

Productivity and Cost Efficiency Analysis– A Comparative Study

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Abstract

Management always looks after the effectiveness, efficiency and performance of banks and it indicates the success of the strategic objective, goals of the firms. In the similar manner performance of any economy depends upon the efficiency of its financial system. The performances of financial system of a country determine its economic growth indicators. Strengthening financial systems has been one of the central issues facing emerging markets and developing economies. This is because sound financial systems serve as an important channel for achieving economic growth through the mobilization of financial savings, putting them to productive use and transforming various risks. Indian financial system is based on the Indian banking industry and its capital market. The Indian commercial banks are traditionally playing most important role as financial intermediaries. The banks comprise more than three-fifth of financial system assets and dominate the whole banking sector in India and played a central role in mobilizing savings in growth process. While internationally accepted prudential norms have been adopted, with higher disclosures and transparency, Indian banking industry is gradually moving towards adopting the best practices in accounting, corporate governance and risk management. Although, the need is to make continuous improvement in cost efficiency and productivity of Indian banking sector, yet this improvement is also required to measure and compare with the benchmark level to understand how much improvement has taken place and their individual relative rank with the top performers. Thus, both of these performance measures are major determinants of competitiveness and profitability of the banking sector. In this way, a study of these sources is crucial for identifying the productivity level of industry and will be helpful to adopt appropriate measures for decision making units at various levels so as to improve productivity and cost efficiency. So in the present study an attempt has been made to evaluate the performance of different categories of banks viz. public, private and foreign bank groups in India. For evaluating the performance, twelve financial ratios have been used. These ratios further have been categorized into two categories viz. productivity and cost efficiency. The period of study cover the years 2005-06 to 2011-12. From the results, it has been found that during the study period the productivity and cost efficiency of public sector bank group declined while it has improved in other two groups.

Keywords: Coefficient of Variation, ANOVA, Tukey's Multiple Comparison Test, Liquidity, Profitability

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1. Introduction

The efficient intermediation of financial resources by various intermediaries in the financial market leads to higher growth and resources development by increasing the savings and their optimum allocation for productive uses. As customary to other economies of world, the financial sector occupies a distinctive position in the Indian economy. Its largest presence is evident in terms of its significant contribution towards the primary, secondary and tertiary sector along with employment generation and foreign exchange services. Presently, the banking sector

shares about 13.2 per cent of growth of India's services sector at factor cost (Government of India, 2012-13). Since last two decades, a range of financial reforms focusing on developing the transparency and upgradation of financial sector in India has been initiated, which further necessitates a regular and indispensable insight in this direction. Also there is utter need to measure that to what extent these reforms have influenced the performance and improvements in one of the key organs of financial sector i.e. the Indian banking sector. One of the prime objectives of these reforms were to enhance the operational efficiency and productivity of the banking sector at group level as well as at the

individual level, at the same time increased competition among the banks has also affected the performance of commercial banks. Therefore, from the point of view of both managerial and policy interest, it is extremely important to know the efficiency levels of banking firms. The present study is an attempt to examine the performance level of different banking groups viz. public, private and foreign on the basis of various financial indicators which have been divided into two categories namely expense and productivity ratios. The period of the study is 2005-06 to 2011-12.

2. An Overview of Indian Banking

The history of formal commercial banking in India can be traced back to the 18th century¹ (Roy 2000). Till nationalization all banks continued to be privately owned except SBI, its associates and RBI. After independence, it was felt that commercial bank credit was flowing mainly to the large and well established business houses, and not so much to sectors such as agriculture and small scale industries. As a result, in 1967, the policy of social control over banks led to the first phase of nationalization in 1969 and second phase in 1980. With the nationalization of banks, a large number of regulatory measures were adopted by RBI to achieve a desired sectoral allocation of credit e.g. subsidized lending rates to priority sectors, provision of refinance facilities, rural and semi-urban branching, ceiling on deposit rates and differential lending rates. These measures led to a phenomenal growth of the banking system, especially of PSBs. In fact, during the early 1990s; PSBs owned nearly 90 percent of total business in the banking industry.

However, this rapid growth, owing to excessive focus on quantitative achievements, made many banks inefficient, unprofitable and undercapitalized. Recognizing these problems, the RBI launched the banking sector reforms in 1992. The areas of reform namely deregulation, branch de-licensing, deregulation of interest rates, gradual decrease of the Cash Reserve Ratio and the Statutory Reserve Ratio, setting capital adequacy norms of a minimum 8 per cent capital to risk-weighted Asset Ratio (CRAR) and imposition of stringent income recognition and provisioning norms. While these reforms were underway, there were some important developments taking place in the world economy, especially a movement towards global integration of financial services.

The banking sector reforms in India, initiated since 1992 was intended to impart enhanced efficiency, productivity and profitability into the system. Hence, it is important, to weigh the gains against losses incurred by the banking industry over a sufficiently long time horizon. As highlighted in the introduction, this paper intend to study the performance of different bank groups in terms of various financial indicator during 2006 to 2012.

3. Objective of this Paper

The objective of this paper is to measure and compare performance of public, private and foreign banks by using Tukey's Multiple Comparison Test. It is a single multiple comparison procedure and statistical test, generally used in conjunction with ANOVA to find which means are significantly different from one another. The test compares the means of every group with the means of every other group; that is, it applies simultaneously to the set of all pairwise comparisons.

4. A Brief Review of Literature

In recent years a number of studies have been conducted to know the liquidity, profitability and performance of players in financial system. There exist rich literature pertaining to developed countries, on assessing bank performance using various methodologies arriving at different conclusions. There also exist many good surveys of the efficiency and productivity literature related to banking. In India, various research studies on performance and efficiency of Indian banking industry were conducted by applying different techniques like taxonomic method, multi comparison test, DEA analysis, zero sum method etc. Notable among these were Sensarma², Das & Ghosh³, Kaur and Kaur⁴, Das⁵, Rajan, Reddy and Pandit⁶, Singh, Ali, Magesh⁷, Ahmed⁸, Seshadri, Kumar and Reddy¹⁰ and Sharma and Raina (2014).

Sensarma² uses the stochastic frontier analysis to estimate bank –specific cost and profit efficiency during 1986 to 2003. He find that while cost efficiency of the banking industry increased during the period, profit efficiency underwent a decline as the economy is undergoing a process of deregulation. In terms of bank groups, domestic banks appear to be more efficient than foreign banks.

Das & Ghosh³ analyzed the efficiency of Indian Banks during 1992-2004 by using DEA and Univariate analysis. The results showed high levels of efficiency in costs and lower levels in profits. The determinants of profit efficiency appear to suggest that big state-owned banks performed reasonably well and are more likely to operate at higher levels of profit efficiency. A close relationship is observed between efficiency and soundness as determined by bank's capital adequacy ratio.

Kaur and Kaur⁴ examines the cost efficiency of Indian commercial banks by using a non-parametric Data Envelopment Analysis Technique for the period 1990-91 to 2007-08. This paper also empirically examines the impact of mergers on the cost efficiency of banks that have been merged during post liberalization period. The findings of this study suggest that over the entire study period average cost efficiency of public sector banks

found to be 73.4 and for private sector banks is 76.3 percent. The findings of this paper suggest that to some extent merger programme has been successful in Indian banking sector.

Das⁵ analyze the performance of the Indian banking sector after the initiation of financial liberalization and also aims to measure the cost efficiency of the Indian banking sector during the post reform period. The study concludes that after financial liberalization there has been no significant change in the cost efficiency of the public sector banks. The finding shows a marginal decline in the cost efficiency of the public sector banks in the post reform period. A comparison among various bank groups in the post reform period shows, the domestic private banks are becoming more efficient in comparison to the public sector and the foreign banks.

Rajan, Reddy and Pandit⁶ in their paper attempts to examine technical efficiency and productivity performance of Indian scheduled commercial banks, for the period 1979-2008. They model a multiple output/multiple input technology production frontier using semiparametric estimation methods. Based on this methodology, the results show that the banking system has gone through two major policy upheavals; nationalization in 1969 and deregulation and other reforms in mid nineties. Both of these have had a significant impact on the efficiency and productivity in the banking industry in two different ways.

Singh, Ali, Magesh⁷ analyze the changes in the productivity efficiency of Indian Public sector banks during the period of 2007 to 2009. Productivity is measured by the Malmquist productivity index using a Data Envelopment Analysis (DEA) technique. The Malmquist productivity measures are decomposed into two components: efficiency change and technical change. The overall results show that there is slight improvement in the total factor productivity change of these banks in which technical efficiency change is found be more important source of productivity growth.

Ahmed⁸ made an attempt to study the productivity performance of Meghalaya Rural Bank (MRB), keeping in view the trends of rural banks in the national context. The productivity in terms of labour, branch, return on assets (ROA), return on investment (ROI) etc. has been calculated to examine the innovativeness of MRB. It is found it has been doing relatively better than that of the Regional Rural Banks (RRBs) as a whole. However, a variation in the productivity has been observed which might have adverse effect on profitability of the bank. impact on This disparity may be due to lesser involvement of rural banks in profitable activities. Single(2008) examined the profitability of sixteen banks for the period 2001 to 2007. The study reveals that overall profitability and the position of selected banks in terms of return on investment is moderate.

Nikita⁹ made an attempt to estimate the technical efficiency of Public sector banks in India. The time period of the study

taken to 2002 to 2012 because in this time period banking sector undergoes immense changes and these changes came in every parameter. For the analysis of the selected parameter of selected bank group of public sector banks, Cobb-Douglas production function is used for the evaluation then stochastic frontier was used. The study has been analysed that public Sector Banks should increase in the amount of deposits and borrowings, so that the performance of the bank improves.

Seshadri, Kumar and Reddy¹⁰ in their contemporary study attempts to empirically observe the efficiency of Public and Private commercial banks considering interest income to total asset ratio, Total Income to Total asset ratio, Interest expended to Total asset ratio and Total expenditure to total asset ratio taken as input and output for the banks and using non – parametric technique. Indian banking system large banks have a less control over the operations in industry and therefore small size banks are efficient and controlling their operations in the forms of providing the modern banking and financial services and updating technological services.

Sharma and Raina (2014) in their paper attempt to measure the performance of the Indian banking sector in terms of efficiency and productivity levels and their determinants during the post-reform period. The study found relatively underestimated efficiency and productivity levels by traditional data envelopment analysis-based Malmquist index. Additionally, the study brings into account the results for external and environmental determining factors contributing to the TFP growth.

5. Methodology

As mentioned earlier that main objective of this paper is to evaluate the performance of different banking groups on the basis of various financial ratios. To evaluate the performance of these groups, following statistical tools have been applied.

5.1 Mean

A tool which show a common characteristic to concentrate at certain values usually somewhere in the centre of distribution.

5.2 Analysis of Variance

A method of splitting the total variation of data into meaningful components that measures different sources of variation.

5.3 Tukey's Multi-comparison Test

Also known as Tukey's Honestly Significant Difference (HSD). It is a single multiple comparison procedure and statistical test, generally used in conjunction with ANOVA to find which means are significantly different from one another. The test compares the

means of every group with the means of every other group; that is, it applies simultaneously to the set of all pairwise comparisons.

The formula for Tukey's test is $qs: \frac{Y_A - Y_B}{SE}$

where Y_A is the larger of the two means being compared, Y_B is the smaller of the two means being compared and SE is the standard error of the data in question.

This qs value is then compared to the q value from the studentized range distribution. If the qs value is larger than the q critical value obtained from the distribution, then two means are said to be significantly different and vice-versa.

For evaluating the performance of different banking groups twenty-four financial ratios have been used. The above mentioned statistical tools have been applied to these ratios. These ratios are further categorized into four groups viz. Liquidity, Expenditure, Profitability and Productivity. All these ratios are measured in terms of percentages and rupees in lakh. The data on these ratios is taken from RBI website www.rbi.org.in. The period of reference 2005-06 to 2011-12.

6. Empirical Results

The efficiency measures calculated in this study are relative in nature. The performance of different banking groups is measured on the basis of various liquidity and profitability measures.

Table-5.1 compares the performance of different banking groups with respect to six expense ratios namely intermediation cost to total assets, wage bills to total expenses, burden to total assets, cost of deposits, cost of borrowings and cost of funds. The table extends that private sector bank group continues to record the highest mean values with respect to most of the expense ratios followed by public sector banks and foreign banks, except in case of intermediation cost to total assets and wage bills to total expenses. In the above mentioned two ratios, foreign bank group registered the highest mean values followed by private sector banks and public sector banks. Among bank groups the foreign bank group was most cost efficient, followed by public and private sector bank group.

6.1 Multiple Comparison Test for Expense Ratios

The level of inter-bank disparities marked by the values of co-efficient of variation reveals that it was significant in case of foreign bank only except in case of burden to total assets where it recorded lowest values. The table further extends that mean difference was insignificant among public and private sector bank groups. Similarly it was insignificant among private and foreign bank groups except for wage bills to total expenses (2011-12),

cost of deposits (2008-09, 2011-12) and cost of funds (2011-12). But there exist marked variations in most of expense ratios except cost of deposit and borrowing among public and foreign banks in most of the years. The overall change in the cost of deposit and borrowing among three bank groups was relatively consistent from 1996-97 to 2005-06 (Table 1).

So it can be concluded that foreign bank group was most efficient in managing its costs in comparison to other two groups. But along with this it, there exist marked variations in this group.

Section 6.2 compares the performance of different categories of banks on the basis of six productivity ratios viz. business per employee, profit per employee, deposits per employee, advances per employee, income per employee and operating expenses per employee. The analysis of the table reveals that the productivity of all the bank groups have improved during the study period. Group-wise analyses shows that productivity of foreign bank group is very good in comparison to other two banks groups as in all the productivity ratios it continues to record the highest mean values followed by public sector banks. In contrast, private sector bank group is very poor among all the bank groups, as it recorded the lowest mean values in most of the productivity indicators.

6.2 Multiple Comparison Test for Productivity Ratios

As far as stability and consistency of efficiency is concerned, it was very high in public sector banks followed by private banks and foreign. Among bank groups, foreign banks registered the highest values of co-efficient of variation (Table 2).

Further the table extends that the mean difference was insignificant among public and private sector banks at 5 per cent significance level. In contrast the mean difference was significant among public and foreign banks in all of the ratios. Similarly it was significant among private and foreign banks with respect to almost all the productivity ratios (except for profit per employee, advances per employee and income per employee in 2005-06).

Finally, it can be concluded that foreign bank group is most efficient group followed by private and public sector bank groups. But as far as stability and consistency is concerned, it was highest in case of public sector bank group followed by private and foreign bank group. Further the table shows that there exist significant difference in the mean values of different banking groups when compared with foreign bank group.

7. Conclusion

This study presents performance evaluation of different categories of banks viz. public, private and foreign bank groups in India. For evaluating the performance, twelve financial ratios

have been used. These ratios further have been categorized into two categories viz. expense and productivity ratios. The period of study cover the years 2005-06 to 2011-12. From the results, it has been found that during the study period the cost efficiency and productivity position of public sector bank group declined while it has improved in other two groups.

Further the results indicated that in most of the financial indicators foreign banks recorded the highest mean values. But as far as stability and consistency is concerned, it was negligible in foreign banks and highest in public sector banks.

It is also found that mean difference was negligible among public and private sector banks but it is significant when compared with foreign bank group. It depicts that public sector banks need to improve their performance in order to compete with private and foreign banks groups.

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Appendix

Table 1. Multiple comparison test for expense ratios

RATIO	YEAR	MEAN (%)			CV	TUKEY'S MULTIPLE COMPARISON TEST						ANOVA	
		Pub.B	Pvt.B	For.B		Pub.B	Pvt.B	For.B	Pub.& Pvt.	Pub.& For.	Pvt.& For.	F-Ratio	Sig. Level
Intermediation	2005-06	2.208	2.368	3.364	0.190	0.45	0.838	0.159	1.156	0.997	3.023	0.057	
Cost to Total Assets	2008-09	1.608	2.056	4.720	0.159	0.273	1.577	0.448	3.112*	2.664	3.371	0.042	
	2011-12	1.538	2.146	4.283	0.168	0.261	1.466	0.608	2.745*	2.138	3.556	0.035	
Wage Bills to Total Expenses	2005-06	22.107	17.979	20.191	0.245	0.408	0.626	4.128	1.916	2.211	1.216	0.304	
	2008-09	13.232	13.290	18.501	0.248	0.302	0.590	0.058	5.269*	5.211	3.776	0.029	
	2011-12	12.787	13.558	20.375	0.218	0.284	0.552	0.771	7.588*	6.817*	7.324	0.002	
Burden to Total Assets	2005-06	1.011	1.162	-0.807	0.473	0.643	-4.310	0.151	1.818*	1.969*	5.753	0.005	
	2008-09	0.444	0.626	-0.077	0.581	0.790	-20.689	0.181	0.522	0.703	2.743	0.073	
	2011-12	2.033	0.991	-0.007	1.620	0.577	-262.403	1.042	2.039*	0.997	3.437	0.039	
Cost of Deposits	2005-06	4.552	4.873	4.365	0.066	0.126	0.460	0.321	0.187	0.508	0.872	0.424	
	2008-09	6.499	6.818	5.149	0.090	0.087	0.463	0.319	1.351*	1.669*	7.195	0.002	
	2011-12	6.673	7.259	5.492	0.092	0.124	0.437	0.585	1.181*	1.767	6.655	0.003	
Cost of Borrowings	2005-06	8.237	12.616	4.653	1.853	2.222	0.726	4.380	3.548	7.964	0.752	0.476	
	2008-09	3.542	8.538	8.220	0.894	0.944	1.659	4.996	4.678	0.318	2.345	0.106	
	2011-12	2.606	4.744	2.867	0.836	0.751	0.904	2.138*	0.261	1.877	3.257	0.046	
Cost of Funds	2005-06	4.595	4.422	4.752	0.079	0.348	0.389	0.174	0.157	0.330	0.264	0.769	
	2008-09	6.255	6.744	5.605	0.093	0.103	0.754	0.488	0.650	1.138	1.026	0.365	
	2011-12	6.381	7.029	4.423	0.093	0.151	0.430	0.648	1.958*	2.607*	20.442	0.000	

Table 2. Multiple comparison test for productivity ratios

RATIO	YEAR	MEAN (%)			CV	TUKEY'S MULTIPLE COMPARISON TEST			ANOVA			
		Pub.B	Pvt.B	For.B		Pub.B	Pub.&Pvt.	Pub.& For.	Pvt.& For.	F-Ratio	Sig. Level	
Business Per Employee	2005-06	420.320	459.092	1049.759	0.665	0.421	0.647	38.770	629.439*	590.669*	12.611	0.000
	2008-09	782.693	608.544	1485.985	0.375	0.321	0.733	174.149	703.291*	877.441*	9.561	0.000
	2011-12	1199.278	795.656	2081.140	0.269	0.212	0.677	403.622	881.862*	1285.484*	11.784	0.000
Profit Per Employee	2005-06	2.647	2.994	30.185	0.881	0.916	2.254	0.347	27.538*	27.192	3.447	0.039
	2008-09	4.693	4.909	30.883	0.384	0.452	0.987	0.217	26.191*	25.974*	15.462	0.000
	2011-12	6.646	6.642	44.506	0.421	0.503	0.980	0.004	37.860*	37.864*	15.846	0.000
Deposit Per Employee	2005-06	243.915	259.127	650.482	0.347	0.487	0.642	15.210	406.566*	391.356*	16.792	0.000
	2008-09	447.543	361.099	899.009	0.409	0.370	0.636	86.445	451.466*	537.911*	12.662	0.000
	2011-12	697.284	404.962	1074.624	0.262	0.653	0.642	292.322	377.340*	669.662*	11.028	0.000
Advances Per Employee	2005-06	264.983	199.965	487.627	1.658	0.618	0.941	65.016	216.685	281.702	2.377	0.102
	2008-09	341.405	263.164	785.253	0.452	0.436	1.143	78.241	443.848*	522.089*	5.681	0.006
	2011-12	531.915	389.301	1098.982	0.292	0.461	0.822	142.615	567.066*	709.681*	9.646	0.000
Income Per Employee	2005-06	4.807	4.501	57.101	1.454	1.023	2.298	0.306	53.303*	53.609	3.775	0.029
	2008-09	47.788	45.047	159.384	0.501	0.451	0.791	2.741	111.596*	114.337*	15.914	0.000
	2011-12	74.342	62.010	210.781	0.294	0.464	0.575	12.333	136.438*	148.771*	26.056	0.000
Operating Expenses Per Employee	2005-06	6.098	7.433	30.664	0.447	0.509	0.847	1.334	24.726*	23.392*	19.138	0.000
	2008-09	7.766	8.660	68.031	0.218	0.446	1.332	0.894	60.265*	59.371*	9.304	0.000
	2011-12	11.519	12.075	52.719	0.144	0.447	0.589	0.556	41.200*	40.645*	35.847	0.000