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A study on technical efficiency of public sector banks in India

Sangeetha R.[1,*], Jain Mathew[2]

[1]Assistant Professor, Department of Management Studies, Christ University, Hosur Road, Bangalore
[2]Professor & Head, Department of Management Studies, Christ University, Hosur Road, Bangalore

Email address:

bhagavathnaren@gmail.com (Sangeetha R.)

Abstract: Banking companies in the service sector exhibit the problem of distinct results in terms of efficiency. This problem is a cause of concern for many big organizations in the service sector like hotels, courier companies, hospitals, banks and so on. In particular, the last decade has observed continuous amendment in regulation, technology and competition in the global financial services industry, and Indian banks are no exception. To measure the stability, sustainability and profitability of the banking system, it is therefore crucial to scale the operations of banks performing in India. A well-organized banking system will provide an extensive way to higher economic growth in any country. Thus, evaluating the technical efficiency is important to depositors, owners, potential investors, managers and to policy makers. The present study investigates the technical efficiency of public sector banks in India by considering the study period between 2008-09 and 2010-11and using the data extracted from RBI website (www.rbi.org.in) and IBA website (www.iba.org.in). For this purpose, the data envelopment analysis (DEA) was used with two input variables (Interest expenses and operating expenses) and two output variables (interest income and other income). The efficiency scores were calculated for a sample of twenty-six public sector banks operating in India. The result shows that Corporation Bank, State Bank of India and IDBI were consistently performed efficiently in all the years under study.

Keywords: Technical Efficiency, DEA And Banking

1. Introduction

In any financial system, the banking sector plays a crucial part in financing economic development. It does so through the institutionalization of savings and investment. Financial institutions, instruments and markets comprise the financial sector. It acts as a means to mobilise the resources from net savers to net borrowers. The gains to the real sector of the economy depend on how effectively the financial sector executes the basic function of intermediation. The financial sector achieves the basic function of intermediation through four transformations. These are liability-asset transformation, size transformation, maturity transformation and risk transformation.Thus the financial system undertakes the tasks of pooling resources, transferring resources across time and space, managing risks and clearing and settling payments. An efficient financial system performs these functions at a minimum cost and through avoidance of systemic instability.

The Indian Financial System comprises of an impressive network of banks and financial institutions and a wide range of financial instruments. There is no doubt that there has been a considerable widening and deepening of the Indian Financial System, particularly in the last two decades. The extension of banking and other financial facilities to a larger cross-section of the people stands out as a significant achievement. As a ratio of GDP at current prices, bank deposits increased from 18 percent in 1969-70 to 45.3 percent by end-March 1995. Since then it has increased to 73 per cent. All the indicators of financial development such as, the "finance ratio", "financial interrelations ratio" and intermediation ratio" have significantly increased, implying the growing importance of financial flows in relation to economic activity.

As regards the policy environment on public ownership, the major share of financial intermediation has been because of public sector during the pre-reform period. As a part of the reforms programme, initially there was infusion of capital by Government in public sector banks, which

was subsequently followed, is expanding the capital base with equity participation followed by expanding the capital base with equity participation by private investors up to a limit of 49 percent. The share of the public sector banks in total banking assets has come down from 90 percent in 1991 to below 75 percent currently: a decline of about one percentage point every year. Diversification of ownership, while retaining public sector character of these banks has led to greater market accountability and improved efficiency without loss of public confidence and safety. It is significant that the infusion of funds by government since the initiation of reforms into the public sector banks amounted to less than 1 percent of India's GDP, a figure much lower than that for many other countries (Rangarajan,2011).

The rest of the paper is structured as follows. Second section reviews about the studies undertaken by previous authors analysing the efficiency of banks in India. Third section discusses about the conceptual framework of input and output oriented DEA approach. Fourth section depicts the empirical analysis and its interpretation and Section five provides Conclusion.

2. Analysis on Banking Efficiency in India: a Brief Review of Literature

The review of previous studies carried out by different researchers in different parts of the world in different time horizons present a deep insight into the problem under consideration. During 1997 Berger and Humphrey pointed out that, among 130 efficiency analyses of financial institutions covering 21 countries, there were around 5 per cent examined the banking sectors of developing countries. Banking sector in any country is the nerve centre, hence it is important to measure and analyse their efficiency in different perspective will through a light regarding commercial banking productivity. Following are the studies, which was a driving force for the present study.

O & T, 2010 used multistage Data Envelopment Analysis (DEA) to estimate the productive efficiency of commercial banks in Nigeria. In their study, thirteen banks with detailed information were selected to study tree different types of efficiencies. It was found that 25% percent of the banks were efficient due to excessive use of some of the inputs despite the corporate restructuring effort implemented. It was further discovered that environmental variables like intermediation ratio and market power will positively affect the productive efficiency of the banks.

Sufian, 2010 made an attempt to examine the impact of risks in Chinese bank's technical and scale efficiency estimates. The author has followed the procedure set by drake and Hall (2003) to include risk factor as a non-discretionary input variable. It was found that scale efficiency has greater influence than pure technical inefficiency in determining the Chinese Banking Sector's total technical efficiency. The results show that potential economies of scale are overestimated in the range of 22% to 30% when risk factor is ex-

cluded. The most beneficiary of the inclusion of risk factor is the city commercial banks and the least were the joint-stock commercial banks.

Kunmar & Gulati, 2008 assessed the extent of technical efficiency in 27 public sector banks operating in India and to provide strict ranking to these banks.Authors have used two popular data envelopment analysis (DEA) models, namely, CCR model and Andersen and Petersen's super-efficiency model, were employed. The cross-section data for the financial year 2004/2005 were used for getting technical efficiency scores. It was found that only seven of the 27 banks are found to be efficient and thus, defined the efficient frontier; and technical efficiency scores range from 0.632 to 1, with an average of 0.885. Thus, Indian public sector banks, on an average, waste the inputs to the tune of 11.5 percent. Andhra Bank has been observed to be the most efficient bank tagged closely by Corporation Bank. Further, the banks associated with SBI group turned out to be more efficient than the nationalized banks.

Kumar & Batra, (2012) explored empirically to measure the productivity changes of Indian banking industry during the post liberalization period of 2006-2011, by applying a non- parametric Malmquist Productivity Index (MPI) method. This methodology helps in exploring the different performance measures viz., productivity growth, technological change, technical efficiency, and scale efficiency during the study period. In specifying the variables input-output, the intermediation approach is chosen, which could be justified in post reforms era. Results specify that during the study period, Indian banking industry experienced stagnation in technological progress. Out of 74 banks chosen for the study, 13 banks have witnessed productivity loss and remaining 61 banks have shown productivity progress. The group wise analysis shows no significant difference among the banks. Further, scale inefficiency seems to be the main reason for overall inefficiency in the industry.

Gupta & Garg, (2011) has attempted to examine the competitiveness of commercial banks in India by investigating the efficiency of 49 commercial banks using data envelopment analysis. Author has also studied the performance of private and public sector is measured using the non-parametric techniques. The study focused on intermediation approach in analysing the inputs (employees, equity funds and operating expenses) and outputs (interest spread, non-interest income, advances, net profits and investments). The study has revealed that out of 49 banks 19 banks were technically as well as scale efficient, which shows that some banks were inefficient and were not operating at the optimal level of operations. The existence of scale inefficiency suggests that there is need for restructuring of present operations, which may help the banks to compete globally. It is suggested that the banks should be well equipped with the state of the art information technology, strong human resources team, and well-trained and highly motivated employees who can help the banks to reach newer heights in the global scenario.

Research undertaken by the previous scholars were given the inspiration to take up the present study to analyse the public sector banks using two models ie., VRS and CRS. VRS (variable returns to scale) model which was developed by Banker, Charnes Cooper (1994) and CRS (constant returns to scale) developed by Charnes, Cooper and Rhodes (1978). The rest of the article comprised of objective of the study, research methodology, data analysis & interpretation and conclusion.

3. Research Methodology

3.1. The DEA Approach

This analysis requires multiple inputs and multiple outputs to study the efficiency evaluation and comparison of 26 public sector banks in India. Data envelopment analysis is a Linear Programming Problem that provides a means of calculating apparent efficiency levels within a group of organizations. The efficiency of an organization is calculated relative to the group's observed best practice. In its Constant Returns to Scale (CRS) form, the DEA methodology was developed by Charnes et al. (1978) and was subsequently extended by Banker et al. (1984) in the Variable Returns to Scale (VRS) form.To measure the efficiency, financial years 2008-09, 2009-10 and 2010-11 were considered.

3.2. Input and Output Variables

There are two approaches in deciding input output variables – production approach and intermediation approach. As per the production approach, pioneered by Benston (1965), a financial institution is defined as a producer of services for account holders that is they perform transactions on deposit accounts and process loans. According to Berger and Humphery (1997), the intermediation approach is more appropriate for evaluating banking institutions because it is inclusive of interest expenses, which often account for two-thirds of total costs. Financial institutions also aim at minimisation of total costs, and not just production costs, to maximise the profits. Hence, this study uses intermediation approach. Listed below in the Table 1 are the selected input output variables used in the present study.

Table 1. *Details of Input and Output.*

Input Variables	Output Variables
Interest Expenses	Interest Income
Operating Expenses	Other Income

3.2. Collection of Data

This study is based on the secondary data published by the IBA (Indian Bankers Association) in their website (www.iba.org.in) and the annual publications of Reserve Bank of India titled "Trend and Progress of Banking in India" for the period 2008-09 to 2010-11. The same is also available in RBI website (www.rbi.org.in). This study fo-

cuses on public sector bank group to evaluate the changes in technical efficiency during the period. Out of 27 public sector banks (19 nationalised banks, 7 state bank group and 1 other public sector bank group) 26 banks were considered due to the non availability of data related to State Bank of Indore (Merged with SBI in 2010) forthe year 2010, it got omitted from the analysis.

4. Data Analysis and Interpretation

To analyse the technical efficiency of public sector banks in India using the above-mentioned input and output variables multistage input oriented DEA model was used. It is significant to note that input oriented efficiency measures address the question:"By how much can input quantities be proportionally reduced without altering the output quantities produced". The data and results are summarised, listed below with respect to 2009, 2010 and 2011.

The multistage input oriented DEA model starts with the measurement of efficiency scores of each bank from its own frontier. The results of the analysis are summarised according to the financial year considered for analysis i.e., the dataset interest income, other income, interest expenses and operating expenses were grouped year wise in Table 2 to Table 4. Descriptive statistics comprising mean, median, minimum, maximum and standard deviation were calculated and depicted along with the dataset. Three types of efficiency scores were calculated and exhibited in Table 5 to Table 6 based on the assumptions of CRS and VRS.

Table 2. *Details of input output variables for the year 2009.*

S.No	Name of the Bank	Interest Income	Other Income	Interest Expenses	Operating Expenses
1	Allahabad Bank	7365	1142	5206	1399
2	Andhra Bank	5375	765	3748	1104
3	Bank of Baroda	15092	2758	9968	3576
4	Bank of India	16347	3052	10848	3094
5	Bank of Maharashtra	4292	500	3035	963
6	Canara Bank	17119	2311	12401	3065
7	Central Bank of India	10455	1070	8227	1862
8	Corporation Bank	6067	1107	4376	1047
9	Dena Bank	3447	430	2383	768
10	Indian Bank	6830	1035	4222	1588
11	Indian Overseas Bank	9641	1596	6772	1942
12	Oriental Bank of Commerce	8856	1071	6860	1398
13	Punjab & SindBank	3247	408	2235	698
14	Punjab National Bank	19127	3065	12295	4206

S.No	Name of the Bank	Interest Income	Other Income	Interest Expenses	Operating Expenses
15	Syndicate Bank	9525	915	6978	1791
16	UCO Bank	8121	1020	6477	1463
17	Union Bank of India	11889	1483	8076	2214
18	United Bank of India	4312	491	3150	975
19	Vijaya Bank	5238	699	4113	925
20	State Bank of India (SBI)	63788	12691	42915	15649
21	State Bank of Bikaner & Jaipur	3810	577	2707	787
22	State Bank of Hyderabad	5709	769	4243	933
23	State Bank of Mysore	3247	480	2409	665
24	State Bank of Patiala	5804	632	4676	794
25	State Bank of Travancore	4123	573	2841	799
26	IDBI Ltd.	11545	1476	10306	1338
Mean		10399	1620	7364	2117
Median		7098	1028	4941	1368
Standard Deviation		11807	2392	7905	2918
Minimum		3247	408	2235	665
Maximum		63788	12691	42915	15649

Source: www.iba.org.in.

Table 3. *Details of input output variables for the year 2010.*

S.No	Name of the Bank	Interest Income	Other Income	Interest Expenses	Operating Expenses
1	Allahabad Bank	8369	1516	5719	1618
2	Andhra Bank	6373	965	4178	1350
3	Bank of Baroda	16698	2806	10759	3811
4	Bank of India	17878	2617	12122	3668
5	Bank of Maharashtra	4736	591	3439	1073
6	Canara Bank	18752	2858	13071	3478
7	Central Bank of India	12064	1735	9519	2222
8	Corporation Bank	6988	1493	5084	1260
9	Dena Bank	4010	589	2910	848
10	Indian Bank	7714	1316	4553	1730
11	Indian Overseas Bank	10246	1143	7078	2466
12	Oriental Bank of Commerce	10257	1200	7350	1686
13	Punjab & SindBank	3934	412	2750	718

S.No	Name of the Bank	Interest Income	Other Income	Interest Expenses	Operating Expenses
14	Punjab National Bank	21422	3610	12944	4762
15	Syndicate Bank	10047	1167	7307	2034
16	UCO Bank	9526	966	7202	1584
17	Union Bank of India	13303	1975	9110	2508
18	United Bank of India	5249	559	3858	1074
19	Vijaya Bank	5201	679	3752	1072
20	State Bank of India (SBI)	70994	14968	47322	20319
21	State Bank of Bikaner & Jaipur	3977	583	2766	890
22	State Bank of Hyderabad	6334	841	4471	984
23	State Bank of Mysore	3559	426	2322	725
24	State Bank of Patiala	5975	674	4441	901
25	State Bank of Travancore	4378	528	2978	956
26	IDBI Ltd.	15261	2302	13005	1831
Mean		11663	1866	8077	2522
Median		8042	1155	5402	1601
Standard Deviation		13146	2810	8744	3785
Minimum		3559	412	2322	718
Maximum		70994	14968	47322	20319

Source: www.iba.org.in.

Table 4. *Details of input output variables for the year 2011.*

S.No	Name of the Bank	Interest Income	Other Income	Interest Expenses	Operating Expenses
1	Allahabad Bank	11015	1370	6992	2338
2	Andhra Bank	8291	897	5070	1705
3	Bank of Baroda	21886	2809	13084	4630
4	Bank of India	21752	2642	13941	5068
5	Bank of Maharashtra	5563	531	3595	1644
6	Canara Bank	23064	2703	15241	4419
7	Central Bank of India	15221	1265	9895	3999
8	Corporation Bank	9135	1324	6196	1642
9	Dena Bank	5034	534	3270	1073
10	Indian Bank	9361	1182	5325	1926
11	Indian Overseas Bank	12101	1225	7893	2572
12	Oriental Bank of Commerce	12088	960	7910	1892
13	Punjab & SindBank	4933	437	3372	984
14	Punjab National Bank	26986	3613	15179	6364
15	Syndicate Bank	11451	915	7068	2548

16	UCO Bank	11371	925	7526	2075
17	Union Bank of India	16453	2039	10236	3950
18	United Bank of India	6341	637	4172	1299
19	Vijaya Bank	5844	533	3897	1433
20	State Bank of India (SBI)	81394	15825	48868	23015
21	State Bank of Bikaner & Jaipur	4796	640	3027	1269
22	State Bank of Hyderabad	7851	984	5003	1513
23	State Bank of Mysore	4079	455	2443	917
24	State Bank of Patiala	6478	756	4145	1330
25	State Bank of Travancore	5229	581	3533	1101
26	IDBI Ltd.	18601	2084	14272	2255
Mean		14089	1841	8891	3191
Median		10188	972	6594	1909
Standard Deviation		15185	2977	9117	4294
Minimum		4079	437	2443	917
Maximum		81394	15825	48868	23015

Source: www.iba.org.in.

Table 5 shows the efficiency score of public sector banks for the year 2009 considering the dataset mentioned in Table 2. Out of 26 banks considered for analysis 6 (23.06%) banks operate at CRS, 16 (61.54 %) banks operate at IRS and 4 (15.38%)banks operate at DRS. The banks operate at IRS i.e., 14 banks need to invest more on input to improve output which will lead closer to the frontier. The mean efficiency scores TE, PTE and SE is 0.960, 0.979 and 0.981 respectively, exhibits that there is about 4%, 3% and 2% possible for the sample banks to be on the frontier based on the returns to scale. Table 5 reveals that Bank of India, Corporation bank, Indian Bank, State Bank of India, State Bank of Patiala and IDBI Ltd were found to be more efficient which operates equally under CRS and VRS. The peers represent the frontier units, which are efficient, with which the firm under research is to be compared as reference for the other banks, which are inefficient. Vijaya Bank has got the highest number of peers that is 22, 24, 25 and 8. It means that Vijaya Bank to become efficient it has to employ the input of any one of its peer's.

Table 5. *Technical Efficiency Scores of Public Sector Banks – 2009.*

S.No	Name of the Bank	TE(CRS)	PTE	SE(VRS)	Scale
1	Allahabad Bank	0.963	0.973	0.990	IRS
2	Andhra Bank	0.945	0.965	0.979	IRS
3	Bank of Baroda	0.991	0.994	0.997	IRS
4	Bank of India	1.000	1.000	1.000	CRS
5	Bank of Maharashtra	0.915	0.944	0.969	IRS
6	Canara Bank	0.973	1.000	0.973	DRS
7	Central Bank of India	0.927	0.930	0.997	DRS
8	Corporation Bank	1.000	1.000	1.000	CRS
9	Dena Bank	0.932	0.984	0.947	IRS
10	Indian Bank	1.000	1.000	1.000	CRS
11	Indian Overseas Bank	0.944	0.951	0.992	IRS
12	Oriental Bank of Commerce	0.978	0.982	0.996	DRS
13	Punjab & SindBank	0.943	1.000	0.943	IRS
14	Punjab National Bank	0.987	1.000	0.987	DRS
15	Syndicate Bank	0.947	0.950	0.997	IRS
16	UCO Bank	0.915	0.916	0.999	IRS
17	Union Bank of India	0.994	0.996	0.998	IRS
18	United Bank of India	0.891	0.919	0.970	IRS
19	Vijaya Bank	0.931	0.943	0.987	IRS
20	State Bank of India (SBI)	1.000	1.000	1.000	CRS
21	State Bank of Bikaner & Jaipur	0.930	1.000	0.930	IRS
22	State Bank of Hyderabad	0.992	1.000	0.992	IRS
23	State Bank of Mysore	0.907	1.000	0.907	IRS
24	State Bank of Patiala	1.000	1.000	1.000	CRS
25	State Bank of Travancore	0.969	1.000	0.969	IRS
26	IDBI Ltd.	1.000	1.000	1.000	CRS
Mean	0.960		0.979	0.981	

Note: TE:Technical Efficiency; PTE:Pure Technical Efficiency; SE: Scale Efficiency.

Table 6 describes the efficiency score of public sector banks for the year 2010 taking into account the dataset mentioned in Table 3. Out of 26 banks considered for analysis 5 (19.23%) banks operate at CRS, 10 (38.46 %) banks operate at IRS and 11(42.31) banks operate at DRS. The banks operate at IRS i.e., 10 banks should pertain more

input to get better output which will lead closer to the frontier. The mean efficiency scores TE, PTE and SE is 0.95, 0.97 and 0.98 respectively, demonstrates that there is about 5%, 3% and 2% possible for the sample banks to be on the frontier based on the returns to scale. Table 6 discloses that Corporation bank, Indian Bank, State Bank of India, and IDBI Ltd were considered to be more efficient which operates equally under CRS and VRS. Allahabad Bank, Bank of Baroda, Central Bank of India andUnion bank of India have got the highest number of peers, that is first two banks has got 10,14,8 and 22 as peers and the last two has got 12, 26, 14 and 22 as peers. It means that Allahabad Bank, Bank of Baroda, Central Bank of India andUnion bank of India, to become efficient it has to employ the input of any one of its peer's.

Table 7 describes the efficiency score of public sector banks for the year 2011 in view of the dataset mentioned in Table 3. Out of 26 banks considered for analysis 6 (23.07%) banks operate at CRS, 12 (38.46 %) banks operate at IRS and 8 (30.77%) banks operate at DRS. The banks operate at IRS i.e., 12 banks shouldapply more input to get better output which will lead closer to the frontier. The mean efficiency scores TE, PTE and SE is 0.94, 0.96 and 0.97 respectively, demonstrates that there is about 6%, 4% and 3% possible for the sample banks to be on the frontier based on the returns to scale. Table 7 discloses that Corporation bank, Indian Bank, Oriental Bank of Commerce, Punjab National Bank, State Bank of India, and IDBI Ltd were considered to be more efficient which operates equally under CRS and VRS.

Table 6. *Technical Efficiency Scores of Public Sector Banks – 2010.*

S.No	Name of the Bank	TE	PTE	SE	Scale
1	Allahabad Bank	0.986	0.989	0.997	DRS
2	Andhra Bank	0.956	0.960	0.996	IRS
3	Bank of Baroda	0.943	0.952	0.991	DRS
4	Bank of India	0.945	0.970	0.975	DRS
5	Bank of Maharashtra	0.874	0.886	0.986	IRS
6	Canara Bank	0.965	0.999	0.966	DRS
7	Central Bank of India	0.886	0.911	0.972	DRS
8	Corporation Bank	1.000	1.000	1.000	CRS
9	Dena Bank	0.895	0.951	0.940	IRS
10	Indian Bank	1.000	1.000	1.000	CRS
11	Indian Overseas Bank	0.883	0.887	0.995	DRS
12	Oriental Bank of Commerce	0.974	1.000	0.974	DRS
13	Punjab & Sind Bank	0.961	1.000	0.961	IRS
14	Punjab National Bank	0.989	1.000	0.989	DRS
15	Syndicate Bank	0.906	0.915	0.990	DRS
16	UCO Bank	0.934	0.959	0.974	DRS
S.No	**Name of the Bank**	**TE**	**PTE**	**SE**	**Scale**
17	Union Bank of India	0.966	0.989	0.978	DRS
18	United Bank of India	0.896	0.904	0.991	IRS
19	Vijaya Bank	0.906	0.914	0.990	IRS
20	State Bank of India (SBI)	1.000	1.000	1.000	CRS
21	State Bank of Bikaner & Jaipur	0.902	0.983	0.918	IRS
22	State Bank of Hyderabad	1.000	1.000	1.000	CRS
23	State Bank of Mysore	0.972	1.000	0.972	IRS
24	State Bank of Patiala	0.986	1.000	0.986	IRS
25	State Bank of Travancore	0.923	0.940	0.982	IRS
26	IDBI Ltd.	1.000	1.000	1.000	CRS
Mean	0.948		0.966	0.982	

Note: TE:Technical Efficiency; PTE:Pure Technical Efficiency; SE: Scale Efficiency.

Table 7. *Technical Efficiency Scores of Public Sector Banks – 2011.*

S.No	Name of the Bank	TE	PTE	SE	Scale
1	Allahabad Bank	0.928	0.934	0.993	DRS
2	Andhra Bank	0.956	0.965	0,991	IRS
3	Bank of Baroda	0.966	1.000	0.966	DRS
4	Bank of India	0.887	0.922	0.962	DRS
5	Bank of Maharashtra	0.870	0.905	0.962	IRS
6	Canara Bank	0.944	0.985	0.958	DRS
S.No	**Name of the Bank**	**TE**	**PTE**	**SE**	**Scale**
7	Central Bank of India	0.868	0.869	0.998	IRS
8	Corporation Bank	1.000	1.000	1.000	CRS
9	Dena Bank	0.908	0.957	0.949	IRS
10	Indian Bank	1.000	1.000	1.000	CRS
11	Indian Overseas Bank	0.907	0.917	0.989	DRS
12	Oriental Bank of Commerce	1.000	1.000	1.000	CRS
13	Punjab & SindBank	0.899	1.000	0.899	IRS
14	Punjab National Bank	1.000	1.000	1.000	CRS
15	Syndicate Bank	0.923	0.934	0.988	DRS
16	UCO Bank	0.946	0.948	0.998	DRS
17	Union Bank of India	0.910	0.919	0.990	DRS
18	United Bank of India	0.914	0.942	0.970	IRS
19	Vijaya Bank	0.852	0.875	0.974	IRS
20	State Bank of India (SBI)	1.000	1.000	1.000	CRS
21	State Bank of Bikaner & Jaipur	0.891	0.992	0.899	IRS
22	State Bank of Hyderabad	0.970	0.989	0.980	IRS
23	State Bank of Mysore	0.947	1.000	0.947	IRS
24	State Bank of Patiala	0.933	0.965	0.967	IRS
25	State Bank of Travancore	0.891	0.943	0.945	IRS
26	IDBI Ltd.	1.000	1.000	1.000	CRS
Mean	0.935		0.960	0.974	

Note: TE:Technical Efficiency; PTE:Pure Technical Efficiency; SE: Scale Efficiency.

Table 8 discloses about number of banks operating below mean efficiency. It is a matter of concern for those banks to upgrade their input (technology) to make them efficient.

Table 8. Number of Banks operating below mean efficiency.

Year	TE(CRS)	TE(VRS)	SE
2009	12	9	9
2010	12	11	10
2011	14	12	11

Source: Authors own calculation.

5. Conclusion

Analysis shows the mean score depicts that 40% to 50% of public sector banks were performed below the mean score during the study period. Further it alsocan be inferred that there exist an increasing trend in all the 3 years with respect to interest income, interest expenses and operating expenses but the other income has shown an increase in the year 2010 which has reduced in the year 2012. Further Corporation bank, State bank of India and IDBI Ltd are the three banks, which has performed 100% efficiently. Hence, these three banks can be taken as reference or base by the other banks to adjust their input and output variables to improve their efficiency.

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