

Chapter -VI

Summary of

Recommendations and Conclusions

6.1: Introduction

Banking Industry in India has travelled a long way to assume its present status. Banking is the major component of the financial sector in India. Banks are the highest financial intermediaries in our economy. Being a bank based financial system; the banking performance has an obvious impact on the economy in India. It has undergone a major structural transformation after the initiation of financial liberalization in India. Deregulation, financial innovation, securitization, globalization, customers' satisfaction and advances in technology are quickly changing the nature of Indian commercial banking. A keen competition rages among the banks operating in India particularly after the emergence of new private banks and more foreign banks. The relative importance of the public sector banks has been declining. The share of public banks in the asset, deposit and credit has been declining which implies decreasing concentration and increasing competition. The banks have been trying to find new avenues not only to retain the present customer strength but also attracting new customers by offering hassle-free services. Competition from global banks and rural banking & microfinance are now the major issues to be addressed by the Indian banking industry for its growth.

Banking operation in India has already gained tremendous momentum. The focus of all banks in India has shifted their approach to 'cost', determined by revenue minus profit. This means that all the resources should be used efficiently to better the productivity and ensure a win-win situation. This present competitive Indian banking scenario raises certain questions in our mind.

Are Indian banks efficient or inefficient in utilizing their available resources?

Which banks will be able to maintain sustainable growth and development?

Thus, this study has measured and examined the relative technical efficiency of the banks in India during 2004/05–2007/08. The data set is a panel of 36 banks listed in the stock exchange. In order to measure bank efficiencies, it has utilized the non-parametric Data Envelopment Analysis (DEA) approach. Considering the banking operation pattern, objectives of individual banks and the regulatory agency (RBI), the

study has specified four inputs and four outputs following intermediation approach [*Inputs* - i) No. of Branches ii) No. of Employees iii) Operating Expenses and iv) Deposit, *Outputs* -i) Net Interest Income ii) Non-interest Income iii) Priority Sector Advance and iv) Net Profit].

Having obtained the efficiency scores, the study has investigated the various insights to DEA efficiencies and has aspired to make a humble attempt for comprehensive rankings of the Indian banks.

The present study will seek to answer the following questions:

1. Are Indian banks technically efficient in utilizing the available resources?
2. Which banks are fully efficient? Which banks are inefficient in converting inputs to outputs?
3. What is the main source of inefficiency of the Indian banks?
4. What is the nature of Returns-to scale of the Indian banks?
5. Is the strength of efficiency of the Indian banks stable?
6. What should be the input output improvement plan for inefficient banks to become fully efficient ones?
7. Is public sector banks pushed to the back side?
8. Is bank size a matter for technical efficiency gain?
9. Which are the super-efficient banks?
10. What is the overall ranking position of the selected banks based on overall efficiency (technical efficiency (DEA) plus financial efficiency)?
11. What should be the financial strategy for improvement of DEA efficiency?
12. Which are the India's efficient banks today and tomorrow?

6.2: Findings of the study

The study has been carried out with a broad objective to analyse the technical efficiency of the Indian listed banks with the framing of the above mentioned questions. The major findings of this study are summarized below.

6.2.1: Technical Efficiency Level of Indian Banks

The empirical results do confirm that majority of Indian banks efficiently managed their financial resources and the mean overall technical efficiency of the Indian domestic commercial banks (based on sample) during study period is 93.4 %. Therefore, Indian banks could have saved on an average 6.6% of present level of inputs used to produce the present level of outputs. Average pure technical efficiency (i.e. managerial performance) and scale efficiency (operation of banks with appropriate size) are also quite high, which are 95.8% and 97.8% respectively. So, Indian banks are quite technically efficient i.e. converting inputs to outputs in an efficient way during the study period.

Three DEA efficiencies (OTE, PTE and SE) of almost all banks are found to be increasing in trend during the study period.

The study also finds that there is mismatch between pure technical efficiency and scale efficiency. 56% of the sample banks which are CCR inefficient have to face this problem. Average scale efficiency of 31% of the sample banks is 10% higher than pure technical efficiency while, pure technical efficiency of balance 25% of the sample banks is about 3% higher than SE. This large difference between pure technical efficiency and scale efficiency can not increase OTE level of the Indian banks beyond 93.4%.

The study also observes that during strong economy, banks are getting the advantage of scale efficiency. Mean Scale efficiency over the study period is highest and stable with lowest asymmetry compared to that of OTE and PTE.

6.2.2: Efficient and Inefficient Banks

One of the greatest advantages of the DEA technique is to categorize the banks under evaluation into two groups- efficient and inefficient. Efficient means efficiency score equal to 100% i.e. 100% utilization of the given inputs to produce given outputs in an input-oriented DEA model technique. Inefficient means efficiency score less than 100% i.e. less than 100% utilization of the given inputs to produce given outputs. The study brings the following outcomes.

1. 44% of the sample banks are fully (100%) CCR and BCC efficient where as 14% are fully BCC efficient but not fully CCR efficient. 39% are both CCR and BCC inefficient during the study period.
2. The study has traced out that there are 9 (25% of the sample banks) top performing banks namely COB, IDL, OBC, SBT, CUB, KVB, HDB, ICB and KMB which are fully efficient under both CCR and BCC model during all the years under study. And 9 least performing banks are BOB, BOM, DEB, SYB, UCB, BOR, DLB, IVB and SIB which are CCR as well as BCC inefficient during all the years under study.

6.2.3: Main Source of Overall Technical Inefficiency

There is a relation among these three types of DEA efficiencies – OTE, PTE and SE. which is popularly known as decomposition of efficiency in DEA literature. Following relationship demonstrates a decomposition of efficiency.

$$\text{OTE} = \text{PTE} \times \text{SE}$$

Most of the inefficient banks in Indian are facing the relation with $\text{OTE} < \text{PTE} \leq \text{SE}$ during all the years under study. From this decomposition of efficiency, it is observed that the main source of overall technical inefficiency (OTIE) of the Indian banking is pure technical inefficiency (PTIE) or managerial inefficiency since mean scale efficiency (SE) is more than mean pure technical efficiency (PTE) during all the years of the study. In other words Scale efficiency contributes more towards overall technical efficiency. But

the contribution of SE over PTE towards OTE is not so high since mean SE is more than mean PTE by only on an average 2% over the study period.

The study finds that 44% of the sample banks over the study period are 100% technical and scale efficient (i.e. PTE = SE = 1 and OTE = 1). 56% have overall technical inefficiency. Out of 56%, inefficiencies of 28 % banks are caused mainly by the operation of the banks with inappropriate size rather caused by managerial inefficiency and remaining 28% are caused primarily by managerial inefficiency rather scale inefficiency.

The study also finds that overall technical inefficiency of the banks which are suffering mainly from operation with inappropriate size i.e. scale inefficiency is lower than those banks suffering mainly from inefficient management.

So, it can be concluded that most of the inefficient banks (CCR) have to face the greater problem of managerial underperformance i.e., inefficient operation of banks themselves rather disadvantageous conditions under which they are operating.

6.2.4: Returns-to-scale (Scale of operation)

Scale inefficiency appears to affect the overall inefficiency of Indian banks. Therefore, the issue of scale inefficiencies is explored with greater detail by considering returns-to-scale (RTS) properties of the individual banks.

With the analysis of returns to scale properties of the individual banks, the study has found that over the study period, 45% banks shows constant returns-to-scale (CRS) i.e. operating at most productive scale size (MPSS), 44% decreasing returns-to-scale (DRS) and 11% only increasing returns-to-scale (IRS) in their production technologies. About 14% banks operating at DRS or IRS are very close to 100% scale efficiency. Thus 59% (45% +14%) banks are scale efficient. These findings support the hypothesis that during strong economy banks are getting the advantage of economies of scale i.e. higher scale efficiency.

On an average 55% branches of the banks with DRS are located at rural and semi urban areas where as it is only 41% for CRS banks and 48% for DRS banks. SBI, BOB and BOI belonging to DRS group are suffering from scale inefficiency largely. Their scale inefficiencies are .098, .088 and .086 respectively (from the highest side). The case of SBI is more serious among them. More than 69% (SBI), 64% (BOI) and 60% (BOB) branches are located in rural and semi urban branches. Thus, banks with DRS are operating relatively at the disadvantageous condition than the banks of CRS and IRS.

Another observation is that number of banks with DRS is more than that of IRS through out the study period. Thus DRS is observed to be the predominant form of scale inefficiency in India.

We can conclude that most of the Indian banks during the study period are operating at correct scale. Thus, there is a little scope of improvement of overall technical efficiency by removing scale inefficiency. Dominance of banking operation at rural and semi urban areas is the major contributor of scale inefficiency of the Indian banks.

6.2.5: Stability of the Efficiency Strength

The banks which provide the best practice input utilization or efficient frontier form reference sets of the inefficient banks. In DEA literature these banks are called peer banks and inefficient banks should follow their good operating practice in order to improve efficiency. Magnitude of frequency in reference sets measures the extent of robustness of efficient banks relative to other efficient banks.

By counting the frequency in reference set, the study has discriminated 16 CCR efficient banks as under (based on grand frontier scores)-

Highly efficient banks ($f > 5$) => IDL, SBT, CUB, KVB, HDB and KMB

Efficient banks ($f < 5$) => COB, OBC, UBI, FDB and ICB

Efficient Banks by Default ($f = 0$) => IOB, JKB, KTB, AXB, IIB

Out of the six banks in highly efficient banks group, efficiency strength of IDL, HDB and KMB is found to be very stable since they are in the highly efficient group in all the years under study. COB, OBC, UBI, FDI and ICB are inconsistent in their robustness of efficiencies. IOB, JKB, KTB, AXB, IIB would likely to drop from the efficient frontier if there is even a small increase (decrease) in the value of any input (output) variables.

The study also segregates 20 inefficient banks on the basis of distribution of efficiency scores into three groups.

Marginally Inefficient (.90 - <1) => PNB, SBJ, CAB, SBM, VJB, CBP, ALB, SBI,

Inefficient (.80 - <.9) = LVB, SIB, DEB, I VB, BOM, BOI, BOB, UCB, SYB

Distinctively Inefficient (<.80) => DLB, BOR

We can say that 17% to 31% Indian banks are (relatively) more stable to maintain their 100% efficiency position. 25% to 31% banks are utilizing their resources in a very inefficient way and they could achieve 14% to 30% reduction in the usage of their resources.

6.2.6: Input Output Improvement Plan of Inefficient Banks

An inefficient DMU becomes efficient by improving its input and output. This input output improvement plan i.e. input and output target is called in DEA literature as CCR / BCC projection. This projection shows how inefficient banks become fully efficient by indicating the level of inputs to be reduced and level of outputs to be increased. Based on the CCR projection the study has found inefficient bank wise input output improvement plan (See Table 5.11). The study has also shown inefficient bank wise reference banks i.e. peer banks. Inefficient banks should follow their operating practice to project themselves into efficient frontier.

However, in order to be efficient, Indian inefficient banks have to reduce on an average over the study period the present level of inputs used (selected for this study) by 34.9%. 23.6%, 13.9% and 12.6% for Input-I (No of Branches), Input-II (No of Employees), Input-III (Operating Expenses) and Input-IV (Deposit) respectively. These

projections include two types of adjustments – 11.9% reduction for each input for radial adjustment and the balance for slack adjustment. Radial adjustment removes purely technical inefficiency and slack adjustment mix inefficiency.

Present levels of outputs are to be increased by 2.1%, 11.1%, 2.7% and 10.3 % for Output-I (Net Interest Income), Output-II (Non-interest Income), Output-III (Priority Sector advance) and Output-IV (Net Profit) respectively. These projections include only slack adjustments since the study has followed input-oriented model.

By the magnitude of amount of inputs reduction and output augmentation, the study has found input wise utilization efficiency and output wise production efficiency of the Indian banks. Most efficiently used input is 'Deposit' (being the lowest reduction required ranks first) followed by 'operating Expenses', 'Employees' and 'Branches'. Most efficient produced output is output- I (being lowest augmentation required ranks first) followed by output-III, IV and II.

Therefore, the study has come to conclusion that lack of proper utilization of two categories of inputs viz., branches and employees rather than operating expenses and deposit along with two categories of outputs mainly lower exposure to off balance activities and lower profitability make the Indian banks technically inefficient.

6.2.7: Ownership and Efficiency

During the study period it is find out that there no significant difference in terms of mean efficiency scores between public and private banks. On the whole, new private banks are most efficient followed by state banks, nationalized banks and then old private banks.

Private Banks are ahead of public banks when it is compared in terms of number of fully efficient banks.

Only nationalized banks group is experiencing a steady increasing trend in overall technical efficiency over the study period.

The study has found that pure technical inefficiency is the main source of overall technical inefficiency and this is mainly because banks belonging to OPBs and then NBs.

Thus, we can say that the ownership pattern does not have any significant impact on efficiency variation among the banks under study.

6.2.8: Bank Size and Efficiency

There is no significant difference among the three groups of banks by size in terms of mean efficiency score and number of 100% efficiency banks during all the years under study. On the whole, an analysis of efficiency by size reveals that the medium sized banks appear to be the most efficient followed by large and then small size banks. There is a clear indication of higher efficiency gain by the large size banks in a steady way during the study period in India. By this steady momentum of efficiency gain, large size banks reach the highest score in OTE and PTE in 2008. So, larger banks are more efficient than smaller banks. This finding leads us to conclude that the entry of foreign banks should not substantially affect the performance of the banking sector in India.

6.2.9: Rankings: Super-efficiency

The super-efficiency model is almost identical to the basic DEA models with the exception that the efficient DMUs being evaluated are allowing efficiency score greater than or at least equal to the value of 1(one). Input oriented SEM provides a means of evaluating the extent to which an efficient DMU is able to increase its inputs level without violating its status as an efficient DMU. Super-efficiency score therefore provides a measure of stability of the 'efficient' status of the efficient DMUs. The first five super-efficient banks over the study period are ICB, KMB, IDL, HDB and JKB. Super-efficiency score wise other banks are presented in Table: 5.18.

6.2.10: Overall Rankings – Super-efficiency plus Financial Efficiency

One of the major limitation of DEA score is that it is very sensitive to the specification of input output variables. The DMU which is efficient with the given input output specification; it may be inefficient with other specifications. Thus, in order to

make rankings more viable and justified, the study has considered three efficiency parameters viz. DEA super-efficiency, profit efficiency and risk efficiency. The five efficient and least efficient banks as per overall rankings over the study period are

DMUs	Rank	DMUs	Rank
HDB	1	BOM	32
KVB	2	IVB	33
SBT	3	BOR	34
KMB	4	UCB	35
ICB	5	DLB	36

Overall rankings of all other banks in the sample for the study period as a whole are given in Table: 5.24.

6.2.10: Financial efficiency vs. DEA efficiency

A significant positive relationship between DEA efficiency and financial soundness i.e. financial efficiency is found in this study as per significant rank correlation between them. Comparison between DEA efficient and inefficient in terms of mean scores on various financial performance metrics indicates that efficient banks relative to inefficient ones have greater utilization of assets, higher capital adequacy ratio, and lower operating cost to operating income and lower risky. On the whole, well capitalized profitable Indian banks are found to have higher technical efficiency over the study period.

6.2.12: Efficient Banks: Today and Tomorrow

11 banks out of 36 banks under study are found in this study as all round efficient banks. These banks are profitable, secured and fully technical and scale efficient over the study period relative to other banks in the sample. They are HDB, KVB, IOB, KTB, SBT, KMB, AXB, FDB, COB, UBI, and OBC. Thus, these banks are the leading Indian banks of ‘Today’. The trend of magnitude of frequency in reference sets and the year wise overall ranking position over the study period suggest that nine banks viz. HDB, KVB, SBT, KMB, FDB, COB, UBI, IDL, CUB and ICB are likely to maintain sustainable growth and development in future and they are India’s efficient banks of ‘Tomorrow’.

6.3: Concluding Remarks

The present study intends to measure and examine the relative technical efficiency of the Indian banking sector during the post reform period covering from 2004-05 to 2007-08. The study has estimated the technical efficiency scores using non-parametric frontier methodology- Data Envelopment Analysis (DEA). This study is not only endeavours to measure the extent of technical efficiency but also to provide strict ranking to these banks in a comprehensive manner.

The empirical results show (as per grand frontier scores) that the level of overall technical efficiency (OTE) of the Indian banking sector over the study period is 93.4% with a range of 64.4% to 100% and 16 banks out of 36 banks are found to be 100% efficient. Thus; average inefficiency in resource utilization is 6.6% implying that the Indian banks could have saved 6.6% of the present level of inputs used to produce the existing level of outputs produced. Study has also observed from yearly efficiency scores that most of the banks under study have improved OTE during the study period. Decomposing efficiency indicates that pure technical inefficiency i.e. management inefficiency is the major source of overall technical inefficiency. Thus, Indian banks can achieve higher efficiency gain through improving managerial efficiency rather scale efficiency. Returns to scale analysis reveals the most of the banks are operating at correct scale. Decreasing returns to scale is observed as the predominant form of scale inefficiency. Input output improvement plan of inefficient banks reveals that the Indian banks are more efficient in using deposit and operating expenses rather than branches and employees as inputs and more efficient in producing net interest income and priority sector advance rather than non-interest income and net profit as outputs. This suggests that most of the inefficient banks need to utilize properly their branches and employees and to enhance the level of non-interest income and profitability for projecting themselves onto the efficient frontier.

Efficiency analysis by ownership type reveals that ownership pattern has no effect on the level of efficiency. However, new private banks as a group are the most efficient

followed by state banks, nationalized banks and old private banks group. Further the study has also shown that there is no significant difference between the three groups of banks by size. Given these empirical results, the issue of the relationship between size and efficiency remains unresolved in India. Over the study period, an analysis of efficiency by size reveals that the medium sized banks appear to be the most efficient in terms of OTE (more than 2% of large size and 4% of small size). But a close examination indicates the large size banks are in a more favorable position as indicated by the slow but steady positive efficiency growth of OTE. In this growth journey, large size banks reach the highest score in 2008. This suggests that larger banks in India tend to achieve higher efficiency gain in the years coming.

ICB bank, KMB, IDL and HDB banks are first four super-efficient banks during the study period. Their super-efficiency scores suggests that they can maintain their 100% overall technical efficiency even after increasing their present level of inputs by about on an average 25%. But, the first four banks as per overall rankings are HDB, KVB, SBT, and KMB and four least efficient banks are IVB, BOR, UCB and DLB banks. The study has revealed that there is a significant positive relation between financial efficiency and technical efficiency. Thus, banks which are technically efficient are also financially sound with greater profitability and lower risk. The analysis of risk-return matrix for efficient banks and inefficient banks separately facilitates to categorize two extreme groups of sample banks- most efficient and most inefficient. Most efficient banks i.e., all round efficient banks are HDB, KVB, IOB, KTB, SBT, KMB, AXB, FDB, COB, UBI, and OBC. Most inefficient banks i.e., relatively unprofitable, unsecured and technically inefficient banks are SBJ, BOB, BOI, SIB, CBP, DEB, BOM, BOR, LVB, IVB, UCB, DLB. With this analysis the study has finally concluded that these all round efficient banks are the India's efficient banks of 'Today'. From the trend of magnitude of frequency in reference sets and the year wise overall ranking position over the study period, the study is likely to predict that six banks from the all-round efficient banks group viz. HDB, KVB, SBT, KMB, FDB, COB, UBI and three other banks viz. IDL, CUB and ICB which are on the verge of achieving the all round efficient bank status are the India's efficient banks of 'Tomorrow' unless there is a radical shift in their fortune.

The practical implication of the research findings is that this study provides inefficient bank wise input output improvement plan which can make them technically efficient. The study suggests which banks should go for scaling down or scaling up their activities in order to take the advantages of economics of scale. The study also provides efficient bank and inefficient bank wise their respective peer banks.

6.4: Suggestive Measures

Based on the observation of this present study and the present banking scenario in India, this study frames the following recommendations for the improvement of the technical efficiency of the individual banks and banking industry in India.

- 1) The study recommends that the banks in a strong economy should be very careful about the managerial performance rather than scale performance for efficient resource utilization.
- 2) RBI should continue the reform measures particularly on the existing policy of reducing non-performing assets, rationalization of staff and branches, and capital adequacy norms which will help Indian banks to obtain efficiency gains. RBI can take the measures to make the Indian banks more competitive since the existing level of competition among the banks in India brings positive development, particularly for public banks and forces the banks to operate efficiently. Thus, the permission of overall investment of 74 per cent (maximum) in the equity of private banks of India by the foreign banks as per road map started from April 2009 will make the Indian banks internationally competitive. It will bring higher efficiency gain among the banks, which will ultimately make the Indian banks as leading global banks.
- 3) Banks, particularly BOM, DEB, SYB, UCB, VJB, IVB, SIB can improve OTE by improving PTE without alteration of scale of operation as a short run efficiency measure and the banks ANB, BOB, BOI, SBI, LVB can improve OTE only by improving SE as a long run measure of efficiency.
- 4) BOB, BOI, BOM, SYB, SBI should go for scaling down their activities in order to take the advantage of economies of scale. SBI, BOI and BOB particularly should be

very careful about opening of new branches at rural areas. These banks may follow the practice of PNB in this regard. Scaling up of activities for BOR, DLB, IVB, and LVB should be the appropriate strategy to avail the advantage of scale of operation.

- 5) Inefficient Indian banks in general need to concentrate more on the utilization of their physical capital in terms of branches and employees (from input side) and enhancement of non-interest income and profitability (from output side) for projecting themselves onto the efficient frontier.
- 6) Banks should use information technology more in providing their services with maintaining higher capital adequacy. They should concentrate more on lending rather deposit mobilization and off balance sheet activities to earn more income for profit maximization. Such a financial operating strategy will make the Indian banks technically efficient.
- 7) Sample banks in general should follow the strategy of ICB for proper utilization of physical capital (branches and employees), IDL for their strategy of using operating expenses and KMB for appropriate utilization of loanable fund i.e. deposit.
- 8) For improvement of efficiency (OTE), banks particularly ALB, ANB, BOB, BOI, PNB, IVB, SIB are suggested to give more concentration in lending to earn more revenues rather than savings. For better performing of lending activities, these banks need more technology upgradation. They may have to be to some extent aggressive in lending activities as their asset quality is high i.e. much lower NPA ratio relative to others even efficient banks. Their strong capital position (higher Net worth to Total Assets) will support their aggressiveness in loan application; otherwise they will become more conservative banks.
- 9) The study has predicted 10 banks (mentioned above) which are Indian efficient banks of tomorrow. All other banks in the sample banks should follow their good practice to improve their efficiency.
- 10) Lastly, categorization of banks of different types made in this study can help regulatory authorities in determining the future courses of action to be pursued to

strengthen the Indian banking sector further. Regulatory authorities should take care to improve the efficiency level of the most inefficient domestic Indian banks by closely monitoring their operations which ultimately helps to achieve a strong and efficient financial system in India.

At this place, it is worth mentioning that the study has chosen only four years period for analysis when Indian economy was strong and stable. The banks which are found to be efficient are efficient only relatively to the other banks in the sample. The lack of relevant studies on Indian banking efficiency has made our analysis difficult. We tried to solve this problem by reviewing the studies in other countries. According these limitations some suggestions for further research can be proposed. First of all, the time span of the research may be extended, in order to understand banking performance during the strong and weak economy. Secondly, the analysis may go further by looking into determinants of technical efficiency by considering bank-specific and economic factors. In this regard we advise to use Tobit regression model for this analysis. Finally, we sincerely hope that this research opens a broad horizon for further researches to evaluate the efficiency of Indian banking Sector, using frontier approach and in turn will contribute for the development of Indian banks.