CHAPTER-8

SUMMARY AND CONCLUSION

Efficiency has become an imperative issue of banking literature. It measures a bank’s performance in relation to a set standard for a specified period of time (Ram Mohan and Ray, 2004). It refers to the best allocation of resources to obtain the highest level of output. Bank’s efficiency is associated with as to how a bank concurrently reduces its cost as well as increases its revenue while operating at its present level of production. Thus, banks need to consider both input and output aspects to enhance the efficiency performance i.e. they have to focus on cost reduction as well as on revenue expansion. Efficiency is supposed to be achieved when a bank is unable to reduce the quantity of input in order to produce the same level of output or to produce more outputs from the same resources (Resti, 1997). Nowadays, efficiency information is essential for every bank in order to verify whether the set standards are achieved by the actual performance of a bank or not. Superior efficiency can lead a bank to earn higher profitability which provides better safety to them to absorb huge risks (Egesa, 2010).

The economic viewpoint of a bank is either to earn maximum profit and maximum revenue or to reduce cost. Based on these economic objectives of a bank, i.e. cost minimization, revenue maximization and profit maximization, there are three main efficiency concepts for analyzing the performance of a bank namely Cost Efficiency, Revenue Efficiency and Profit Efficiency. Cost Efficiency assesses the relative performance of bank as against the best practice bank which is managing its operating costs at the lowest for producing the same output under similar technological conditions (Bader et al., 2008 and Kamarudin et al., 2014). Cost Efficiency reflects whether there exists room for the bank to cut down its cost if it operates efficiently. In contrast, Revenue Efficiency measures the comparative performance of bank as against the best practice bank which is producing the maximum output from the inputs available (Bader et al., 2008 and Kamarudin et al., 2014). Revenue Efficiency score helps to recognise that whether a bank can produce more outputs from the available inputs to earn higher revenues. Cost Efficiency is based on input oriented approach as it assesses the bank’s competence in controlling its cost whereas Revenue Efficiency follows the output
oriented approach since it considers the potential of bank to generate as much revenue as it can (Coelli et al., 2005). On the other hand, if a bank prefers to be wholly efficient i.e. to maximize its profits, it needs to focus on both Cost Efficiency and Revenue Efficiency simultaneously. Profit Efficiency is said to be achieved when a firm chooses that output and input combination which gives them maximum profits at the applicable input-output prices. Profit Efficiency indicates how well a bank produces the maximum profit by considering both cost and revenue at a same time (Bader et al., 2008 and Kamarudin et al., 2014). Profit Efficiency presents useful information to the management as it provides a comprehensive picture of the accomplishment of economic goals of a bank by considering input-output approach simultaneously (Berger and Mester, 2003 and Maudos and Pastor, 2003).

8.1. **Objectives of the study**

The main objectives of the study are:

1. To analyze and evaluate the Revenue Efficiency scores of Scheduled Commercial Banks (SCBs) operating in India. In addition, Revenue Efficiency is analyzed across bank ownership. The study also determines the nature of Return to Scale (RTS) of banks and identifies the number of banks operating as leaders and laggards in India.

2. To analyze and evaluate the Cost Efficiency scores of Scheduled Commercial Banks (SCBs) operating in India. In addition, Cost Efficiency is analyzed across bank ownership. The study also determines the nature of Return to Scale (RTS) of banks and identifies the number of banks operating as leaders and laggards in India.

3. To study Profit Efficiency of Scheduled Commercial Banks (SCBs) operating in India vis-à-vis Revenue and Cost Efficiency. In addition, Profit Efficiency is analyzed across bank ownership.

4. To identify the factors i.e., Bank Specific Factors, Industry Specific Factors and Economy Specific Factors, affecting the Revenue, Cost and Profit Efficiency of Scheduled Commercial Banks (SCBs) operating in India.
8.2. Database and Methodology

8.2.1. Database

The study tries to capture the universe of Scheduled Commercial Banks that have been operating in India during 1991-92 to 2012-13. However, some filters have been applied over the years as:

- Banks that merged with other banks are not taken after merger.
- Banks closed during the time period of the study are excluded after their closure.
- Banks for which data was not available are dropped from the sample of the study.

Thus the effective sample of the study varies across years for estimating the efficiency scores of the banks. The same is given as follows in Table: 8.1:

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Public Sector Banks</th>
<th>Private Sector Banks</th>
<th>Foreign sector Banks</th>
<th>Indian Scheduled Commercial Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991-92</td>
<td>28</td>
<td>23</td>
<td>23</td>
<td>74</td>
</tr>
<tr>
<td>1992-93</td>
<td>28</td>
<td>22</td>
<td>21</td>
<td>71</td>
</tr>
<tr>
<td>1993-94</td>
<td>27</td>
<td>22</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>1994-95</td>
<td>27</td>
<td>29</td>
<td>20</td>
<td>76</td>
</tr>
<tr>
<td>1995-96</td>
<td>27</td>
<td>34</td>
<td>27</td>
<td>88</td>
</tr>
<tr>
<td>1996-97</td>
<td>27</td>
<td>33</td>
<td>32</td>
<td>92</td>
</tr>
<tr>
<td>1997-98</td>
<td>27</td>
<td>34</td>
<td>35</td>
<td>96</td>
</tr>
<tr>
<td>1998-99</td>
<td>27</td>
<td>33</td>
<td>34</td>
<td>94</td>
</tr>
<tr>
<td>1999-2000</td>
<td>27</td>
<td>32</td>
<td>37</td>
<td>96</td>
</tr>
<tr>
<td>2000-01</td>
<td>27</td>
<td>31</td>
<td>37</td>
<td>95</td>
</tr>
<tr>
<td>2001-02</td>
<td>27</td>
<td>30</td>
<td>34</td>
<td>91</td>
</tr>
<tr>
<td>2002-03</td>
<td>27</td>
<td>28</td>
<td>27</td>
<td>82</td>
</tr>
<tr>
<td>2003-04</td>
<td>27</td>
<td>30</td>
<td>27</td>
<td>84</td>
</tr>
<tr>
<td>2004-05</td>
<td>28</td>
<td>29</td>
<td>26</td>
<td>83</td>
</tr>
<tr>
<td>2005-06</td>
<td>28</td>
<td>28</td>
<td>26</td>
<td>82</td>
</tr>
<tr>
<td>2006-07</td>
<td>28</td>
<td>25</td>
<td>24</td>
<td>77</td>
</tr>
<tr>
<td>2007-08</td>
<td>28</td>
<td>23</td>
<td>23</td>
<td>74</td>
</tr>
<tr>
<td>2008-09</td>
<td>27</td>
<td>20</td>
<td>21</td>
<td>68</td>
</tr>
<tr>
<td>2009-10</td>
<td>27</td>
<td>22</td>
<td>24</td>
<td>73</td>
</tr>
<tr>
<td>2010-11</td>
<td>26</td>
<td>20</td>
<td>26</td>
<td>72</td>
</tr>
<tr>
<td>2011-12</td>
<td>26</td>
<td>20</td>
<td>30</td>
<td>76</td>
</tr>
<tr>
<td>2012-13</td>
<td>26</td>
<td>20</td>
<td>30</td>
<td>76</td>
</tr>
</tbody>
</table>
The time period of 22 years has been divided into two parts as 1991-92 till 2001-02 representing the Reformatory Era and 2002-03 till 2012-13 representing the Post Reformatory Era. The former time period is termed as Reformatory Era as it encloses the major reforms in Indian Banking Sector initiated by Narasimham Committee with its first report in 1991 and second report in 1998. Similarly, Basel norms came up with their 3 pillared structure in 1992. In the early 2000s, reforms with respect to electronic banking i.e., Real Time Gross Payment and Settlement System (RTGS), National Electronic Funds Transfers (NEFT), Clearing Mechanism, Online Bill Payments, and Telephone Banking were introduced. Further, Anti-money Laundering (AML) and Know Your Customer (KYC) norms in 2002 filtered the unethical and illegal issues from the banking business. However, the period from 2002-03 to 2012-13 focused on the implementation of these reforms and is hence called Post Reformatory Era. The paper is based on secondary data. The data has been collected from annual reports of banks and website of Reserve Bank of India (RBI). Reports on Trend and Progress in Banking from 1990-91 to 2011-12 have also been used.

8.2.2. Non-Parametric Approach: Data Envelopment Analysis

To measure the Revenue, Cost and Profit Efficiency, the study applied Data Envelopment Analysis (DEA) - a Non-Parametric Approach. A Revenue Efficiency model is an output oriented model that maximizes revenue for a given set of input quantities and output prices. It is evaluating the bank’s ability to increase the revenues. On the other hand, Cost Efficiency model is an input oriented model, as it minimizes inputs at a given level of output quantities and input prices. Cost Efficiency measures a bank’s ability to control the costs. Profit Efficiency measures how close a bank comes to producing maximum profit given the input, output quantities as well as their prices. It is used to maximize the bank’s profit as it takes into account cost as well as revenues.

8.2.3. Selection of Banking Inputs and Outputs

For calculating the efficiency scores, various inputs-outputs along with their prices are given in detail in the Table 8.2 below:
Table: 8.2 Inputs and Outputs used in the study along with their prices

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Variables</strong></td>
<td></td>
</tr>
<tr>
<td>1. Deposits</td>
<td>Demand Deposits+ Term Deposit + Savings Deposits</td>
</tr>
<tr>
<td>2. Borrowings</td>
<td>Borrowings from RBI and other Banks or Financial institutions</td>
</tr>
<tr>
<td>3. Fixed Assets</td>
<td>Premises+ Fixed Assets under Construction+ Other fixed Assets</td>
</tr>
<tr>
<td>4. Number of Employees</td>
<td>Number of Employees working in the banks</td>
</tr>
<tr>
<td><strong>Output Variables</strong></td>
<td></td>
</tr>
<tr>
<td>1. Investments</td>
<td>Investments in Approved Securities, Government Securities, other approved securities, shares, debentures</td>
</tr>
<tr>
<td>2. Loans and Advances</td>
<td>Term Loans + Cash Credit, overdraft + Bills purchased and discounted etc</td>
</tr>
<tr>
<td>3. Non-Interest Income</td>
<td>Commission +Bill Discounted +Fee</td>
</tr>
<tr>
<td><strong>Input Prices</strong></td>
<td></td>
</tr>
<tr>
<td>1. Price of Deposits</td>
<td>Interest paid on deposits/ deposits</td>
</tr>
<tr>
<td>2. Price of Borrowings</td>
<td>Interest paid on borrowings from RBI and other agencies/Borrowing</td>
</tr>
<tr>
<td>3. Price of Fixed Assets</td>
<td>Rent, taxes and Lighting + Depreciation on banks’ assets + Repair and Maintenance + Insurance/ Fixed Assets</td>
</tr>
<tr>
<td>4. Price of number of employees</td>
<td>Payment and provisions for employees/ number of employees</td>
</tr>
<tr>
<td><strong>Output Prices</strong></td>
<td></td>
</tr>
<tr>
<td>1. Prices of Investments</td>
<td>Income (interest and dividend received) from Investments/ Investments</td>
</tr>
<tr>
<td>2. Prices of Loan and Advances</td>
<td>Interest received from loans and advances/ Loans and Advances</td>
</tr>
<tr>
<td>3. Prices of Non-interest Income</td>
<td>Assumes the Price of non-interest income as unity throughout the years for all banks</td>
</tr>
</tbody>
</table>

8.2.4. Statistical Tools and Technique used

- **Descriptive Statistics**
  
  Various descriptive tools like minimum, maximum, mean and standard deviation are calculated to analyse and compare the efficiency performance of banks.

- **Panel Data Tobit Regression Analysis**

  Further, Panel Data Tobit model is applied to identify the factors affecting the various efficiency parameters. Efficiency scores calculated from the first stage of analysis with the help of DEA falls between 0 and 1 thus making the variable a limited dependent variable. Due to this limited nature of dependent variable, Ordinary Least Squares Method (OLS) cannot be applied. To estimate factors affecting Revenue, Cost and Profit Efficiency score, Random-effect Panel Tobit model is used as there is no command for a parametric conditional fixed-effects model.
8.2.5. Hypotheses of the study

Taking into consideration theoretical as well as empirical results of previous research, following hypotheses are framed and tested:

H₁- There is a positive relationship between Capital Adequacy Ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₂- There is a positive relationship between Equity to Total Assets Ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₃- There is a negative relationship between Non Performing Assets (NPA) to Net Advances and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₄- There is a positive/negative relationship between Total Investments to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₅- There is a positive/negative relationship between Total Loans and advances to Total Deposits and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₆- There is a negative relationship between Total Expenses to Total Income and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₇- There is a negative relationship between Operating Expenses to Total Expenses and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₈- There is a positive relationship between Business per Employee and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₉- There is a positive relationship between Return on Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₁₀- There is a positive relationship between Spread to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₁₁- There is a positive relationship between Non-Interest Income to Total Income and Revenue Efficiency, Cost Efficiency and Profit Efficiency.
H_{12}- There is a positive/negative relationship between Cash Deposit Ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{13}- There is a positive/negative relationship between Liquid Assets to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{14}- There is a positive/negative relationship between Size and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{15}- There is a positive/negative relationship between Time Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{16}- There is a positive/negative relationship between Public Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{17}- There is a positive/negative relationship between Private Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{18}- There is a positive relationship between Market Share in terms of Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{19}- There is a negative relationship between Inflation and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{20}- There is a positive relationship between Gross Domestic Product and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

8.3. **Findings of the Study**

The findings of performance of Indian Scheduled Commercial Banks are discussed as per the objectives of the study. These are as follows:

**8.3.1. Revenue Efficiency**

- Indian Scheduled Commercial Banks have never achieved full Revenue Efficiency score of 1 both in the Reformatory Era as well as in the Post Reformatory Era.
During Reformatory Era, Scheduled Commercial Banks could generate only 74.4% revenue from their available inputs. Average Allocative Efficiency (Inefficiency) is 83.1% (16.9%) whereas Technical Efficiency (output oriented) (Inefficiency) is 89.5% (10.5%). Pure Technical and Scale Efficiency (Inefficiency) of Scheduled Commercial Banks is 95.6% (4.4%) and 93.5% (6.5%) respectively.

During Reformatory Era, the dominant reason behind revenue inefficiency is Allocative Inefficiency. Causes of Technical Inefficiency (output oriented) reveal that Scale Inefficiency is constantly higher than Pure Technical Inefficiency among SCBs.

During Post Reformatory Era, Scheduled Commercial Banks operating in India could generate only 66.0% of revenue, which is very less than what they were expected to generate from the same inputs. Allocative Efficiency (Inefficiency) is 74.6% (25.4%) whereas Technical Efficiency (output oriented) (Inefficiency) is 88.0% (12%). Pure Technical and Scale Efficiency (Inefficiency) of Scheduled Commercial Banks is 96.9% (3.1%) and 90.8% (9.2%) respectively.

Allocative inefficiency seems to be the major cause of Revenue Inefficiency among SCBs even in the Post Reformatory Era. Furthermore, Scale Inefficiency is the major reason of Technical Inefficiency (output oriented).

Revenue Efficiency scores differ during Reformatory Era and Post Reformatory Era. Scheduled Commercial Banks (SCBs) exhibit higher Revenue Efficiency Scores in Reformatory Era as compared to Post Reformatory Era. The same is reconfirmed from the results of Tobit regression.

The results of across ownership suggest that during Reformatory Era, average Revenue Efficiency (Inefficiency) of Public Sector Banks operating in India is 80.3% (19.7%). Private Sector Banks could generate only 69.9% of revenue from their available inputs. Revenue Efficiency (inefficiency) of Foreign Sector Banks operating in India is 74.1% (25.9%). Average Allocative Efficiency (Inefficiency) of Public, Private and Foreign Sector Banks is 87.1% (12.9%),
81.5% (18.5%) and 81.0% (19.0%) respectively. Public Sector Banks have Technical Efficiency (output oriented) (Inefficiency) score of 92.0% (8.0%), Private Banks have score of 85.8% (14.2%) and Foreign Sector Banks have the score of 91.3% (8.7%). Pure Technical and Scale Efficiency (Inefficiency) of Public Sector Banks is 97.9% (2.1%) and 94.0% (6.0%) respectively. Private Sector Banks have the Pure Technical and Scale Efficiency (inefficiency) score of 92.1% (7.9%) and 93.1% (6.9%) respectively. Pure Technical and Scale Efficiency (Inefficiency) of Foreign Sector Banks is 97.1% (2.9%) and 93.9% (6.1%) respectively.

➢ The results of across ownership during Post Reformatory Era highlight that Public Sector Banks operating in India could generate only 66.9% of revenue from the available inputs. Private Sector Banks could generate only 69.3% of revenue which is very less compared to benchmark Revenue Efficiency score of 1. On an average Revenue Efficiency (inefficiency) score of Foreign Sector Banks is 62.0% (38.0%). Allocative Efficiency (inefficiency) is 75.4% (24.6%) whereas Technical Efficiency (output oriented) (inefficiency) is 87.9% (12.1%) for Public Sector Banks. Private Sector Banks have the Allocative Efficiency (inefficiency) of 79.3% (20.7%) whereas Technical Efficiency (output oriented) (inefficiency) of 86.3% (13.7%). Foreign Sector Banks depict the Allocative Efficiency (inefficiency) of 69.5% (30.5%) whereas Technical Efficiency (output oriented) (inefficiency) of 89.3% (10.7%). Pure Technical Efficiency of Public, Private and Foreign Sector Banks is 98.5%, 96.1% and 95.8% respectively. Further, Public, Private and Foreign Sector Banks have the Scale Efficiency of 89.2%, 89.7% and 93.2% respectively.

➢ The dominant source of Revenue Inefficiency of Public Sector Banks, Private Sector Banks and Foreign Sector Banks; both in Reformatory and Post Reformatory Era is Allocative inefficiency. Furthermore, the main cause of Technical inefficiency (output oriented) among Public Sector Banks and Foreign Sector Banks is attributed to Scale inefficiency as it is higher than Pure Technical inefficiency. Technical inefficiency (output oriented) among Private Sector Banks depicts that Pure Technical Efficiency scores are low in
comparison to Scale Efficiency scores in Reformatory Era, but in the Post Reformatory Era, Private Sector Banks turn out to be Scale inefficient as their Scale Efficiency scores are less as compared to Pure Technical Efficiency scores.

- In Reformatory Era, the average Revenue Efficiency scores place Public Sector Banks on the first position followed by Foreign Sector Banks and then Private Sector Banks. Same is suggested by the results of Panel Tobit Regression across Ownership.

- In the Post Reformatory Era, Private Sector Banks seem to have picked up their performance in comparison to Public and Foreign Sector Banks, but the differences were insignificant as depicted by the results of Panel Tobit Regression.

- Public Sector Banks (PSBs) have lesser efficiency scores in Post Reformatory Era in terms of Revenue, Allocative, Technical (output oriented) and Scale Efficiency, but the Pure Technical Efficiency (output oriented) scores of PSBs marginally improved in Post Reformatory Era as compared to Reformatory Era. The average Revenue Efficiency of Private Sector Banks for both eras depicts that there is slightly lesser amount of Revenue Efficiency in Post Reformatory Era. Allocative and Scale Efficiency scores of Private Sector Banks also show lesser scores in Post Reformatory Era. Contrary to this, Technical Efficiency (output oriented) and Pure Technical Efficiency scores of Private Sector Banks improved in Post Reformatory Era. The results of Revenue Efficiency and its components of Foreign Sector Banks exhibit higher Revenue Efficiency scores in Reformatory Era as compared to Post Reformatory Era. The same results are reconfirmed from results of Tobit Regression.

- In Reformatory as well Post Reformatory Era, results highlight that majority number of banks operate on DRS i.e. numerous banks experience diseconomies of Scale. Number (percentage) of Indian Scheduled Commercial Banks
operating on DRS and IRS is higher than the number and percentage of banks operating on CRS.

- The ownership wise results of Return to Scale depict that maximum number of banks experiencing diseconomies of scale (DRS) belong to Public Sector Banks followed by Private Sector Banks both in the Reformatory Era as well as in the Post Reformatory Era. Highest number of banks operating on CRS belong to Foreign Sector Banks.

- The results of leaders and laggards reveal that majority numbers of Public Sector Banks, Private Sector Banks and Foreign Sector Banks are laggards according to Revenue Efficiency for both Reformatory Era and Post Reformatory Era.

### 8.3.2. Cost Efficiency

- Indian Scheduled Commercial Banks have never achieved the full Cost Efficiency score of 1 both in the Reformatory Era and Post Reformatory Era.

- During Reformatory Era, the average Cost Efficiency (inefficiency) of Scheduled Commercial Banks operating in India is 66.7% (33.3%). Average Allocative Efficiency (inefficiency) is 74.5% (25.5%) whereas Technical Efficiency (inefficiency) is 89.5% (10.5%). Pure Technical and Scale Efficiency (Inefficiency) of Scheduled Commercial Banks is 95.5% (4.5%) and 93.6% (6.4%) respectively.

- The dominant reason behind Cost Inefficiency is Allocative Inefficiency since Technical Efficiency Scores (input oriented) have always been higher than Allocative Efficiency Scores. Causes of Technical Inefficiency reveal that Scale inefficiency is the main cause of inefficiency.

- In Post Reformatory Era, average Cost Efficiency (inefficiency) score of Scheduled Commercial Banks operating in India is 61.6% (38.4%). Allocative Efficiency (inefficiency) is 69.3% (30.7%) whereas Technical Efficiency (inefficiency) is 88.0% (12%). Pure Technical and Scale Efficiency (inefficiency) of Scheduled Commercial Banks is 96.9% (3.1%) and 90.7% (9.3%) respectively.
In the Post Reformatory Era, Allocative Inefficiency seems to be the major cause of Cost Inefficiency among SCBs. Furthermore, decomposition of Technical Efficiency (input oriented) score depicts that Scale inefficiency is the major reason behind Technical Inefficiency.

Scheduled Commercial Banks (SCBs) exhibit higher Cost Efficiency Scores in Reformatory Era as compared to Post Reformatory Era. The same is reconfirmed from the results of Tobit regression.

During Reformatory Era, the average Cost Efficiency (inefficiency) of Public Sector Banks, Private Sector Banks and Foreign Sector Banks operating in India is 66.7% (33.3%), 61.1% (38.9%) and 72.1% (27.9%) respectively. Public Sector Banks have average Allocative Efficiency (inefficiency) of 72.5% (27.5%) whereas Technical Efficiency (inefficiency) of 92.0% (8.0%). Average Allocative Efficiency of Private Sector Banks is 71.5% (28.5%) whereas Technical Efficiency of Private Sector Banks is 85.8% (14.2%). Foreign Sector Banks have average Allocative Efficiency (inefficiency) of 78.7% (21.3%) whereas Technical Efficiency (inefficiency) is 91.3% (8.7%). Pure Technical and Scale Efficiency (Inefficiency) of Public Sector Banks is 97.8% (2.2%) and 94.1% (5.9%) respectively. Pure Technical and Scale Efficiency of Private Sector Banks is 92.0% (8%) and 93.2% (6.8%) respectively. Pure Technical and Scale Efficiency (Inefficiency) of Foreign Sector Banks is 97.0% (3.0%) and 94.0% (6.0%) respectively.

In Post Reformatory Era, Public Sector Banks on an average could utilize merely 58.8% of its inputs which means that they are wasting their inputs to the extent of 41.2%. Private Sector Banks operating in India use only 60.0% of inputs which is very low as compared to full Cost Efficiency score. Foreign Sector Banks have the average Cost Efficiency (inefficiency) score of 65.3% (34.7%). Allocative Efficiency (inefficiency) of Public Sector Banks is 66.2% (33.8%), Private Sector Banks is 68.4% (31.6%) and Foreign Sector Banks is 72.7% (27.3%). Technical Efficiency (input oriented) (inefficiency) of Public, Private and Foreign Sector Banks is 87.9% (12.1%), 86.3% (13.7%) and 89.3%
Pure Technical Efficiency of Public Sector Banks is 98.4% (1.6%) and Scale Efficiency is 89.3% (10.7%). Further, Pure Technical Efficiency and Scale Efficiency of Private Sector Banks is 96.0% (4.0%) and 89.8% (10.2%) respectively. For Foreign Sector Banks, Pure Technical Efficiency (inefficiency) is 96.1% (3.9%) and Scale Efficiency (inefficiency) is 92.8% (7.2%).

The foremost reason behind Cost Inefficiency of Public Sector Banks, Private Sector Banks and Foreign Sector Banks is Allocative Inefficiency. Furthermore, during the Reformatory Era, the main source of Technical Inefficiency (input oriented) is attributed to Scale inefficiency among Public Sector Banks and Foreign Sector Banks. On the other hand, Private Sector Bank’s Technical Inefficiency (input oriented) is due to Pure Technical Inefficiency as these scores are low in comparison to Scale Efficiency scores during Reformatory Era. During Post Reformatory Era, all banks operating in different sectors i.e., Public Sector Banks, Private Sector Banks and Foreign Sector Banks are facing the problem of Scale inefficiency as their Scale Efficiency scores are less than their Pure Technical Efficiency scores.

On the whole ownership wise results for Cost Efficiency and its component’s for Reformatory Era reveal that Foreign Sector Banks have superior Cost Efficiency scores followed by Public Sector Banks (PSBs) and Private Sector Banks. Similar results are recommended by Panel Tobit Regression across Ownership.

During Post Reformatory Era, once again according to Cost Efficiency scores, Foreign Sector Banks are placed on the first position, but the second position is taken by Private Sector Banks followed by Public Sector Banks. But, the difference between Private and Foreign Sector Banks is insignificant though it is significant among Public and Foreign Sector Banks as depicted by results of Panel Tobit Regression.

Public Sector Banks (PSBs) have higher Cost, Allocative, Technical and Scale Efficiency in Reformatory Era as compared to Post Reformatory Era. But, Pure Technical Efficiency of Public Sector Banks slightly improved in Post
Summary and Conclusion

Reformatory Era. Cost Efficiency scores of Private Sector Banks for both Reformatory and Post Reformatory Era indicate that there exists minute difference in these scores. The efficiency scores slightly decline in the Post Reformatory Era. Allocative and Scale Efficiency scores of Private Sector Banks are also less in Post Reformatory Era. On the other hand, Technical Efficiency (input oriented) and Pure Technical Efficiency scores of Private Sector Banks improved in Post Reformatory Era depicting that they are making best efforts in utilizing their inputs more efficiently. The Cost Efficiency and its component’s scores of Foreign Sector Banks exhibit that these scores are higher in Reformatory Era as compared to Post Reformatory Era. The results of Tobit regression also reconfirm the same.

- The results highlight that majority of banks operates on DRS i.e. numerous banks experience diseconomies of Scale in both Reformatory as well as Post Reformatory Era. Number (percentage) of Indian Scheduled Commercial Banks operating on DRS and IRS are higher than the number and percentage of banks operating on CRS.

- The ownership wise results of Return to Scale depict that maximum number of banks experiencing diseconomies of scale (DRS) belong to Public Sector Banks followed by Private Sector Banks in Reformatory Era as well as in Post Reformatory Era. Highest numbers of banks operating on CRS belong to Foreign Sector.

- The results of leaders and laggards reveal that number of Public Sector Banks, Private Sector Banks and Foreign Sector Banks are laggards according to Cost Efficiency in both Reformatory Era and Post Reformatory Era.

8.3.3. Profit Efficiency vis-à-vis Revenue and Cost Efficiency

- Indian Scheduled Commercial Banks have Profit, Revenue and Cost Efficiency less than 1 during Reformatory and Post Reformatory Era which depicts that banks are not able to maximize their revenues and minimize their costs simultaneously.
During Reformatory Era, the average Profit, Revenue and Cost Efficiency of Indian Scheduled Commercial Banks is 81.5%, 74.4% and 66.7% respectively, or level of Profit, Revenue and Cost inefficiency is 18.5%, 25.6% and 33.3% respectively. Scheduled Commercial Banks are more efficient in generating revenues and profits rather than in using their resources efficiently which reflects the highest level of Cost Inefficiency.

During Post Reformatory Era, Indian Scheduled Commercial Banks have average Profit, Revenue and Cost Efficiency (inefficiency) of 76.7% (23.3%), 66.0% (34.0%) and 61.6% (38.4%) respectively. Revenue Efficiency appears to play a significant role in leading to higher Profit Efficiency scores as compared to Cost Efficiency.

Indian Scheduled Commercial Banks (SCBs) exhibit higher efficiency scores in Reformatory Era as compared to Post Reformatory Era. The same is reconfirmed from the results of Tobit Regression.

During Reformatory Era, the average Profit Efficiency (inefficiency) of Public Sector Banks is 86.6% (13.4%), Private Sector Banks is 74.3% (25.7%) and Foreign Sector banks is 72.1% (27.9%). Revenue Efficiency of Public Sector Banks, Private Sector Banks and Foreign Sector Banks is 80.3%, 69.9% and 74.1% respectively. Cost Efficiency of Public Sector Banks is 66.7%, Private Sector Banks 61.1% and Foreign Sector Banks 72.1%. During Reformatory Era, on an average, Cost Inefficiency appears to play a significant role in leading to higher Profit Inefficiency scores for banks belonging to all sectors.

During Post Reformatory Era, the average Profit Efficiency of Public Sector Banks is 74.8% (25.2%), Private Sector Banks is 74.8% and Foreign Sector Banks is 80.2%. Revenue Efficiency (inefficiency) of Public, Private and Foreign Sector Banks is 66.9% (33.1%), 69.3% (30.7%) and 62.0% (38%) respectively. Public Sector Banks have Cost Efficiency score of 58.8% (41.2%). Private Sector Banks have average Cost Efficiency of 60.0%. Foreign Sector Banks have the Cost Efficiency score of 65.3%. The highest level of Profit Inefficiency is due to Cost Inefficiency in case of Public and Private Sector
Banks while Revenue Inefficiency is the reason behind low Profit Efficiency in case of Foreign Sector banks.

➢ In Reformatory Era, the average Profit and Revenue Efficiency scores depict that Public Sector Banks are placed on the first position followed by Foreign Sector Banks and then Private Sector Banks. The results of Panel Tobit Regression across ownership also depict the same. Foreign Sector Banks are performing better in terms of cost as they have highest Cost Efficiency scores in the Reformatory Era.

➢ In the Post Reformatory Era, Foreign Sector Banks are performing better than both Public and Private Sector Banks according to the results of Profit Efficiency. Private Sector Banks seemed to have picked up their revenue performance in comparison to Public and Foreign Sector Banks but the differences are insignificant as depicted by the results of Tobit Regression. Foreign Sector Banks are cost efficient followed by Private Sector and Public Sector Banks. But the difference between Private and Foreign Sector Banks is insignificant, though it is significant between Public and Foreign Sector Banks as depicted by the results of Panel Tobit Regression.

➢ Overall, the results demonstrate that Profit, Revenue and Cost Efficiency Scores declined in the Post Reformatory Era as compared to Reformatory Era for all the banks belonging to different sectors.

8.3.4. Factor Affecting Revenue, Cost and Profit Efficiency

➢ Several Banks, Industry and Economy specific variables affects the efficiency of Indian Scheduled Commercial Banks. Specifically, CAMEL Framework highlights that it significantly influences the efficiency of the banks.

➢ Capital Adequacy Ratio (CAR), Net Non-Performing Assets to Net Advances (NPANA), Return on Assets (ROA), Size (LNTA) and Inflation (INF) reveals a negative relationship with all the efficiency scores.

➢ Equity to Total Assets (ETA), Total Investments to Total Assets (TITA), and Non-Interest Income to Total Income (NIITI), Cash Deposit Ratio (CDR), Time
Dummy (TD), Public Dummy (PUBD) and Log of Gross Domestic Product (LNGDP) discloses positive relationship for all the three models of efficiency.

- Total Loans and advances to Total Deposits (TATD) reveals positive relationship with Profit Efficiency and Revenue Efficiency but negative relation with Cost Efficiency.

- Total Expenses to Total Income (TETI) have negative impact on both the Cost Efficiency and Profit Efficiency however has positive impact in case of Revenue Efficiency.

- Operating Expenses to Total Expenses (OETE) has negative impact on both Revenue Efficiency and Profit Efficiency while has positive relation with Cost Efficiency.

- Business per Employee (BPE) has positive impact on Cost and Profit Efficiency while it has negative impact on the Revenue Efficiency.

- Spread to Total Assets (STA) has positive impact on the Revenue Efficiency and Profit Efficiency. Contrary, Spread to Total Assets (STA) is expected to have positive impact but it turned out be reversed in case of Cost Efficiency.

- Liquid Assets to Total Assets (LATA) reveals a negative relationship with Cost and Profit Efficiency though it has positive impact on Revenue Efficiency.

- Private Dummy (PVTD) also portrays positive relation with Revenue Efficiency and Profit Efficiency. On the other hand, it has negative and insignificant relation with the Cost Efficiency.

- Market Share in terms of Total Assets has positive impact on the Revenue Efficiency and Profit Efficiency while it has negative relation with Cost Efficiency.

8.4. **Recommendations of the Study**

The present study suggests following recommendations:

- Indian Scheduled Commercial Banks should focus on Asset Liability Management and should correlate their inputs i.e., deposits, borrowings,
employees and fixed assets with their outputs i.e., loans and advances, investments and non-interest income in order to improve efficiency. Indian SCBs should seriously consider the risk assessment and risk management criteria by balancing their assets and liabilities. Asset driven strategies should be framed for correcting the mismatch focusing on shortening the duration of the asset portfolio. Similarly, liability driven strategies should also be formed concentrating on lengthening the maturity profiles of liabilities.

- Further, they are required to choose their input-output mix taking into consideration their prices. This would help them to take benefit of the favourable economic environment and sustain in the unfavourable economic scenario. No doubt, economic changes cannot be anticipated in advance, but bank managers can protect themselves by moving more towards non-traditional businesses such as treasury operations, corporate banking, investment banking, global banking, private equity, assets management, treasury securities services and asset securitization which will assist them to cover the losses from traditional activities as well as earn consistent revenues thus, enhancing their efficiency.

- Banks need to expand their business to correct their scale of operations. They should open new branches for expansion. Financial Inclusion should be enhanced. There is still a strong need to capture the unbanked population. Masses should be taught to develop banking habits.

- For achieving full efficiency, bank managers should set targets in consultation with their employees. The consultative pattern would fix responsibilities for resource utilization and service generation at all levels in the organisation. Bank managers should form a committee of their employees and jointly assign the output goals to them by optimizing the use of inputs so that cost minimization and revenue maximization is simultaneously achieved.

- Scheduled Commercial Banks (SCBs) must see that every unit of capital invested should be recovered in the stipulated time. Technological upgradations should be taken up in phases. Huge expenditure at a point of time does not
generate equivalent revenues instantly and disturbs the financial figures at that point of time. Such investment and upgradation should be spread over a period of time. Masses should be educated to use technology. Only usage of technology by people would help in recovering cost earlier.

➢ Scheduled Commercial Banks (SCBs) should make customer centric policies. Some tailor made policies should be introduced taking into consideration customers’ pocket, literacy levels and their specific requirements. This would expand the business of banks and would reduce the rate of non-repayment. Customer perceived measures of quality in terms of reliability, responsiveness, tangibility, assurance, and empathy need to be priorities of banks’ business. This would help banks in using technology and human resources in the best possible manner and to gain insight into the behaviour of customers. Bank managers must try to meet the customer expectations by integrating improvements in their technical quality, functional quality along with guarantee of quality to the customers.

➢ There is an urgent need to control NPAs. This is the foremost requirement to improve asset quality and efficiency of banks. Indian Bank managers should focus on credit risk management. Effective and regular follow up of loans and advances is required. After every quarter, banks should check the embezzlement or diversion of funds. Reserve Bank of India (RBI) should impose stringent penalties on the defaulters. Black listed debtors should be debarred from further sanction of loans by all banks as well. Bank staff needs to be trained about proper documentation while granting loans to the customers. For checking credit worthiness, effective scrutiny of periodical statements of borrowers should be made through proper monitoring.

➢ Banks in different sectors should operate within uniform set of policies. Public Sector Banks (PSBs) alone should not be burdened with achieving social objectives set up by the government. Recently, launched Pradhan Mantri Jan Dhan Yojna is a step in this direction.
Specifically, it is recommended that domestic banks, both in the Public Sector Banks and the Private Sector Banks should develop a professional work culture. A self-conscience business model propagating Theory Y should be incorporated. RBI should organize certain conferences and workshops on issues like work culture, organization climate and motivation etc.

Last but not the least, Reserve Bank of India, Government of India and the bank managers need to rethink, reformulate, redefine and redesign their policies and strategies with the intention that Indian Banks can take advantage of competitive environment and can enhance the efficiency of banking sector which has been the chief mission of Narasimham Committee Reforms.

8.5. Scope for Future Research

The study has endeavoured to evaluate a major research gap by evaluating Revenue, Cost and Profit Efficiency of Indian Scheduled Commercial banks. An in-depth analysis has been made only for Cost and Revenue Efficiency in the present study. Further research can be conducted by analyzing the Profit Efficiency of the banks in detail and decomposing it into Technical and Allocative components to analyse the reasons behind Profit Inefficiency. Moreover the present study used only Data Envelopment Analysis (DEA) technique which is a Non-Parametric Approach. A future study can be conducted by employing both Parametric as well Non-Parametric Approach to check deviation if any in the efficiency of the banks. Selection of Input and Output affects the results of DEA. A study can be conducted by taking novel and distinct inputs and outputs for calculating the efficiency of the banks. Various risks faced by banks and off-balance sheet activities too can be taken into consideration. Another possible direction for future research is that one could also investigate the impact of crisis along with bank, industry and economy specific factors on the efficiency of Indian Banks. In addition, a study can be conducted by considering the qualitative aspects of efficiency of the banks. Efficiency can also be judged through a primary survey by interviewing bank employees.