A CAMEL Approach Using Financial Accuracy of Public and Private Sector Banks in India

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Abstract

In today's Modern economic era banking sector plays central role to meet the investor's expectations and growth of the economy in general. In thiscontext present study is anattempt to evaluate the comparative performance of public sector and private sector banks in India using CAMEL approach. Private sector banks have induced stiff competition to the public sector banks relating to capital adequacy and for asset quality management, ICICI bank stoodat the top position. Similarly, in terms of operating and net profit margin, HDFC bank stood at top position where as SBI stood at lowest showing alarming situation for Public sector bank. ANOVA was used to analyse the significant difference in the private sector and public sector banks with CAMEL approach factors. The result indicate that private and public sector banks do not differ much in terms of CAMEL parameters and which will help policy makers to frame the future banking system successfully.

Keywords*: ANOVA, return on net worth, liquidity ratio, management quality, earning quality*

1. Introduction

Various studies have been conducted in India as well as in the world using CAMEL framework, where performance of public and private sector banks were compared in terms of liquidity, solvency and efficiency. For instance, Japanese Banks were assessed for the capital adequacy, assets and management quality, earnings ability and liquidity position using CAMEL framework [1]. Further, seven Jordanian commercial banks performance evaluation through CAMEL approach where return of assets were shown as a measure of banks' financial performance and the bank size, asset management and operational efficiency as three independent variables affecting the financial performance [2]. In another study the soundness of Indian Banking was studied through CAMEL approach in view of financial reforms where the key factors were identified as risk management, NPA levels, effective cost management and financial inclusion [3]. So efficient, effective and well-organized banking sector can bring remarkable growth in every sector of the economy [4]. Liberalisation policyhelps banking sector re - energize and will assist in economic developments for India [5-7]. This is evident due to sound banking policy in financial system of India as it absorbed the impacts of global financial crisis and it also shows that banking sector is thebackbone of Indian economy.

In the recent past the banking sector in India has undergone several changes, especially with establishment ofnew banks in the private sector operatingwith the latest technology. The existence of efficiency and competition in banking industry is an apparent indicator of elevated competition in public and private sector banks in India [8]. Thus, it is important to evaluate the banks performance critically for an efficient management of banking operations as well as to ensure financial accuracy of the banking industry. In this regard, the present study evaluates [9-11] the performance of commercial banks using CAMEL approach model.

2. Objectives

To evaluate strength and weakness of the banks in their performance using CAMEL approach model. For this concern the following hypothesis were made:

H_0 = There is no significant difference in performance of Public and Private Sector Banks in India as a measure through CAMEL approach model

H_1 = There is a significant difference in performance of Public and Private Sector Banks in India as a measure through CAMEL approach model.

3. Methodology

a) Sampling: The selected banking companies were based on highest market capitalisation in different sectors. Among these selected backs, public sector banks are State bank of India (SBI), Punjab National Bank and Bank of Baroda; whereasprivate sector banks are HDFC Bank, ICICI Bank and Axis Bank.
b) Statistical tools: The statistical tools used in this study are Arithmetic mean, Standard Deviation and One way variance (ANOVA) for analysis and interpretation.
c) Key Variables: The key variables used for the analysis are shown in the figure 1.

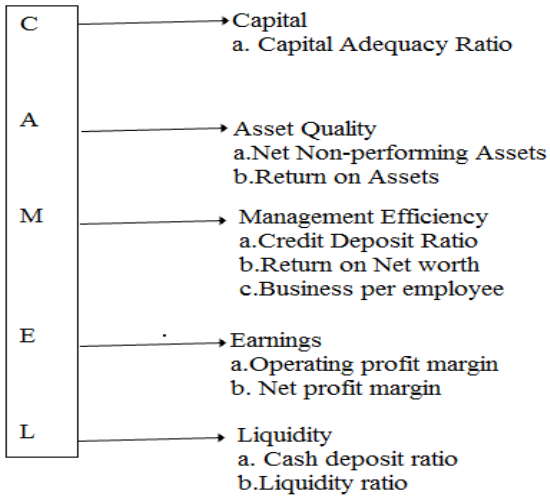

Figure 1. Key variables used in the CAMEL Approach Model

4. Data Analysis and Interpretations

A) **Capital**: It is imperative for a bank to maintain depositors' confidence and preventing the bank from going bankrupt. It replicate the overall financial condition of banks and also the ability of management to meet the need of additional capital

a. Capital Adequacy Ratio (CAR): The capital adequacy ratio used by banks to determine the adequacy of their capital keeping in view their risk exposures. Capital adequacy ratios measure of the amount of a bank's core capital expressed as a percentage of its risk-weighted asset.

Capital Adequacy Ratio = (Tier 1 Capital + Tier 2 Capital) / Risk weighted Assets

Table 4.1. Capital Adequacy Ratio of selected banks for the period 2010-201**5**

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	16.22	19.54	12.65	11.98	12.42	0.4
2011-12	16.52	18.52	13.66	13.86	12.63	0.5
2012-13	16.8	18.74	17	12.92	12.72	1.3
2013-14	16.07	17.7	16.07	12.96	12.11	1.5
2014-15	16.79	17.02	15.09	12	12.89	1.9
Average	16.48	18.30	14.89	12.74	12.55	1.12
SD	0.33	0.97	1.76	0.78	0.30	0.65

Source: Authors compilation based on reports extracted from RBI website [12].

The table 4.1 shows that capital adequacy ratio of the selected six companies for the last 5 years, where ICICI bank performs best among all the banks, whereas bank of Baroda performs lowest. So ICICI bank is

able to cover realistic point of losses which will happen in banking operation. Axis bank has highest level of Standard deviation and Punjab National Bank (PNB) has the lowest level of Standard Deviation.

H01: There are no significance differences between public and Private sector banks on CAR.

Table 4.2. One-Way ANOVA for Capital Adequacy Ratio

Source of Variation	SS	df	MS	F	P-value	F_{crit}
Between Groups	923.1235	5	184.6247	209.6194	5.566E-19	2.620654
Within Groups	21.13828	24	0.880762			
Total	944.2618	29				

As the Calculated value (209.6194) is greater than critical value (2.620654) at the 5% level of significance in Table 4.2, the Null hypothesis (H01) is rejected, and hence it can be concluded that there is a significant difference on the Capital adequacy Ratio among the bank group.

B) Asset Quality: The quality of assets is an important parameter to gauge the strength of bank. The prime motto behind measuring the assets quality is to ascertain the component of non-performing assets as a percentage of the total assets.

a. Net Non-Performing Assets (NNPA): Non-Performing assets are the assets which seize the generated income for the banks. Net NPA is the total bad assets (actual) minus the provision left aside.

Net NPA = Gross NPA – Total provisions held

Table 4.3. Net-Non Performing Assets of selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	16.22	19.54	12.65	1.6	0.9	0.4
2011-12	16.52	18.52	13.66	1.8	1.5	0.5
2012-13	16.8	18.74	17	2.1	2.4	1.3
2013-14	16.07	17.7	16.07	2.6	2.9	1.5
2014-15	16.79	17.02	15.09	2.1	4.1	1.9
Average	16.48	18.30	14.89	2.04	2.36	1.12
SD	0.33	0.97	1.76	0.38	1.24	0.65

Source: Authors compilation based on reports extracted from RBI website [12].

The table 4.3 shows that Net Non-Performing Assets of the selected six companies for the last 5 years. From the table its clearly observe that ICICI bank is highest among all the banks, whereas bank of Baroda has the lowest Net Non-Performing Assets. So ICICI bank has to reconsider loan accounts to meet the losses. Axis bank has the highest level of Standard deviation and HDFC Bank has the lowest level of Standard Deviation.

H02: There are no significance differences between public and Private sector banks on NNPA.

Table 4.4. One Way ANOVA analysis for Net Non-Performing Assets

Source of Variation	SS	df	MS	F	P-value	F_{crit}
Between Groups	1658.202	5	331.640	317.3512	4.25E-2	2.6206
Within Groups	25.08064	24	1.04502			
Total	1683.283	29				

As the Calculated value (317.3512) is greater than critical value (2.620654) in Table 4.4, the Null hypothesis (H02) is rejected, and hence it can be concluded that there is a significant difference on the Net Non-Performing Assets among the bank group.

b. Return on Assets (ROA): It does explain the bank's ability to generate profits from its assets.

Return on Asset=Net Income/Average total assets

Table 4.5. Return on Assets of selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	Punjab National Bank	Bank of Baroda
2010-11	1.4	1.1	1.4	1.6	0.9	0.4
2011-12	1.5	1.2	1.5	1.8	1.5	0.5
2012-13	1.7	1.4	1.5	2.1	2.4	1.3
2013-14	1.7	1.5	1.6	2.6	2.9	1.5
2014-15	1.8	1.5	1.6	2.1	4.1	1.9
Average	1.62	1.34	1.52	2.04	2.36	1.12
SD	0.16	0.18	0.08	0.38	1.24	0.65

Source: Authors compilation based on reports extracted from RBI website [12].

The table 4.5 shows that Return on Assets of the selected six companies for the last 5 years. It may clearly be observed that Punjab national Bank is highest among all the banks, whereas bank of Baroda has the lowest Return on Assets. So this shows the profitable assets quality of Punjab national Bank. Bank of Baroda has the highest level of Standard deviation and Axis Bank has the lowest level of Standard Deviation.

H03: There are no significance differences between public and Private sector banks on ROA.

Table 4.6. One Way ANOVA analysis for Return on Assets

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.246667	5	1.049333	2.888073	0.035228	2.620654
Within Groups	8.720000	24	0.363333			
Total	13.966670	29				

As the Calculated value (2.888073) is greater than critical value (2.620654) in Table 4.6, the Null hypothesis (H03) is rejected, and hence Return on assets will be not same in bank group.

C) Management Efficiency: The ratio in this segment involves subjective analysis to measure the efficiency and effectiveness of management.

a. Credit Deposit Ratio: The loan to deposit ratio is used to calculate a lending banks ability to cover withdrawals made by its customers. The bank has to repay deposits on request, so having a ratio that's too high puts the bank at high risk.

Credit Deposit ratio= Loans/Deposit

Table 4.7 Credit Deposit Ratio of selected banks for the period 2010-2015

year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	76.02	90.45	74.65	79.9	76.25	73.87
2011-12	78.06	97.71	76.26	82.14	77.39	74.76
2012-13	80.14	99.25	77.58	85.17	78.13	71.68
2013-14	81.79	100.71	80.03	86.84	78.06	69.54
2014-15	81.71	104.72	84.71	84.47	76.6	69.54
Average	79.544	98.57	78.65	83.70	77.29	71.88
SD	2.49	5.23	3.92	2.72	0.85	2.41

Source: Authors compilation based on reports extracted from RBI website [12]

The table 4.7 shows that Credit Deposit ratio of ICICI Bank is highest among all the banks, whereas bank of Baroda has the lowest Credit Deposit Ratio. So this shows the profitable assets quality of Punjab national Bank (PNB). Bank of Baroda has the highest level of Standard deviation and Axis Bank has the lowest level of Standard Deviation.

H04: There are no significance differences between public and Private sector banks on CDR.

Table 4.8 One Way ANOVA analysis for Credit Deposit Ratio

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2092.104	5	418.420	39.9551	0.718	2.620654
Within Groups	251.3342	24	10.47226			
Total	2343.439	29				

From the table 4.8, the calculated value (39.9551) is greater than critical value (2.620654), the Null hypothesis (H04) is rejected, and hence it can be concluded that there is a significant difference on the Return on Assets among the bank group.

b. Return on Net worth (RONW): It's used in to measure bank's profitability, how much banks generates with the money that the equity shareholders invested.

Return on Net worth = Net Income/Shareholders' Equity

Table 4.9 Return on Net Worth of selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	15.47	9.35	17.83	11.34	22.12	20.15
2011-12	17.26	10.7	18.59	13.94	18.52	18.22
2012-13	18.57	12.48	15.64	14.26	15.19	14.01
2013-14	19.5	13.4	16.26	9.2	9.69	12.61
2014-15	16.47	13.89	16.46	10.2	8.12	8.53
Average	17.454	11.96	16.96	11.79	14.73	14.70
SD	1.61	1.90	1.21	2.25	5.88	4.61

Source: Authors compilation based on reports extracted from RBI website [12]

From the Table 4.9 HDFC bank is highest among all the banks, whereas SBI has the lowest Return on Net worth. HDFC Bank have Profitable assets quality. Punjab National bank has the highest level of Standard deviation and Axis Bank has the lowest level of Standard Deviation.

H05: There are no significance differences between public and Private sector banks on RONW

Table 4.10. One Way ANOVA analysis for Return on Net Worth

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	142.8954	5	28.57909	2.501563	0.058549	2.620654147
Within Groups	274.1878	24	11.42449			
Total	417.0833	29				

Table 4.10 indicates thatcalculated value (2.501563) is not greater than critical value (2.620654), the Null hypothesis (H05) is accepted, and hence it can be concluded that there is no significant difference on the Return on Assets among the bank group.

c. Business per Employee (BPE): Its measures management's ability to use their employee resources effectively to create profits for the company. Total Deposits plus total advances divided by number of employees the average revenue generated by each employee of a company.

Business per Employee = Revenue/Number of Employees

Table 4.11 Business per Employee of selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	Punjab National Bank	Bank of Baroda
2010-11	6.53	7.35	13.66	7.05	9.73	12.29
2011-12	6.54	7.08	12.76	7.98	10.83	14.66
2012-13	7.50	7.35	12.15	9.43	11.06	16.89
2013-14	8.90	7.47	12.30	10.64	12.21	18.65
2014-15	10.92	7.67	13.71	12.34	12.91	18.89
Average	8.078	7.38	12.92	9.49	11.35	16.28
SD	1.86	0.21	0.74	2.10	1.24	2.80

Source: Authors compilation based on reports extracted from RBI website [12]

From the Table 11 Bank of Baroda is highest among all the banks, whereas ICICI bank has the lowest Return on Net worth. So this shows the profitable assets quality of HDFC Bank. Punjab National bank has the highest level of Standard deviation and Axis Bank has the lowest level of Standard Deviation.

H06: There are no significance differences between public and Private sector banks on BPE.

Table 5.12. One way ANOVA analysis for Business per Employee

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	277.3948	5	55.47897	18.6514203	1.43E-07	2.620654
Within Groups	71.38841	24	2.974517			
Total	348.7832	29				

It shown (Table 5.12) that As the Calculated value (18.6514203) is greater than critical value (2.620654) at, the Null hypothesis (H06) is rejected, and hence it can be concluded that there is a significant difference on the Business per Employee among the bank group.

Table 4.13. Operating Profit Margin selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	19.5	11.4	13.67	12.9	21.11	13.62
2011-12	15.57	10.16	10.69	17.11	18.4	13.28
2012-13	14.9	13.33	11.41	13.52	16.73	16.1
2013-14	17.28	15.26	14.4	10.92	16.56	18.31
2014-15	18.7	16.7	15.29	11.45	13.89	20.17
Average	17.19	13.37	13.09	13.18	17.34	16.30
SD	1.97	2.69	1.97	2.44	2.66	2.97

Source: Authors compilation based on reports extracted from RBI website [12]

D) Earnings: It fundamentally determines the profitability of bank and explains its sustainability and growth in earnings in future.

a. Operating Profit Margin (OPM):It shows how much cash is thrown off after most of the expenses are met. A high operating profit margin means that the bank has good cost control.

Operating Profit Margin =Operating Earnings / Revenue

From the Table 4.13, it may be observed that the HDFC Bank is highest among all the banks, whereas SBI bank has the lowest Operating profit margin. So HDFC Bank has the good control on the cash.
H07: There are no significance differences between public and Private sector banks on OPM

Table 4.14. One Way ANOVAanalysis for Operating Profit Margin

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	107.5777	5	21.51553	3.509543	0.016009	2.620654
Within Groups	147.1339	24	6.130578			
Total	254.7115	29				

Above table 4.14 shows that the calculated value (3.509543) is greater than critical value (2.620654),the Null hypothesis (H07) is rejected, and hence it can be concluded that there is a significant difference on the Operating Profit Marginamong the bank group.

b. Net Profit Margin (NPM): Its shows that the percentage of revenue remaining after all operating expenses, interest, taxes have been deducted from a bank's total revenue.

Net Profit Margin = TotalRevenue – Total Expenses)/Total Revenue = Net Profit/Total Revenue

Table 4.15 Net Profit Margin of selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	16.18	15.79	17.12	7.58	16.42	7.17
2011-12	15.93	16.14	15.47	10.99	13.4	10.46
2012-13	16.04	17.19	15.35	11.78	10.29	11.54
2013-14	17.28	17.96	16.34	7.98	6.99	16.87
2014-15	21.07	18.24	20.73	8.59	6.61	19.38
Average	17.3	17.06	17.00	9.38	10.74	13.08
SD	2.18	1.08	2.20	1.88	4.20	4.96

Source: Authors compilation based on reports extracted from RBI website [12]

Table 4.15 shows that the ICICI Bank is highest among all the banks, whereas SBI bank has the lowest Net profit margin. So ICICI bank has the good control on the revenue for all the expenses. Punjab National bank has the highest level of Standard deviation and ICICI Bank has the lowest level of Standard Deviation.

H08: There are no significance differences between public and Private sector banks on NPM

Table 4.16 One way ANOVAanalysis for Net Profit Margin

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	309.9794	5	61.99588	6.58098	0.000549	2.620654
Within Groups	226.0911	24	9.420463			
Total	536.0705	29				

Table 4.16 shows that the calculated value (6.58098) is greater than critical value (2.620654), the Null hypothesis (H08) is rejected, and hence it can be concluded that there is a significant difference on the Operating Profit Margin among the bank group.

D) Liquidity: The excellent liquidity position of the banks favourably impact the financial performance of the banks. Among assets cash and investments are the most liquid of a bank‘s assets. In this category of ratios, the ability of bank to meet its obligations is assessed.

a. **Cash Deposit Ratio (CDR)**: It specify how much of a bank’s funds are being used for lending, the main banking activity. Banks total of Cash in hand and Balances with RBI divided by Total deposits.

Cash Deposit Ratio= Liquid asset / total deposit

Table5.17. Cash Deposit Ratio selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	6.46	11.32	7.07	8.96	7.49	6.11
2011-12	6.02	8.6	6.01	7.51	6.1	6.01
2012-13	5.46	7.21	5.39	5.34	4.72	4.09
2013-14	8.81	6.54	5.97	5.81	4.76	3.08
2014-15	10.79	6.85	6.11	6.76	4.88	3.47
Average	7.508	8.10	6.11	6.88	5.59	4.55
SD	2.23	1.96	0.61	1.44	1.21	1.42

Source: Authors compilation based on reports extracted from RBI website [12]

From the Table 4.17, it shows that the HDFC Bank is highest among all the banks, whereas Bank of Baroda has the lowest Cash Deposit Ratio. So HDFC bank has lends highest out of the deposits it has mobilised. HDFC Bank has the highest level of Standard deviation and Axis Bank has the lowest level of Standard Deviation.

H09: There are no significance differences between public and Private sector banks on CDR.

Table 4.18 One way ANOVA analysis for Cash Deposit Ratio

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	42.46947	5	8.493893	3.453516	0.017163	2.620654
Within Groups	59.0278	24	2.459492			
Total	101.4973	29				

Table 4.18 indicates that the calculated value (3.453516) is greater than critical value (2.620654), the Null hypothesis (H09) is rejected, and hence it can be concluded that there is a significant difference on the Cash Deposit Ratio among the bank groups.

b. **Liquidity Ratio (LR)**: It refers to highly liquid assets held by financial institutions in order to meet short-term obligations. It shows the capacity of bank to respect the demand from depositors during a particular year.

Liquidity Ratio =Liquid assets / total assets

Table 4.19 Liquidity Ratio selected banks for the period 2010-2015

Year	HDFC Bank	ICICI Bank	Axis bank	SBI	PNB	Bank of Baroda
2010-11	0.5	0.07	0.02	0.04	0.03	0.02
2011-12	0.58	0.07	0.03	0.05	0.02	0.03
2012-13	7.42	0.09	0.03	0.04	0.02	0.02
2013-14	0.6	0.09	0.03	0.03	0.02	0.02
2014-15	0.58	0.06	0.03	0.04	0.02	0.02
Average	1.936	0.08	0.03	0.04	0.02	0.02
SD	3.07	0.01	0.00	0.01	0.00	0.00

Source: Authors compilation based on reports extracted from RBI website [12]

From the Table 4.19, it shows that the HDFC Bank is highest among all the banks, whereas Bank of Baroda has the lowest Cash Deposit Ratio. So HDFC bank has lends highest out of the deposits it has mobilised. HDFC Bank has the highest level of Standard deviation and Axis Bank has the lowest level of Standard Deviation.

H010: There are no significance differences between public and Private sector banks on LR.

Table 4.20. One way ANOVA analysis for Liquidity Ratio

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	15.02664	5	3.005328	1.918301	0.128511	2.620654
Within Groups	37.59988	24	1.566662			
Total	52.62652	29				

In table 5.20, the Calculated values (1.918301) is not greater than critical value (2.620654) so Null hypothesis (H010) is accepted, and hence it can be concluded that there is no significant difference on the Cash Deposit Ratio among the bank groups.

5. Conclusion

CAMEL approach specifies show banking sector performs in five critical dimensions and based on that we can analyse their efficiency and profitability. The results of ANOVA test shows that performance of banks group affected differently; it denotes that there is a significant difference in performance of public sector and Private sector banks as assessed by CAMEL model. The results show that there is a statistically significant difference between the CAMEL ratios of Public Sector Banks and Private Sector Banks in India, thus, signifying that the overall performance of Public Sector Banks and Private sector banks is different. Also, it can be concluded that the banks with least level in cash Deposit Ratio, Operating and net Profit margin needed to improve their performance to come up to the desired standards.

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