

# Efficiency of Commercial Banks in India: A Data Envelopment Analysis

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**Abstract:** The present paper is an attempt to measure the efficiency of Indian Commercial Banks by using Data Envelopment Analysis (DEA). Operating Expenses and Interest Expenses are taken as inputs while interest income and other income are taken as outputs to measure the technical and scale efficiency of Public and Private Sector Banks. The study found that the mean technical efficiency of Public Sector Banks is higher than Private Sector Banks.

**Keywords:** DEA, Technical efficiency, Scale Efficiency.

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## INTRODUCTION

The current global crisis that hit every country raised various issue regarding efficiency and solvency of banking system in front of policy makers. Now, crisis has been almost over, Government of India (GOI) and Reserve Bank of India (RBI) are trying to draw some lessons. RBI is making necessary changes in his policy to ensure price stability in the economy. The main objective of these changes is to increase the efficiency of banking system as a whole as well as of individual institutions. So, it is necessary to measure the efficiency of Indian Banks so that corrective steps can be taken to improve the health of banking system. The present paper is an attempt to measure the efficiency of Indian Commercial Banks by using Data Envelopment Analysis (DEA).

## PREVIOUS STUDIES ON EFFICIENCY OF BANKS USING DEA

**Piyu Yue (1992)** examined the technical and scale efficiency of 60 Missouri commercial banks for the period from 1984 to 1990 using Data Envelopment Analysis. He considered four input variables- Interest expenses, Non-interest expenses, Transation deposits, Non-transation Deposits and three output variables- Interest income, Non-interest income and total loan. The DEA scores and return to scale were measured by applying CCR and Additive DEA model. With the help of window analysis, he identified the best and the worst banks in a relative sense, as well as the most stable and most variable banks.

**Bhattacharyya, Lovell and Sahay (1997)** used DEA to measure technical efficiency of 70 Indian commercial banks for the period 1986-1991. In their study advances, investment and deposits were taken as outputs while interest expenses and operating expenses were included as inputs. Their study was divided into two stages. In the first stage DEA was used to find out technical efficiency and in the second stage Stochastic Frontier Analysis (SFA) was used to calculate variation in efficiency scores. They found that the efficiency of public sector banks were more than the private and foreign banks.

**Ram Mohan and Subhash Ray (2004)** compared efficiency of 58 public, private sector and foreign banks using tornquist and malmquist TFP approach for the period 1992-2000. In their study loan, investments and other income were taken as bank output while deposit and operating costs were used as bank inputs. They found that public sector banks were significantly better than private sector banks in respect of technical efficiency but not in allocative efficiency. They also found that public sector banks were better than private sector banks on revenue maximization efficiency but there is no significance difference in the efficiency of public sector banks and foreign banks.

**Das, Nag and Ray (2005)** measured the technical efficiency, cost efficiency, revenue efficiency and profit efficiency of public, private and foreign bank of India for the period 1997-2003 using DEA. Borrowed fund, number of staff, fixed assets and equity were taken as inputs while investments, loan and non interest income were considered as outputs. They concluded that Indian banks are still not much differentiated in terms of input or output oriented technical efficiency and

cost efficiency. However, they differ sharply in respect of revenue and profit efficiencies. Banks size, ownership and listed on stock exchange have positive impact on profit and revenue efficiency. They also observed that median efficiency scores of bigger banks have improved considerably during the post reform period.

**Sinha and Chatterjee (2008)** compared the technical efficiency of 38 public and private sector banks taking contingent liabilities and other incomes as output indicators for the period 2001-02 to 2004-05. For this single stage and malmquist DEA have been used. The result obtained from them showed that the mean technical efficiency scores of public sector banks were considerably lower than the private sector banks. Both under constant and variable return to scale, the overall mean technical efficiency score of observed public sector banks was about 85 percent of observed private sector banks. The total factor productivity growth of 25 observed commercial banks was negative during the study period.

**Asror Nigmonov (2010)** examined the efficiency of private, joint stock and foreign banks using input oriented DEA approach. In this study, operating expenses, fixed assets, total deposits were taken as input while total credit-reserve for possible loan losses, total non-interest income, other non-interest income (excluding commission income) were taken as outputs. The study found that the main source of inefficiency was due to the technical efficiency. He also found that there is no significant divergence between the relative performance of private, joint stock and foreign banks.

**Table I: Previous Studies of Banks Efficiency using DEA**

Authors	Method	Target Country	No. and Type of Banks	Inputs	Outputs	Period of study
Piyu Yue (1992)	DEA	Missouri	60(Commercial banks)	Int. Exp., Non-int Exp., Transation deposits, and Non-Transation deposits	Interest income, non-interest income and total loan	1984-1990
Bhattacharyya, Lovell and Sahay (1997)	DEA and SFA	India	70 (public, private and foreign)	Interest Expenses and Operating Expenses.	Advances, Investment and Deposits	1986-1991
Ram Mohan and Subhash Ray (2004)	DEA	India	58 (public, Private and foreign)	Deposits and Operating Cost	Loan, Investment and other incomes	1992-2000
Das, Nag and Ray (2005)	DEA	India	68-71 (public, private and foreign banks)	Borrowed funds, Staff, Fixed Assets and Equity	Investment, Loan & Non-Interest Income	1997-2003
Sinha and Chatterjee (2008)	DEA	India	38 (public, private)	Net worth and No. of branches	Contingent liabilities and other incomes	2001-02 to 2004-05
Asror Nigmonov (2010)	DEA	Uzbekistan	23 (private, joint stock and foreign)	Operating exp., fixed assets, total deposits	Total credit- reserve for possible loan losses, Net Non-inv. Income, other non-interest income	2004-2006

Source: Related Studies.

### SELECTION OF A MODEL

There are two principal approaches of measuring efficiency. Such as Stochastic Frontier Approach (SFA), and Data Envelopment Analysis (DEA). The former method is parametric which assume that error term is standard symmetrical distribution i.e.  $N(0, \sigma^2)$ . But when a firm produces multiple outputs then the SFA cannot be used because a production function is not defined in the multiple output case. The DEA has following advantages.

- Multiple outputs and multiple inputs are used to measure efficiency.

- It does not require any function from.
- Technical and scale efficiency can be calculated.
- All inputs and outputs are handled simultaneously.

Therefore, DEA model is selected for measuring relative efficiency of banks in the present study.

### EXPLANATION OF DEA MODEL<sup>1</sup>

Data envelopment analysis is a non-parametric linear programming based technique for measuring the relative efficiency of a set of firms (DMUs) where multiple inputs and outputs are used. The non-parametric method of DEA was introduced by Charnes, Cooper and Rhodes (CCR) in 1978 and further extended by Banker, Charnes and Cooper (BCC) in 1984. Efficient DMUs are that which can produce a given amount of output or more while using given amount of inputs, or use the same or less inputs to produce a given amount of outputs, as compared with other DMUs in the group.

Mathematical formulation of output oriented technical efficiency of firm K is

$$\text{Max} = \theta$$

Subject to

$$\sum_{j=1}^N \lambda_j X_{ij} \leq X_{ik} \quad (i = 1, 2, \dots, n)$$

$$\sum_{j=1}^N \lambda_j Y_{rj} \geq \theta Y_{rk} \quad (r = 1, 2, \dots, m)$$

$$\sum_{j=1}^N \lambda_j = 1, \quad \lambda_j \geq 0 \quad (j = 1, 2, \dots, N)$$

The TE of firm K would be measured by

$$TE_k = \frac{1}{\theta^*}$$

Where  $\theta^*$  is the optimal solution of the DEA LP problem. Here  $X^j = (X_1^j, X_2^j, \dots, X_n^j)$  are bundle of n inputs used and  $Y^j = (y_1^j, y_2^j, \dots, y_m^j)$  are the bundle of m outputs produced by firm j ( $j = 1, 2, \dots, N$ ),  $(X^k, y^k)$  are actual inputs and outputs of firm K.

When saving of inputs are more important than increasing outputs, the appropriate measure of firm K efficiency would be input-oriented technical efficiency.

$$\text{Min } \theta$$

Subject to

$$\sum_{j=1}^N \lambda_j X_{ij} \leq \theta X_{ik} \quad (i = 1, 2, \dots, n)$$

$$\sum_{j=1}^N \lambda_j Y_{rj} \geq Y_{rk} \quad (r = 1, 2, \dots, m)$$

$$\sum_{j=1}^N \lambda_j = 1, \quad \lambda_j \geq 0 \quad (j = 1, 2, \dots, N)$$

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### SELECTION OF INPUTS AND OUTPUTS

The most important step in DEA is selection of appropriate inputs and outputs for measuring relative efficiency of firms (DMUs). The previous researches and literatures on banks efficiency help us in choosing inputs and outputs. On the basis of review of literature the following two inputs and two outputs are chosen for our study.

Inputs	Operating Expenses and Interest Expenses
Outputs	Interest Income and Other Income

### OBJECTIVES OF THE STUDY AND DATA SOURCE

1. To compare the technical and scale efficiency of Indian commercial banks.
2. To identify the potential improvements.

The present paper is based on secondary data. The bank-wise data are taken from Indian banking association website for the year ending March 2010. All 27 public sector banks and 22 private sector banks are included (present on March, 2010) while foreign banks are excluded in the present study.

### ASSUMPTIONS OF THE STUDY

The present study is based on following assumptions-

- An output oriented model has been used.
- Variable Return to Scale (VRS) has been used to find better result.
- No weight has been given to both inputs and outputs.

### RESULTS

In the present paper, the results are obtained from DEAP version 2.1 Software. The table II shows the bank-wise technical efficiency both in constant and variable return to scale, scale efficiency and return to scale. In case of technical efficiency under CRS, only eight banks are efficient, each of which scores 100% whereas rest of the banks i.e. 41 banks are inefficient in comparison to the efficient banks, each of which scores less than 100%. In above eight efficient banks, only two are public sector banks and rest six are private sector banks. Out of 49 banks 14 banks are technical efficient (6 public sector banks and 8 private sector banks) under VRS. Scale efficiency is defined as the ratio of technical efficiency (CRS) / technical efficiency (VRS). The scale efficiency of 12 banks is 100% i.e. these DMUs are constant return to scale. The table II shows that The Bank of Rajasthan Ltd and The Catholic Syrian Bank Ltd are the most inefficient DMUs which scores only 71.4%.

**Table II Technical and Scale Efficiency of Banks with Return to Scale.**

SR.NO.	NAME OF BANK(DMUs)	T.E.(CRS) %	T.E.(VRS) %	S.E. %	RETURN TO SCALE
1	Allahabad Bank	96.7	98.2	98.4	DRS
2	Andhra Bank	92.5	94.3	98	DRS
3	Bank of Baroda	92.7	95.1	97.4	DRS
4	Bank of India	90.7	96.9	93.6	DRS
5	Bank of Maharashtra	83.6	85.5	97.8	DRS
6	Canara Bank	94.6	99.7	94.8	DRS
7	Central Bank of India	88	91.4	96.3	DRS
8	Corporation Bank	99	99.6	99.3	DRS
9	Dena Bank	86.3	87.1	99	DRS
10	Indian Bank	99.8	100	99.8	DRS
11	Indian Overseas Bank	85.1	88.2	96.4	DRS
12	Oriental Bank of Commerce	96.8	100	96.8	DRS

13	Punjab & Sind Bank	93.9	93.9	100	CRS
14	Punjab National Bank	97.8	100	97.8	DRS
15	Syndicate Bank	87.7	91.8	95.5	DRS
16	UCO Bank	93.4	96.1	97.2	DRS
17	Union Bank of India	94.2	98.8	95.4	DRS
18	United Bank of India	86.7	88.4	98	DRS
19	Vijaya Bank	87.3	89.2	97.9	DRS
20	State Bank of India (SBI)	86.8	100	86.8	DRS
21	State Bank of Bikaner & Jaipur	87	87.3	99.7	DRS
22	State Bank of Hyderabad	100	100	100	CRS
23	State Bank of Indore	92.7	92.8	100	CRS
24	State Bank of Mysore	92.9	93.4	99.5	DRS
25	State Bank of Patiala	98.6	98.7	100	CRS
26	State Bank of Travancore	91.5	92.7	98.7	DRS
27	IDBI Ltd	100	100	100	CRS
28	City Union Bank Ltd.	96.4	97.5	98.9	IRS
29	ING Vysya Bank Ltd.	86.3	86.4	99.8	IRS
30	SBI Commercial & International Bank Ltd.	74.8	100	74.8	IRS
31	Tamilnad Mercantile Bank Ltd.	92.3	93	99.2	IRS
32	The Bank of Rajasthan Ltd.	70.6	71.4	99	DRS
33	The Catholic Syrian Bank Ltd.	71.2	71.4	99.7	DRS
34	The Dhanalakshmi Bank Ltd.	72.9	73.7	99	IRS
35	The Federal Bank Ltd.	100	100	100	CRS
36	The Jammu & Kashmir Bank Ltd.	97.4	97.4	100	CRS
37	The Karnataka Bank Ltd.	85	85.3	99.7	IRS
38	The Karur Vysya Bank Ltd.	91.7	91.9	99.8	IRS
39	The Lakshmi Vilas Bank Ltd.	87.3	87.5	99.7	IRS
40	Nainital Bank Ltd.	100	100	100	CRS
41	The Ratnakar Bank Ltd.	91.5	97.6	93.8	IRS
42	The South Indian Bank Ltd.	91.9	92	99.9	IRS
43	Axis Bank Ltd.	100	100	100	CRS
44	Development Credit Bank Ltd.	73.2	74.4	98.4	IRS
45	HDFC Bank Ltd.	98.1	100	98.1	DRS
46	ICICI Bank Ltd.	100	100	100	CRS
47	Indusind Bank Ltd.	87.4	87.4	99.9	IRS
48	Kotak Mahindra Bank Ltd.	100	100	100	CRS
49	YES Bank	100	100	100	CRS

Source: Authors

TE = Technical Efficiency, SE = Scale Efficiency, VRS= Variable Return to Scale, CRS= Constant Return to Scale, DRS= Decreasing Return to Scale

The table III shows peers, peers weight and pear count of DMUs. Pear (reference) units are the 100% efficient units, against which each inefficient unit is compared. An inefficient unit will have one or more peers in its peer set. In the present study,



there are 13 peers which appear in inefficient peer set. All the peers are efficient units. In table III, peers weight are in same order as peer in peers set. Peers set tell about reference units whereas peer weight tell about how much weight age should be give to each reference unit. Peers count shows how many times each efficient DMU is a peer for another inefficient DMU. The higher the peer count, the more likely the efficient unit is an example of good performance. In this way, The Federal Bank Ltd has highest peer count i.e. 25, so The Federal Bank Ltd can be declared as “Industry Leader”. The inefficient banks should follow The Federal Bank Ltd to become 100% efficient.

**Table III: Peers Set, Peer Weight and Peer Count of the Banks.**

SR.NO.	NAME OF BANK (DMUs)	T.E.(VRS) %	PEERS SET	PEER WEIGHTS	PEER COUNT
1	Allahabad Bank	98.2	46 22 14 35	0.085 0.601 0.077 0.237	0
2	Andhra Bank	94.3	22 10 14 35	0.161 0.151 0.114 0.575	0
3	Bank of Baroda	95.1	35 22 14 46	0.068 0.185 0.722 0.025	0
4	Bank of India	96.9	14 27 12	0.634 0.217 0.149	0
5	Bank of Maharashtra	85.5	10 22 35	0.316 0.205 0.479	0
6	Canara Bank	99.7	20 27 14	0.003 0.453 0.544	0
7	Central Bank of India	91.4	12 27 14 22	0.393 0.265 0.195 0.147	0
8	Corporation Bank	99.6	35 46 22 14	0.076 0.050 0.859 0.014	0
9	Dena Bank	87.1	46 22 14 35	0.002 0.140 0.029 0.829	0
10	Indian Bank	100	10	1.000	8
11	Indian Overseas Bank	88.2	10 14 22	0.450 0.303 0.246	0
12	Oriental Bank of Commerce	100	12	1.000	5
13	Punjab & Sind Bank	93.9	35 22 40	0.622 0.298 0.080	0
14	Punjab National Bank	100	14	1.000	12
15	Syndicate Bank	91.8	12 14 22	0.372 0.208 0.420	0
16	UCO Bank	96.1	12 27 22	0.790 0.053 0.156	0
17	Union Bank of India	98.8	12 27 14 22	0.305 0.124 0.319 0.252	0
18	United Bank of India	88.4	10 22 35	0.238 0.475 0.286	0
19	Vijaya Bank	89.2	35 10 22	0.335 0.256 0.409	0
20	State Bank of India (SBI)	100	20	1.000	1
21	State Bank of Bikaner & Jaipur	87.3	22 10 14 35	0.016 0.162 0.009 0.813	0
22	State Bank of Hyderabad	100	22	1.000	22
23	State Bank of Indore	92.8	40 35 22	0.365 0.434 0.201	0
24	State Bank of Mysore	93.4	10 35 48	0.035 0.943 0.022	0
25	State Bank of Patiala	98.7	40 22 27	0.157 0.766 0.077	0
26	State Bank of Travancore	92.7	35 10 22	0.681 0.130 0.189	0
27	IDBI Ltd	100	27	1.000	8
28	City Union Bank Ltd.	97.5	49 27 35 30	0.013 0.018 0.175 0.794	0
29	ING Vysya Bank Ltd.	86.4	43 35 48 40	0.144 0.052 0.176 0.628	0
30	SBI Commercial & International Bank Ltd.	100	30	1.000	6
31	Tamilnad Mercantile Bank Ltd.	93	35 43 49 30	0.301 0.005 0.006 0.688	0
32	The Bank of Rajasthan Ltd.	71.4	35 48 40	0.277 0.238 0.484	0
33	The Catholic Syrian Bank Ltd.	71.4	35 48 40	0.115 0.062 0.823	0

34	The Dhanalakshmi Bank Ltd.	73.7	35 48 43 40	0.053 0.069 0.010 0.868	0
35	The Federal Bank Ltd.	100	35	1.000	25
36	The Jammu & Kashmir Bank Ltd.	97.4	35 22 40	0.825 0.011 0.164	0
37	The Karnataka Bank Ltd.	85.3	27 35 49 30	0.061 0.355 0.056 0.528	0
38	The Karur Vysya Bank Ltd.	91.9	22 40 35 30	0.028 0.347 0.448 0.176	0
39	The Lakshmi Vilas Bank Ltd.	87.5	40 35 22	0.799 0.155 0.046	0
40	Nainital Bank Ltd.	100	40	1.000	14
41	The Ratnakar Bank Ltd.	97.6	40 48 30	0.321 0.015 0.664	0
42	The South Indian Bank Ltd.	92	40 35 22	0.556 0.313 0.131	0
43	Axis Bank Ltd.	100	43	1.000	5
44	Development Credit Bank Ltd.	74.4	40 30 48 43	0.294 0.596 0.091 0.020	0
45	HDFC Bank Ltd.	100	45	1.000	0
46	ICICI Bank Ltd.	100	46	1.000	4
47	Indusind Bank Ltd.	87.4	43 35 48 40	0.079 0.510 0.067 0.343	0
48	Kotak Mahindra Bank Ltd.	100	48	1.000	8
49	YES Bank	100	49	1.000	3

Source: Authors

Peers weights are in same order as peer count.

### POTENTIAL IMPROVEMENT

In case of banks having 100% efficiency score, the actual and target data are equal, so there is no scope for further potential improvement. But banks having below 100% efficiency score have some scope for further improvement. In case of output potential improvement is positive i.e. inefficient banks should increase outputs to become 100% efficient. We have used output oriented model, so both outputs have a scope for future improvement as shown in table IV. In table IV we may take The Bank of Rajasthan Ltd which has lowest efficiency score i.e. 71.4%. This bank should increase interest income and other income by 40.02% and 134.43% respectively to become 100% efficient.

**Table IV: Efficiency Reports (Outputs) of Banks with Potential Improvement.**

SR. NO.	NAME OF BANK (DMUs)	T.E.(VRS)	INTEREST INCOME			OTHER INCOME		
			Actual	Target	P.I. %	Actual	Target	P.I. %
1	Allahabad Bank	98.2	8369	8521	1.81	1516	1543	1.82
2	Andhra Bank	94.3	6373	6756	6.02	965	1023	6.06
3	Bank of Baroda	95.1	16698	17552	5.11	2806	2950	5.10
4	Bank of India	96.9	17878	18452	3.21	2617	2936	12.19
5	Bank of Maharashtra	85.5	4736	5541	17.01	591	798	35.01
6	Canara Bank	99.7	18752	18802	0.26	2858	3020	5.68
7	Central Bank of India	91.4	12064	13200	9.42	1735	1898	9.42
8	Corporation Bank	99.6	7295	7322	0.37	1186	1190	0.37
9	Dena Bank	87.1	4010	4602	14.76	589	676	14.84
10	Indian Bank	100	7857	7857	0.00	1174	1174	0.00
11	Indian Overseas Bank	88.2	10246	11610	13.31	1143	1817	58.95
12	Oriental Bank of Commerce	100	10257	10257	0.00	1200	1200	0.00

13	Punjab & Sind Bank	93.9	3934	4190	6.51	412	582	41.39
14	Punjab National Bank	100	21467	21467	0.00	3565	3565	0.00
15	Syndicate Bank	91.8	10047	10945	8.94	1167	1542	32.07
16	UCO Bank	96.1	9526	9912	4.04	966	1202	24.46
17	Union Bank of India	98.8	13303	13466	1.22	1975	1999	1.24
18	United Bank of India	88.4	5249	5935	13.07	559	832	48.84
19	Vijaya Bank	89.2	5201	5832	12.14	679	822	21.03
20	State Bank of India (SBI)	100	70994	70994	0.00	14968	14968	0.00
21	State Bank of Bikaner & Jaipur	87.3	3977	4556	14.56	583	668	14.63
22	State Bank of Hyderabad	100	6334	6334	0.00	841	841	0.00
23	State Bank of Indore	92.8	2736	2949	7.77	373	405	8.56
24	State Bank of Mysore	93.4	3559	3809	7.02	426	555	30.48
25	State Bank of Patiala	98.7	5975	6056	1.36	674	822	21.90
26	State Bank of Travancore	92.7	4378	4721	7.82	528	673	27.52
27	IDBI Ltd	100	15273	15273	0.00	2291	2291	0.00
28	City Union Bank Ltd.	97.5	957	982	2.61	143	147	2.21
29	ING Vysya Bank Ltd.	86.4	2233	2584	15.72	620	717	15.68
30	SBI Commercial & International Bank Ltd.	100	40	40	0.00	6	6	2.70
31	Tamilnad Mercantile Bank Ltd.	93	1118	1202	7.43	173	186	7.60
32	The Bank of Rajasthan Ltd.	71.4	1359	1904	40.02	130	305	134.43
33	The Catholic Syrian Bank Ltd.	71.4	578	810	40.09	74	113	53.29
34	The Dhanalakshmi Bank Ltd.	73.7	535	726	35.87	91	124	35.78
35	The Federal Bank Ltd.	100	3673	3673	0.00	531	531	0.00
36	The Jammu & Kashmir Bank Ltd.	97.4	3057	3138	2.66	416	450	8.16
37	The Karnataka Bank Ltd.	85.3	2043	2396	17.24	311	365	17.17
38	The Karur Vysya Bank Ltd.	91.9	1758	1912	8.78	247	269	8.79
39	The Lakshmi Vilas Bank Ltd.	87.5	909	1038	14.20	104	134	29.04
40	Nainital Bank Ltd.	100	224	224	0.00	16	16	0.00
41	The Ratnakar Bank Ltd.	97.6	144	148	2.32	13	19	40.58
42	The South Indian Bank Ltd.	92	1936	2105	8.73	208	285	36.91
43	Axis Bank Ltd.	100	11638	11638	0.00	3946	3946	0.00
44	Development Credit Bank Ltd.	74.4	459	617	34.29	107	144	34.30
45	HDFC Bank Ltd.	100	16173	16173	0.00	3808	3808	0.00
46	ICICI Bank Ltd.	100	25707	25707	0.00	7478	7478	0.00
47	Indusind Bank Ltd.	87.4	2707	3096	14.38	553	632	14.28
48	Kotak Mahindra Bank Ltd.	100	3256	3256	0.00	628	628	0.00
49	YES Bank	100	2370	2370	0.00	576	576	0.00

Source: Authors  
P.I. = Potential Improvement



**Table V: Mean Technical and Scale Efficiency of Public & Private Sector Banks.**

<b>Banks</b>	<b>Mean T.E. (VRS) (%)</b>	<b>Mean S.E. (%)</b>
Public Sector Banks	94.78	97.56
Private Sector Banks	91.22	98.17

Source: Authors

The above table V shows that Mean Technical Efficiency of all 27 Public Sector Banks is 94.78% which is higher than 22 Private Sector Banks i.e. 91.22%. But Mean Scale Efficiency of Public Sector Banks is a little lower than Private Sector Banks.

### CONCLUSION

On the basis of two inputs and two outputs (used in above study), we found that out of 27 public sector banks, only 6 banks are 100% efficient and out of 22 private sector banks, only 8 banks are 100% efficient (Table II). The Bank of Rajasthan Ltd and The Catholic Syrian Bank Ltd are the most inefficient banks with only 71.4% technical efficiency score (VRS) (Table II). The Federal Bank Ltd is the industry leader having maximum peer count (Table III). The mean technical efficiency of Public Sector Banks are higher than Private Sector Banks (Table V). This study may be extended further if other inputs and outputs are included.

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