UGC Approved Journal Number: 44278

Shanlax International Journal of Management

A Peer-reviewed - Refereed Scholarly Quarterly Journal
with Impact Factor

VOLUME 5 | SPECIAL ISSUE 1 | September 2017

International Conference on

Interdisciplinary Research for Sustainable Development

of) Bombay

ISSN 2321 - 4643

Complementing Data Envelopment Analysis with Regression: A New Approach

Reshampal Kaur
Research Scholar, Panjab Technical University, Jalandhar, India, Postal code 144603

Dr. Monika Aggarwal
Associate Professor, UIAMS, Panjab University, Chandigarh, India, Postal code 160014

***Abstract*- The present study endeavours to propose a new two-step approach to examine the impact of each input variables on each output variables that cause efficiency or inefficiency amongst DMUs. As a first step the present research investigates the year-wise efficiency level of public sector banks (DMUs) operating in India. The data were collected from the Reserve Bank of India's publication Statistical Tables Relating to Banks in India for 16 years starting from the year 1998 to the year 2013. The CCR model of Data Envelopment Analysis was used to determine efficiency levels, benchmarks and sources of inefficiency for each inefficient bank. Using least square regression analysis the study attempts to introduce second step for further investigating the effect of each input variable on each output variable. It was found that public sector banks are inefficient for almost half of the observations which strongly demands for the efforts for improvement. Main sources of inefficiency are found to be excess usage of borrowings and deposits. The study concludes that though Data Envelopment Analysis measures the efficiency level, benchmarks and sources of inefficiency amongst DMUs but it does not measure the effect of each input variable in producing the present level of outputs. This two-step approach helps in determining the effect of each input variable on each output variable which further helps in critically examining sources of inefficiency.**

Key words- Efficiency, Data Envelopment Analysis (DEA), Public Sector Banks (PSBs), Decision Making Units (DMUs), Regression.

I. INTRODUCTION

Data Envelopment Analysis (DEA) is widely accepted and preferred technique for a comparative efficiency evaluation among similar entities called decision making units (DMUs), with multiple inputs and outputs.As per [13], DEA is a mathematical approach for synchronizing the relationships among several inputs and several outputs and is a sure method to measure performance of banks.In case of banking industry, the DEA computes the efficiency of a bank in relation to its peer group. It identifies the most efficient banks in a population and provides a measure of inefficiency for all others.

Since long Indian Banking Sector was dominated by public sector commercial banks and even today these banks are the most preferred destination of investment for depositors in India. Thus, efficiency of PSBs is one of the most interesting and important issues to strengthen the foundations of the banking system and to make it more suitable for the changing needs of the Indian economy.

The Present study estimates the changes in efficiency of public sector banks (PSBs) operating in India, for the period of sixteen years, from 1998 to 2013, using CCR model of DEA. In this analysis, all efficiency level of each bank under study is estimated for each year and on this basis, these banks are termed as 'efficient' or 'inefficient' for that year. Each Inefficient bank is assigned with a set of peer banks, called 'benchmarks', to be taken as close target for improvement. For an inefficient bank, its benchmarks are the efficient banks with same set of weights in DEA. Further, each inefficient bank is diagnosed for the sources of its inefficiency indicating that which input variable is over used (or which output is under produced) and by how much quantity, which is making the said bank inefficient. Further a new two-step approach is proposed to complement DEA with regression analysis. We examine the effect of each input variable on each output variables using Least Squares regression.

It was found that during the total time period under study, PSBs are efficient only for 51 percent observations and main source of inefficiency is over usage of inputs borrowings and deposits. Regression suggests that wage bills is greatly related to both the outputs.

This paper is set out as follows. The next section is based on the review of similar studies. Section three describes the methodology used in this paper along with description of data and the techniques used in paper. Fourth section explains the empirical findings of the paper and the last section briefly lists the conclusions of this study.

II. REVIEW OF RELATED LITERATURE

This section reviews some similar studies which are based on efficiency evaluation by DEA followed by regressing efficiency scores thus found against some bank specific or environmental variables.

[1] used Data Envelopment Analysis (DEA) for estimating cost and profit efficiencies, followed by Tobit Regression to identify potential influences of bank specific and environmental variables on efficiency measures, for 28 Chinese commercial banks, during 1995 to 2004. [6] used super slacks based DEA to estimate the scores of efficiencies followed by stochastic frontier regression model to estimate the external environment risk effects and then employed the DEA method again to estimate the efficiency scores of 29 banks in Taiwan for the period from 2002 to 2004. [11] used DEA to find cost and profit efficiency and examined the impact of financial deregulation on efficiency of all Indian commercial banks during the period 1992–2004. Further they explored the sources of (in)efficiency

using Tobit regression. [14] used DEA to estimate the technical, pure technical and scale efficiency scores of all banks operating in Malaysia, around Asian financial crisis (1997), in the period 1995-1999. Further, to substantiate the results of DEA approach, a multivariate Tobit Model is employed to relate bank efficiency level to a set of bank specific traits and other macroeconomic determinants. [2] used a bootstrapped DEA to identify the technical efficiency scores and then used a bootstrapped truncated regression model to analyse the relationship between the efficiency scores and environmental variables, for 9 Saudi banks, for 1999-2007. [15] employed DEA method to measure the cost efficiency followed by the panel regression analysis to examine the impact of origins on bank efficiency for multinational banks operating in Malaysia, from 1995 to 2007. [16] employed DEA based Malmquist Productivity Index (MPI) followed by the application of the least square method to regress the productivity scores, to analyse the productivity of Malaysian banking sector, during the period 1995-2004.[7] used DEA and used generalized linear models and a truncated regression model combined with bootstrapped confidence intervals to investigate the impact of regulatory and supervisory approaches on bank efficiency of commercial banks operating in the 22 European Union countries, during the period 2000-2008. [8] used DEA to estimate technical and scale efficiency followed by Panel Regression models using a Generalized Methods of Moments (GMM) to examine the determinants of interest rate margins in Latin America, based on 1700 bank observations, for the period, 1999-2006.[17] employed CCR model of DEA followed by panel regression analysis to regress the efficiency scores on a set of bank characteristics, on the Indonesian banking sector, taking a sample of 33 bank, during the period from 1999 to 2007. [9] used DEA to estimate efficiency scores and developed a truncated regression model to investigate the dynamics between the financial freedom counterparts of the economic freedom index and bank efficiency levels, based on 6744 bank observations of commercial banks operating in the 27 European Union member states, from 2001-2009. [10] used DEA to estimate cost efficiency scores and developed a fractional regression model to test the implications of financial freedom for bank efficiency, across US states, based on a sample of 3809 commercial banks per year on average, over 1987-2012. [12] used DEA to estimate efficiency scores and then regressed these scores on the indicators of target and acquiring banks to examine the effect of Mergers & acquisitions on bank efficiency, for 120 commercial banks from six emerging countries, from 2002 to 2009. [13] used the Slack-Based s (SBM) DEA to compute the profit efficiency, followed by multivariate panel regression analysis based on the Ordinary Least Square (OLS) and Generalized Least Square (GLS) methods to examine the determinants of banks profit efficiency and analysed the impact of global financial crisis on 31 commercial banks in Bangladesh, for 2004-2011. [18] used bootstrap DEA to analyse the efficiency of all Malaysian commercial banks, during 1999-2008 and used bootstrap regression to examine the impact of origins on bank efficiency. [19] used three major Fuzzy DEA models, with data specified in bounded forms in combination with the conditional bootstrapped truncated regression to analyse the efficiency of 13 Mozambican banks, from 2003 to 2011. [21] applied Dynamic Network DEA to estimate overall efficiency scores of Asean banking institutions, taking a sample of 138 Asean commercial banks, for the period 2007-2014 and then applied fixed-effects panel data Regression model to examine the relationship between EM and overall efficiency. [4] used DEA followed by Tobit Regression analysis to determine technical, allocative and cost efficiencies and the factors influencing the efficiency, for the period 2005-2013, of 27 conventional and 4 participation banks in Turkey. [20] used Network DEA for efficiency analysis and robust regression approaches such as Tobit, Simplex, and Beta to assess the determinants of mergers and acquisitions for 9 banks of South Africa, for 2003 to 2012.

All these studies consider some bank specific or environmental variables, other than input- output variables used for DEA, for regressing DEA efficiency scores. Some commonly used variables are listed in Table A.1.

III. METHODOLOGY

This section explains the research methodology followed in this study. Subsection *'A'* provides the detail of the data used in the study along with its sources. Subsection *'B'* discusses the CCR model of DEA and Subsection *'C'* explains the process of using regression analysis to complement the findings of DEA.

A.Data Base

The present study analyses the efficiency of 25 PSBs operating in India, using DEA, for the time period starting from FY 1998 through 2013. Table I gives the list of PSBs under study, considered as DMUs. Although there are total 27 PSBs, operating in India, but for the purpose of uniformity in data, the IDBI Bank and the Bhartiya Mahila Bank were eliminated as these banks were formulated in the year 2011 & 2015 respectively.

Table I

List of Banks under study	Groupwise List of Banks	
	Name of the Bank	*Group*
1	State Bank of India	SBI & Associates
2	State Bank of Bikaner and	
3	State Bank of Hyderabad	
4	State Bank of Mysore	
5	State Bank of Patiala	
6	State Bank of Travancore	

7	Allahabad Bank	Other Nationalized Banks
8	Andhra Bank	
9	Bank of Baroda	
10	Bank of India	
11	Bank of Maharashtra	
12	Canara Bank	
13	Central Bank of India	
14	Corporation Bank	
15	Dena Bank	
16	Indian Bank	
17	Indian Overseas Bank	
18	Oriental Bank of Commerce	
19	Punjab National Bank	
20	Punjab and Sind Bank	
21	Syndicate Bank	
22	UCO Bank	
23	Union Bank of India	
24	United Bank of India	
25	Vijaya Bank	

For the analysis, a non-parametric, input-oriented DEA CCR model has been used, with constant returns to scale, taking four inputs and two outputs. Inputs are considered to be Owned funds, Deposits, Borrowings and Wage bills. Whereas, outputs have been taken as, Spread and Other income. Table II gives the detailed description of the selected variables.

The data separately for each FY, from 1997-98 through 2012-13, corresponding to each PSB under study, related to selected input-output variables has been obtained from the Statistical Tables Relating to Banks in India, published by the Reserve Bank of India.

As per [3], for accuracy in DEA results, the number of DMUs should be greater than three times of total number of input variables and output variables. In present study, there are 400 observations (25 DMUs * 16 years) and the total number of input-output variables is six (4+2). Thus, this study observes well the property of minimal number of DMUs.

Correlation analysis presented in Table IV indicates significant positive relationship between the input and output variables. Thus, it is well justified to include these variables for the analysis.

Table II

Description of Input and Output Variables	**Variables With Their Description**	
	Variables	***Description***
Input Variables	Owned funds	Sum of Capital and Reserves
	Deposits	Total deposits
	Borrowings	Total Borrowings
	Wage Bills	Salaries to all employees
Output Variables	Spread	Interest Earned Minus Interest Expended
	Other Income	Sum of income from Commission, exchange & brokerage etc.

Table III

Descriptive Statistics of Input & Output Variables[a]	**Descriptive Statistics**				
	N	***Minimum***	***Maximum***	***Mean***	***Std. Deviation***
Owned Funds	400	2177.0	988837.0	57197.83	98725.56
Deposits	400	47686.0	12027396.00	852906.29	1292143.55
Borrowings	400	2.0	1691827.0	51514.33	147160.26
Wage Bills	400	1289.0	183809.0	11991.01	19325.68
Spread	400	0.0	443313.0	26146.32	44157.92
Other Income	400	522.0	160348.0	10831.73	18991.88

[a]All variables are measured in Million Indian Rupees.

B. CCR model of DEA

The CCR model of DEA, developed by Charnes, Cooper and Rhodes (1978), has an input orientation and assumes constant returns to scale. It measures and compares the efficiency of decision making units (DMUs) with similar inputs and outputs.

Consider 'n' DMUs, each with 'm' inputs and 's' outputs, where j[th] DMU, DMU_j , (j=1,2,….., n) uses input vector

$X_j = (x_{1j}, x_{2j}, \ldots\ldots, x_{mj})$ to produce output vector

$Y_j = (y_{1j}, y_{2j}, \ldots\ldots, y_{sj})$ for $X_j \geq 0,\ Y_j \geq 0$

For input weights vector $V = (v_1, v_2, \ldots, v_m)$ and output weights vector $U = (u_1, u_2, \ldots, u_s)$ each DMU_k has an optimization problem

$$\text{Maximize } \theta = u_1 y_{1k} + u_2 y_{2k} + \cdots + u_s y_{sk}$$

$$s.t. \quad v_1 x_{1k} + v_2 x_{2k} + \cdots + v_m x_{mk} = 1$$

$$u_1 y_{1j} + u_2 y_{2j} + \cdots + u_s y_{sj} \leq v_1 x_{1j} + v_2 x_{2j} + \cdots + v_m x_{mj}$$

$$for\ all\ j = 1,2,\ldots,n.$$

$$v_1, v_2, \ldots, v_m \geq 0\ ;\ u_1, u_2, \ldots, u_s \geq 0 \qquad \ldots (1)$$

Corresponding to $k = 1,2,\ldots,n$;equation (1) gives a set of 'n' optimization problems. Each problem is then solved for obtaining values of most favourable input weights $v_1, v_2, \ldots, v_m$ and output weights $u_1, u_2, \ldots, u_s$ for each corresponding DMU.

Table IV

Correlation Matrix	Input Output Variables					
	Owned Funds	*Deposits*	*Borrowings*	*Wage Bills*	*Spread*	*Other Income*
Owned Funds	1					
Deposits	.989**	1				
Borrowings	.951**	.938**	1			
Wage Bills	.957**	.958**	.927**	1		
Spread	.981**	.980**	.951**	.980**	1	
Other Income	.954**	.954**	.911**	.973**	.955**	1

** significance at 5% level

In the present study, PSBs are considered as DMUs and CCR model of DEA is applied separately for each financial year, on the data collected for the PSBs under study, to find comparative efficiency level of each PSB in each year. On the basis of DEA efficiency scores, PEBs are identified to be efficient or inefficient, year wise. Further, benchmarks and sources of inefficiency are found for inefficient PSBs.

C. Regression Analysis

We propose a new approach to use regression analysis for identifying the determinants of efficiency. The proposed approach is new in two ways.

Firstly, most of the related studies consider bank specific and environmental variables for regressing DEA efficiency scores. Commonly used variables for the purpose are listed in Table A.1. but, we strongly claim that as DEA is a comparative analysis and for banks operating in same environment, considering environmental variables should not be important. Moreover, all important bank specific variables have already been considered as input-output variables in DEA. Thus, we do not consider any bank specific or environmental variable for regression, other than input-output variables already considered for DEA.

Secondly, existing studies regress DEA efficiency scores by choosing DEA efficiency scores as dependent variable in regression, unlike this, we regress each output variable separately against all input variables, to identify main determinants of all output variables, as output variables are directly related to efficiency and increased outputs result in an obvious increase in efficiency.

Least Squares method was used to regress each output variable separately against all input variables.

IV. Empirical Results

This section gives the results of CCR model of DEA and Least Squares regression. Table A.2 gives the efficiency level of each bank under study, for each year, column wise. Last column gives the number of years, out of total 16 years, for which corresponding bank is efficient. Last two rows give the number of efficient banks and number of inefficient banks year wise. To summarize, out of total 400 observations, 204 are for efficient banks and 196 are for inefficient banks.

Table A.3 gives the detail of year wise benchmarks of inefficient banks. Analysis shows that State Bank of Bikaner and Jaipur as well as Corporation Bank are efficient in all years of study. Thus, these banks do not show any benchmark in this table.

Table A.4 explains the sources of inefficiency for each inefficient bank for each year. Analysis indicates that for all the inefficient banks, in all the years of study, there are 339 entries for sources of inefficiency, which comprises of frequency of input and output variables, given in Table V.

Table V

Frequency of Input-Output variables as source of Inefficiency			
Input Variables	**Frequency**	**Output Variables**	**Frequency**
Owned Funds	46	Spread	30
Borrowings	83	Other Income	56
Deposits	83		
Wage Bills	41		

Results reveal that ‘Borrowings’ and ‘Deposits’ are most frequent source of inefficiency, which indicates that these variables are required to be used more judicially and efforts should be made to create more outputs from proper utilization of these variables.

Further, Regression analysis is employed to determine the effect of each input variable on either of output variable separately. Thus, Least Squares panel regression analysis is executed twice. Results are given in Table VI and Table VII.

Table VI shows the results of output variable ‘Spread’ being regressed on all input variables and indicate that the variable ‘Wage Bills’ is largely related with the variable ‘Spread’.

Results of Least squares regression, taking ‘Other Income’ as dependent variable and all input variables as independent variables is given in Table VII. Analysis shows that the variable ‘Other Income’ is negatively related to the variable ‘Borrowings’. Also, it has a strong positive relation with the variable ‘Wage Bills’.

Table VI

Dependent Variable: Spread Method: Panel Least Squares Year: 1998- 2013 Total panel (balanced) observations: 400		
Variable	*Coefficient*	*t- Statistics*
Constant	50.7726	0.1263
Borrowings	0.0364	5.7976
Deposits	0.0072	4.7009
Owned Funds	0.1089	5.0119
Wage Bills	0.9886	18.8588

R-Squared: 0.9844 Adjusted R-Squared: 0.9843 Log Likelihood: -4013.011		

Table VII

Dependent Variable: Other Income Method: Panel Least Squares Year: 1998- 2013 Total panel (balanced) observations: 400		
Variable	*Coefficient*	*t- Statistics*
Constant	-998.1642	-3.3641
Borrowings	-0.011	-2.3672
Deposits	0.0009	0.8140
Owned Funds	0.0552	3.4393
Wage Bills	0.7051	18.2235
R-Squared: 0.9541 Adjusted R-Squared: 0.9536 Log Likelihood: -3891.553		

V. Conclusions

The objective of this study has been to estimate the efficiency changes of PSBs over the period of 16 years from 1998 to 2013 as well as to identify the causes of low efficiency and suggesting the ways for improvement. Using DEA, it is found that PSBs under study are efficient only in 51 percent of observations, which indicates a lot of room for improvement. Sources of inefficiency have been explored for each inefficient PSB and it is found that over utilization of input variables 'Borrowings' and 'Deposits' is the most prominent sources of inefficiency. Second main source of inefficiency is low productivity of output variable 'Other Income'. With a purpose of improvement in efficiency for each inefficient PSB, this study has provided with the benchmarks, which are the efficient banks, having same set of weights in DEA analysis.

This paper contributes to the existing literature by proposing a new approach of using regression analysis along with DEA, to identify the determinants of output variables among the input variables. It is found from the Least Squares regression analysis that 'Wage Bills' is the main determinant of both the output variables.

These findings suggest that efforts should be made to create more outputs by utilizing 'Borrowings' and 'Deposits' to improve the overall efficiency level of PSBs.

VII. References

[1] Ariff M. & Can L., (2008), Cost and profit efficiency of Chinese banks: A non-parametric analysis, China Economic Review 19, 260–273.

[2] Assaf A.G., Barros C.P. & Matousek R., (2011), Technical efficiency in Saudi banks, Expert Systems with Applications 38, 5781–5786.

[3] Barros, C. P., Gonçalves, O. & Peypoch, N. (2012). French regional public airports technical efficiency. International Journal of Transport Economics, 39(2), 255–274.

[4] Batir T.E., Volkman D.A. & Gungor B., (2017), Determinants of bank efficiency in Turkey: Participation banks versus conventional banks, Borsa Istanbul Review xx, 1-11.

[5] Charnes A., Cooper W.W. & Rhodes E., (1978), Measuring the efficiency of decision making units, European Journal of Operational Research, 2, 429-44.

[6] Chiu Y.H. & Chen Y.C., (2009), The analysis of Taiwanese bank efficiency: Incorporating both external environment risk and internal risk, Economic Modelling 26, 456–463.

[7] Chortareas G.E., Girardone C. & Ventouri A., (2012), Bank supervision, regulation, and efficiency: Evidence from the European Union, Journal of Financial Stability 8, 292– 302.

[8] Chortareas G.E., Garza-Garcia J.G. & Girardone C., (2012), Competition, efficiency and interest rate margins in Latin American banking, International Review of Financial Analysis 24, 93–103.

[9] Chortareas G.E., Girardone C. & Ventouri A., (2013), Financial freedom and bank efficiency: Evidence from the European Union, Journal of Banking & Finance 37, 1223–1231.

[10] Chortareas G., Kapetanios G. & Ventouri A., (2016), Credit market freedom and cost efficiency in US state banking, Journal of Empirical Finance 37, 173–185.

[11] Das A. & Ghosh S., (2009), Financial deregulation and profit efficiency: A nonparametric analysis of Indian banks, Journal of Economics and Business 61, 509–528.

[12] Du K. & Sim N., (2016), Mergers, acquisitions, and bank efficiency: Cross-country evidence from emerging markets, Research in International Business and Finance 36, 499–510.

[13] Kamarudin F., Sufian F. & Nassir A.M., (2016), Global financial crisis, ownership and bank profit efficiency in the Bangladesh's state owned and private commercial banks, Contaduría y Administración 61, 705–745.

[14] Seiford, L.M. & Zhu, J. (1999), Profitability and marketability of the top 55 US commercial banks, Management Science, 45, 1270-88.

[15] Sufian F. (2009), Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia, Research in International Business and Finance 23, 54–77.

[16] Sufian F., (2011a), An exploration into the home field, global advantage and liability of unfamiliarness hypotheses in multinational banking, IIMB Management Review 23, 163-176.

[17] Sufian F. (2011b), Banks total factor productivity change in a developing economy: Does ownership and origins matter? Journal of Asian Economics 22, 84–98.

[18] Sufian F. & Habibullah M.S., (2012), Globalization and bank efficiency nexus: Symbiosis or parasites? Review of Development Finance 2, 139–155.

[19] Sufian F., Kamarudin F. & Nassir A.M., (2016), Determinants of efficiency in the Malaysian banking sector: Does bank origins matter? Intellectual Economics10, 38–54.

[20] Wanke P., Barros C.P. & Emrouznejad A., (2016), Assessing productive efficiency of banks using integrated Fuzzy-DEA and bootstrapping: A case of Mozambican banks, European Journal of Operational Research 249, 378–389.

[21] Wanke P., Maredza A. & Gupta R., (2017), Merger and acquisitions in South African banking: A network DEA model, Research in International Business and Finance 41, 362–376.

[22] Wu Y.C., Ting I.W.K., Lu W.M., Nourani M. & Kweh Q.L., (2016), The impact of earnings management on the performance of ASEAN banks, Economic Modelling 53, 156–165.

[23] Kaur R. & Aggarwal M., (2015), DEA as a tool to measure bank efficiency: a study of public sector banks in India, International Journal of Mathematics and Computer Applications Research, Vol. 5, Issue 2, Apr, 53-64.

[24] Kaur R. & Aggarwal M., (2016), Mathematical Modelling of Malmquist TFP Index as applicable in Banks: A Study of its Origin and Development, IOSR journal of business and management, Special Issue AETM'16.

[25] Kaur R. & Aggarwal M., (2017), Performance measurement with data envelopment analysis: an application to Indian public sector banks, International journal of science, technology and management, Vol 6, Issue 1, Jan.

Authors Profile

Reshampal Kaur, M.Sc. (Mathematics), UGC-NET, is a research scholar of Panjab Technical University, Jalandhar, pursuing Ph. D. in Stream of Applied Sciences, in the Discipline of Mathematics, with an area of research in Operations Research.

Monika Aggarwal, MBA, M.Com, Ph.D from Guru Nanak Dev University, Amritsar, is working as Associate Professor, University Institute of Applied Management Sciences, Panjab University, Chandigarh. She is a certified financial education trainer with Securities and Exchange Board of India. She has also delivered numerous training programmes for mutual funds, banks, educational institutions etc. A recipient of Dr S. Radhakrishnan Post Doctoral Fellowship UGC, New Delhi, she has completed FDP from IIMB, Bangalore and ISB, Mohali. She has 32 research papers, 4 text books, 4 edited books to her credit and presented her research work in India and abroad including London and Bangkok.

ANNEXURE: TABLE A.1
TABLE A.2

TABLE A.

Table A.1: Commonly Used Variables for Regressing DEA Efficiency Scores	
Bank Specific Variables	**Environmental Variables**
Number of variables	Financial freedom
Total business	Government spending
Return on investment	Property rights
Deposit per employee	Index of economic freedom
Credit per employee	Economic growth (log of gross domestic products)
Interest income/ avg. working funds	Inflation (log of rate of inflation)
Non-interest income/ avg. working funds	z-score index
Credit /deposit ratio	Yearly growth of GDP (%)
Return on assets	Inflation (yearly increase of consumer price index (%)
Natural logarithm of total deposits	Log of z-score
Total loans over total assets	The three largest banks asset concentration ratio
log of total assets	
Credit risk (Loan loss provisions over total loans)	
Non-interest income over total assets	
Non-interest expense over total assets	
Total book value of shareholders divided by total assets	
Size (log of assets)	
Share in total deposits of all banks	
Shareholder's equity/total assets	
Return on average equity	
Log of total assets	
Credit risk (log of Loan loss provisions over total loans)	
Diversification (log of non-interest income over total assets)	
Capitalization (log of equity/total assets)	
Overhead expense (log of non-interest expense/ total assets)	
Liquidity (log of total loans/total assets)	
Diversification (non-interest income over total assets)	
Capital adequacy (Total equity/total assets)	
Total deposit / total assets	
Loan quality (non-performing loans / total loans)	
Total Loans/ total deposits	

Table A.2: DEA Efficiency Scores (%)

DMUs	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Number of Efficient Years (out of 16)
State Bank of India	95.4	100	83.8	80.6	87.3	81.9	83.6	88	100	94.6	100	100	100	100	100	100	8
State Bank of Bikaner and Jaipur	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	16
State Bank of Hyderabad	100	100	100	100	100	100	100	85.8	89.9	100	100	95.9	100	100	100	100	13
State Bank of Mysore	100	100	100	100	100	100	100	100	100	100	100	90.5	100	100	89.5	100	14
State Bank of Patiala	100	100	100	100	100	100	100	100	94.7	89.5	100	91.8	99.5	100	96.9	93	10
State Bank of Travancore	100	100	100	100	95	100	100	100	100	100	98.5	100	100	89.9	93.5	94.6	11

Allahabad Bank	100	100	100	95.9	100	100	100	100	100	100	98.2	100	100	94.2	95.8	88.7	11
Andhra Bank	85.5	84	91.2	81.1	90.8	100	100	100	92	98.8	100	93.4	100	100	100	98.7	7
Bank of Baroda	78.8	91.4	85.3	83.2	77.2	89.2	93.7	88.6	84.1	90	89.9	94.5	91.8	94.9	100	100	2
Bank of India	79.3	83.2	76.3	80.5	89.2	94.1	88.7	72.7	86	95.4	98.3	100	88.9	82.8	91	95.7	1
Bank of Maharashtra	85.9	88.9	95.2	100	100	93.2	81.4	75.8	96.5	100	100	99.3	95.6	89.4	97.8	95.2	4
Canara Bank	88.1	94.9	82	84.2	100	100	100	100	100	91.3	100	87.2	100	96.9	100	85.7	8
Central Bank of India	90.4	84.6	74.7	75.2	94.3	100	100	100	100	100	100	78.7	94.8	84.9	77.4	74.1	6
Corporation Bank	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	16
Dena Bank	93.4	87.3	74.8	69.5	95.6	100	100	84.1	100	100	100	100	100	100	96.7	93.7	8
Indian Bank	59.9	60.6	62.1	67.4	82.7	79	96.2	88.6	89.6	100	100	100	100	100	100	100	7
Indian Overseas Bank	71.9	82.2	100	100	100	100	100	100	100	100	100	98.9	87.4	86.1	85	88.2	9
Oriental Bank of Commerce	95.5	100	100	100	100	100	100	100	100	100	99.6	100	100	100	100	100	14
Punjab National Bank	100	100	84.6	88.2	95.2	100	100	87.7	93.1	100	100	100	100	100	99	100	10
Punjab and Sind Bank	75.4	81.4	75.3	88.2	89.5	100	100	100	100	100	94.1	91.1	90.5	78.7	66.6	79.8	5
Syndicate Bank	96.5	100	100	100	100	100	98.3	91.8	99.9	96.7	91.5	93.2	97.2	100	100	96.2	7
UCO Bank	55.3	62.6	67.4	67.2	82.9	86.1	90.3	78.4	90	94	95.6	91.4	89.6	99.5	89.3	100	1
Union Bank of India	88.8	100	58.6	84	100	94.9	87.8	87.2	100	100	100	100	100	89.7	100	96.4	8
United Bank of India	71.5	59.1	52.4	56.1	76.3	96.3	100	100	97.4	88.6	69	76.4	100	89.2	92	100	4
Vijaya Bank	68.9	76.5	87.2	88.6	95.5	94.9	100	100	100	100	89.4	99.4	99.9	85.7	78.9	74.7	4
No. of Efficient Banks	8	12	10	10	12	16	17	14	14	16	15	11	15	12	11	11	
No. of Inefficient Banks	17	13	15	15	13	9	8	11	11	9	10	14	10	13	14	14	
Total No. of Observations = 400; Efficient = 204 ; Inefficient = 196																	

Table A.3: Year wise Benchmarks of Inefficient Banks 1998-2013

Abbreviations Used: State Bank of India (SBI); State Bank of Bikaner and Jaipur (SBBJ); State Bank of Hyderabad (SBHY); State Bank of Mysore (SBMY); State Bank of Patiala (STBP); State Bank of Travancore (SBT); Allahabad Bank (ALLB);Andhra Bank (ANDB); Bank of Baroda (BOB); Bank of India (BOI); Bank of Maharashtra (MAHB); Canara Bank (CB); Central Bank of India (CBIN); Corporation Bank (COB); Dena Bank (DB); Indian Bank (IDIB); Indian Overseas Bank (IOB); Oriental Bank of Commerce (OBC); Punjab National Bank (PNB); Punjab and Sind Bank (PSIB); Syndicate Bank (SYNB); UCO Bank (UCB); Union Bank of India (UBIN); United Bank of India (UTBI); Vijaya Bank (VB).

DMUs	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
State Bank of India	SBBJ: 10.98 SBT:6. 226 COB:0 .745		SBHY :9.748 SBMY :4.898 STBP: 1.014	SBBJ: 5.776 SBHY :9.105	SBMY :3.603 STBP: 7.154 MAH B:5.53	SBMY :11.06 OBC:3 .532 PNB:0 .463	SBBJ:4 .216 SBMY: 10.579 ANDB: 1.21 OBC:1. 55	SBBJ: 11.317 SBT:1. 515 COB:0 .28 VB:2. 476		SBBJ: 5.151 IDIB:4 .311 PSIB:3 .23						
State Bank of Bikaner and Jaipur																
State Bank of Hyderabad								SBBJ: 0.111 SBT:0. 474 COB:0 .1	SBMY :0.397 DB:0. 341 IOB:0. 126			SBBJ: 0.343 SBT:0 .53 COB: 0.242				

								VB:0.333	VB:0.272							
State Bank of Mysore												SBBJ:0.19			IDIB:0.152	
State Bank of Patiala									SBT:0.277 COB:0.374 VB:0.195	SBHY:0.15 COB:0.145 UBIN:0.232		SBBJ:0.165 ALLB:0.16 COB:0.262 DB:0.147	SBHY:0.11 SBMY:0.115 UBIN:0.283		SBHY:0.528	SBBJ:0.74 COB:0.119
State Bank of Travancore					SBHY:0.349 IOB:0.198						SBMY:0.643 MAHB:0.333			SBHY:0.401 STBP:0.218	SYNB:0.079	SBBJ:0.694 UTBI:0.139
Allahabad Bank				STBP:0.178 SBT:1.114 IOB:0.151							CB:0.281 COB:0.48			SBHY:0.935 IDIB:0.253	SBBJ:1.223 ANDB:0.587	SBBJ:0.342 SBHY:0.707 COB:0.113 UTBI:0.335
Andhra Bank	SBBJ:0.347 STBP:0.445 COB:0.114	SBHY:0.608 SBT:0.114	SBHY:0.588 SBT:0.385	SBHY:0.738	SBHY:0.525 MAHB:0.39				COB:0.236 DB:0.147 IOB:0.298	SBHY:0.633		SBT:0.793 COB:0.129				SBHY:0.166 SBMY:1.122 UCB:0.227
Bank of Baroda	SBHY:1.542 SBMY:0.354 COB:1.646	SBHY:1.524 STBP:0.364 OBC:1.058	SBHY:0.442 STBP:2.975	SBHY:1.603 STBP:1.201 OBC:0.293	SBHY:2.043 SNMY:0.231 STBP:0.729	SBMY:0.448 STBP:0.81 ALLB:0.263 CB:0.471	SBMY:0.401 ALLB:0.861 VB:1.666	SBBJ:0.718 SBT:0.751 COB:0.405 IOB:0.66	SBBJ:1.243 SBMY:0.62 COB:1.198	SBHY:1.796 ALLB:0.247 PSIB:1.014	SBMY:0.476 CB:0.18 COB:0.409 DB:0.502 IDIB:0.922	SBBJ:2.609 IDIB:0.461	SBMY:1.19 ALLB:0.975 PNB:0.171 UBIN:0.104	SBHY:1.238 COB:0.558 IDIB:0.215 OBC:0.662		
Bank of India	SBHY:1.492 SBT:1.189 COB:0.957	SBHY:2.179 COB:0.477 OBC:0.371	SBBJ:0.607 SBHY:2.279 COB:0.165	SBBJ:1.058 SBHY:1.775 SBMY:0.571	SBMY:2.504 MAHB:0.33 OBC:0.882	ANDB:2.531 COB:0.215	SBHY:0.591 SBT:1.124 ANDB:0.48 DB:0.843	SBBJ:0.513 SBT:1.486 ANDB:0.325	SBMY:1.9 SBT:1.184 COB:0.276	SBMY:4.804	SBMY:1.962 IDIB:0.431 UBIN:0.644		SBHY:1.145 ALLB:0.243 ANDB:0.559 PNB:0.207	SBHY:1.869 STBP:1.056	SBHY:0.362 COB:1.26	SBBJ:0.418 SBMY:0.154 COB:1.619
Bank of Maharashtra	SBMY:1.045 STBP:0.37	SBHY:0.659 SYNB:0.12	SBHY:0.414 SBMY:0.543 IOB:0.146			SBMY:0.439 SBT:0.247 OBC:0.106	SBT:0.646 OBC:0.181	SBBJ:0.406 SBT:0.533	SBT:0.106 IOB:0.316 VB:0.223			SBT:0.171 DB:0.975	SBBJ:0.79 SBMY:0.116	SBBJ:0.776 DB:0.132	SYNB:0.318	SBBJ:0.866 SBMY:0.355
Canara Bank	SBT:2.745 ALLB:0.199 COB:1.078	SBHY:2.263 COB:0.547 OBC:0.515	SBBJ:0.369 SBHY:2.465 COB:0.36	SBHY:2.977 SBMY:0.351						SBHY:1.92 DB:0.722 OBC:0.458		SBT:0.845 BOI:0.453 UBIN:0.296		COB:0.435 IDIB:1.5		SBMY:1.121 COB:0.285 OBC:0.134 UTBI:1.694
Central Bank of India	STBP:2.129 PNB:0.21	PNB:0.62	SBHY:0.373 STBP:2.154	SBHY:0.48 SBMY:1.188 STBP:1.268	SBHY:0.264 SBMY:1.069 IOB:0.627 SYNB:0.377							SBBJ:0.431 ALLB:0.245 DB:1.26	COB:0.458 DB:1.787	SBBJ:1.613 PNB:0.188	SBBJ:1.113 SYNB:0.27	SBBJ:1.527 SBHY:0.172 SBMY:0.548
Corporation Bank																

Dena Bank	SBBJ: 0.119 SBHY :0.553 SBMY :0.463 COB:0 .18	SBHY :0.533 STBP: 0.412	SBHY :0.608 SBMY :0.216	SBHY :0.163 SBMY :0.606 STBP: 0.238	SBBJ: 0.626			SBBJ: 0.356 SBT:0. 398							SBHY :0.304 ANDB :0.17	SBMY :0.21 COB:0 .124 UCB:0 .319
Indian Bank	SBBJ: 0.598 SBT:0. 669 COB:0 .036	SBBJ: 0.683 COB:0 .264	SBBJ: 1.041 COB:0 .17	SBBJ: 0.895 SBHY :0.289	SBBJ: 1.04 SBMY :0.533 COB:0 .17	SBMY :0.809 STBP: 0.151 ALLB: 0.306	SBMY: 1.316 PSIB:0. 579 UTBI:0 .299	SBBJ: 0.453 SBT:0. 174 COB:0 .108 IOB:0. 341	SBBJ: 0.753 SBMY :0.113 SBT:0. 494							
Indian Overseas Bank	SBHY :0.608 SBMY :1.129	SBHY :0.409 SBMY :0.87 SYNB :0.201										BOI:0. 496	ANDB :0.276 PNB:0 .302	STBP: 1.385 ANDB :0.114 OBC:0 .145	SBHY :0.786 COB:0 .2	SBBJ: 0.502 COB:0 .246 UTBI: 0.503
Oriental Bank of Commerce	COB:1 .128										ANDB :0.461 COB:0 .73					
Punjab National Bank			SBHY :2.81 IOB:0. 106 SYNB :0.1	SBHY :2.373 SBMY :1.845	SBHY :2.157 SBMY :2.449 STBP: 0.163			SBBJ: 3.01 IOB:0. 692	SBBJ: 2.432 COB:1 .24 IOB:0. 354						SBI:0. 148 SBHY :0.255 ANDB :1.081 COB:0 .497 IDIB:0 .115	
Punjab and Sind Bank	SBBJ: 0.408 COB:0 .266	SBHY :0.45 SBT:0. 133	SBHY :0.281 SBMY :0.408	SBMY :0.422 SBT:0. 41	SBBJ: 0.181 SBMY :0.745						IDIB:0 .374	SBT:0 .374	SBBJ: 0.737 ANDB :0.132	SBBJ: 0.13 IDIB:0 .142 SYNB :0.126	SBBJ: 0.551	SBHY :0.25
Syndicate Bank	STBP: 1.75						SBT:0. 63 CBIN:0 .334 PSIB:0. 497	SBT:0. 581 IOB:0. 364 PSIB:0 .749	SBMY :0.255 CBIN: 0.624 DB:0. 33	SBT:0. 443 MAH B:0.57 DB:0. 619 VB:0. 461	SBMY :0.109 MAH B:0.94 DB:0.7 04 UBIN: 0.114	SBT:1 .875	SBBJ: 2.261			SBBJ: 2.082
UCO Bank	SBBJ: 1.008 SBT:0. 191	SBHY :0.815 SBMY :0.275	SBMY :0.746 STBP: 0.655	SBBJ: 0.865 SBHY :0.134 STBP: 0.307	SBBJ: 0.473 SBMY :1.677 COB:0 .13	SBMY :0.861 ALLB: 0.166 IOB:0. 105 PSIB:0 .699	SBT:0. 489 CBIN:0 .198 IOB:0. 267	SBT:1. 189 PSIB:0 .596	SBT:0. 972 CBIN: 0.268	SBBJ: 0.723 SBT:0. 766	SBBJ: 1.092 SBMY :0.189 DB:0.3 71	SBBJ: 1.767	SBBJ: 1.728 SBMY :0.143	SBBJ: 0.325 IDIB:0 .395 SYNB :0.382	SBHY :0.292 ANDB :0.755	
Union Bank of India	STBP: 1.839 COB:0 .422		SBHY :0.931 STBP: 0.538	SBHY :1.842 STBP: 0.129		SBT:0. 78 ALLB: 0.179 CB:0.1 59 OBC:0 .429	IOB:0. 56 OBC:0. 578	SBT:0. 547 VB:1. 54						SBBJ: 0.177 SBHY :0.394 STBP: 1.699 IDIB:0 .183		SBBJ: 1.463 SBMY :1.077 COB:0 .527
United Bank of India	SBBJ: 0.382 STBP: 0.741	SBHY :0.217 OBC:0 .106 PNB:0 .11	STBP: 0.863	SBHY :0.162 STBP: 0.676	SBBJ: 0.84 SBMY :0.605	ALLB: 0.716 DB:0. 104			SBMY :0.183 DB:0. 551 IOB:0. 247	SBHY :0.286 MAH B:0.17 PSIB:0 .37	SBBJ: 0.51 DB:0.2 67	SBT:0 .323 DB:0. 518		SBHY :0.279 STBP: 0.311 OBC:0 .155	SBHY :0.489	
Vijaya Bank	SBBJ: 0.119 STBP: 0.612	SBHY :0.28 STBP: 0.431	STBP: 0.709	SBHY :0.526 SBMY :0.422	SBHY :0.303 SBMY :0.396 IOB:0. 162	SBMY :0.834 CBIN: 0.15					SBHY: 0.575 STBP: 0.239	SBBJ: 0.482 ALLB :0.233 DB:0. 36	SBBJ: 0.38 IDIB:0 .214	SBBJ: 0.123 DB:0. 601 IDIB:0 .166	ANDB :0.275	SBBJ: 0.243 COB:0 .173

Table A.4: Year wise Sources of Inefficiency of Inefficient Banks Abbrv. Used: BR (Borrowings); DP (Deposits); OF (Owned Funds); WB (Wage Bills); SP (Spread); OI (Other Income)		
1998	State Bank of India	OF 25701.361, BR 56620.843
1998	Andhra Bank	OF 1002.768, BR 1121.078
1998	Bank of India	BR 7970.195
1998	Bank of Maharashtra	OF 2997.282, BR 78.098, OI 439.625
1998	Canara Bank	DP 2567.589, SP 1651.58
1998	Central Bank of India	OF 8338.785, WB 776.632, SP 758.576
1998	Dena Bank	BR 174.784
1998	Indian Bank	OF 12072.633, SP 2700.042
1998	Indian Overseas Bank	DP 32657.171, BR 602.336, OI 54.707
1998	Oriental Bank of Commerce	DP 5577.377, OI 472.872
1998	Punjab And Sind Bank	OF 2007.785, SP 151.664
1998	Syndicate Bank	OF 3405.572, WB 1030.99, SP 1634.779
1998	UCO Bank	OF 10570.391, BR 122.564, SP 72.004
1998	Union Bank of India	DP 22936.565; OI 335.456
1998	United Bank of India	OF 7552.809; BR 228.081
1998	Vijaya Bank	OF 955.959; BR 699.188
1999	Andhra Bank	DP 4512.712; BR 244.402
1999	Bank of Baroda	OF 725.602
1999	Bank of India	DP 15998.047; BR 20463.529
1999	Bank of Maharashtra	WB 20.935; OI 573.659
1999	Canara Bank	DP 2550.748; BR 8386.686
1999	Central Bank of India	OF 9637.949; WB 234.346
1999	Dena Bank	BR 3654.329; OI 129.523
1999	Indian Bank	OF 11032.647; SP 1922.53
1999	Indian Overseas Bank	DP 41444.416
1999	Punjab And Sind Bank	DP 14131.55; BR 357.968
1999	UCO Bank	OF 11791.569; WB 236.231; OI 7.201
1999	United Bank of India	OF 7142.445; OI 50.47
1999	Vijaya Bank	OF 702.634; OI 75.947
2000	State Bank of India	OF 19814.942; BR 36002.424
2000	Andhra Bank	DP 18395.115; WB 44.013
2000	Bank of Baroda	DP 57597.14
2000	Bank of India	BR 9066.1; SP 1933.523
2000	Bank of Maharashtra	DP 4253.976; OI 538.303
2000	Canara Bank	BR 4928.456; SP 1475.779
2000	Central Bank of India	WB 1851.816; OI; 216.613
2000	Dena Bank	OF 1132.436; BR 3448.608
2000	Indian Bank	OF 10585.195; BR 338.709; SP 868.265
2000	Punjab National Bank	WB 1678.683; OI 803.555
2000	Punjab And Sind Bank	DP 10481.122; WB 62.038
2000	UCO Bank	OF 10231.226; WB 141.687

2000	Union Bank of India	DP 5361.955; OI 454.911
2000	United Bank of India	OF 3569.453; BR 43.035; WB 200.901; OI25.811
2000	Vijaya Bank	WB 615.665; OI 265.115
2001	State Bank of India	OF 3194.607; BR 75174.858
2001	Allahabad Bank	DP 1849.727; OI 494.598
2001	Andhra Bank	DP 23707.798; BR 448.775; OI 276.693
2001	Bank of Baroda	BR 5411.326; OI 382.261
2001	Bank of India	BR 11293.792; SP 923.346
2001	Canara Bank	DP 28922.086; BR 8934.903; SP 471.133
2001	Central Bank of India	OI 920.368
2001	Dena Bank	BR 1327.406
2001	Indian Bank	OF 10929.733; SP 1336.832
2001	Punjab National Bank	BR 360.924; OI 2245.391
2001	Punjab And Sind Bank	DP 12375.669; WB 51.051
2001	UCO Bank	OF 8514.853; BR 2168.103
2001	Union Bank of India	BR 840.817; OI 2460.936
2001	United Bank of India	OF 3423.453; BR 512.077
2001	Vijaya Bank	OI 693.812
2002	State Bank of India	BR 44901.235; OI 2590.1
2002	State Bank of Travancore	DP 2285.59; OI 53.151
2002	Andhra Bank	DP 208.632; OI 106.397
2002	Bank of Baroda	BR 2408.369
2002	Bank of India	DP 5056.488; BR 21106.233
2002	Central Bank of India	OI 1824.149
2002	Dena Bank	SP 846.787
2002	Indian Bank	OF 21444.452; SP 2528.752
2002	Punjab National Bank	OI 4284.867
2002	Punjab And Sind Bank	DP 27112.888; WB 191.695; SP 68.199
2002	UCO Bank	OF 10793.477; SP 1117.133
2002	United Bank of India	OF 6533.241; WB 1084.371; SP 9.713
2002	Vijaya Bank	OI 1036.229
2003	State Bank of India	DP 23619.66; BR 8950.368
2003	Bank of Baroda	OF 3121.242
2003	Bank of India	DP 26825.725; BR11099.77; SP 397.801
2003	Bank of Maharashtra	DP 35611.398
2003	Indian Bank	OF 29275.229
2003	UCO Bank	DP 19097.225
2003	United Bank of India	OF 9372.77; WB 506.21
2004	State Bank of India	BR 43284.861
2004	Bank of Baroda	OF 9088.997
2004	Bank of India	BR 25535.374
2004	Bank of Maharashtra	DP 6098.458; BR 506.753
2004	Indian Bank	OF 37058.204; WB 490.437
2004	Syndicate Bank	DP 26718.317

2004	UCO Bank	DP 32833.465
2004	Union Bank of India	DP 5748.664; BR 74.507
2005	State Bank of India	BR 77742.148
2005	State Bank of Hyderabad	BR 2283.393
2005	Bank of Baroda	OF 2665.699
2005	Bank of India	BR 33798.72
2005	Bank of Maharashtra	BR 2282.214; OI 516.6
2005	Dena Bank	BR 115.518; OI 326.056
2005	Indian Bank	OF 32683.796
2005	Punjab National Bank	OF 11830.585; OI 2746.954
2005	Syndicate Bank	OI 1241.837
2005	UCO Bank	DP 16384.161; BR 817.254; OI 1225.652
2005	Union Bank of India	BR 6650.913; OI 343.894
2006	State Bank of Patiala	DP 44887.595
2006	Andhra Bank	OF 2165.995
2006	Bank of Baroda	OF 614.753
2006	Bank of India	DP 98215.114; BR 21231.354
2006	Bank of Maharashtra	DP 10686.138; OI 2193.486
2006	Punjab National Bank	BR 9356.768; OI 1079.089
2006	Syndicate Bank	DP 642.658; WB 467.701
2006	UCO Bank	DP 60125.556; WB 566.87; OI 1093.909
2006	United Bank of India	OF 876.416; WB 1420.329
2007	State Bank of India	BR 225496.633; WB 441.279
2007	State Bank of Patiala	DP 10975.711
2007	Andhra Bank	OF 3460.068
2007	Bank of Baroda	OF 4223.619
2007	Bank of India	DP 69919.548; BR 14477.403; SP 364.755
2007	Canara Bank	OF 8397.308
2007	Syndicate Bank	DP 84728.746
2007	UCO Bank	DP 148589.502; WB 990.145
2008	State Bank of Travancore	BR 14383.442
2008	Allahabad Bank	OF 1251.025; SP 273.448
2008	Bank of India	OF 7167.138
2008	Oriental Bank of Commerce	OF 11681.228; DP 142952.455; OI 1718.538
2008	Punjab And Sind Bank	BR 23034.677; WB 260.32; OI 649.865
2008	Syndicate Bank	DP 91553.262
2008	UCO Bank	DP 214025.62; WB 1660.328
2008	United Bank of India	WB 235.89
2008	Vijaya Bank	DP 24143.415; BR 4769.944; SP 230.121
2009	State Bank of Hyderabad	DP 62907.268; BR 10698.057
2009	State Bank of Mysore	BR 9848.656; SP 94.84
2009	State Bank of Patiala	DP 92947.932
2009	Bank of Baroda	SP 2657.674
2009	Bank of Maharashtra	DP 27529.059; WB 362.165; OI 171.247

2009	Canara Bank	BR 189.913
2009	Central Bank of India	DP 114172.211; SP 1162.748
2009	Indian Overseas Bank	BR 14489.049; WB 2315.301
2009	Punjab And Sind Bank	BR 18378.898; WB 693.371; OI 276.493
2009	Syndicate Bank	DP 220299.56; BR 3264.931; OI 2907.881
2009	UCO Bank	DP 222808.154; BR 4968.1; WB 973.398; SP 3049.685
2009	United Bank of India	WB 345.701
2009	Vijaya Bank	DP 268.598; SP 2924.791
2010	State Bank of Patiala	DP 35598.083; OI 262.312
2010	Bank of Baroda	DP 115337.377
2010	Bank of India	BR 58008.692
2010	Bank of Maharashtra	DP 141347.266; WB 742.489
2010	Central Bank of India	DP 194842.287; WB 142.317; SP 2915.394
2010	Indian Overseas Bank	BR 4103.555; WB 9839.861; OI 2139.249
2010	Punjab And Sind Bank	DP 2218.04; BR 3797.544; OI 1455.792
2010	Syndicate Bank	DP 95331.895; BR 50980.571; WB 1649.044; OI 1502.726
2010	UCO Bank	DP 225758.857; OI 1255.666
2010	Vijaya Bank	DP 125636.454
2011	State Bank of Travancore	DP 6222.703; BR 17512.102
2011	Allahabad Bank	DP 46877.531
2011	Bank of Baroda	BR 15124.685
2011	Bank of India	DP 92321.405; BR 29375.485
2011	Bank of Maharashtra	WB 1821.953; OI 1420.677
2011	Canara Bank	DP 456534.416; SP 6457.262
2011	Central Bank of India	WB 2607.945; OI 5195.751
2011	Indian Overseas Bank	BR 79127.954; OI 635.643
2011	Punjab And Sind Bank	DP 15171.016
2011	UCO Bank	DP 334615.008; OI 994.341
2011	United Bank of India	DP 19633.289; OI 213.852
2011	Vijaya Bank	WB 1293.943; OI 622.732
2012	State Bank of Mysore	BR 2231.312
2012	State Bank of Patiala	DP 80469.5; BR 54050.426
2012	State Bank of Travancore	DP 182875.112; BR 18882.826; WB 6.847
2012	Allahabad Bank	DP 89585.567; OI 53.509
2012	Bank of India	SP 388.282
2012	Bank of Maharashtra	DP 29645.454; BR 7854.123; WB 1345.454
2012	Central Bank of India	DP 87293.803
2012	Dena Bank	DP 141814.879
2012	Indian Overseas Bank	DP 48825.933; BR 73325.145
2012	Punjab And Sind Bank	DP 6043.666; WB 22.9
2012	UCO Bank	DP 261985.409; BR 33802.005
2012	United Bank of India	DP 78037.813
2012	Vijaya Bank	DP 59773.173
2013	State Bank of Patiala	DP 38910.79; BR 20663.2

2013	State Bank of Travancore	DP 159256.881; BR 35273.307; WB 211.553
2013	Allahabad Bank	DP 13911.857
2013	Andhra Bank	BR 35841.377
2013	Bank of India	BR 18118.852
2013	Bank of Maharashtra	BR 52398.03
2013	Canara Bank	OF 20771.689
2013	Central Bank of India	BR 10784.56
2013	Dena Bank	BR 22922.484
2013	Indian Overseas Bank	BR 48488.611
2013	Punjab And Sind Bank	DP 58192.152; OI 316.004
2013	Syndicate Bank	DP 248081.284; OI 3652.872
2013	Union Bank of India	BR 34464.65
2013	Vijaya Bank	DP 44135.743