

## Performance Appraisal of Indian Public Sector Banks

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*The strength of economy of any country basically hinges on the strength and efficiency of financial system, which, in turn, depends upon a sound banking system. The regulators have recommended bank's supervision through CAMEL rating model to assess the performance of banks, which is better than the earlier systems. The prime objective of CAMEL model of rating banking institutions is to make their comparative performance analysis. It is basically a ratio based model for evaluating the performance of banks. The basic purpose of the present study is to evaluate the financial performance of Indian public sector banks excluding State Bank Group for the period of 2007-11. The study found that Bank of Baroda was at the first position with overall composite ranking average of 6.05 due to its better performance in the areas of liquidity and asset quality, closely followed by Andhra Bank with average of 6.15 because of its strength in the spheres of management efficiency, capital adequacy and asset quality. United Bank of India holds the bottom most rank with average of 14.60 due to management inefficiency, poor assets and earning quality. The study recommends that United Bank of India has to improve its management efficiency, assets and earning quality. Similarly Bank of Maharashtra should improve its liquidity position and management efficiency.*

**JEL Classification:** G21, G24 and G28

### 1. Introduction

A sound financial system is indispensable for the growth of a healthy and vibrant economy. The banking sector, being a crucial constituent of financial system is the lifeline of any modern economy. It is one of the important financial pillars of the financial system which plays a vital role in the success /failure on an economy. Banks are one of the oldest financial intermediaries in the financial system. They play an important role in the mobilization of deposits and disbursement of credit to various sectors of the economy. The banking system is the fuel injection system which spurs economic efficiency by mobilizing savings and allocating them to high return investment. Research confirms that countries with a well developed banking system grow faster than those with a weaker one. Fase and Abma (2003) argued that the expansion of the financial system could have a positive repercussion on economic growth of a country. Levine (2005) suggested five channels through which financial systems may have an effect on economic growth: Financial intermediaries, monitor investment, manage risk, mobilise savings and facilitate the exchange of goods and services. In a study on banks and

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stock market it was found that they positively influenced economic growth (Beck and Levine, 2004). The strength of an economy hinges on the strength and efficiency of the financial system, which, in turn, depends upon a sound and solvent banking system. A sound banking system efficiently deploys mobilized savings in productive sectors and a solvent banking system ensures that the bank is capable of meeting its obligation to the depositors. Patrick (1996) opined that financial sector acts as supply leading to transfer of resources from traditional, low growth sector to high growth sector and to promote and stimulate an entrepreneurship response in the high growth sector.

As it is clear from above discussion that the role of banking is very significant in the economy in capital formation. A sound banking system proves to be one of the pillars of economic, social and industrial growth of a country. In the recent past, the bank regulators have introduced a number of measures to link the regulation of banks to their level of risk and financial liability. The regulators have recommended bank supervision through CAMEL (capital adequacy, asset quality, management quality, earnings and liquidity) rating model to assess the performance of banks. The findings of the present study are different from the previous studies in rating various Indian public sector banks. With this view, an attempt has been made to contribute to the already existing body of knowledge.

The study is organized as follows. The present part introduces the concept of the study and outlines the need for it; the second part reviews the literature available; the third part describes the methodology for the research; the fourth part analyzes and presents the results of the study and the fifth part concludes the study.

## 2. Review of Literature

Researchers, academicians and policy makers have assessed the performance of banking and financial sector using CAMEL model from different perspectives and in different time periods. A brief review of some important studies is carried out here which highlights the need for the present study.

In India Reserve Bank of India suggested two supervisory rating models named CAMELS (Capital Adequacy, Assets Quality, Management, Earning, Liquidity, Systems and Controls) and CACS (Capital Adequacy, Assets Quality, Compliance, Systems and Controls) for rating of Indian commercial banks and foreign banks operating in India. Gaytán and Johnson (2002) opined that this model is only parallel with the performance of the bank. The CAMEL model is still very much popular among regulators due to its effectiveness, although the other variables in banks are highly volatile to market forces. Veni (2004) studied the capital adequacy requirement of banks and the measures adopted by them to strengthen their capital ratios. The author highlighted that the rating agencies using CAMEL model lays emphasis on capital adequacy ratios of banks for rating the bank's certificate of deposits, fixed deposits and bonds. Baral (2005) studied the performance of joint ventures banks in Nepal by using the CAMEL. The study revealed that the financial health of joint ventures is more effective than that of commercial banks. CAMEL showed that the financial health of joint venture banks was not difficult to manage the possible impact to their balance sheet. Nurazi and Evans

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(2005) investigated whether CAMEL(S) ratios can be used to predict bank failure in Indonesia. The results found that logistic regression in tandem with multiple discriminant analysis could function as an early warning system for identifying bank failure and as a complement to on-site examination. Satish and Bharathi (2006) undertook a study for the year 2005-06 using CAMEL. Study suggested that ongoing developments in the Indian economy should excel the size and quality of service of banks. Grier (2007) recommended that management is considered to be the single most important element in the CAMEL rating system because it plays a substantial role in bank's success; however, it is subject to measure as the asset quality examination. Wirnkar and Tanko (2008) analyzed the adequacy of CAMEL in examining the overall performance of Nigerian banks during (1997-2005). The analysis disclosed the inability of each component in CAMEL to congregate the full performance of a bank. Muhammad (2009) claimed that the strength of CAMEL's factors would determine the overall strength of the bank. The quality of each component further underlines the inner strength. Jha and Hui (2012) compared the financial performance of different ownership structured commercial banks in Nepal. The results showed that public sector banks are significantly less efficient than their counterpart are; however domestic private banks are equally efficient to foreign-owned (joint venture) banks.

It is clear from the above that research has been carried out using CAMEL in different countries including India. But we hardly find any similarity as per sample selection or time frame of data is concerned.

### **3. Research Methodology**

The present study is a descriptive research study based on analytical research design. The secondary data from the annual reports of relevant banks for a period of 5 years (2007-2011) have been taken, which is the most recent data available on banking sector immediate after 2007 global financial crisis. A sample of 19 public sector banks excluding State Bank group are chosen as sample for the purpose of present study. Twenty ratios related to CAMEL model are applied in this study, whereas only 15 ratios have been discussed by Siva and Natarajan (2011). Again ratios namely Net Profit to Total Assets and Return on Equity has been discussed in the present study, which are not discussed by Parsad et al. (2011). For analysis and interpretation of results, the statistical tools used are arithmetic mean, F-test, One Way ANOVA. Beside these, tests of normality and homogeneity of variances are also used.

#### **3.1 Objectives of the Study**

The objectives of the present study are:

1. To measure the financial performance of the Indian Public Sector Banks.
2. To give suitable recommendations for improvement of financial performance of the sample banks.

### 3.2 Hypothesis of the Study

There is no significant difference in performance of public sector banks as assessed by CAMEL model.

## 4. Analysis and Discussion

### 4.1 Capital Adequacy

Capital adequacy is said to be as one of the important reflectors of the financial health of a bank. Protecting stakeholder' confidence and preventing its bankruptcy are very essential for a bank to survive. Capital is supposed to be a cushion, which provides protection to stakeholder' interest and it increases the stability and efficiency of bank. Capital Adequacy indicates the overall financial position of a bank. It indicates whether the bank has sufficient capital to bear unexpected losses in the future and bank leverage. The capital adequacy of a bank is measured by following ratios:

#### 4.1.1 Capital to Risk-weighted Assets Ratio (CRAR)

This ratio is propounded to ensure that banks can adopt a reasonable level of losses arising from operations and to ascertain bank's loss bearing capacity. Higher the ratio means banks are stronger and the investors are more protected. Latest RBI guideline for banks in India is to maintain a CRAR of 9%. Capital to Risk-weighted Assets Ratio (CRAR) =  $(\text{Tier-I} + \text{Tier-II}) / \text{Risk Weighted Assets}$ . Tier 1 capital includes shareholders' equity; perpetual non-cumulative preference shares, disclosed reserves and innovative capital instruments. Tier 2 capital includes undisclosed reserves, revaluation reserves of fixed assets and long-term holdings of equity securities, general provisions/general loan-loss reserves; hybrid debt capital instruments and subordinated debt.

#### 4.1.2 Debt-Equity Ratio

The degree of leverage of a bank is reflected by debt-equity ratio. It shows the proportion of debt and equity in the total finance of the bank. It is calculated by dividing total borrowings with shareholders' net worth. Net worth includes equity capital, and reserves and surpluses. Higher ratio indicates less protection for the depositors and creditors and vice-versa.

#### 4.1.3 Advances to Assets Ratio

This is a ratio between total advances and total assets. It is calculated by dividing the total advances with total assets. This ratio indicates a bank's aggressiveness in lending which ultimately leads to better profitability. The value of total assets does not include the revaluation of all the assets. Receivables are also included in total advances. Higher ratio is preferred as compared to lower one.

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### 4.1.4 Government Securities to Total Investments Ratio

The risk involved in a bank's investment is indicated by this ratio. It is calculated by dividing the amount invested in government securities by total investment. Government securities are considered one of the most safe and risk-free debt instruments. So higher the investment in government securities, lower will be the risk involved and vice versa.

### 4.1.5 Composite Capital Adequacy

The different ratios measuring capital adequacy of sample banks are shown in table 1. It is clear from this table that all banks have higher CRAR ratio than prescribed level by

**Table 1**

Bank	CRAR		Debt-Equity		Advances/ Assets		Govt. Securities/ Total investments		Group Rank	
	%	Rank	Time	Rank	%	Rank	%	Rank	Mean	Rank
Allahabad Bank	12.85	10	0.53	7	60.36	10	77.21	17	11.00	11
Andhra Bank	12.89	8	0.76	11	62.28	2	89.13	1	5.50	2
Bank of Baroda	13.52	4	0.68	10	61.54	6	77.93	15	8.75	7
Bank of India	12.38	14	1.16	17	61.77	5	78.86	14	12.50	16
Bank of Maharashtra	12.10	18	0.57	9	59.14	13	84.90	7	11.75	14.5
Canara Bank	13.93	1	0.56	8	61.78	4	86.31	4	4.25	1
Central Bank of India	11.56	19	0.50	5	58.40	15	84.98	6	11.25	13
Corporation Bank	13.58	2	1.22	18	57.70	18	74.54	19	14.25	19
Dena Bank	12.17	16	0.45	4	60.46	9	82.08	10	9.75	8
Indian Bank	13.45	5	0.24	1	58.52	14	79.38	13	8.25	5.5
Indian Overseas Bank	13.55	3	1.35	19	60.26	11	84.27	8	10.25	9
Oriental Bank of Commerce	12.87	9	0.38	3	60.18	12	87.04	3	6.75	3
Punjab & Sind Bank	12.96	7	1.08	16	58.39	16	86.16	5	11.00	11
Punjab National Bank	13.17	6	0.80	12	61.82	3	83.48	9	7.50	4
Syndicate Bank	12.27	15	1.05	15	62.70	1	88.08	2	8.25	5.5
Union Bank of India	12.80	11	0.86	13	61.16	8	80.26	12	11.00	11
United Bank of India	12.60	12	0.31	2	55.04	19	74.77	18	12.75	17
UCO Bank	12.11	17	0.94	14	61.28	7	77.77	16	13.50	18
Vijaya Bank	12.39	13	0.51	6	57.84	17	80.55	11	11.75	14.5

Reserve Bank of India. It is found that the Canara Bank secured the top position with highest average CRAR of 13.93 followed by Corporation Bank (13.58). Central Bank of India was at the bottom most position with a least average CRAR of 11.56. In terms of debt-equity ratio Indian Bank was at the top position with the least average of 0.24 followed by United Bank of India with average of 0.31. Indian Overseas Bank stood at the last position. In case of advance to assets, Syndicate Bank was at first position with the highest average of 62.70, followed by Andhra Bank with average of 62.28. United

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Bank of India was at the bottom most position with an average of 55.04. Andhra Bank was at the top most position in Government securities to total investments with highest average of 89.13 followed by Syndicate Bank with average of 88.08. Corporation Bank was at the last position with the least average of 74.54.

On the basis of group averages of four sub parameters of capital adequacy Canara Bank was at the top position with group average of 4.25, followed by Andhra Bank with group average of 5.50. Corporation Bank stood at last position due to its poor performance in debt-equity ratio, advance to assets and Government securities to total investments ratio.

### **4.2 Assets Quality**

The quality of assets also plays a crucial role in determining the financial strength of a bank. The prime objective to assess the quality of assets is to ascertain the composition of Non-Performing Assets (NPAs) as a percentage of the total assets. The following ratios are required to assess assets quality:

#### **4.2.1 Net NPAs to Net Advances Ratio**

Measuring the net non-performing assets as a percentage of net advances is the most standard measure to assess the assets quality. Net NPAs are calculated by deducting net of provisions on non-performing assets and interest in suspense account from Gross NPAs.

#### **4.2.2 Total Investments to Total Assets Ratio**

Total investments to total assets reflect the extent of deployment of assets of a bank in investment as against advances. This ratio measures the proportion of total assets locked up in investments. It is ascertained by dividing total investments with total assets. A higher ratio represents that the bank has maintained a high cushion of investments as a safeguard against NPAs by adopting a conservative policy.

#### **4.2.3 Net NPAs to Total Assets Ratio**

This ratio indicates the efficiency of bank in ascertaining the risk arising from credit and recovering the debts. Under this ratio, the net NPAs are expressed as a percentage of total assets. Lower the ratio reflects the better is the quality of advances and vice versa.

#### **4.2.4 Percentage Change in Net NPAs Ratio**

This ratio calculates the movement in net NPAs in current year in relation to the previous year net NPAs. The higher the reduction in net NPAs levels in current year shows, the better is for the bank.

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### 4.2.5 Composite Asset Quality

The various ratios reflecting assets quality of sample banks are shown in table 2. It is found that the Andhra Bank secured the top position with least average of net NPAs

**Table 2**

Bank	Net NPAs to Net Advances Ratio		Total Investments to Total Assets Ratio		Net NPAs to Total Assets Ratio		Percentage Change in Net NPAs		Group Rank	
	%	Rank	%	Rank	%	Rank	%	Rank	Mean	Rank
Allahabad Bank	0.808	11	29.30	15	0.48	9	28.65	11	11.50	14
Andhra Bank	0.210	1	25.28	4	0.13	1	51.59	16	5.50	2
Bank of Baroda	0.414	5	22.77	1	0.25	4	10.33	3	3.25	1
Bank of India	0.626	8	24.12	2	0.50	10	36.75	13	8.25	5
Bank of Maharashtra	1.166	16	29.00	14	0.68	15	23.74	5	12.50	15
Canara Bank	1.008	14	26.48	7	0.62	13	23.98	8	10.50	12.5
Central Bank of India	1.146	15	27.62	11	0.66	14	-0.75	1	10.25	11
Corporation Bank	0.370	4	28.40	13	0.21	3	26.99	9	7.25	3
Dena Bank	0.290	2	27.09	9	0.77	17	7.88	2	7.50	4
Indian Bank	0.306	3	30.38	18	0.18	2	36.12	12	8.75	7
Indian Overseas Bank	1.238	17	27.76	12	0.75	16	59.43	17	15.50	18.5
Oriental Bank of Commerce	0.796	10	26.12	5	0.47	8	51.45	15	9.50	9.5
Punjab & Sind Bank	0.454	6	29.44	17	0.26	5	18.37	4	8.00	6
Punjab National Bank	0.590	7	26.40	6	0.35	6	112.77	19	9.50	9.5
Syndicate Bank	0.908	12	24.80	3	0.58	12	28.46	10	9.25	8
Union Bank of India	0.694	9	26.78	8	0.43	7	66.36	18	10.50	12.5
United Bank of India	1.468	18	32.14	19	0.81	18	23.79	7	15.50	18.5
UCO Bank	1.662	19	27.48	10	1.02	19	23.77	6	13.50	16.5
Vijaya Bank	0.980	13	29.34	16	0.57	11	42.93	14	13.50	16.5

to net Advances of 0.21 followed by Dena Bank (0.29). UCO Bank of India was at the bottom most position with a highest average of 1.662. In terms of total investments to total assets ratio Bank of Baroda was at the top position with the least average of 22.77 followed by Bank of India with average of 24.12. United Bank of India stood at the last position with the highest average of 32.14. In case of net NPAs to total assets ratio, Andhra Bank was at first position with the least average of 0.13, followed by Indian Bank with average of 0.18. UCO Bank was at the bottom most position with highest average of 1.02. In case of Percentage Change in Net NPAs Central Bank of India was at top position with -0.75 and only bank which managed to reduce its NPAs. On the other hand Punjab National Bank was at the last position with the highest percentage change in net NPAs of 112.77, indicating that over the period of study the net NPAs of the bank increased more than two times.

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On the basis of group averages of four sub parameters of asset quality Bank of Baroda was at the top position with group average of 3.25, followed by Andhra Bank with group average of 5.50. Indian Overseas Bank and United Bank of India stood bracketed at last position.

### **4.3 Management Efficiency**

Management efficiency is one of the crucial component of the CAMEL model that ensures the survival and growth of a bank. Management efficiency means follow up of defined norms, capability to plan and respond to dynamic environment and administrative ability of the bank. Effective management is one of the crucial factors behind any institution's performance.

#### **4.3.1 Total Advances to Total Deposits**

This ratio assesses the efficiency of the bank's management in applying the deposits (including receivables) available excluding other funds like equity capital, etc. into advances with high yields. Savings deposits, demand deposits, term deposits and deposits of other banks are included in total deposits.

#### **4.3.2 Profit per Employee**

As the name indicates this ratio reveals the profit per employee. It is calculated by dividing the profit after tax earned by the bank with the total number of employees. The higher the ratio, higher is the efficiency of the management and vice versa.

#### **4.3.3 Business per Employee**

Business per employee reveals the productivity and efficiency of human resources of bank. It is calculated by dividing the total business with total number of employees. Higher the ratio, the better it is for the bank and vice versa.

#### **4.3.4 Return on Equity**

It is a measure of the profitability of a bank. In calculation of this ratio, Profit after tax is expressed as a percentage of equity.

#### **4.3.5 Composite Management Efficiency**

The various ratios reflecting management efficiency position of sample banks are shown in table 3. It is found that the Bank of India secured the top position with highest



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**Table 3**

Bank	Total Advances to Total Deposits Ratio		Profit per Employee		Business per Employee		Return on Equity		Group Rank	
	%	Rank	Times	Rank	%	Rank	%	Rank	Mean	Rank
Allahabad Bank	69.29	11	4.94	10	742.60	9	18.04	13	10.75	11
Andhra Bank	72.12	4	5.88	6	798.96	6	20.77	3	4.75	1
Bank of Baroda	71.72	7	6.33	3	898.60	3	18.20	12	6.25	5
Bank of India	75.12	1	5.14	9	855.60	4	19.67	6	5.00	3
Bank of Maharashtra	67.43	16	2.53	17	628.72	17	15.70	15	16.25	17
Canara Bank	71.44	8	5.79	7	829.82	5	19.03	10	7.50	7
Central Bank of India	66.77	17	2.37	18	562.41	19	12.56	17	17.75	18
Corporation Bank	69.90	9	7.87	1	1073.35	2	19.36	8	5.00	3
Dena Bank	67.85	15	4.18	12	727.00	10	19.66	7	11.00	12.5
Indian Bank	67.86	14	6.31	4	632.00	16	21.20	1	8.75	10
Indian Overseas Bank	72.64	3	4.17	13	691.28	13	19.95	5	8.50	9
Oriental Bank of Commerce	69.41	10	6.81	2	1112.02	1	12.11	18	7.75	8
Punjab & Sind Bank	68.68	13	4.71	11	720.90	11	19.33	9	11.00	12.5
Punjab National Bank	73.36	2	5.52	8	678.52	15	20.64	4	7.25	6
Syndicate Bank	71.87	5	3.35	15	689.62	14	19.00	11	11.25	14
Union Bank of India	71.83	6	5.97	5	759.56	7	21.10	2	5.00	3
United Bank of India	62.92	19	2.07	19	594.40	18	10.51	19	18.75	19
UCO Bank	69.12	12	2.81	16	749.20	8	15.94	14	12.50	15
Vijaya Bank	65.81	18	3.89	14	717.56	12	14.49	16	15.00	16

average of Total Advances to Total Deposits Ratio of 75.21 followed by Punjab National Bank (73.36). United Bank of India was at the bottom most position with a least average of 62.92. In terms of Profit per Employee ratio Corporation Bank was at the top position with the highest average of 7.87 followed by Oriental Bank of Commerce with average of 6.81. United Bank of India stood at the last position with the least average of 2.07. In case of Business per Employee, Oriental Bank of Commerce was at first position with the highest average of 1112.02, followed by Corporation Bank with average of 1073.35. Central Bank of India was at the bottom most position with least average of 562.41. In case of Return on Equity Indian Bank was at top position with average of 21.02 followed by Union Bank of India with an average of 21.10. United Bank of India was at the bottom most position with least average of 10.51.

On the basis of group averages of four sub parameters of management efficiency Andhra Bank was at the top position with group average of 4.75. United Bank of India stood at bottom most position.

### 4.4 Earning Quality

The quality of earnings is a very important criterion which represents the quality of income in terms of income generated by core activity-income from lending operation. This criterion contains importance in the light of the argument that most of bank's earnings are from non-core activities such as treasury operation, investments, and corporate advisory service and so on.

#### 4.4.1 Operating Profit to Total Assets

This ratio reflects how much profit a bank can earn from its operations for every rupee invested in its total asset. The better utilization of assets will result in higher operating profit.

#### 4.4.2 Net Profit to Total Asset

This ratio reflects the return on assets employed. It is calculated by dividing the net profits with total assets of the bank. Higher the ratio reflects better earning potential and vice versa.

#### 4.4.3 Interest Income to Total Income

This ratio calculates the income from lending operations as a percentage of the total income earned by the bank during a year. Interest income includes interest/discount on advances/bills, income on investments, interest on balances with RBI and other inter-bank funds and others. Total income includes interest income and other income like commission, net profit (loss) on sale of investment, land and other assets, revaluation of investment and miscellaneous income.

#### 4.4.4 Spread or Net Interest Margin (NIM) to Total Assets

NIM is the difference between the interest income and the interest expended. It is expressed as a percentage of total assets. A higher spread indicates the better earnings given the total assets.

#### 4.4.5 Composite Earning Quality

The various ratios reflecting earning quality position of sample banks are shown in table 4. It is found that Indian Bank secured the top position with highest average of operating

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**Table 4**

Bank	Operating Profit to Total Assets		Net Profit to Total Assets		Interest Income to Total Income		Net Interest Margin (NIM) to Total Assets		Group Rank	
	%	Rank	Times	Rank	%	Rank	%	Rank	Mean	Rank
Allahabad Bank	2.08	7	1.00	6	88.20	11	2.59	8	8.00	7
Andhra Bank	2.14	4	1.08	3	88.16	12	2.92	4	5.75	3
Bank of Baroda	2.00	8	0.95	9	86.14	17	2.58	9	10.75	12.5
Bank of India	2.10	6	0.91	11	86.23	16	2.57	10	10.75	12.5
Bank of Maharashtra	1.44	16	0.61	16	90.70	3	2.60	7	10.50	10.5
Canara Bank	1.95	10	1.01	5	87.91	13	2.41	13	10.25	9
Central Bank of India	1.26	19	0.51	18	90.87	1	2.18	18	14.00	17
Corporation Bank	2.17	3	1.03	4	85.71	18	2.39	14	9.75	8
Dena Bank	1.86	12	0.84	12	87.37	14	2.55	11	12.25	15
Indian Bank	2.76	1	1.44	1	77.93	19	3.43	1	5.50	2
Indian Overseas Bank	1.96	9	0.92	10	90.22	6	2.87	5	7.50	5
Oriental Bank of Commerce	1.84	13	0.74	13	90.52	4	2.34	15	11.25	14
Punjab & Sind Bank	1.94	11	0.98	8	89.64	9	2.91	3	7.75	6
Punjab National Bank	2.50	2	1.14	2	86.90	15	3.23	2	5.25	1
Syndicate Bank	1.60	14	0.71	14	90.80	2	2.42	12	10.50	10.5
Union Bank of India	2.12	5	0.99	7	89.22	10	2.71	6	7.00	4
United Bank of India	1.42	17	0.50	19	89.69	8	2.30	16	15.00	19
UCO Bank	1.38	18	0.53	17	90.39	5	2.04	19	14.75	18
Vijaya Bank	1.54	15	0.64	15	89.90	7	2.29	17	13.50	16

profit to total assets ratio of 2.76 followed by Punjab National Bank (2.50). Central Bank of India was at the bottom most position with a least average of 1.26. In terms of net profit to total assets ratio Indian Bank was at the top position with the highest average of 1.44 followed by Punjab National Bank with average of 1.14. United Bank of India stood at the last position with the least average of 0.50. In case of Interest Income to Total Income, Central Bank of India was at first position with the highest average of 90.87, followed by Syndicate Bank with average of 90.80. Indian Bank was at the bottom most position with least average of 77.93. In case of net interest margin (NIM) to total assets ratio Indian Bank was at top position with average of 3.43 followed by Punjab National Bank with an average of 3.23. UCO Bank was at the bottom most position with least average of 2.04.

On the basis of group averages of four sub parameters of earning quality Punjab National Bank was at the top position with group average of 5.25. United Bank of India stood at bottom most position.

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### **4.5 Liquidity**

Liquidity is a crucial aspect which reflects bank's ability to meet its financial obligations and to maintain adequate level of liquid assets, which will otherwise result in decline in the earnings. An adequate liquidity position can be obtained either by increasing liabilities or by converting its assets quickly into cash. Bank has to take proper measures to hedge the liquidity risk, at the same time securing good proportion of funds to be invested in high return generating securities.

#### **4.5.1 Liquid Assets to Total Assets**

This ratio measures the overall liquidity position of a bank. The liquid assets include cash in hand, money at call and short notice, balance with Reserve bank of India and balance with other financial institutions/banks (India and Abroad). The total assets include the revaluation of all the assets.

#### **4.5.2 Liquid Assets to Total Deposits**

This ratio measures the liquidity available to the depositors of a bank. The liquid assets include cash in hand, money at call and short notice, balance with Reserve bank of India and balance with other institutions/banks (India and Abroad). Total deposits include savings deposits, demand deposits, term deposits and deposits of other financial institutions/banks.

#### **4.5.3 Liquid Assets to Demand Deposits**

This ratio reflects the ability of bank to honour the demand from depositors during a particular year. In order to provide higher liquidity for depositors, bank has to invest these funds in highly liquid form.

#### **4.5.4 Approved Securities to Total Assets**

This ratio is calculated by dividing the total amount invested in approved securities with total assets. Approved securities include investments made in the state-associated/owned bodies like Electricity Corporations, Housing Development Corporations, Regional Rural Banks and corporation bond.

#### **4.5.5 Composite Liquidity**

The various ratios reflecting liquidity position of sample banks are shown in table 5. It is found that the Bank of Baroda secured top position with highest average of liquid assets to total assets Ratio of 12.50 followed by Corporation Bank (11.22). Allahabad Bank was at the bottom most position with a least average of 7.50. In terms of liquid assets to

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**Table 5**

Bank	Liquid Assets to Total Assets		Liquid Assets to Total Deposits		Liquid Assets to Demand Deposits		Approved Securities to Total Assets		Group Rank	
	%	Rank	Times	Rank	%	Rank	%	Rank	Mean	Rank
Allahabad Bank	7.50	19	8.59	19	108.54	14	0.34	4	14.00	17
Andhra Bank	9.66	7	11.16	7	130.40	8	0.15	15	9.25	6
Bank of Baroda	12.50	1	14.57	1	189.14	1	0.47	2	1.25	1
Bank of India	10.78	3	12.77	3	183.71	2	0.31	6	3.50	2
Bank of Maharashtra	7.82	18	8.89	18	83.08	19	0.12	16	17.75	19
Canara Bank	8.78	13	10.16	14	122.94	9	0.22	10	11.50	14.5
Central Bank of India	9.14	10	10.39	11	115.89	13	0.33	5	9.75	9.5
Corporation Bank	11.22	2	13.34	2	83.61	18	0.11	17	9.75	9.5
Dena Bank	9.58	8	10.81	9	117.87	11	0.23	9	9.25	6
Indian Bank	8.28	17	9.56	17	131.47	7	0.45	3	11.00	12.5
Indian Overseas Bank	8.84	11	10.67	10	116.99	12	0.17	13	11.50	14.5
Oriental Bank of Commerce	10.14	4	12.49	4	149.45	3	0.16	14	6.25	3
Punjab & Sind Bank	8.82	12	10.32	12	138.05	5	0.91	1	7.50	4
Punjab National Bank	8.66	14	10.29	13	104.57	16	0.30	7	12.50	16
Syndicate Bank	9.96	5	11.49	5	121.43	10	0.10	18	9.50	8
Union Bank of India	8.62	16	10.06	15	100.82	17	0.21	11	14.75	18
United Bank of India	9.52	9	10.91	8	104.93	15	0.19	12	11.00	12.5
UCO Bank	8.65	15	9.77	16	142.75	4	0.29	8	10.75	11
Vijaya Bank	9.90	6	11.32	6	132.21	6	0.07	19	9.25	6

total deposits ratio Bank of Baroda was at the top position with the highest average of 14.57 followed by Corporation Bank with average of 13.34. Allahabad Bank stood at the last position with the least average of 8.59. In case of liquid assets to demand deposits, Bank of Baroda was at first position with the highest average of 189.14, followed by Bank of India with average of 183.71. Bank of Maharashtra was at the bottom most position with least average of 83.08. In case of approved securities to total assets Punjab & Sind Bank was at top position with average of 0.91 followed by Bank of Baroda with an average of 0.47. Vijaya Bank was at the bottom most position with least average of 0.07.

On the basis of group averages of four sub parameters of liquidity Bank of Baroda was at the top position with group average of 1.25. Bank of Maharashtra stood at bottom most position.

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### 4.6 Overall Composite Ranking

Table 6 depicts the group ranking of the Indian public sector banks for the period 2007-2011. It is found that Bank of Baroda was at the first position with overall composite

**Table 6**

Bank	C	A	M	E	L	Mean	Rank
Allahabad Bank	11.00	11.50	10.75	8.00	14.00	11.05	14
Andhra Bank	5.50	5.50	4.75	5.75	9.25	6.15	2
Bank of Baroda	8.75	3.25	6.25	10.75	1.25	6.05	1
Bank of India	12.50	8.25	5.00	10.75	3.50	8.00	3
Bank of Maharashtra	11.75	12.50	16.25	10.50	17.75	13.75	18
Canara Bank	4.25	10.50	7.50	10.25	11.50	8.80	7
Central Bank of India	11.25	10.25	17.75	14.00	9.75	12.60	15.5
Corporation Bank	14.25	7.25	5.00	9.75	9.75	9.20	9
Dena Bank	9.75	7.50	11.00	12.25	9.25	9.95	12
Indian Bank	8.25	8.75	8.75	5.50	11.00	8.45	6
Indian Overseas Bank	10.25	15.50	8.50	7.50	11.50	10.65	13
Oriental Bank of Commerce	6.75	9.50	7.75	11.25	6.25	8.30	4
Punjab & Sind Bank	11.00	8.00	11.00	7.75	7.50	9.05	8
Punjab National Bank	7.50	9.50	7.25	5.25	12.50	8.40	5
Syndicate Bank	8.25	9.25	11.25	10.50	9.50	9.75	11
Union Bank of India	11.00	10.50	5.00	7.00	14.75	9.65	10
United Bank of India	12.75	15.50	18.75	15.00	11.00	14.60	19
UCO Bank	13.50	13.50	12.50	14.75	10.75	13.00	17
Vijaya Bank	11.75	13.50	15.00	13.50	9.25	12.60	15.5

ranking average of 6.05, due to its better performance in areas of liquidity and asset quality. While Andhra Bank got second position rank with overall composite ranking average of 6.15, due to its better performance in the spheres of management efficiency, capital adequacy and asset quality. United Bank of India holds the bottom most rank with overall composite ranking average of 14.60, due to management inefficiency, poor assets and earning quality. The findings of present study are contradictory to that of Rao and Datta (1998) which found that Corporation Bank and Oriental Bank of Commerce are at the top whereas Indian Bank and UCO Bank are at the bottom.

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### 4.7 Classification of Public Sector Banks Based on CAMEL Criteria

**Table 7**

Rank	CAMEL Criteria	Range	Mean=10, SD=2.39
Excellent	Upto (Mean-0.67 SD)	First = 25%	Upto 8.40
Good	From (Mean-0.67 SD) Upto Mean	Second= 25%-50%	From 8.40 to 10
Fair	Above Mean, upto (Mean + 0.67 SD)	Third= 50%-75%	From 10 to 11.60
Poor	Above (Mean + 0.67 SD)	Fourth= Above 75%	Above 11.60

### 4.8 Classification of Public Sector Banks Based on CAMEL Criteria

**Table 8**

CAMEL Criteria	Banks
Excellent (Upto 8.40)	Bank of Baroda, Andhra Bank, Bank of India, Oriental Bank of Commerce, Punjab National Bank
Good (From 8.40 to 10)	Indian Bank, Canara Bank, Punjab & Sind Bank, Corporation Bank, Union Bank of India, Syndicate Bank, Dena Bank
Fair (From 10 to 11.60)	Indian Overseas Bank, Allahabad Bank,
Poor (Above 11.60)	Central Bank of India, Vijaya Bank, UCO Bank, Bank of Maharashtra, United Bank of India

### 4.9 Tests of Normality

For testing the normality of data, we proposed the null hypothesis that the population distribution is normal. For this Shapiro-Wilk test was applied and results are depicted in table 7.

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**Table 9**

Sr. No.	Bank	Statistic	df	P - Values
1.	Allahabad Bank	0.950	5	0.735
2.	Andhra Bank	0.740	5	0.024
3.	Bank of Baroda	0.968	5	0.865
4.	Bank of India	0.951	5	0.742
5.	Bank of Maharashtra	0.909	5	0.459
6.	Canara Bank	0.886	5	0.337
7.	Central Bank of India	0.948	5	0.720
8.	Corporation Bank	0.959	5	0.798
9.	Dena Bank	0.991	5	0.984
10.	Indian Bank	0.924	5	0.559
11.	Indian Overseas Bank	0.937	5	0.645
12.	Oriental Bank of Commerce	0.932	5	0.612
13.	Punjab & Sind Bank	0.756	5	0.034
14.	Punjab National Bank	0.956	5	0.779
15.	Syndicate Bank	0.980	5	0.937
16.	Union Bank of India	0.969	5	0.870
17.	United Bank of India	0.978	5	0.923
18.	UCO Bank	0.948	5	0.720
19.	Vijaya Bank	0.932	5	0.610

The results highlighted that calculated P- values are greater than the chosen alpha level of 0.05 for all banks, which means data are normally distributed.

### 4.10 Tests of Homogeneity of Variances

For testing the homogeneity of variance of data, we proposed the null hypothesis that there is no significant difference in population variance for the ratios. For this Levene's test of Homogeneity was applied in table 8.

**Table 10**

Levene Statistic	df1	df2	P-values
1.138	18	76	0.335

The results highlighted that calculated P- values are greater than the chosen alpha level of 0.05 for all banks, thus we accept the null hypothesis.

### 4.11 ANOVA Results

For determining whether there is any significant difference between the means of CAMEL ratios, we applied one-way ANOVA test on the data shown in table 6. The results of one-way ANOVA test are presented in table 9.



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Table 11

Sources of Variation	Sum of Squares	Degree of Freedom	Mean Square	F-Value
Between Groups	534.733	18	29.707	4.037
Within Groups	559.225	76	7.358	
Total	1093.958	94		

It is clear from the table that the calculated values of F-ratio is more than the tabulated values (at 5% level of significance is 1.741). It means there is statistically significant difference between the mean values of CAMEL ratios of public sector banks during the period of study. Hence we reject the null hypothesis. It implies that there is significant difference in performance of public sector banks by CAMEL model. So the findings of present study are similar to the study by Siva and Natarajan (2011) which also found significance difference in ratios.

### 5. Conclusion and Suggestions

CAMEL model is important tool to assess the relative financial strength of a bank and to suggest suitable measures to improve its weaknesses. In the present study CAMEL ranking approach is used to assess relative performance of Indian public sector banks. The study observed that there is significant difference between the mean values of CAMEL ratios of public sector banks. It is found that during the year 2007-2011 the top two performing banks are Bank of Baroda and Andhra Bank because of high capital adequacy and asset quality. The findings of the present study are similar to the findings of a study by Parsad et al. (2011). The worst performer is United Bank of India during the study period because of management inefficiency, low capital adequacy and poor assets and earning quality. Here, the findings of present study are contradictory to that of Parsad et al. (2011) which found Central Bank of India at the last position followed by UCO Bank and Bank of Maharashtra. The study recommends that United Bank of India has to improve its management efficiency, asset and earning quality. Similarly Bank of Maharashtra should take necessary steps to improve its liquidity position and management efficiency. The present study does not relate to State Bank Group, Private Sector Banks and Foreign Banks.

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