

Relative Efficiency of Banks in India - Evaluation and Policies for Improvement



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This paper attempts to determine the relative efficiency of 80 banks operating in India using Data Envelopment Analysis using 2008, 2009 and 2010 year data. The banks are grouped into 3 categories, namely Public sector banks, Private sector banks and Foreign banks. The study finds that Foreign banks are most efficient followed by Private sector and then by Public sector banks. The choice of source of funds, Non-performing assets (NPA) and low return on investments are identified as important factors for underperforming banks. The analysis and results provide policy measures for improvement of efficiencies of underperforming banks.

Keywords: Data Envelopment Analysis, Efficiency index, Mean Efficiency

1. Introduction

The Indian financial sector reform of 1991 has greatly changed the face of Indian Banking system. In addition to the nationalized banks, several private Banks were newly founded or created by previously extant financial institutions. India has also seen the entry of over two dozen foreign banks since the beginning of financial reforms. In the face of increased competition, the banks have to operate more efficiently in order to sustain and perform better. In the context of increased competition and the importance of banks in financial markets, it becomes very much essential to evaluate whether these banks operate efficiently. Primarily, there are two chief reasons to measure the efficiency of banking institutions. Firstly, this assists to identify the most efficient banks and benchmarks the relative efficiency of individual banks against the most efficient banks. Secondly, it helps to evaluate the impact of various policy measures on the performance of banks.

There are numerous inputs and output parameters which indicate the financial performance of a bank. A simple mathematical formula of output to input ratio cannot determine the efficiency of operations of banks. Therefore, a mathematical model – Data Envelopment Analysis (DEA) is used to statistically measure the relative efficiency of banks operations. DEA is an application of linear programming which is used to measure the relative efficiency of operating units with the same goals and objectives. DEA is a deterministic methodology for examining the relative efficiency, based on the data of selected inputs and outputs of a number of entities called decision-making units. The main advantage of DEA is that, unlike regression

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analysis, it does not require an assumption of a functional form relating inputs to outputs. Instead, it constructs the best production function solely on the basis of observed data; hence statistical tests for significance of the parameters are not necessary. In our paper, we have used financial ratios of banks as inputs and outputs, when finding out the relative efficiencies of banks. The rationale is that, these financial ratios which incorporate the financial measures represent the operational performance of banks.

2. Literature Review

There have been several studies that analyzed bank efficiency in India. In Indian context the whole literature which tries to measure/capture the performance of banks can be divided into two parts based on their methodologies viz., traditional measures and frontier approaches. Frontier approaches are studies conducted with DEA techniques. The major works under traditional measures are: Divitia and Venkatachalam (1978), Angadi (1983), Subramanyam and Swamy (1994 a,b), Hansda (1995) and Das (1999). The major findings of the above studies are; the banking functions are more or less uniform, production differences between firms are not only because of technological improvement but also comes from competence, there are wide disparities in their measure of performance of bank groups and rural branches are more profit making than urban².

Studies by Sarkar et al. (1998) compared banks of public, private and foreign sectors in India to study the effect of ownership type on different bank performance measures. Another study to compare operational efficiencies of different banks over a period of time was conducted by Rammohan (2002, 2003).

Bhattacharya et al (1997) measured the productive efficiency of Indian commercial banks in the late 1980's to early 1990's. This study showcases the impact of policy measures undertaken during liberalization in 1980's on the performance of various banks. This DEA approach revealed that the Indian public sector banks were the best performing banks, as the entire banking sector was overwhelmingly dominated by the Indian public sector banks, while some of the new private sector banks were just emerging at that time in the India.

Sathye (2003) used DEA to study the relative efficiency of Indian banks in the late 1990's with that of banks operating in other countries. He found that the public sector banks have a higher mean efficiency score as compared to the private sector banks in India, but found mixed results when comparing public sector banks and foreign commercial banks in India. Kumbhakar and Sarkar (2003) found that private sector banks in India have improved their performance when compared with public sector banks in India after the deregulation measures.

Rammohan and Ray (2004) compared the revenue maximizing efficiency of banks in India in 1990's. Deposits and operating costs were taken as inputs while loans, investments and other income were taken as outputs. Their research found that public sector banks were significantly better than private sector banks on revenue maximization efficiency. However it was found that the difference in efficiency between public sector banks and foreign banks was not significant.

² The traditional approaches used in the above studies are ratio analysis, regression analysis, Index number approach, taxonomic method, multivariate analysis, translog function etc., and the frontier approaches mainly characterized into two groups i.e., parametric and non-parametric approaches.

Das et al. (2004) studied the efficiency of Indian banks using DEA. Four input measures: deposits and other borrowings, number of employees, fixed assets and equity, and three output measures: investments, performing loan assets and other non-interest fee based incomes were used in the analysis. He found that Indian banks did not exhibit much of a difference in terms of input or output oriented technical and cost efficiency. However, in terms of revenue and profit efficiencies prominent differences were seen. He also found that size of the bank, ownership of the bank, and listing on the stock exchange had a positive impact on the average profit and revenue efficiency scores.

Sanjeev (2006) studied the efficiency of private banks, public banks, and foreign banks in India during 1997-2001 using DEA. He also extended his study to uncover the possibility of any relationship between the efficiency and NPA of the banks and found that efficiency has increased post-reforms and that NPA and efficiency are negatively related.

3. Objectives

The objectives of the paper are:

- To determine the relative efficiency of 80 banks from groups of Public, Foreign and Indian Private Banks that ~~operates~~ operate in India by comparing the efficiencies:
- Across all the 80 banks operating in India.
- Within groups of Public, Foreign and Indian Private Banks.
- Identify the factors that contribute most to the inefficiency of the banks and suggest improvements to increase their efficiencies.

4. Methodology

The data is obtained from yearly publication issues of statistical tables relating to banks in India by Reserve Bank of India, the central bank of the country. It provides details such as liabilities and assets, deposits, advances, investment and expenses of commercial banks in India. It also provides consolidated report of selected ratios of scheduled commercial banks that contains various key financial ratios of all commercial banks operating in India. Data for the years 2008, 2009 and 2010 are used for the purpose of our analysis to measure efficiency of banks in this paper using DEA. The critical inputs and outputs used for the analysis are given below:

Inputs	Outputs
Ratio of deposits to total liabilities	(Credit + Investment)-Deposit ratio
Cost of deposits	Ratio of net interest income to total assets (Net Interest Margin)
Ratio of intermediation cost to total assets	Return on equity
Ratio of wage bills to total expense	Ratio of non-interest income to total assets
Ratio of burden to interest income	Ratio of net NPA to net advances
	Return on advances adjusted to cost of funds

Return on investments adjusted to cost of funds

The analysis was carried out in the following steps:

- The banks were grouped into 3 categories, namely Public sector banks, Private sector banks and Foreign banks.
- In the first run, using only 2010 year data all the 79 banks³ were analyzed to identify how banks perform when compared with all the other banks that operate in India.
- In the next run, again using only the 2010 year data each of the categories were analyzed separately to identify how the banks perform only relative to banks in its category.
- The above steps (step 2 and step 3) are carried out using 2008 and 2009 year data to understand how banks have performed over the last 3 years in comparison to banks across sectors and to banks only in its sector.

5. Results and Discussion

Public Sector Banks (Full Run)

The efficiency of public sector banks varied from 0.55 to 1 with mean efficiency score of 0.74 as shown in Appendix Table 1. Indian Overseas Bank has the least efficiency of 0.55 and 4 banks namely State Bank of Travancore, Andhra Bank, Corporation Bank and Punjab National Bank have the highest efficiency of 1. Many banks have an efficiency index in the range of 0.60 to 0.80 indicating relative inefficiency of these banks. Although banks have varying efficiency index in this category, the mean efficiency as a measure indicates relative inefficiency compared to both private sector and foreign banks. We also see that the inefficiency of this sector is only marginal when compared to private sector but more pronounced when compared with foreign banks.

Private Sector Banks (Full Run)

The efficiency of private sector banks varies from 0.47 to 1 with a mean efficiency index of 0.77. Bank of Rajasthan has the least efficiency of 0.47 and 4 banks namely Nainital Bank, ICICI Bank, IndusInd Bank and Kotak Mahindra bank have the highest efficiency of 1. Banks such as HDFC Bank and Axis bank have efficiency index close to 1 indicating they are almost as efficient as the best banks. Like public sector banks, banks here with varying efficiency index indicate relative inefficiency compared with foreign banks.

Foreign Banks (Full Run)

The efficiency of foreign sector banks varies from 0.61 to 1 with a mean efficiency of 0.96. Bank of Bahrain & Kuwait has the lowest efficiency of 0.61 and many banks such as Bank of America, BNP Paribas, etc. have the highest efficiency of 1. Many other banks such as HSBC, Oman International have efficiency close to 1 indicating satisfactory efficiency. The mean index suggest that most of the banks in this category are relatively efficient barring a few.

³ The data for Internasional Indonesia is not available for year 2010 and hence excluded from the analysis using 2010 data.

Public Sector Banks (Sector Run)

The “sector runs” compared the efficiencies of the banks within the category namely public sector banks, private sector banks and foreign banks and the results are presented in Appendix Table 2. For the public sector banks we find that the efficiency index varies from 0.92 to 1 with mean efficiency score of 0.96. Most of the banks turn out to be efficient with scores close to 1. The relatively least efficient bank in this category is the Vijaya Bank with an efficiency index of 0.92. The individual scores and mean scores suggest that all the public sector banks have more or less similar efficiency. The public sector banks do not seem to have stark difference in their strategy and performance.

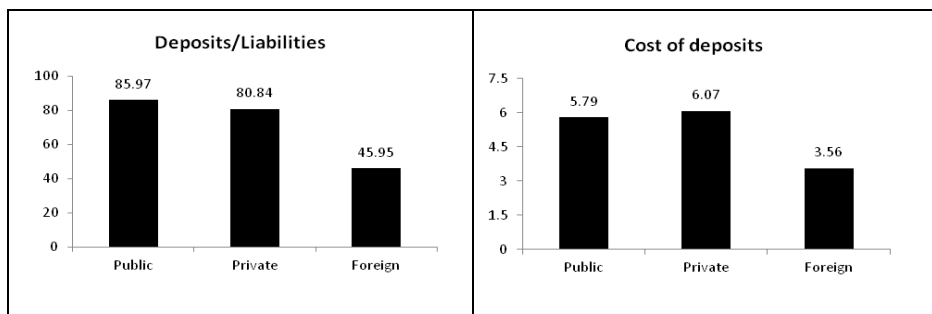
Private Sector Banks (Sector Run)

For the private sector banks we find that the efficiency index varies from 0.74 to 1 with a mean efficiency score of 0.94. The spread of index is higher here (0.26) compared to public sector banks (0.08). Many banks are highly efficient and some are close to high efficiency with index close to 1. However, there are few banks such as Bank of Rajasthan, Dhanlaxmi Bank, and Catholic Syrian Bank that show relative inefficiency with index scores in the range of around 0.75. Unlike public sector banks, private sector banks show higher differences in their performance among themselves.

Foreign Banks (Sector Run)

For the foreign banks we find that the efficiency index varies from 0.46 to 1 with a mean efficiency of 0.90. More banks turn out to be inefficient now expectedly as the current pool consists of better performing banks as shown in the full run.

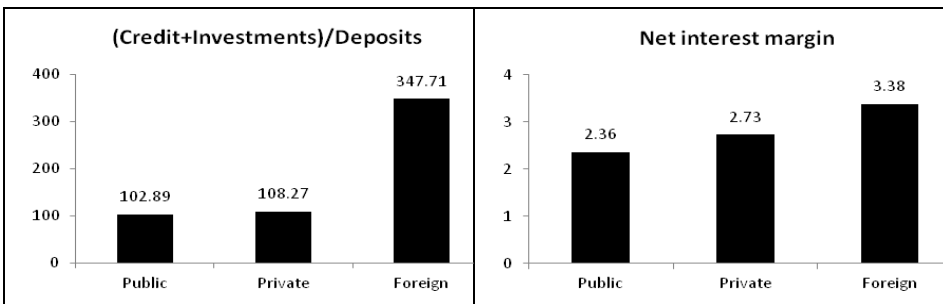
Looking at the data closely, we observe that the average ratio of deposits to total liabilities for public sector banks are high compared to that of both private sector and foreign banks. The ratio of deposits to total liabilities for public sector, private sector and foreign banks are 85.97, 80.84 and 45.95 respectively. This coupled with the average cost of deposits which are 5.79, 6.07 and 3.56 respectively in the above order of sectors are a source of inefficiency for public sector and private sector banks. The foreign banks attribute much lesser cost to their funds which translates into higher efficiency. Although the foreign banks have higher intermediation costs, wage bills and burden they are able to generate higher output with the given inputs.



Despite having high ratio of deposits to total liabilities for public sector banks their (credit+investment)-deposit ratio is lower compared to foreign banks. The average

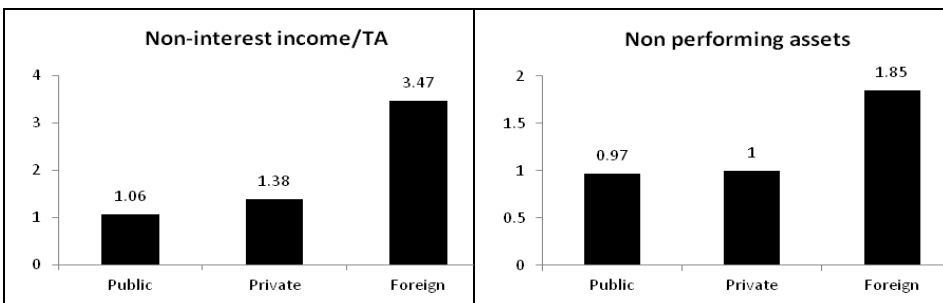
(credit+investment)-deposit ratio for these banks are 102.89, 108.27, 347.71 respectively. The data clearly suggests that foreign banks with least deposits make most of credit and investments. The private sector banks are also better off compared to public sector banks as they also make higher credit and investments comparatively with smaller deposits.

Interest income is earned from interest bearing assets such as loans, investments in bonds and treasury securities, balances with banks & money at call. The average net interest margin which is the ratio of net interest income to total assets for public, private and foreign banks is 2.36, 2.73 and 3.38 respectively. It shows that foreign banks earn higher net interest margin per rupee of their assets implying that their assets are being put to better use.

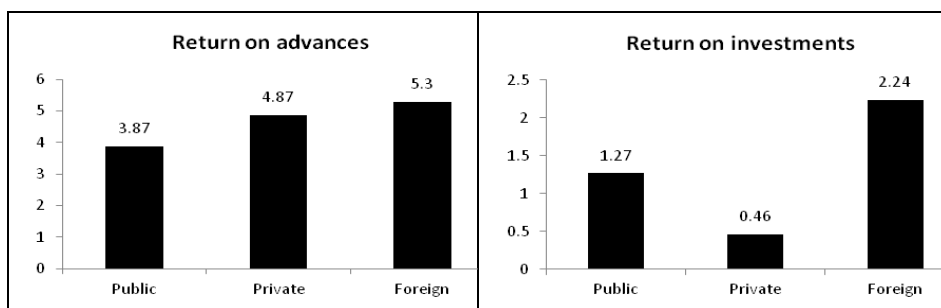


Another source of income for banks is the non-interest income which is composed of service charges, advisory services charges, brokerage services charges, trading revenue and other gains/losses. The foreign banks are better off in generating non-interest income as well. The average ratios of non-interest income to total assets are 1.06, 1.38 and 3.47 respectively in the same order of sectors as above. Thus, every rupee of asset earns higher interest and non-interest income for foreign banks followed by private banks and then by public sector banks.

Non-performing assets (NPA) are those that have stopped paying interest for 90 days or more and are past due. Every bank ideally should have as minimum NPA as possible to boost profitability. The average ratios of NPA to net advances for the three categories are 0.97, 1 and 1.85 respectively. The foreign banks have more NPA but their earning assets seem to have high quality that can generate enough income to more than compensate for the losses due to NPA. This is reflected in the ratio of interest and non-interest income to total assets.



As advances and investments form major chunk of assets for a typical bank, the returns on these assets are an important measure of profitability. The average return on advances adjusted to cost of funds are 3.87 for public banks, 4.87 for private banks and 5.3 for foreign banks excluding UBS. UBS was excluded because it has high negative return which would potentially distort the average value. As these are mainly interest bearing assets, the above values strengthen the previous conclusions that foreign banks earn the highest interest income. These banks are able to raise more money than other banks for every rupee of money paid for the funds. The average return on investments adjusted to cost of funds for these banks are 1.27, 0.46 and 2.24 respectively. The foreign banks earn the highest return but we see that private banks earn less return than the public banks on average. However, the net interest margin is more for private banks which could be because typically advances form a major portion of assets that earns more than investments do.



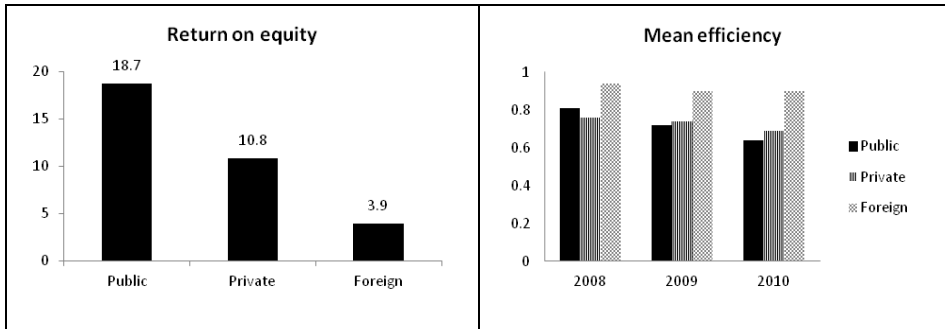
Return on equity is high for public banks compared to both private and foreign banks. The average ROE for the public, private and foreign banks are 18.7, 10.8 and 3.9 respectively. It is observed that the tier-I capital for public sector are lower than that of private banks helping them to achieve higher ROE. This could be because the public sector banks where the government has a stake close to 51% can't raise further equity as that will lead to further dilution of government stake. Thus, ROE is not an appropriate metric to be looked at in isolation.

Using 2008, 2009 and 2010 data for the analysis⁴, we find that the mean efficiency index for public sector banks is 0.81, 0.72 and 0.64 in 2008, 2009 and 2010 respectively as shown in Appendix Table 3. The reduction in efficiency index in 2009 seems to be due to marginal increase in cost of deposits and sharp decrease in return on investments adjusted to cost of funds from 1.35 in 2008 to 0.84 in 2009. Although the public sector banks have marginally improved in terms of the input parameters in 2010, the ratio of NPA to net advances has increased significantly in 2010 from 0.75 in 2008 to 0.97 in 2010 which seems to have led to reduction in mean efficiency index.

The efficiency index for private sector banks follows a similar pattern to that of public sector banks. Unlike public sector banks the decrease in index for private sector banks is only marginal in 2009. The index scores are 0.76, 0.74 and 0.69 in

⁴ The data for banks American Express Banking Corp., Bank Internasional Indonesia, Credit Agricole Bank, FirstRand Bank, JSC VTB Bank, Royal Bank of Scotland and UBS AG are excluded for the analysis as they don't have data for all 3 years 2008, 2009 and 2010.

2008, 2009 and 2010 respectively. We find that the ratio of burden to interest income has increased from 7.65 in 2008 to 9.24 in 2010. The ratio of NPA to net advances has increased from 0.79 in 2008 to 1.00 in 2010 and the return on investments adjusted to cost of funds has decreased sharply from 0.89 in 2008 to 0.46 in 2010.



The efficiency index for foreign banks are 0.94, 0.90, and 0.90 in 2008, 2009 and 2010 respectively. Although, the mean efficiency has slightly dropped from 2008 score, they still seem to be operating at a satisfactory efficiency level compared to public and private sector banks.

In the sector wise run for the public sector banks, we find that there is not much variation in either efficiency index of individual banks or the mean score. The mean efficiency scores are 0.97, 0.96, and 0.96 in 2008, 2009 and 2010 respectively. The sector seems to be functioning efficiently when compared among its own peers although its performance has deteriorated if compared across all the sectors.

From the sector run of private sector banks, we find that the efficiency index has dropped for some of the banks such as Dhanalaxmi Bank and Lakshmi Vilas Bank while for some it has improved. The mean efficiency indexes for these banks are 0.99, 0.98 and 0.94 in 2008, 2009 and 2010 respectively. From the data we see that most of the inputs have become more expensive and at the same time outputs have reduced for Dhanalaxmi bank. We see a similar pattern for Lakshmi Vilas Bank also but ratio of NPA to net advances has increased very sharply from 1.55 in 2008 to 4.11 in 2010.

For the foreign banks we find that the overall efficiency index has actually increased in 2010 although only marginally. The index scores are 0.94, 0.93 and 0.96 in 2008, 2009 and 2010 respectively. The banks have been able to reduce their cost of deposits and burden as a proportion of interest income and have also managed to increase their credit and investments to the deposit base.

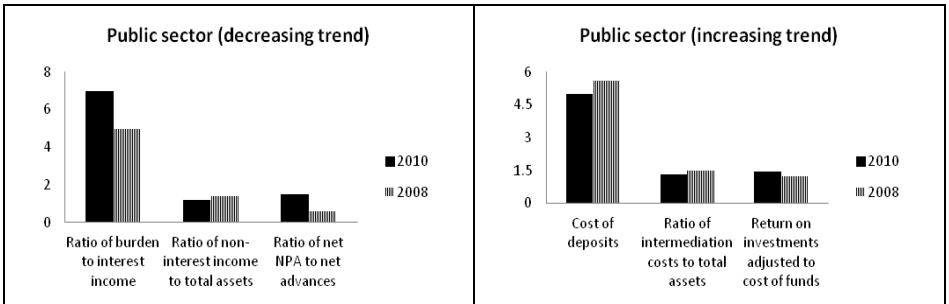
The analysis was further extended to identify reasons for some banks showing sharp decrease in efficiency index over the years while some showing opposite trend for each of the sectors.

Public Sector Banks (Time Series Analysis)

By looking at the data from 2008 to 2010 we see that State Bank of India, State Bank of Mysore, Allahabad Bank, Bank of India, Indian Overseas Bank, Syndicate Bank, Union Bank of India and Vijaya Bank have shown sharp declining trend. We find increases in ratio of burden to interest income, ratio of net NPA to net advances and

decrease in ratio of non-interest income to total assets have contributed to sharp decline in efficiency index. The chart below shows how the average values of above ratios for these banks have changed from 2008 to 2010.

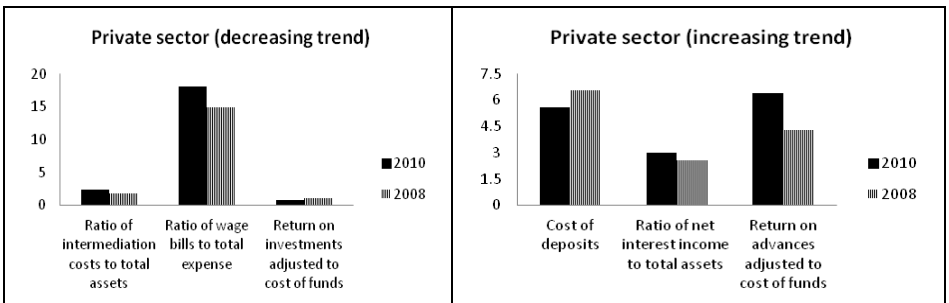
While the above banks showed declining trend some others banks namely Andhra Bank, Bank of Baroda, Corporation Bank and Punjab National Bank showed increasing trend in efficiency index scores. For these banks, we find decreases in cost of deposits, ratio of intermediation cost to total assets and increase in return on investments adjusted to cost of funds have contributed to improvement in efficiency index. The chart below shows how the average values of above ratios for these banks have changed from 2008 to 2010.



Private Sector Banks (Time Series Analysis)

By looking at the data from 2008 to 2010 we see that Bank of Rajasthan, Dhanlaxmi Bank, Jammu & Kashmir Bank and Nainital Bank have shown sharp declining trend. We find increases in ratio of intermediation cost to total assets, ratio of wage bills to total expense and decrease in return on investments adjusted to cost of funds have contributed to sharp decline in efficiency index. The chart below shows how the average values of above ratios for these banks have changed from 2008 to 2010.

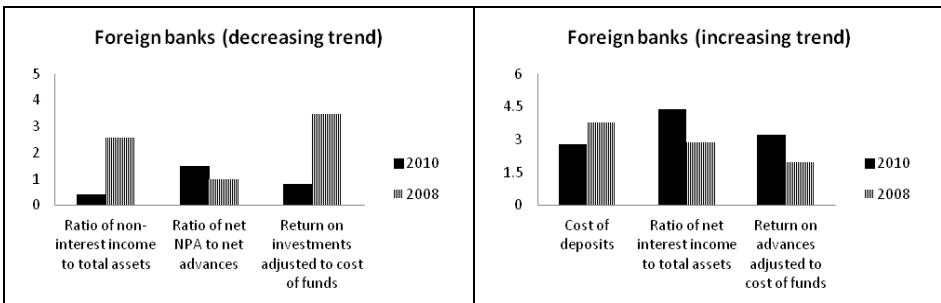
While the above banks showed declining trend some other banks namely Federal Bank, ING Vysya Bank, Lakshmi Vilas Bank and Kotak Mahindra Bank showed increasing trend in efficiency index scores. For these banks, we find decrease in cost of deposits and increases in net interest margin and return on advances adjusted to cost of funds have contributed to improvement in efficiency index as shown in the chart below.



Foreign Banks (Time Series Analysis)

By looking at the data from 2008 to 2010 we see that Abu Dhabi Commercial Bank, Bank of Bahrain & Kuwait and J.P.Morgan Chase Bank have shown sharp declining trend. We find increases in ratio of net NPA to net advances, decreases in ratio of non-interest income to total assets and return on investments adjusted to cost of funds to be the primary factors for sharp decline in efficiency index as shown in the chart below.

While the above banks showed declining trend some other banks namely Chinatrust Commercial Bank, DBS Bank, Deutsche Bank and Societe Generale showed increasing trend in efficiency index similar to public and private sector banks. For these banks, we find sharp decrease in cost of deposits and increases in net interest margin and return on investments adjusted to cost of funds have been the predominant factors for improvement in efficiency index. The chart below shows how the average values of above ratios for these banks have changed from 2008 to 2010.



The above analysis shows that different critical parameters were responsible for the above trends for various sectors. Overall, we find that increase in ratio of net NPA to net advances and decrease in return on investments adjusted to cost of funds have been the primary contributors for decreases in efficiency index across sectors. On the other hand, we also see that the decrease in cost of deposits and increase in return on investments/advances adjusted to cost of funds have been the primary contributors for increase in efficiency index across sectors.

Overall, the foreign sector banks are the best performing banks in terms of relative efficiency. They are followed by private sector banks and the public sector banks in that order. The following are suggested for the improvement of performance of inefficient banks to match with the best performing banks based on the analysis:

- The public sector and private banks must reduce the dependence on deposits as a major source of funding and look at alternative sources whereby the overall cost of funds can be reduced. The higher dependence also translates to higher cost of deposits as banks compete with each other to get more deposits by offering a competitive rate of return to depositors.
- Increase good quality credit and investments on the deposit base to increase interest income for every rupee of deposit. Extending credit to good credit worthy customers would help in increasing interest income while at the

same time reducing NPA. Predictive Analytics need to be applied to achieve this.

- Provide better advisory and customer friendly brokerage services to increase non-interest income.
- Make good quality advances and investments to earn a higher return. Investing in good diversified portfolio would help in increasing the returns while minimizing the risk.

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Appendix Table 1 *Relative efficiencies of Banks in 2010 – Full Run*

S. No	Name of the Bank	Efficiency Index 2010	S. No	Name of the Bank	Efficiency Index 2010
FULL RUN					
Public Sector Banks					
1	State Bank of Bikaner and Jaipur	0.61	14	Central Bank of India	0.63
2	State Bank of Hyderabad	0.87	15	Corporation Bank	1.00
3	State Bank of India	0.57	16	Dena Bank	0.67
4	State Bank of Indore	0.77	17	Indian Bank	0.64
5	State Bank of Mysore	0.62	18	Indian Overseas Bank	0.55
6	State Bank of Patiala	0.85	19	Oriental Bank of Commerce	0.76
7	State Bank of Travancore	1.00	20	Punjab and Sind Bank	0.62
8	Allahabad Bank	0.62	21	Punjab National Bank	1.00
9	Andhra Bank	1.00	22	Syndicate Bank	0.60
10	Bank of Baroda	0.88	23	UCO Bank	0.80
11	Bank of India	0.68	24	Union Bank of India	0.83
12	Bank of Maharashtra	0.62	25	United Bank of India	0.62
13	Canara Bank	0.76	26	Vijaya Bank	0.58
Mean Score – Public Sector Banks					0.74
Private Sector Banks (Full Run)					
S. No	Name of the Bank	Efficiency Index 2010	S. No	Name of the Bank	Efficiency Index 2010
1	Bank of Rajasthan	0.47	12	Ratnakar Bank	0.56
2	Catholic Syrian Bank	0.50	13	SBI Comm. & Intl. Bank	0.77
3	City Union Bank	0.99	14	South Indian Bank	0.65

4	Dhanlaxmi Bank	0.52	15	Tamilnad Mercantile Bank	0.57
5	Federal Bank	0.82	16	Axis Bank	0.96
6	ING Vysya Bank	0.64	17	Development Credit Bank	0.56
7	Jammu & Kashmir Bank	0.69	18	HDFC Bank	0.97
8	Karnataka Bank	0.77	19	ICICI Bank	1.00
9	Karur Vysya Bank	0.97	20	IndusInd Bank	1.00
10	Lakshmi Vilas Bank	0.78	21	Kotak Mahindra Bank	1.00
11	Nainital Bank	1.00	22	Yes Bank	0.69
Mean Score - Private Sector Banks					0.77
Foreign Banks (Full Run)					
S. No	Name of the Bank	Efficiency Index 2010	S. No	Name of the Bank	Efficiency Index 2010
1	AB Bank	1.00	17	FirstRand Bank	1.00
2	Abu Dhabi Commercial Bank	0.72	18	HSBC	0.96
3	American Express Banking Corp.	1.00	19	J.P.Morgan Chase Bank	0.93
4	Antwerp Diamond Bank	1.00	20	JSC VTB Bank	0.93
5	Bank of America	1.00	21	Krung Thai Bank	1.00
6	Bank of Bahrain & Kuwait	0.61	22	Mashreqbank	1.00
7	Bank of Ceylon	1.00	23	Mizuho Corporate Bank	0.72
8	Bank of Nova Scotia	1.00	24	Oman International Bank	0.99
9	Bank of Tokyo-Mitsubishi, UFJ	1.00	25	Royal Bank of Scotland	1.00
10	Barclays Bank	0.92	26	Shinhan Bank	1.00
11	BNP Paribas	1.00	27	Societe Generale	1.00
12	Chinatrust Commercial Bank	1.00	28	Sonali Bank	1.00
13	Citibank	1.00	29	Standard Chartered Bank	1.00

14	Credit Agricole Bank	1.00	30	State Bank of Mauritius	1.00
15	DBS Bank	1.00	31	UBS AG	1.00
16	Deutsche Bank	1.00			
Mean Score - Foreign Banks					0.96

Appendix Table 2 *Relative efficiencies of Banks in 2010 – Sectoral Run*

S. No	Name of the Bank	Efficiency Index 2010	S. No	Name of the Bank	Efficiency Index 2010
Sectoral Run					
Public Sector Banks (only)					
1	State Bank of Bikaner and Jaipur	0.95	14	Central Bank of India	0.93
2	State Bank of Hyderabad	1.00	15	Corporation Bank	1.00
3	State Bank of India	1.00	16	Dena Bank	0.92
4	State Bank of Indore	0.96	17	Indian Bank	0.93
5	State Bank of Mysore	0.94	18	Indian Overseas Bank	0.93
6	State Bank of Patiala	1.00	19	Oriental Bank of Commerce	0.95
7	State Bank of Travancore	0.94	20	Punjab and Sind Bank	0.94
8	Allahabad Bank	0.97	21	Punjab National Bank	0.98
9	Andhra Bank	0.95	22	Syndicate Bank	0.96
10	Bank of Baroda	1.00	23	UCO Bank	0.97
11	Bank of India	1.00	24	Union Bank of India	0.96
12	Bank of Maharashtra	0.94	25	United Bank of India	0.92
13	Canara Bank	0.93	26	Vijaya Bank	0.92
Mean Score – Public Sector Banks					0.96
Private Sector Banks (only)					
1	Bank of Rajasthan	0.76	12	Ratnakar Bank	0.93
2	Catholic Syrian Bank	0.74	13	SBI Comm. & Intl. Bank	1.00
3	City Union Bank	1.00	14	South Indian Bank	0.94
4	Dhanlaxmi Bank	0.80	15	Tamilnad Mercantile Bank	0.91
5	Federal Bank	1.00	16	Axis Bank	1.00
6	ING Vysya Bank	1.00	17	Development Credit Bank	0.83
7	Jammu & Kashmir Bank	1.00	18	HDFC Bank	1.00

8	Karnataka Bank	0.99	19	ICICI Bank	1.00
9	Karur Vysya Bank	1.00	20	IndusInd Bank	1.00
10	Lakshmi Vilas Bank	0.88	21	Kotak Mahindra Bank	1.00
11	Nainital Bank	1.00	22	Yes Bank	1.00
Mean Score – Private Sector Banks					0.94
Foreign Banks (only)					
1	AB Bank	1.00	17	FirstRand Bank	1.00
2	Abu Dhabi Commercial Bank	0.54	18	HSBC	0.95
3	American Express Banking Corp.	1.00	19	J.P.Morgan Chase Bank	0.55
4	Antwerp Diamond Bank	1.00	20	JSC VTB Bank	0.55
5	Bank of America	1.00	21	Krung Thai Bank	1.00
6	Bank of Bahrain & Kuwait	0.46	22	Mashreqbank	1.00
7	Bank of Ceylon	1.00	23	Mizuho Corporate Bank	0.48
8	Bank of Nova Scotia	1.00	24	Oman International Bank	0.99
9	Bank of Tokyo-Mitsubishi, UFJ	0.90	25	Royal Bank of Scotland	0.90
10	Barclays Bank	0.87	26	Shinhan Bank	1.00
11	BNP Paribas	1.00	27	Societe Generale	0.86
12	Chinatrust Commercial Bank	1.00	28	Sonali Bank	0.94
13	Citibank	0.99	29	Standard Chartered Bank	1.00
14	Credit Agricole Bank	1.00	30	State Bank of Mauritius	0.80
15	DBS Bank	1.00	31	UBS AG	1.00
16	Deutsche Bank	1.00			
Mean Score – Foreign Banks					0.90

Appendix Table 3 *Relative Efficiencies of Banks 2008 to 2010 – Full Run*

S. No	Name of the Bank	Efficiency Index		
		2008	2009	2010
Public Sector Banks (Full Run)				
1	State Bank of Bikaner and Jaipur	0.7136	0.7728	0.6087
2	State Bank of Hyderabad	0.8702	0.8262	0.8166
3	State Bank of India	0.7741	0.6718	0.4451
4	State Bank of Indore	0.8525	0.8406	0.6967
5	State Bank of Mysore	0.8979	0.6688	0.5645

6	State Bank of Patiala	0.8196	0.8373	0.7582
7	State Bank of Travancore	0.9348	1.0000	0.7978
8	Allahabad Bank	0.8611	0.5919	0.5922
9	Andhra Bank	0.7775	0.6514	0.7954
10	Bank of Baroda	0.6258	0.6399	0.8041
11	Bank of India	1.0000	0.9277	0.6491
12	Bank of Maharashtra	0.7680	0.6461	0.5034
13	Canara Bank	0.6745	0.7476	0.6948
14	Central Bank of India	0.6820	0.5994	0.4674
15	Corporation Bank	0.8665	0.8186	0.9025
16	Dena Bank	0.8711	0.7668	0.6449
17	Indian Bank	0.8359	0.5958	0.6095
18	Indian Overseas Bank	1.0000	0.8062	0.4357
19	Oriental Bank of Commerce	0.6680	0.6617	0.6363
20	Punjab and Sind Bank	0.7781	0.6175	0.5947
21	Punjab National Bank	0.7493	0.7131	0.7770
22	Syndicate Bank	0.9361	0.7687	0.5035
23	UCO Bank	0.8686	0.6971	0.7516
24	Union Bank of India	1.0000	0.8258	0.7609
25	United Bank of India	0.5853	0.5578	0.4841
26	Vijaya Bank	0.7588	0.6353	0.5175
	Mean Score	0.8142	0.7264	0.6466
Private Sector Banks (Full Run)				
1	Bank of Rajasthan	0.6643	0.5882	0.3763
2	Catholic Syrian Bank	0.5665	0.5683	0.3641
3	City Union Bank	1.0000	0.9623	0.9371
4	Dhanlaxmi Bank	0.7035	0.6437	0.3950
5	Federal Bank	0.7368	0.7754	0.8003
6	ING Vysya Bank	0.5193	0.5366	0.6027
7	Jammu & Kashmir Bank	0.9749	0.9619	0.6881
8	Karnataka Bank	0.7893	0.8069	0.5649
9	Karur Vysya Bank	0.8326	0.7343	0.8753
10	Lakshmi Vilas Bank	0.5163	0.5957	0.7756
11	Nainital Bank	0.9637	0.7626	0.6802
12	Ratnakar Bank	0.5884	0.5854	0.4962
13	SBI Comm. & Intl. Bank	0.7366	0.7604	0.6772
14	South Indian Bank	0.7432	0.6516	0.6396
15	Tamilnad Mercantile Bank	0.6801	0.5621	0.5656

16	Axis Bank	0.9610	0.8279	0.8900
17	Development Credit Bank	0.6930	0.8071	0.5102
18	HDFC Bank	0.7368	0.7915	0.7595
19	ICICI Bank	1.0000	1.0000	0.9870
20	IndusInd Bank	1.0000	0.9795	0.9586
21	Kotak Mahindra Bank	0.7262	0.7776	0.9496
22	Yes Bank	0.6994	0.7088	0.6903
	Mean Score	0.7651	0.7449	0.6902
Foreign Banks (Full Run)				
1	AB Bank	1.0000	1.0000	1.0000
2	Abu Dhabi Commercial Bank	1.0000	0.7216	0.5518
3	Antwerp Diamond Bank	1.0000	1.0000	1.0000
4	Bank of America	1.0000	1.0000	1.0000
5	Bank of Bahrain & Kuwait	0.9399	0.6654	0.4647
6	Bank of Ceylon	1.0000	1.0000	1.0000
7	Bank of Nova Scotia	1.0000	1.0000	1.0000
8	Bank of Tokyo-Mitsubishi, UFJ	1.0000	1.0000	1.0000
9	Barclays Bank	1.0000	1.0000	0.8982
10	BNP Paribas	0.9015	0.6889	1.0000
11	Chinatrust Commercial Bank	0.7367	1.0000	1.0000
12	Citibank	1.0000	0.9813	1.0000
13	DBS Bank	0.8340	0.8568	1.0000
14	Deutsche Bank	0.8426	1.0000	1.0000
15	HSBC	0.8391	0.8715	0.9535
16	J.P.Morgan Chase Bank	1.0000	1.0000	0.5478
17	Krung Thai Bank	1.0000	1.0000	1.0000
18	Mashreqbank	1.0000	1.0000	1.0000
19	Mizuho Corporate Bank	0.7390	0.6860	0.5271
20	Oman International Bank	0.9730	0.5439	0.9937
21	Shinhan Bank	1.0000	0.8961	1.0000
22	Societe Generale	0.8193	1.0000	1.0000
23	Sonali Bank	0.9382	1.0000	0.9437
24	Standard Chartered Bank	1.0000	0.7357	1.0000
25	State Bank of Mauritius	1.0000	0.9419	0.8155
	Mean Score	0.9425	0.9036	0.9078

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