parameter, higher the liquidity. This parameter has suffered the most in the case of banks in either sector, post-merger.

Liquid assets to total assets ratio shows the part of total assets which can be converted into cash quickly. This ratio has declined in banks in both sectors. The p-values (0.98 and 0.95 for private and public sector banks, respectively) also show that there is no improvement in financial performance.

Liquid assets to total deposits ratio indicates the availability of liquidity for the depositors. This ratio has also deteriorated in the case of banks in either sector, the p-values being 0.98 for private sector banks and 0.94 for public sector banks.

Government securities to total assets ratio indicates the proportion of total assets invested in safe investments. The p-values of 0.77 and 0.50 for private and public sector banks, respectively, indicate that there is no significant improvement in the post-merger financial performance.

Demand deposits represent that part of deposits which are not subject to time restrictions for withdrawal. Liquid assets to demand deposits ratio indicates the availability of liquidity for such depositors. This ratio has also deteriorated like other ratios in this parameter. The p-values are 0.97 for private sector banks and 0.79 for public sector banks.

Table 2: Summary of Ratio Wise Differenced Mean and p-Values

Ratios	Differenced Means		p-Values	
	PrBs*	*PuBs#*	*PrBs*	*PuBs*
Capital Adequacy				
Capital Adequacy Ratio (%)	2.86%	0.69%	0.05	0.06
Debt to Equity Ratio	5.72	-1.50	0.83	0.05
Proprietary Ratio (%)	0.93%	0.89%	0.22	0.01
Total Advances to Total Assets Ratio (%)	9.25%	5.67%	0.00	0.00
Government Securities to Total Investment Ratio (%)	1.51%	4.95%	0.34	0.04
Asset Quality				
Net NPA to Net Advances (%)	-0.61%	-1.99%	0.20	0.01
Total Investments to Total Assets Ratio (%)	-0.14%	-2.44%	0.52	0.86
Management Efficiency				
Expenditure to Income Ratio (%)	-3.50%	0.06%	0.17	0.51
Total Advances to Total Deposits Ratio (%)	23.10%	8.38%	0.01	0.00
Assets Turnover Ratio (Times)	-0.01	-0.03	0.85	1.00
Earning Per Employee (Rs.)	33.31	116.61	0.38	0.00
Business Per Employee(Rs.)	6611.41	19242.78	0.23	0.00
Earning Efficiency				
Return on Assets (%)	-0.02%	-0.03%	0.55	0.61
Return on Equity (%)	0.41%	-1.91%	0.44	0.80
Spread Ratio (%)	0.18%	0.33%	0.33	0.34

Ratios	Differenced Means		p-Values	
	*PrBs**	*PuBs#*	*PrBs*	*PuBs*
Net Interest Margin	-0.04%	-0.66%	0.52	0.97
Operating Profit to Working Fund Ratio (%)	-0.89%	0.08%	0.98	0.40
Interest Income to Total Income Ratio (%)	0.17%	-1.86%	0.48	0.93
Liquidity				
Liquid Assets to Total Assets Ratio (%)	-5.04%	-2.56%	0.98	0.95
Liquid Assets to Total Deposits Ratio (%)	-4.27%	-2.71%	0.98	0.94
Government Securities to Total Assets Ratio (%)	-0.80%	0.00%	0.77	0.50
Liquid Assets / Demand Deposits (%)	-29.98%	-10.00%	0.97	0.79

*PrBs – Private Sector Banks

#PuBs – Public Sector Banks

The findings in Table 2 are converted to numbers, and weighted scores and weighted average scores are calculated for each parameter under CAMEL. The ratios under each parameter, which are found to be statistically significant, are denoted as 'S' and those that are not significant are denoted as 'NS'.

Weighted Average Score

Table 3: Weighted Average Score – Capital Adequacy

Capital Adequacy	PrBs	PuBs	Weight*	Score PrBs	Score PuBs	WS PrBs	WS PuBs
Capital Adequacy (CAR)	S	NS	0.70	1	0	0.70	0
Debt to Equity Ratio	NS	S	0.10	0	1	0	0.10
Proprietary Ratio	NS	S	0.07	0	1	0	0.07
Total Advances to Total Assets Ratio (%)	S	S	0.07	1	1	0.07	0.07
Government Securities to Total Investment Ratio (%)	NS	S	0.07	0	1	0	0.07
WAS						**0.77**	**0.31**
Significance						S	NS

*Reddy, K. S. (2012). Relative performance of commercial banks in India using CAMEL approach. International Journal of Multidisciplinary Research, 2(3), 38-58.

NS – Not significant and S – Significant

WS – Weighted score and WAS – Weighted average score

Table 3 shows whether the parameter, Capital Adequacy, has shown statistically significant improvement post-merger. If the differenced mean of a ratio is significant statistically then a score of '1' is given, else a score of '0' is given. Reddy (2012), in his paper, has recommended the weights to be assigned to each ratio based on the relative importance of the ratio with respect to others ratios within the parameter. Capital adequacy ratio, being the direct indicator of the capital adequacy condition of the bank, is given a weight of 70%. Weighted scores (WS) are calculated using the weights recommended. Based on the WS, weighted average scores (WAS) are calculated for each parameter. If WAS of a parameter is equal to or more than 0.50 then it is said to be significant statistically. This means that the respective parameter has shown improvement post-merger. In the case of private sector banks, the capital adequacy parameter has shown significant improvement, but the same cannot be said with respect to the public sector banks.

Table 4: **Weighted Average Score – Asset Quality**

Asset Quality	PrBs	PuBs	Weight	Score PrBs	Score PuBs	WS PrBs	WS PuBs
Net NPA to Net Advances (%)	NS	S	0.7	0	1	0	0.7
Total Investments to Total Assets Ratio (%)	NS	NS	0.3	0	0	0	0
WAS						**0.00**	**0.70**
Significance						**NS**	**S**

Table 4 shows the WAS of asset quality parameter. Net NPA to net advances ratio directly indicates the asset quality of the bank, and hence is given a weight of 70%. This ratio is significant in the case of public sector banks. The asset quality parameter shows significant improvement only in the case of public sector banks.

Table 5: **Weighted Average Score – Management Efficiency**

Management Efficiency	PrBs	PuBs	Weight	Score PrBs	Score PuBs	WS PrBs	WS PuBs
Expenditure to Income Ratio (%)	NS	NS	0.15	0	0	0	0
Total Advances to Total Deposits Ratio (%)	S	S	0.4	1	1	0.4	0.4
Assets Turnover Ratio (Times)	NS	NS	0.15	0	0	0	0
Earning Per Employee (Rs.)	NS	S	0.15	0	1	0	0.15
Business Per Employee (Rs.)	NS	S	0.15	0	1	0	0.15
WAS						**0.40**	**0.70**
Significance						**NS**	**S**

Table 5 shows the WAS of management efficiency parameter. Management efficiency is mainly assessed based on how efficiently the deposits are converted into advances. Hence, a weight of 40% is assigned to this ratio. Others ratios are equally weighted. Similar to asset quality parameter, the management efficiency parameter shows significant improvement only in the case of public sector banks.

Table 6: **Weighted Average Score – Earning Efficiency**

Earning Efficiency	PrBs	PuBs	Weight	Score PrBs	Score PuBs	WS PrBs	WS PuBs
Return on Assets (%)	NS	NS	0.17	0	0	0	0
Return on Equity (%)	NS	NS	0.17	0	0	0	0
Spread Ratio (%)	NS	NS	0.17	0	0	0	0
Net Interest Margin	NS	NS	0.17	0	0	0	0
Operating Profit to Working Fund Ratio (%)	NS	NS	0.17	0	0	0	0
Interest Income to Total Income Ratio (%)	NS	NS	0.17	0	0	0	0
WAS						**0.00**	**0.00**
Significance						**NS**	**NS**

Table 6 shows the WAS of earning efficiency parameter. As can be seen, all the ratios are equally weighted. There is no significant improvement in the earning efficiency parameter in banks in either sector.

Table 7: Weighted Average Score – Liquidity

Liquidity	PrBs	PuBs	Weight	Score PrBs	Score PuBs	WS PrBs	WS PuBs
Liquid Assets to Total Assets Ratio (%)	NS	NS	0.25	0	0	0	0
Liquid Assets to Total Deposits Ratio (%)	NS	NS	0.25	0	0	0	0
Government Securities to Total Assets Ratio (%)	NS	NS	0.25	0	0	0	0
Liquid Assets/Demand Deposits (%)	NS	NS	0.25	0	0	0	0
WAS						**0.00**	**0.00**
Significance						**NS**	**NS**

Table 7 shows the WAS of the liquidity parameter. All the ratios are equally weighted. There is no significant improvement in the case of banks in either sector.

Table 8: Weighted Average Score (C A M E L)

	Capital Adequacy	Asset Quality	Management Efficiency	Earning Efficiency	Liquidity
PrBs	0.77/S	0.00/NS	0.40/NS	0.00/NS	0.00/NS
PuBs	0.31/NS	0.70/S	0.70/S	0.00/NS	0.00/NS

Table 8 shows the summary of WAS of each of the parameters. In the case of capital adequacy parameter, only private sector banks have shown statistically significant improvement. In the cases of asset quality and management efficiency parameters, only public sector banks show statistically significant improvement. Earning efficiency and liquidity parameters show no significant improvement in the case of both public and private sector banks.

Cumulative Weighted Average Score (CWAS)

Further, Cumulative Weighted Average Score (CWAS) is calculated to find out improvement in the post-merger financial performance of private and public sector banks based on the CAMEL model. A score of '1' is given if the parameter has improved significantly, else a score of '0' is given. Equal weight is assigned to each parameter. To prove improvement in financial performance post-merger, the CWAS should be more than 0.50 (Reddy, 2012).

Table 9: Cumulative Weighted Average Score (CWAS) of Private Sector Banks

Private Sector Banks				
Variable	t-Test	Weights	Score	WAS
C	Significant	0.2	1	0
A	Not Significant	0.2	0	0
M	Not Significant	0.2	0	0
E	Not Significant	0.2	0	0
L	Not Significant	0.2	0	0.2
CWAS				**0.2**

Table 9 shows CWAS value of private sector banks. This value is less than 0.50. Thus, it can be said that mergers in the private sector, on an average, have not led to significant improvement in financial performance.

Table 10: Cumulative Weighted Average Score (CWAS) of Public Sector Banks

Public Sector Banks				
Variable	t Test	Weightage	Score	WAS
C	Not Significant	0.2	0	0
A	Significant	0.2	1	0.2
M	Significant	0.2	1	0.2
E	Not Significant	0.2	0	0
L	Not Significant	0.2	0	0
CWAS				**0.4**

Table 10 shows CWAS of public sector banks. Since the value is less than 0.50, in this case also, it cannot be said that there is statistically significant improvement in post-merger financial performance.

Significant Difference between the Post-Merger Financial Performances of Private Sector Banks and Public Sector Banks

To test the second hypothesis, post-merger financial performance of private sector banks is compared with that of public sector banks. It is assessed whether there is a statistically significant difference between their post-merger financial performances. Two-sample test, assuming equal variances, is conducted for the same. Level of significance is taken at 5% (0.05). This test is carried out for each of the ratios under CAMEL. Table 11 shows the findings for capital adequacy ratio (CAR).

Table 11: t-Test: Two-Sample Assuming Equal Variances – CAR

	Private	*Public*
Mean	2.86%	0.69%
Variance	0.00229	0.00015
Observations	10	9
Pooled Variance	0.00128	
Hypothesized Mean Difference	0	
df	17	
t Stat	1.316	
P (T<=t) one-tail	0.103	
t Critical one-tail	1.740	
P (T<=t) two-tail	0.206	
t Critical two-tail	2.110	
	Fail to Reject Null	

The p-value in Table 11 for capital adequacy ratio is 0.206. Since it is more than 0.05, the null hypothesis cannot be rejected. Thus, post-merger, there is no significant difference in the capital adequacy ratio of private sector banks, compared to the public sector banks.

Table 12: Summary of Results of Two-Sample T-Test Assuming Equal Variances

Ratios	*t Stat*	*P (T<=t) Two-Tail*	*t Critical Two-Tail*	*Remark*
Capital Adequacy				
Capital Adequacy	1.316	0.206	2.11	Fail to Reject Null
Debt to Equity Ratio	1.198	0.247	2.11	Fail to Reject Null
Proprietary Ratio	0.028	0.978	2.11	Fail to Reject Null
Total Advances to Total Assets Ratio (%)	1.299	0.211	2.11	Fail to Reject Null
Government Securities to Total Investment Ratio (%)	-0.777	0.448	2.11	Fail to Reject Null
Asset Quality				
Net NPA to Net Advances (%)	1.435	0.169	2.11	Fail to Reject Null
Total Investments to Total Assets Ratio (%)	0.635	0.534	2.11	Fail to Reject Null
Management Efficiency				
Expenditure to Income Ratio (%)	-0.761	0.457	2.11	Fail to Reject Null
Total Advances to Total Deposits Ratio (%)	1.636	0.12	2.11	Fail to Reject Null
Assets Turnover Ratio (Times)	0.87	0.396	2.11	Fail to Reject Null
Earning Per Employee (Rs.)	-0.748	0.465	2.11	Fail to Reject Null
Business Per Employee (Rs.)	-1.277	0.219	2.11	Fail to Reject Null
Earning Ability				
Return on Assets (%)	0.05	0.961	2.11	Fail to Reject Null
Return on Equity (%)	0.991	0.336	2.11	Fail to Reject Null

Ratios	t Stat	P (T<=t) Two-Tail	t Critical Two-Tail	Remark
Spread Ratio (%)	-0.175	0.863	2.11	Fail to Reject Null
Net Interest Margin	0.833	0.416	2.11	Fail to Reject Null
Operating Profit to Working Fund Ratio (%)	-1.188	0.251	2.11	Fail to Reject Null
Interest Income to Total Income Ratio (%)	0.577	0.572	2.11	Fail to Reject Null
Liquidity				
Liquid Assets to Total Assets Ratio (%)	-0.959	0.351	2.11	Fail to Reject Null
Liquid Assets to Total Deposits Ratio (%)	-0.673	0.51	2.11	Fail to Reject Null
Government Securities to Total Assets Ratio (%)	-0.393	0.699	2.11	Fail to Reject Null
Liquid Assets/Demand Deposits (%)	-1.104	0.285	2.11	Fail to Reject Null

Table 12 shows the summary of results of two-sample t-test assuming equal variances for all the ratios. It can be seen that p-value is more than 5% in all the ratios, and hence, the null hypothesis cannot be rejected. Thus, there is no significant difference between the post-merger financial performance of the private sector and public sector banks.

Conclusion and Further Scope

On the basis of differenced mean (Table 2), it cannot be conclusively said whether any one sector has performed better than the other. In some parameters private sector banks have done better, while in others, the banks in the public sector have performed better.

Under CAMEL parameters, private sector banks have shown statistically significant improvement only in the case of capital adequacy. On the other hand, public sector banks have shown improvement only in asset quality and management efficiency parameters. Surprisingly, none of the banks in both sectors could show significant improvement in the earning efficiency and liquidity parameters. On the contrary, there was deterioration in these parameters.

Based on the CWAS of the private and public sector banks, it cannot be said that there is a statistically significant improvement in the post-merger financial performance. Thus, hypothesis 1 cannot be proved (Tables 9 and 10).

The two-sample t-test assuming equal variances revealed that there was no significant difference between the post-merger financial performance of private sector and public sector banks (Table 12). Thus, hypothesis 2 also cannot be proved.

Overall, the study implies that mergers and acquisitions may not necessarily result in improvement in all parameters, and it should be done keeping in view the objectives sought to be achieved by the merger.

There is a scope for further research, and if tested with data comprising more than three years it may give some other results. Moreover, if a different methodology is applied, the results may differ.

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