

Performance Analysis of Banks in India– Discriminant Analysis with CAMELS Framework

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ABSTRACT

India’s banking sector is facing the toughest challenge in recent times in terms of distressed loans. Higher write offs and provisioning has adversely affected growth in advances. Poor earnings growth by companies, slow pace of investments, risk aversion of banks due to rising bad loans, and availability of alternative funding sources for corporates pulled down credit growth during the year. A high and rising proportion of banks stressed loans, particularly those of public sector banks (PSBs) and the resulting increase in NPAs provisioning has weighed down credit growth. Hence it becomes important to analyse the banking sectors performance through appropriate criteria. This paper is an attempt to do a comparative evaluation of the performance of selected public sector and private sector banks in India using CAMELS framework. The paper also attempts to identify the ratios discriminating private sector and public sector banks. Four factors viz: D/E, Tier I capital ratio, Sensitive sector loans to total loans and net NPA ratio have emerged as significant discriminators between private sector and public sector banks.

1. Introduction

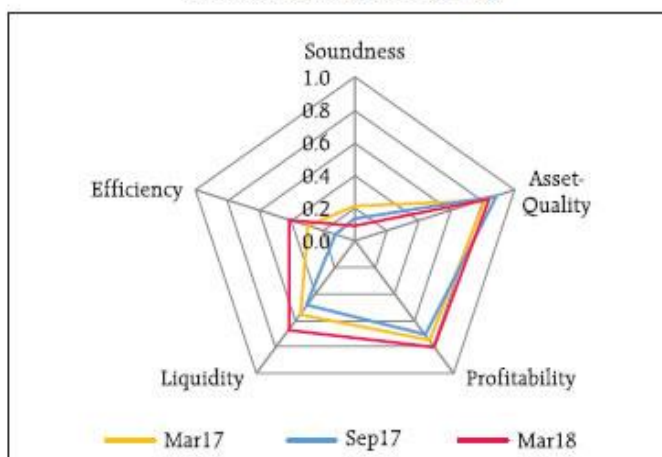
India’s banking sector is facing the toughest challenge in recent times in terms of distressed loans. Higher write offs and provisioning has adversely affected growth in advances. Credit growth is at 4.7% in FY 2017. As at the end of March-2017, 12.1% of the advances of the banking system were stressed. The net interest margin witnessed decline during the year due to loss of interest from standard assets being converted into NPAs. The margins reduced to 2.35% in FY17 as compared to 2.42% in FY16. Poor earnings growth by companies, slow pace of investments, risk aversion of banks due to rising bad loans, and availability of alternative funding sources for corporates pulled down credit growth during the year. A high and rising proportion of banks stressed loans, particularly those of public

sector banks (PSBs) and the resulting increase in NPAs provisioning has weighed down credit growth.

Banking sector holds the largest quantum of financial assets in any economy. Being the barometer of the economy, it reflects macro-economic situation of a nation. Thus examination of financial soundness of banks becomes vital. The competitiveness of banking sector, intangible nature of its products and services makes the task of performance evaluation daunting. As per RBI’s Financial Stability Report, June 2018, Banking Stability Indicator showed deterioration in profitability and asset quality leading to increased risks in this sector.

Figure 1. Banking Stability Indicators

Chart 2.5: Banking stability map



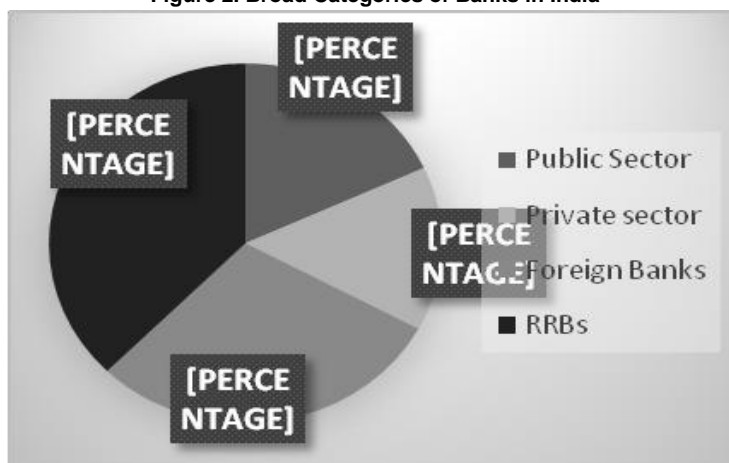
Note: Away from the centre signifies increase in risk.

Source: RBI supervisory returns and staff calculations.

2. Broad categories of banks in India

Indian banking system comprises of private sector banks, public sector banks, foreign banks, regional rural banks and cooperative banks.

Figure 2. Broad Categories of Banks in India



Source: ibef.org

Public sector banks and private sector banks in India holds Rs.104118 bn and Rs. 44114 bn financial assets respectively (Capitaline database). ROA of public and private sector banks stood at -0.9% and 1.3% respectively for the year ended 2018 whereas the ROE was -13.6% and 11.1% for public and private sector banks. In the light of increasing stress in banking sector, it becomes important to analyse the banking sectors performance through appropriate criteria. This paper is an attempt to do a comparative evaluation of the performance of public sector and private sector banks in India using CAMELS framework. The paper also attempts to identify the ratios discriminating private sector and public sector banks.

CAMELS is a rating system developed in the US that is used by supervisory authorities to evaluate banks and other financial institutions. It is used to measure risk and financial stability of a bank. A bank's ability to survive and sustain given its financial, managerial and operational aspect is tested. Five factors viz. Capital Adequacy (C), Quality of assets (A), Quality of management (M), Earnings (E), Liquidity (L) and Sensitivity to market risks (S) are examined and rated. CAMELS framework is accepted as one of the most effective way of bank performance evaluation. CAMELS scanning helps banks to diagnose its financial health and alert the bank to take preventive steps for its sustainability, (Siva and Natarajan, 2011).

3. Literature Review

CAMELS model have been successfully applied in various studies on banks and financial institutions. A few important studies are discussed in the following paragraph.

Nimalathasan, (2008) studied banks in Bangladesh using CAMELS and observed that 64% of banks performance was satisfactory. Hussein and Husni, (2011), in their study of banking sector in UAE observed that large banks perform better than small banks. Capital adequacy was an important performance indicator. Ramkrishna et al, (2016) analysed the performance of Indian commercial banks pre and post financial crisis. Scale efficiency of public sector banks and technical

efficiency of private banks has improved after financial crisis of 2008. Xu et al, (2015) studied the impact of bank reforms in Chinese banks and concluded that lending decision should be based on commercial principles. Sharma et al, (2016) analysed a range of performance indicators to classify Russian banks into clusters during different development periods. Pandya (2014) examined the performance of foreign banks in India using selected ratios. Ratio of NPA to Total Assets was observed to an important indicator of bank performance. Srinivas and Saroja, (2014) compared the performance of old private sector banks and new private sector banks using various parameters like profits, advanced, deposits, number of branches and number of employees. The study revealed better performance of old private sector as compared to new banks. Messai and Jouini, (2013) studied 368 European banks using CAMEL framework with regulatory variables like Deposit Insurance, Insolvency and corrective measures available and money market operations by Central Bank. The role of Central Bank was observed to be very crucial in maintaining the stability of financial institutions. Ginevicius and Podvieszko, (2011) proposed an evaluation framework based on financial data for Lithuanian commercial banks using criteria like Delinquent loan ratio, Impairment loss and Cost/Income ratio. Ifeacho and Ngalawa, (2014) studied the impact of bank specific and macro-economic variables on South African banking sector. Asset quality, management quality and liquidity have a positive bearing on ROA and ROE. Ferrouhi, (2014) applied CAMEL model to obtain ranking of Moroccan banks and the model was observed to be effective. Singh and Kohli, (2006) examined the performance of private sector banks in India using CAMEL and identified top performing banks the year 2005. Ongone and Kusa, (2013) studied banking sector in Kenya and observed that bank specific factors are important determinants of banks financial performance. Katarzyna (2016) found that CAMELS framework is useful to check the health of banking sector in her study of European banks. Thus CAMELS framework have found wide acceptance among researchers in evaluation of banking sector performance. The current study proposes to apply this framework and analyse selected public and private sector banks and also identify the factors

discriminating a public sector and a private sector banks performance.

4. Research Methodology

Eight private sector banks and six public sector banks were selected for the study. (Annexure 1 gives the list of banks selected for the study). The banks were selected on the basis of their market capitalisation and listing on Nifty. The period of study was financial year ended 2013 to 2017. As already

stated, CAMELS model was selected as the tool for performance analysis. The ratios have been calculated using the reported financial statements obtained from Capitaline database. Ranking is given to each bank on each ratio. (Table 1 gives the selected ratios for each of the criteria in the model). Discriminant Analysis using IBM SPSS 19 is applied to identify the performance criteria (ratios) discriminating a public sector bank and a private sector bank.

Table 1. CAMELS FRAMEWORK

Sr. No	Model Criteria	Aspect	Ratios selected
1	Capital Adequacy	Protection of depositors and investors and financial soundness of the bank	1. CRAR (T1+T2)(%) 2. Debt to equity 3. Tier 1 capital ratio(%)
2	Asset Quality	Quality of asset/loan the bank holds. Offers the stability of the company when faced with particular risks.	1. Net NPA(%) 2. Gross NPA(%)
3	Management Efficiency	Ability of the bank to react to financial stress with effective policies and guidelines leading to safe operation of the institution	1. Business per employee=Advances +deposits/total no. of employees(Cr) 2. Net profit/employee(Cr) 3. Cost to Income(%) 4. Advances/Deposits(%)
4	Earning Quality	Ability to create returns on its assets. These returns enable the institution to expand, retain competitiveness, and provide adequate capital	1. ROE(%) 2. Interest income /Total (investments and Advances) 3. Net Interest Margin(NIM) 4. Interest spread
5	Liquidity	Ability to meet unexpected withdrawals from depositors without affecting the daily operations by maintaining liquid cash and assets that can be easily converted into cash.	1. Cash/Deposits(%) 2. Investment/Deposits
6	Sensitivity	Exposure to market risks. Banks sensitivity to changes in interest rates, foreign exchange rates, changes in price of commodities, etc is measured.	1. Loan to sensitive sectors/Total loans

5. Analysis and Discussion

a) CAMELS Analysis of Private Sector Banks

Table 2 gives the ratios for private sector banks and comparative ranking based on ratios. ICICI has the highest capital adequacy ratios. The bank also leads in liquidity and management efficiency. However it scores low on asset quality

and sensitivity to market risks. South Indian Bank scores low in all aspects except sensitivity to market risks. Federal Bank, IndusInd Bank and Axis Bank are moderate performers on all aspects. HDFC scores high on asset and earnings quality but is poor on capital adequacy. Kotak Bank has the highest capital adequacy but ranks low on management efficiency and sensitivity to market risks.

Table 2CAMELS Ranking – Private Sector Banks

Ratios	ICICI Bank	Federal Bank	IndusInd Bank	Axis Bank	South Indian Bank	Yes Bank	Kotak Mahindra Bank	HDFC bank
CRAR (%)	17.6	14.8	14.8	15.6	12.2	16.4	17.6	15.6
	1	4	4	3	5	2	1	3
TierI Capital ratio (%)	13.2	13.8	13.6	12.6	10.4	11.8	16.6	9.14
	4	2	3	5	7	6	1	8
D/E	7.02	10.47	8.32	9.44	15.1	11.17	6.5	13
	2	5	3	4	8	6	1	7
Net NPA (%)	2.35	1.07	0.34	1.51	1.74	0.38	1.06	0.306
	8	5	2	7	6	3	4	1
Gross NPA (%)	5.08	2.66	0.96	3.62	2.56	0.86	2.23	1

	8	6	2	7	5	1	4	3
Business per employee (Rs/crs)	8.49	11.68	7.92	13.94	13.45	17.41	7.75	11.566
	6	4	7	2	3	1	8	5
NP/ Employee (Rs./crs)	0.14	0.07	0.1	0.17	0.05	0.21	0.1	0.146
	4	6	5	2	7	1	5	3
Cost/Income (%)	24.22	39.49	30.11	23.82	41.40	25.36	43.86	24.68
	1	6	5	3	7	4	8	2
Advances / Deposits (%)	101.69	74.24	89.37	88.33	73.2	87.94	88.23	83.412
	1	7	2	3	8	5	4	6
ROE (%)	12.79	11.2	10.3	11.77	10.3	20.51	12.94	18.94
	4	6	7	5	7	1	3	2
Interest income /Total Investments (%)	10.59	10.43	12.21	10.40	10.30	11.06	11.67	10.93
	5	6	1	7	8	3	2	4
Net Interest Margin (%)	5.43	4.11	5.98	5.40	3.59	4.72	5.93	5.91
	4	7	1	5	8	6	2	3
Interest spread (%)	5.05	3.94	5.60	5.25	3.69	4.48	5.81	5.84
	5	7	3	4	8	6	2	1
Cash/Deposits (%)	6.76	4.86	6.01	4.53	4.53	5.46	4.89	6.782
	2	6	3	7	7	4	5	1
Investments /Deposits (%)	48.1	33.93	34.15	36.76	28.02	45.81	38.22	33.29
	1	5	7	3	8	2	4	6
Loans to SS/Total Loans (%)	41.41	21.26	21.05	37.70	9.00	11.18	22.40	16.42
	8	5	4	7	1	2	6	3

b) CAMELS Analysis of Public Sector Banks

The ratios and ranking for public sector banks is produced in Table 3. SBI ranks high on asset and earnings quality and sensitivity to market risks. Bank of Baroda scores high on capital adequacy, asset quality and management efficiency.

PNB and Canara Bank have moderate score on all aspects except sensitivity to market risk where they score low. IDBI is most sensitive in its exposure to market risks.

Table 3. CAMELS ranking – Public Sector Banks

Ratios	SBI	IDBI	PNB	Canara Bank	Bank of Baroda
CRAR(%)	12.8	12	12.2	11.6	12.8
	1	3	2	4	1
TierI Capital ratio (%)	9.8	8.2	9.2	9	10.2
	2	5	3	4	1
D/E	1.568	2.254	1.026	0.69	0.686
	4	5	3	2	1
Net NPA (%)	2.862	5.386	5.136	3.912	2.894
	1	5	4	3	2
Gross NPA (%)	5.642	9.878	8.652	5.756	6.188
	1	5	4	2	3
Business per employee (Rs/crs)	12.554	25.026	13.086	14.362	17.744
	5	1	4	3	2
NP/ Employee (Rs/crs)	0.054	-0.05	0.028	0.028	0.04
	1	4	3	3	2

Cost/Income (%)	30	19.2	29.4	29.2	24.6
	5	1	4	3	2
Advances /Deposits(%)	82.6	77.6	73.4	68.2	67
	1	2	3	4	5
ROE (%)	9.448	-5.606	5.054	5.218	5.032
	1	5	3	2	4
Interest/Total Investments (%)	9.6	10.4	9.8	10	9.2
	4	1	3	2	5
Net Interest Margin (%)	4.24	3.12	4.094	3.146	3.444
	1	5	2	4	3
Interest spread (%)	4.4	3.4	4.6	1.2	4.4
	2	3	1	4	2
Cash/Deposits (%)	9.244	8.1	11.032	10.722	22.428
	4	5	2	3	1
Investments /Deposits (%)	31.362	37.472	30.152	30.366	21.242
	2	1	4	3	5
Loans to SS/Total Loans (%)	1.908	2.272	1.898	1.068	1.232
	4	5	3	1	2

c) Discriminant Analysis of Private and Public Sector Banks

The category wise descriptive statistics in Table 4 clearly identifies mean Tier I Capital ratio, D/E, NNPA and Sensitive

sector loans ratio to be different for private and public sector banks.

Table 4. Group Statistics

category	Mean	Std. Deviation	Valid N (listwise)		
			Unweighted	Weighted	
.00	crar	15.5750	1.75153	8	8.000
	tiericapital	12.6425	2.27524	8	8.000
	de	10.1275	2.94561	8	8.000
	npa	.1379	.17020	8	8.000
	gnpa	.0237	.01473	8	8.000
	bpemp	11.5258	3.39442	8	8.000
	nppemp	.1233	.05317	8	8.000
	costtiincome	.3162	.08558	8	8.000
	advancetodeposit	74.9189	31.25920	8	8.000
	roe	.1357	.03928	8	8.000
	inttoinv	.1095	.00681	8	8.000
	nim	.0513	.00903	8	8.000
	intspread	.0496	.00835	8	8.000
	cashtodeposit	.0548	.00938	8	8.000
	investmenttodep	.3726	.06702	8	8.000
ssloantotalloans	.2255	.11586	8	8.000	
1.00	crar	12.2800	.52154	5	5.000
	tiericapital	9.2800	.76942	5	5.000
	de	1.2448	.66912	5	5.000
	npa	.0404	.01197	5	5.000
	gnpa	.0722	.01924	5	5.000
	bpemp	16.5544	5.14837	5	5.000
	nppemp	.0200	.04057	5	5.000
	costtiincome	.2636	.04625	5	5.000
	advancetodeposit	73.7600	6.51214	5	5.000
	roe	.4834	.35547	5	5.000
	inttoinv	.0980	.00447	5	5.000
	nim	.0361	.00528	5	5.000
	intspread	.0360	.01421	5	5.000
	cashtodeposit	.1231	.05754	5	5.000
	investmenttodep	.3014	.05794	5	5.000
ssloantotalloans	.0358	.03997	5	5.000	

The Eigen value of the Discriminant Function (Table 5) and Wilks lambda (Table 6) converted into chi-square value is significant at $p < 0.05$ indicating that the function strongly

discriminates the two groups viz: selected private and public sector banks.

Table 5 Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	361.227 ^a	100.0	100.0	.999

a. First 1 canonical discriminant functions were used in the analysis.

Table 6 Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.003	53.030	4	.000

D/E, Tier I capital ratio, Sensitive sector loans to total loans and net NPA ratio are observed to be different for the selected private and public sector banks. These factors have significant p values. (Table 7). Private sector banks have

higher debt to equity, sensitivity to market risks and net NPA ratio making it riskier than public sector banks. However Private sector banks are adequate cushioned in terms of Tier I capital adequacy.

Table 7 Variables Entered/Removed^{a,b,c,d}

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	de	.205	1	1	11.000	42.710	1	11.000	.000
2	tiericapital	.038	2	1	11.000	126.309	2	10.000	.000
3	ssloantotalloans	.014	3	1	11.000	214.389	3	9.000	.000
4	npa	.003	4	1	11.000	722.454	4	8.000	.000

At each step, the variable that minimizes the overall Wilks' Lambda is entered.

- a. Maximum number of steps is 32.
- b. Minimum partial F to enter is 3.84.
- c. Maximum partial F to remove is 2.71.
- d. F level, tolerance, or VIN insufficient for further computation.

6. Conclusion

Indian banking sector has always shown resilience to market shocks. However increasing bad loans leading to increased provisioning has adversely affected profitability. Public sector banks on account of strong support from Government can withstand business and financial risks more than private sector banks. High Debt Equity coupled with high sensitivity to sector risks increases the burden on private sector banks. However, due to aggressive business practices the

earnings quality of private sector banks are high leading to higher returns on equity. Public sector banks, on the other hand, fails to improve its earnings quality inspite of the large volume of financial assets held by them. These banks can leverage their strengths viz. quantum of assets held, manpower and market penetration to improve their earnings quality and return on equity.

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Annexure 1
List of Banks included in the study

Private sector Banks		Public Sector Banks	
Sr. No	Name of the Bank	Sr. No	Name of the Bank
1	ICICI Bank	1	SBI
2	Federal Bank	2	IDBI
3	IndusInd Bank	3	Punjab National Bank
4	Axix Bank	4	Canara Bank
5	Sputh Indian Bank	5	Bank of Baroda
6	Yes Bank		
7	Kotak Mahindra Bank		
8	HDFC Bank		