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OPERATIONAL EFFICIENCY OF MERGED BANKS IN INDIA – DISCRIMINANT ANALYSIS APPROACH

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ABSTRACT

Banks play a vital role in the economic prosperity of any nation. Since 1991 the banking sector in India undergone radical reforms both in technology and services front. Today banking institutions in India are technology driven and doing vibrant operations par with foreign banks. The economic reforms led large number of mergers and acquisitions within India. The present study conducted for a period of ten years from 1995-'96 to 2004-'05. The secondary data were collected from different official sources like RBI, PROWESS and other prominent websites. This study aims to know the operational performance of merged banks before and after merger as well as factors influencing the operational performance of those banks using discriminant analysis.

INTRODUCTION

The Indian business environment has been altered radically since 1991 with the changes in the economic policies and introduction of new institutional mechanism. This change in the business environment, which is the effect and impact of Liberalization, Privatization, Globalization, Information technology and Financial awareness, has contributed fuel to a dynamism in the Indian Economy. Economic environment in India has been made more favorable for the growth of the various business enterprises along with competitive strength. Such growth, opportunities and challenges come in various shapes and size in the dynamic global market environment require innovative approaches. In order to meet the needs and requirements of financial stack holders and other players in the market, it is necessary to reorient the strategies adopted by the firms. These strategies considered opportunities for growth both internally and externally.

The sweeping wave of economic reforms and liberalization has transformed the business scenario all over the world. The most significant development has been the integration of national economies with market oriented globalised economy, resulting in shrinking of the size of the market. And it becomes externally difficult for all the companies to survive, unless they cut cost and maintain price. In such a situation M&A which facilitates elimination of duplication of the administrative and marketing expenses is inevitable. To fund this M&A activities and also to continue the business activities on a large scale, the traditional customers of a banker turn away increasingly from traditional loan to new alternative services. As a result of changes in the expectations of the corporate customers, banks are constrained to rethink their business and devise new strategies to face the challenges before them. Moreover, foreign banks have been permitted to bring their share up to 74% in the Indian banks. This adds more oil to the spreading fire. The foreign banks would consider M&As as a quick method of inorganic growth. Therefore, Indian Banks are also forced to think on the same line to face the competitions effectively.

In the changing scenario, every business including service institutions like banks strive hard for survival in this growing era of core competence. Due to intense completion among the banks, every bank is doing something better than others to capture the business. It is necessary for any business firms to analyze its financial health. In this regard, it is necessary to analyze the financial health of merged banks to establish its financial health in the form of profitability, liquidity, solvency etc. This analysis provides a clear picture of the financial soundness of a firm and a road map outlining the directions the business is heading to. So an attempt has been made in this present chapter to have an insight into the examination of financial health of merged banks in India selected for the study.

WAVE OF M&A

During post independence period, it was considered necessary to reduce inequalities between different regions and groups. At that time there were only a few banks and bankers who enjoyed good reputation and some other banks struggled a lot to survive as it were operated under various types of tensions and pressures. As it was extremely difficult to mobilize adequate resources for development to remove inequality, a sound financial system, especially the well functioned banking system, was inevitable along with better service to customers and through them, to nation. Hence, the then government of India under the stewardship of late Smt. Indira Gandhi decided to nationalize some of the important banks in the country. Accordingly during July 1969, 14 major banks which held deposits exceeding Rs.50 crores and in 1980, 6 more banks which held deposits exceeding Rs.200 crores were nationalized. This laid the foundation for merger activities.

The nationalized banks are under the control of Reserve Bank of India, with the assurance of guarantee to safety and security. Through nationalization, the government aimed to remove control by few, provision of adequate credit for agriculture, small scale industries and exports, encouragement of new classes of entrepreneur and giving a professional bent to the bank management. These nationalized

banks, by opening branches in the villages, offer not only financial assistance but also provide advice and guidance on several vital problems concerning the rural folk and the economically backward sections in the villages derive unique benefits.

OBJECTIVES OF THE STUDY

The discriminate factor is performed in order to identify the discriminating variable between the groups and find out the relative important of these variables in discriminating between the groups.

1. To analyze and compare the operational performance of merged banks before and after merger.
2. To study factor influencing the operational performance of pre and post merger period.

REVIEW OF LITERATURE

Sanjay Kumar¹ (1998) took a study on “Profitability of Indian Commercial Banks – The Key Discriminators” and attempted to explore the relationship between bank profitability and its determinants. The study used a model with the most critical variables / ratios using multi-discriminant analysis for the precise analysis and measurement of profitability. The study revealed that only four most discriminating variables out of 14 variables are the key discriminators which can be used in profitability analysis of banks, measuring their financial health and prudent selection of banks for investment, lending or deposits.

Devivedi V. K² (1999) has examined Merger and Acquisition as a Tool for Business to Improve the Potentialities in his study on “Mergers and acquisition – Possibility Banking Industry”. It is revealed by his study that M&A can be used to improve the financial position and increase the profitability if it is carried out systematically and professionally by giving due attention to the HR issues.

Laxman G³ (2004) in his research article “Impact of Merger and Acquisitions on Financial Performance of Private Sector Banks”, has made an attempt to assess the impact of merger on financial performance in terms of CAR, NPAs, Interest income, Interest Expenditure, Operating expenditure, Provisions and Contingencies, Spread, Gross Profit, Net profit as percentage to total assets before and after merger. The study concluded that there is a decreasing trend in spreads and increasing tendency in NPAs of the target bank. But these indicators are more or less remained the same when compared to average indicators of the Private Sector Banks during the period under study.

Selvam. M, Vanitha.S, Babu.M⁴ (2005) carried out a study entitled “Merger and Acquisition in Banking Industry – An Evaluation”. The study was carried out with the objective of analyzing and comparing the financial performance of merged banks before and after merger in terms of growth of total asset, profits, revenue, investment and deposits. The sample units of the study were State Bank of India, Oriented Bank of Commerce, Centurion Bank, Bank of Baroda, Union Bank of India, HDFC Bank and ICICI bank. The study revealed that the ICICI Bank achieved the higher growth rate in all respects except deposit. It is concluded by the study that the banks may develop opportunity measure to gauge the success and also to improve their post merger performance.

Sathya Swaroop Debasish⁵ (2005) in her study “Merger in Indian Banking – Case of ICICI Bank and Bank of Madura” has analyzed the conceptual overview on the series of recent merger and acquisitions. It suggested that the removal of entry barriers saw emergence of private sector banks (both old and new) in India and how market forces are compelling these to conglomerate and consolidate their competitive abilities.

Sivaram Y.G⁶ (2006) in his article titled on “M&As in Banks – The Indian Dilemma”, discussed the scenario of M&A activities in India. He concluded that the banking sector has gained momentum in merger and acquisition activities and the factors such as globalization, technological changes regulatory, flexibility have triggered the M&As in the Indian banking sector.

Kavitha Bhatnagar⁷ (2006) in her study entitled on “M&A in Indian Banking Sector”, discussed the India Banking Association document “Banking Industry Vision 2010”. It is visualized that the merger in India either between the public sector banks, or public sector and private sector banks is the logical thing to happen in the competitive race. The study concluded that merger and acquisition route is providing a quick step to acquire competitive size, an opportunity to share markets and reduce the cost of product development and delivery.

Ranjan Mugarjee⁸ (2007) carried out a study on “An Overview of Pre and Post M&A Deals” with the objective of analyzing the need for the attention of professional in finance, law, strategy etc. The study revealed the danger areas and pit falls of the integration process and due diligence.

METHODOLOGY

Sources of Data

The study is based on secondary data. The data were collected from the official directory and data base of Centre for Monitoring Indian Economy (CMIE) namely PROWESS. The published annual reports of the selected banks related websites, magazines and journals on finance have also been used as data source.

Period of Study

The study covers a period of 10 years as five years before the date of merger and five years after the date of merger including the year of merger. So it covers a period from 1995-2006

Sampling Design

The study is related to the banking industry. The merger process in banking industry started in 1950s-merger of private banks to avoid loss making by them. During late 1960's the government of India intended nationalization of banks by RBI.

In continuation of this, merger and acquisition took place in the form of public sector banks acquiring private banks/private sector bank with another private sector bank etc. After financial sector reforms in the year 1991 the banking sector especially the public sector banks were forced to improve their competitiveness. So the banks merged after the period 1991 were taken into consideration as it needs special attention to see to what extent these banks attained success in their merged process. So such banks were selected merged from 1995 onwards on the basis of the availability of data for a period of 5 years before the merger and five years from the merged period. The list of such banks is presented in Table 1.

TABLE 1 SAMPLE BANKS

Sl. No	Merging bank	Merged bank	Year
1	Kasinath Seth Bank	State Bank of India (SBI)	1995
2	Punjab Co-operative Bank	Oriental Bank of Commerce (OBC)	1997
3	Bareilly Co-operation Bank	Bank Of Baroda (BOB)	1999
4	Sikkim Bank	Union Bank of India (UBI)	1999
5	Times Bank	Housing Development Financial Corporation Bank (HDFC)	2000
6	Bank of Madura	Industrial Credit Investment Corporation of India (ICICI Bank)	2001
7	Nedungadi Bank	Punjab National Bank (PNB)	2003
8	Global Trust Bank	Axis Bank	2004
9	IDBI Bank	Industrial Development Bank of India (IDBI)	2005

Source: IBA Bulletin

FRAMEWORK OF ANALYSIS

The secondary data were collected from different sources. Statistical tools are applied to analyze different financial ratios which are grouped under 5 categories. Calculations were made to test the financial performance of the merged bank for a period of 5 years before and five years after the merged period. The statistical tools used are: Discriminat analysis.

FINANCIAL EFFICIENCY

This research explains operational performance of the merged banks with the help of 11 ratios are used. They are given below:

OPERATIONAL RATIOS

1. Ratio of Price earning ratio (X_1)
2. Ratio of price to book value per share (X_2)
3. Price to cash EPS (X_3)
4. Market capital to share capital (X_4)
5. EV / EBIDT (X_5)
6. Non performing asset to net advance (X_6)
7. Business per employee (X_7)
8. Profit per employee (X_8)
9. Return on asset (X_9)
10. Return on equity (X_{10})
11. Capital adequacy ratio (X_{11})

ANALYSIS RESULT AND DISCUSSION

PRE MERGER PERIOD

Step wise Discriminant Function Analysis is a multivariate statistical technique which allows to study the differences between two or more groups with respect to several variables simultaneously and provide a means of classifying any object/individual into the group with which it is most closely associated and to infer the relative importance of each variable used to discriminate between different groups. A linear combination of predictor variables, weighted in such a way that it will best discriminate among groups with the least error is called a linear discriminant function and is given by:

$D = L_1.X_1 + L_2.X_2 + \dots + L_K.X_K$, where X_i 's are predictor variables, L_i 's represents the discriminant coefficients, and D is the value of the discriminant function of a particular individuals/element such that if this value is greater than a certain critical value D , the individual would be classified in group I ; otherwise the individual would be classified in Group II.

Classification:

In the present study, the sample banks were grouped into namely, banks which are having lower ROE (Grouped I: $n_1= 4$) and banks which are having higher ROE (Grouped II: $n_2= 5$) by taking into consideration whether the different mean ratios are above the ROE or below it.

Predictor variables (operational ratios) considered for the analysis during per merger period for discriminant function analysis include the following:

$X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}$ and X_{11}

The results are presented in the table 2.

TABLE 2 MEAN OF INDEPENDENT OPERATIONAL RATIOS

Predictor Ratios	Bank with Lower ROE (X_{10}) ($N_1=4$)	Bank with Higher ROE (X_{10}) ($N_2=5$)
	Mean	
X_1	2.101	6.716
X_2	0.516	3.367
X_3	1.754	3.794
X_4	0.178	0.492
X_5	2.526	10.481
X_6	3.605	6.986
X_7	0.516	3.776
X_8	0.016	0.024
X_9	0.471	0.638
X_{11}	0.235	0.195

Source: Compiled from Annual Reports of the Banks

Note: ROE - Return on Equity

Table 2 shows the mean of the selected ratios related to the higher ROE and during pre merger period lower ROE. The mean of X_1 pertaining to lower ROE was 2.101 and that of higher ROE was 6.716. In case of X_2 the mean for lower ROE was 0.516 and that of higher ROE was 3.367, the mean of lower ROE and higher ROE in case of X_3 were found to be 1.754 and 3.794 respectively. In respect of lower ROE, the mean of X_4 was 0.178 and that of higher ROE was 0.492. The mean of X_5 relating to lower and higher ROE were found to be 2.526 and 10.481 respectively. The mean of X_6 relating to lower ROE and higher ROE were 3.605 and 6.986. In respect of X_7 the mean of lower ROE and higher ROE were 0.516 and 3.776. The mean relating to X_8 in case of lower ROE was 0.016 and 0.024 incase higher ROE. The mean of lower and higher ROE in case of X_9 were 0.471 and 0.638 respectively.



TABLE 3 TESTS OF EQUALITY OF GROUP

MEANS UNIVARIATE ANOVAS

Ratios	Wilk's Lambda	F (DF=1, 7)	Sig
X ₁	0.657	3.658	0.097
X ₂	0.900	0.775	0.408
X ₃	0.832	1.417	0.273
X ₄	0.642	3.504	0.089
X ₅	.0360	12.424*	0.010
X ₆	0.884	0.920	0.369
X ₇	0.702	2.973	0.128
X ₈	0.965	0.252	0.631
X ₉	0.935	0.529	0.490
X ₁₁	0.834	0.610	0.543

Source: Compiled from Annual Reports of the Banks

X₁₀ Dependent Variable

**-Significant at 1 % level *-Significant at 5 % level

CLASSIFICATION OF RATIOS BASED ON DISCRIMINANT FUNCTION

Using the discriminant function fitted and the observed predictor ratios of the bank, the bank is classified and the correct % of classification is presented below.

**TABLE 4 CLASSIFICATION OF RATIOS USING
DISCRIMINANT FUNCTION**

ROE	Classification of Banks		Total
	Banks with Lower ROE (X_{10})	Banks with Higher ROE (X_{10})	
Banks with Lower ROE (X_{10})	4	0	4
Banks with Higher ROE (X_{10})	0	5	5

Source: Compiled from Annual Reports of the Banks

Note: ROE - Return on Equity

From the above table, it is observed that out of 4 banks who have lower ROE, all the 4 (100 %) were correctly classified; out of 5 banks who have higher ROE, all the 5 (100 %) were correctly classified. Thus, out of total 9 banks, all the 9 banks were correctly classified. Hence the percentage of correct classification is $(9/9)*100\%$ or 100 %. The percent of correct classification of respondents using the observed data clearly indicates adequacy of the model in discriminating between the two groups.

RELATIVE IMPORTANCE OF PREDICTOR VARIABLE

The contribution of the selected ratios in discriminating the two groups and also their relative discriminating power were found using the formula:

$$I_j = \text{Mod of } K_j (x_{j1} - x_{j2})$$

I_j = Importance of j^{th} variable

K_j = Unstandardised discriminant co-efficient for j^{th} variable

X_{ik} = Mean of the j^{th} variable for the k^{th} group

$R_j = I_j / \text{Sum of } I_j$ where R_j is the relative importance of j^{th} ratios. The calculated values are given in the following table.

The relative importances of each predictor ratios in discriminating between the two groups are obtained and the results are presented below.

TABLE 5 THE RELATIVE IMPORTANCE OF RATIOS IN DISCRIMINATING BETWEEN THE GROUPS

Predictor Ratio	Importance value of the ratios (I _j)	Relative Importance (R _j)	Rank
X ₄	7.2867	29.9	2
X ₅	16.1248	66.2	1
X ₉	0.9631	3.95	3
Total	24.3746	100	

Source: Compiled from Annual Reports of the Banks

CANONICAL DISRIMINANT FUNCTION FITTED:

$$D = - 9.147 - 23.206 X_4 + 2.027 X_5 + 5.767X_9$$

Test Functions

Eigen value: 30.336

Percentage of variation explained: 100

Wilks Lambda = 0.032

Chi-square = 18.946; DF = 3; p = 0.000

Canonical Correlation: 0 .984

Among the ratios under study, two operational ratios namely X_4 , X_5 and X_9 are substantially important variables in discriminating between groups namely banks with lower ROE and with higher ROE among the banks under study.

Thus it is concluded that the discriminate function which enabled the researcher to classify a new bank in either bank with low ROE (X_{10}) group or bank with higher ROE (X_{10}) group and identified substantially important ratios namely X_4 , X_5 and X_9 in discriminating between the group namely banks with lower and higher ROE (X_{10}).

POST MERGER PERIOD

The operational ratios namely X_1 , X_2 ,.....and X_{11} during post merger were used for discriminant function analysis.

TABLE 6 MEAN OF INDEPENDENT OPERATIONAL RATIOS

Predictor Ratios	Banks with Lower ROE (N ₁ = 4)	Banks with Higher ROE (N ₂ =5)
	Mean	
X ₁	10.812	10.980
X ₂	1.797	1.662
X ₃	9.054	9.314
X ₄	1.301	1.318
X ₅	8.884	15.628
X ₆	4.927	2.366
X ₇	3.100	6.647
X ₈	0.117	0.064
X ₉	0.471	0.638
X ₁₁	0.213	0.324

Source: Compiled from Annual Reports of the Banks

Note: ROE - Return on Equity

Table 6 presents the mean of the selected ratios related to the lower ROE and higher ROE during post merger period. The mean relating to X₁ in case of lower ROE was 10.812 and that of higher ROE

was 10.980 the mean of lower ROE and higher ROE of variable X_2 were 1.797 and 1.662 respectively. In case of X_3 , the mean for lower ROE was 9.054 and that of higher ROE was 9.314. In respect of lower ROE the mean of X_4 was 1.301 and that of higher ROE was 1.318. The mean of X_5 relating to lower ROE and higher ROE were 8.884 and 15.628 respectively. The mean of X_6 relating to lower ROE was 4.927 and higher ROE was 2.366. The mean of lower ROE and higher ROE of the variable X_7 were 3.100 and 6.647 respectively. In case X_8 the mean of lower ROE was 0.117 and higher ROE was 0.064. The mean of lower and higher ROE of variable X_9 were 0.471 and 0.638 respectively.

**TABLE 7 TESTS OF EQUALITY OF GROUP MEANS
UNIVARIATE ANOVAS**

Ratios	Wilk's Lambda	F (DF=1, 7)	Sig
X_1	1	0.001	0.979
X_2	0.998	0.015	0.905
X_3	1	0.003	0.958
X_4	1	0.000	0.986
X_5	0.463	8.125*	0.025
X_6	0.707	2.900	0.332
X_7	0.778	1.994	0.203
X_8	0.916	0.645	0.448
X_9	0.930	0.529	0.490
X_{11}	0.828	0.425	0.478

Source: Compiled from Annual Reports of the Banks

X_{10} Dependent Variable

**-Significant at 1 % level *-Significant at 5 % level

CLASSIFICATION OF RATIOS BASED ON DISCRIMINANT FUNCTION

Using the discriminant function fitted and the observed predictor variables of the individual, the individual is classified and the correct % of classification is presented below.

TABLE 8 CLASSIFICATION OF RATIOS USING DISCRIMINANT FUNCTION

ROE	Classification of Banks		Total
	Banks with Lower ROE (X_{10})	Banks with Higher ROE (X_{10})	
Banks with Lower ROE (X_{10})	3	1	4
Banks with Higher ROE (X_{10})	0	5	5

Source: Compiled from Annual Reports of the Banks

Note: ROE - Return on Equity

From the above table, it is observed that out of 4 banks who have lower ROE, 3 banks (100 %) were correctly classified; out of 5 banks who have higher ROE, all the 5 (100 %) were correctly classified. Thus, out of total 9 banks, all the 8 banks were correctly classified. Hence the percentage of

correct classification is $(8/9)*100\%$ or 88.9 %. The percent of correct classification of respondents using the observed data clearly indicates adequacy of the model in discriminating between the two groups.

RELATIVE IMPORTANCE OF PREDICTOR VARIABLE

The relative importances of each predictor ratios in discriminating between the two groups are obtained and the results are presented below.

TABLE 9 THE RELATIVE IMPORTANCE OF RATIOS IN DISCRIMINATING BETWEEN THE GROUPS

Predictor Ratio	Importance value of the ratios (I _j)	Relative Importance (R _j)	Rank
X ₃	7.2867	31.1	2
X ₅	16.1248	68.9	1
Total	23.4115	100	

Source: Compiled from Annual Reports of the Banks

CANONICAL DISRIMINANT FUNCTION FITTED:

$$D = - 4.221 - 0.180 X_3 + 0.465 X_5$$

Test Functions

Eigen value: 3.028

Percentage of variation explained: 100

Wilks Lambda = 0.248

Chi-square = 8.359; DF = 2; p = 0.015

Canonical Correlation: 0.867

Among the ratios under study, two operational variables namely X_3 and X_5 are substantially important variables in discriminating between groups namely banks with lower ROE and with higher ROE among the banks under study.

Thus, it is concluded that the discriminate function which enabled the researcher to classify a new bank in either bank with lower ROE (X_{10}) group or bank with higher ROE (X_{10}) group and identified substantially important ratios namely, X_3 and X_5 in discriminating between the groups namely banks with lower and higher ROE (X_{10}).

CONCLUSION

The new economic environment of the 1990s has facilitated M&As between banks which facilitated efficient performance. But it can be concluded the improvement in terms of various parameters can be identified with supported relative information of their own. The policy makers can use the findings of the study as a base for framing policies relating to M&As in service sector and to identify the areas of improvement for better operational and performance for the banks.

The above study reveals that the lower or higher return on equity is discriminating between the groups. The discriminant analysis clearly reveals that both the pre and post merger period of this study either bank with lower return on equity or bank with higher return on equity improved its efficiency due to the following operational ratios and the key variables namely, market capital, share capital, return on asset and earning per share.

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