Impact of Size on The Operational Efficiency of Public Sector Banks in India – A Statistical Analysis

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ABSTRACT   Though the consolidation of banking sector has been debated since financial sector reforms in early nineties, it is gaining ground during the current decade and is one of the emerging trends in the banking sector. A study of the relationship between the size and the operational efficiency of the public sector banks is attempted in this paper. The present study is on the 20 public sector banks based on the secondary data for the last five year period 2009-10 to 2013-14.

Cost to Income Ratio (CIR) is taken as a measure of operational efficiency and size of assets of the bank as measured by log of assets is taken as dependent variable. Though data analysis of all the 20 banks revealed negative correlation between CIR and log of assets indicating positive impact of size on operational efficiency, the strength of the relationship is not so strong.

Introduction:

Right from the age of Presidency Banks, the Indian banking sector has witnessed consolidation to enhance competitiveness. In fact, India's largest bank, the State Bank of India, is a product of mergers of the Presidency Banks. The consolidation of the Indian Banks in the public sector has been gaining ground during the past few years with intent to form a few larger banks. The objective of consolidation is to have banks that could have the resilience against rough weather in the path of growth and adverse external economic conditions in the world now and then.

It is well established that larger banks may be more efficient and profitable than smaller ones and generate economies of scale and scope. The transaction costs and risks associated with financing of priority sector advances may be high for smaller banks. Large and consolidated banks can mitigate the costs better and penetrate through lending into these sectors.

The issue of consolidation had been given due attention in various reports of the committees looking into Indian financial sector and prominent among them are Narasimham Committee – I(1991), Narasimham Committee – II (1998) and Raghuram G Rajan Committee (2009). It is apt to mention the inaugural address of the Finance Minister, Government of India, on the annual day of the Competition Commission of India on May 20, 2013, where in the need for restructuring of banks through mergers was focussed upon stating that the need for two or three world-size banks in an economy that is poised to become one among the five largest in the world is rather obvious.

Rating of Indian banks in the global league indicated that only SBI at 38th place and ICICI Bank at 99th place could have their presence felt among the top 100 banks (Brand Directory League Tables 2013). In this context, studies on impact of the size of assets on the performance of banks in India are likely throw light on the anticipated process of consolidation of public sector banks in India.

This paper mainly focussed on the impact of size of assets on the operational efficiency of public sector banks in India and is organized in to five sections as under:

I Literature Review:

Nutan N. Thoke and Parikshit K. Pachorkar (2012) made a correlation study of financial performance indicators in Indian public sector banks and private sector banks. The study attempted to analyze the relationship between financial performance indicators (variables), ROA (Return on Assets) and Interest income size to bank size (Total assets), Assets Management measured by Assets utilization ratio (operational profit divided by total assets), Operational Efficiency measured by the operating efficiency ratio (total operating expenses divided by net interest income). The findings indicated high degree of positive correlation between independent variables and interest income in public sector banks.

The financial performance of banking sector in India was analyzed at length by classifying the banks based on their financial characteristics by R. Azhagaiah and S. Gejalakshmi (2012) taking into account 17 private and 19 public sector banks. The study revealed that banks with higher total capital, deposits and total assets do not always mean that they have better financial performance. The authors inferred that the overall banking industry is strongly influenced by asset utilization, operational efficiency, log of asset size, in addition to return on assets and interest income and concluded that the overall regression analysis showed that the financial performance of the banking industry is strongly and positively influenced by the operational efficiency, asset management and interest income size.

Cheenu Goel and Chitwan Bhutani Rekhi (2013) made a comparative study on the performance of selected public sector and private sector banks in India. They observed that public sector banks are not as profitable as private sector banks are and concluded that efficiency and profitability are interrelated. They indicated that key to increase performance depends upon ROA, ROE and NIM.

A study on the effect of bank size and operational efficiency on performance of banks was done by Sreesha Ch (2014) wherein financial performance was measured by using two indicators viz., internal-based performance measured by return on assets and market-based performance measured by Tobin's Q model or P/B ratio. The study employed the correlation and multiple regression analysis of annual time series data from 2009-2013 to capture the impact of bank size, operational efficiency and non-performing asset on financial performance measured by the said two indicators. The author concluded that there existed a significant impact of asset size, NPA and operational efficiency on internal financial performance of commercial banks measured by RoA.

II Objective of the Paper:

The main objective of the study is to analyze the impact of size of the total assets on the operational efficiency of the public sector banks so as to throw light on the effect of consolidation of public sector banks in India on their financial performance.

III Research Methodology:

To achieve the aforementioned research objective, the annual time series data for the five year period 2009-10 to 2013-14 in respect of 20 public sector banks is collected from reliable secondary sources where in the annual audited financial statements of the said banks are available. The log of total assets is taken as the size of the assets and cost to income ratio (CIR) is taken as a measure of operating efficiency of the banks under consideration.

There are several ratios being used by researchers for assessing the operational efficiency of banks. But cost to income ratio is regarded as an important one in measuring operational efficiency. It is one of the three ratios for efficiency (the other two being Business to Staff Expenses and Staff Expenses to Total Expenses) employed by RBI in constructing the Banking Stability Map and Banking Stability Indicator in its Financial Stability Report (June 2014).

Cost to income Ratio (CIR) = Operating Expenses / [(Interest Income – Interest Expenses) +Other Income]
Though several researchers have been employing the ratio with the exclusion of other income in the denominator, it is felt to be apt to include the total income (i.e., both schedules 13 and 14 in the financial statements of banks).

Net Interest Margin (NIM) and Cost to Income Ratio (CIR) are regarded as two important measures of managerial efficiency of banks. But NIM is dependent on interest rates of deposits and advances which are in fact market driven and hence CIR could be considered as a good measure of managerial efficiency.

Statistical tools viz., Correlation and Simple Regression Analysis are employed in the study and the data is analyzed with Data Analysis tool from MS-Excel 2007

IV Data Analysis:

The size of the total assets as on 31.03.2014 of the banks under review is tabulated in Table 1 hereunder:

Table 1: Total Assets of Public Sector Banks as on 31.03.2014

Sl. No	Name of the Bank	Assets (Rs. crore)
1	Bank of Baroda	659504.54
2	Bank of India	573190.20
3	Punjab National Bank	550419.92
4	Canara Bank	491921.86
5	Union Bank of India	353780.91
6	IDBI Bank	328996.63
7	Central Bank of India	289496.23
8	Indian Overseas Bank	274904.85
9	Syndicate Bank	251861.46
10	UCO Bank	239124.76
11	Corporation Bank	222048.47
12	Allahabad Bank	220434.28
13	Oriental Bank of Commerce	220302.50
14	Indian Bank	187326.70
15	Andhra Bank	167340.92
16	Vijaya Bank	137358.61
17	Bank of Maharashtra	136320.06
18	United Bank of India	125104.96
19	Dena Bank	124863.49
20	Punjab & Sind Bank	94509.14

(Source: www.moneycontrol.com)

The average log of assets reckoned as the size of assets and average CIR of the PSBs under review for the five year period 2009-10 to 2013-14 are tabulated in Table 2 hereunder:

Table 2:
Average Values of Log of Assets and Cost to Income Ratio for the period 2009-10 to 2013-14

Sl No	Name of the PSB	Assets (Rs. crore)	Log of assets (ln)	Cost to Income Ratio
1	Bank of Baroda	458135.07	12.9897	42.90
2	Punjab National Bank	432489.80	12.9553	43.31
3	Bank of India	407293.48	12.8870	53.84
4	Canara Bank	375848.90	12.8159	51.46
5	IDBI Bank	285910.24	12.5546	45.44
6	Union Bank of India	271799.89	12.4914	53.93
7	Central Bank of India	235970.89	12.3578	65.13
8	Indian Overseas Bank	209817.95	12.2218	61.54
9	Syndicate Bank	189008.32	12.1267	59.52
10	UCO Bank	183798.50	12.1043	51.48
11	Oriental Bank of Commerce	179580.85	12.0849	50.88
12	Allahabad Bank	176145.52	12.0568	53.95
13	Corporation Bank	166845.43	11.9972	47.36
14	Indian Bank	142935.22	11.8473	49.35
15	Andhra Bank	127569.44	11.7333	48.52
16	United Bank of India	101756.44	11.5158	56.50
17	Vijaya Bank	99203.42	11.4774	65.77
18	Bank of Maharashtra	97757.65	11.4586	64.58
19	Dena Bank	90823.37	11.3763	51.73
20	Punjab & Sind Bank	74621.47	11.2059	57.74

(Source: www.moneycontrol.com)

The descriptive statistics of the log of assets (ln) and Cost to Income Ratio (CIR) of the above tabulated data are given hereunder:

Table 3: Descriptive Statistics for the Variables – Data of 20 PSBs

Ln		CIR	
Mean	12.1129	Mean	53.7468
Standard Error	0.1232	Standard Error	1.5516
Standard Deviation	0.5510	Standard Deviation	6.9388
Minimum	11.2059	Minimum	42.9042
Maximum	12.9897	Maximum	65.7703
Count	20	Count	20

(Source: computed from MS-Excel 2007)

The correlation between the size of assets and the cost to income ratio is studied and negative correlation is observed. Correlation coefficient of -0.4713 (Table 4) indicates correlation between the size and CIR, but not so strong correlation could be attributed. Regression analysis is done with size of assets as independent variable and cost to income ratio as dependant variable and the findings are as under in Table 4:

Table 4: Correlation and Simple Regression Analysis – Data of 20 PSBs

	ln		CIR		
ln	1				
CIR	-0.4713		1		

Regression Statistics					
Multiple R	0.4713				
R Square	0.2222				
Adjusted R Square	0.1790				
Standard Error	6.2873				
Observations	20				

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	203.2368	203.2368	5.1413	0.0359
Residual	18	711.5456	39.5303		
Total	19	914.7824			
		Coefficients	Standard Error	t Stat	P-value
Intercept		125.6474	31.7412	3.9585	0.0009
Ln		-5.9359	2.6179	-2.2674	0.0359

(Source: computed from MS-Excel 2007)

At 5% significance level, as significance F value of 0.0359 is less than 0.05, the correlation is found to be significant. In order to further assess the impact of size on CIR, the top 5 banks and the bottom 5 banks in terms of the aver-

age value of size of assets are studied separately. The data pertaining to the top 5 banks, viz., Bank of Baroda, Punjab National Bank, Bank of India, Canara Bank and IDBI Bank, is studied with Correlation and Simple Regression Analysis and the findings are as mentioned in Table 6:

The descriptive statistics of the log of assets (ln) and Cost to Income Ratio (CIR) of the above said 5 banks are given hereunder in Table 5:

Table 5: Descriptive Statistics for the Variables – Data of Top 5 Banks

CIR		ln	
Mean	47.3916	Mean	12.8405
Standard Error	1.5938	Standard Error	0.0563
Standard Deviation	7.9692	Standard Deviation	0.2813
Minimum	36.4775	Minimum	12.3612
Maximum	64.7598	Maximum	13.3992
Count	25	Count	25

(Source: computed from MS-Excel 2007)

The correlation between the size of assets and the cost to income ratio is studied and negative correlation is observed. Correlation coefficient of -0.4528 indicates correlation between the size and CIR, but not so strong correlation could be attributed. Regression analysis is done with size of assets as independent variable and cost to income ratio as dependant variable and the findings are as under in Table 6:

Table 6: Correlation and Simple Regression Analysis – Data of Top 5 Banks

	CIR		ln	
CIR	1			
Ln	-0.4528		1	

Regression Statistics				
Multiple R	0.4528			
R Square	0.2050			
Adjusted R Square	0.1705			
Standard Error	7.2583			
Observations	25			

ANOVA				
	df	SS	MS	F	Significance F
Regression	1	312.5051	312.5051	5.9318	0.0230
Residual	23	1211.7028	52.6827		
Total	24	1524.2079			
		Coefficients	Standard Error	t Stat	P-value
Intercept		212.0919	67.6394	3.1356	0.0046
Ln		-12.8266	5.2664	-2.4355	0.0230

(Source: computed from MS-Excel 2007)

At 5% significance level, as significance F value

of 0.0230 is less than 0.05, the correlation is found to be significant. Data pertaining to the bottom 5 banks, viz., United Bank of India, Vijaya Bank, Bank of Maharashtra, Dena Bank and Punjab & Sind Bank, is studied with Correlation and Simple Regression Analysis and the findings are as mentioned in Table 8:

The descriptive statistics of the log of assets (ln) and Cost to Income Ratio (CIR) of the above said 5 banks are given hereunder in Table 7:

Table 7: Descriptive Statistics for the Variables – Data of Bottom 5 Banks

CIR		ln	
Mean	59.2632	Mean	11.4068
Standard Error	2.0793	Standard Error	0.0515
Standard Deviation	10.3965	Standard Deviation	0.2577
Minimum	42.3183	Minimum	10.9449
Maximum	79.4727	Maximum	11.8304
Count	25	Count	25

(Source: computed from MS-Excel 2007)

The correlation between the size of assets and the cost to income ratio is studied and negative correlation is observed. Correlation coefficient of -0.4380 indicates correlation between the size and CIR, but not so strong correlation could be attributed. Regression analysis is done with size of assets as independent variable and cost to income ratio as dependant variable and the findings are as under in Table 8:

Table 8: Correlation and Simple Regression Analysis – Data of Bottom 5 Banks

	CIR	ln
CIR	1	
Ln	-0.4380	1

Regression Statistics	
Multiple R	0.4380
R Square	0.1918
Adjusted R Square	0.1567
Standard Error	9.5473
Observations	25

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	497.5875	497.5875	5.4589	0.0285
Residual	23	2096.4900	91.1517		
Total	24	2594.0775			
	Coefficients	Standard Error	t Stat		P-value
Intercept	260.7896	86.2752	3.0228		0.0061
Ln	-17.6672	7.5616	-2.3364		0.0285

(Source: computed from MS-Excel 2007)

At 5% significance level, as significance F value of 0.0285 is less than 0.05, the correlation is found to be significant. It could be gauged from the above analysis that there existed negative correlation between the log of assets and CIR and the correlation; however, it is not so strong.

The CIR values of the top 5 banks are compared with those of the bottom 5 banks and the findings are tabulated hereunder in Table 9:

Table 9: t –test results for the CIR values

	Top 5 Banks	Bottom 5 Banks
Mean	47.3916	59.2632
Variance	63.5087	108.0866
Hypothesized Mean Difference	0.0000	
Df	45.0000	
t Stat	-4.5313	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6794	
P(T<=t) two-tail	0.0000	
t Critical two-tail	2.0141	

(Source: computed from MS-Excel 2007)

The mean value of CIR of the top 5 banks is 47.3916 as against 59.2632 for the bottom 5 banks. Two-tailed t-test with p value of 0.0000 indicates that the difference in CIR values of the top 5 banks and bottom 5 banks in terms of the size of assets is significant.

V Conclusions:
The size of the total assets had an impact on the cost to income ratio (CIR) of the 20 Public Sector Banks under study. Correlation indicated that there is a negative correlation between log of assets and CIR indicating increase in operational efficiency with the increase in the size of assets of the bank. Simple Regression Analysis also confirmed that the correlation is significant. Further, the mean values of CIR of the top 5 banks and of the bottom 5 banks are quite distinct and the difference is found to be significant from the t-test. As CIR is regarded as good measure of the operational efficiency and is an index of the managerial efficiency of the top management of the Bank, it could be concluded that consolidation of public sector banks, by way of mergers, could lead to increase in their operational efficiency.

In this context, the values of the correlation coefficient, being less than 0.5000, as observed in the above findings indicated that the strength of the correlation is not so strong. It could be inferred that PSBs had to critically examine the causes there for so as to achieve higher operational efficiency after consolidation by way of mergers among them. It also provides ample scope for further research to throw light on the factors coming in the way of reaping economies of scale in full measure by the public sector banks in India under study.

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