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RESEARCH PAPER

Analyzing the financial soundness of public sector banks in India using CAMEL model

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ABSTRACT

The Indian banking system has undergone tremendous changes in the last decade, its financial soundness and performance being paramount in the achievement of a stable and sustainable economic growth. Thus, the aim of this research was to analyze the financial soundness of the public sector banks that operate in India. In order to achieve this, one of the most popular methods for the analysis of the financial soundness of banks namely CAMEL model was used. The obtained results highlight the strength and vulnerabilities of the analyzed banks underlying the need to strengthen the concerns of the decision makers from banks to improve and increase their soundness. The study concluded that the Punjab National Bank's overall performance was very good followed by State Bank of India and the financial performance was very poor in case of IDBI.

KEY WORDS : CAMEL model, Financial soundness, Performance, Public sector banks

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In order to ensure a healthy, solid and stable banking sector, the banks must be analyzed and evaluated in a way that will allow the smooth correction and removal of potential vulnerabilities. In this way one of the most popular methods for the analysis and evaluation of bank's performance is represented by CAMEL rating. CAMEL rating is an international bank rating system wherein the bank regulators or examiners (generally the

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Authors' affiliations: Saurabh Singh and J.P. Pandey, College of Agribusiness Management, GBPUAT, Udham Singh Nagar (Uttarakhand) India officers trained by RBI) evaluates an overall performance of the banks and determines their strengths and weaknesses. This rating system is based on the financial statements of banks *viz.*, balance sheet, profit and loss statement and on-site examination by the bank regulators. In this rating system, the officers rate the banks on scale from 1 to 5, where 1 is the best and 5 is the worst. The parameters on the basis of which the ratings are made will be represented by an acronym CAMEL. CAMEL indicates Capital adequacy, Asset quality, Management efficiency, Earnings quality and Liquidity. It was developed in 1970 by three federal supervisors of United States (Federal Reserve, The FDIC and OCC) to provide a convenient summary of bank at the time of on-site examination.

Kumar et al. (2012) analyzed the performance of

twelve public and private sector banks over a period of eleven years (2000-11) in the Indian banking sector. For that purpose, CAMEL model had been used and based on the values of ratios depicting CAMEL parameters the selected banks had been ranked. The study concluded that private sector banks were at the top of the list with their performances in terms of soundness being the best. Public sector banks like Union Bank and SBI had taken a backseat and displayed low economic soundness in comparison.

Roman and Sargu (2013) focused on fifteen commercial banks that operate in Romania, for which they aimed to highlight their soundness through certain representative indicators that express the main content of the six parameter of the CAMEL framework for the analyzed period of time (2004-11). Their result highlighted the strength, but especially the vulnerabilities of the selected banks which highlighted the main segments of the banking activity on which the decision making concerns from the banking system must focus in order to record an improvement and increase their soundness.

Shukla (2015) analyzed the financial strength of public and private sector bank over a period of four years (2010-13) using CAMEL approach. Financial strength was analyzed by ranking the banks based on parameters of CAMEL model, as this model is the useful tool to examine the safety and soundness of banks and help mitigate the potential risks which may lead to bank failures. The study concluded that the private sector banks were growing at the faster pace than public sector banks.

Trivedi *et al* (2015) examined the comparative performance of two leading public and private sector banks *i.e.* Axis and Kotak Mahindra Bank from private sector and Bank of Baroda and State Bank of India from the public sector by ranking the parameters based on CAMEL approach for the period of five years (2009-13). The study concluded that Bank of Baroda has the highest capital base, Axis bank has the highest asset quality, and Kotak Mahindra has efficient management. Further, SBI reflected a strong earnings quality and Kotak Mahindra represented strong liquidity levels.

Ishaq *et al.* (2016) analyzed the impact of CAMEL model parameters on bank performance. In their study CAMEL model parameters such as Capital adequacy, Asset quality, Management efficiency, Earnings and profitability and Liquidity were considered as independent variables whereas Earnings per share as a measure of bank's performance was considered as the dependent variable. The sample size was 10 commercial banks of Pakistan and the study period was seven years (2007-13). The study concluded that CAMEL model had a significant impact on bank's performance, wherein the research would be very helpful for their management of the banks in the banking industry of Pakistan.

Objective:

To analyze the financial soundness of public sector banks in India using CAMEL model.

METHODOLOGY

The study was analytical in nature and based on secondary data covering a period from 2013-17 as many previous researches have analyzed the performance of banks before the year 2013. The sample is composed of top eight largest public sector banks, which were selected based on their market capitalization

Sr. No.	Banks	Market capitalization (Rs. crore)
1.	State Bank of India	154,750.96
2.	Bank of Baroda	32,762.18
3.	Punjab National Bank	15,247.33
4.	IDBI	13,588.18
5.	Canara Bank	10,710.50
6.	Union Bank	7,957.13
7.	Bank of India	7,191.48
8.	Syndicate Bank	5,178.27

In order to evaluate and analyze the soundness of the selected banks one of the most popular methods have chosen in this research namely CAMEL model. CAMEL is an acronym of Capital Adequacy, Asset quality, Management efficiency, Earnings quality and Liquidity.

Capital adequacy is the minimum reserves of capital which a bank or other financial institution must have to handle the losses and meet all its obligations towards customers without ceasing its operation. The reason why capital adequacy ratios are critical is

To make sure that banks have enough cushion to absorb a reasonable amount of losses before they become insolvent and consequently loss depositors' funds.

During the process of winding up, funds belonging to depositors are given a high priority than the bank's capital, so depositors can only lose their savings if a bank registers a loss exceeding the amount of capital it processes. Thus, the higher the bank's capital adequacy ratio, the higher the degree of depositors money.

Bank's capital consists of tier 1 capital (bank's core capital) and tier 2 capital (supplementary capital). Tier 1 capital consists of shareholder's equity and retained earnings. It is intended to measure a bank's financial health and is used when a bank must absorb losses without ceasing business operations. The minimum tier 1 capital ratio is 10.5 per cent. Tier 2 capital includes revaluation reserves, hybrid capital instruments and subordinated term debt, general loan loss reserves and undisclosed reserves. Tier 2 is supplementary capital because it is less reliable than tier 1 capital. The minimum tier 2 capital is 12 per cent.

Asset quality is the significant element that measure that measures the strength of a bank and is directly linked with the capital adequacy because most of the times the solvency risks are determined by the depreciation of the assets (IMF and World Bank, 2005). It's a measure to account for the extent of Non-performing assets in the portfolio of the banks and the extent of damage this particular asset class can have on the financial performance.

The management quality is of great importance for the insurance of banks health and stability. For the evaluation of management soundness, indicators such as total assets to total deposits ratio, asset turnover ratio and net profit margin ratio are used. In the analysis of the earnings and profitability of banks, normally the following indicators namely return on assets and return on equity are used. Return on assets underlies how profitable are the bank assets in generating revenues. Return on equity reflects the profitability of banks own capital, but the values of this indicator must be interpreted with caution, as the high level can underlie a high profitability and a low level of capitalization whereas the low level can underlie a low profitability and high capitalization of banks (Evan *et al.*, 2000).

Liquidity is the most important component for a bank and has significant impact on its financial soundness. It constitutes one of the vital elements that evaluate the performance of a bank because it indicates the capacity of banks to pay its short term debts and face unexpected withdrawals of depositors. The indicators that measure the liquidity reflect the capacity of the banks to withstand shocks to cash flows; the most used being current and quick ratio.

The variable used in our research and the way they are computed were presented in Table A. The average for each parameter from the CAMEL model have computed separately and analyzed for the period of five years (2013-17). The obtained averages have been used in order to rank the banks. The best score obtained by a bank got the rank one followed upto eight. If the same average for two or more banks were obtained then the respective banks would be assigned the average rank.

Table A: R	atios used in CAM	EL model	
Sr. No.	CAMEL parameters	Ratios used in the study	
1.	С	Capital adequacy ratio	Tier 1 Capital + Tier 2 Capital / Risk weighted assets
		Debt equity ratio	Debt / Equity
		Total advances to total assets ratio	Total advances / Total assets
2.	А	Gross NPA ratio	Gross NPA / Gross advances
		Net NPA ratio	Net NPA / Net advances
		Total investments to total assets ratio	Total investments / Total assets
3.	М	Total assets to total deposits ratio	Total assets / Total deposits
		Asset turnover ratio	Net sales / Average total assets
		Net profit margin ratio	Net profit / Total revenue
4.	Е	Return on assets	Net income / average total assets
		Return on equity	Net income / Average shareholders equity
5.	L	Current ratio	Current assets / Current liabilities
		Quick ratio	(Cash equivalents + marketable securities + accounts receivables) /
			current liabilities

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T-test analysis:

The one sample t-test is a statistical procedure used to determine whether a sample of observations could have been generated by a process with specific mean. There are two kinds of hypotheses for a one sample ttest, the Null hypothesis and the alternate hypothesis. The alternate hypothesis assumes that some difference exists between the true mean and comparison value, whereas the Null hypothesis assumes that no difference exists. The purpose of one sample t-test is to determine if the Null hypothesis should be rejected, given the sample data.

Hypothesis formulated for the given study is as follows:

H_o: There is no significant difference between capital adequacy of selected banks

H.: There is a significant difference between capital adequacies of selected banks

H_o: There is no significant difference between asset quality of selected banks

H₁: There is a significant difference between asset qualities of selected banks

H_a: There is no significant difference between management efficiency of selected banks

H₁: There is a significant difference between management efficiency of selected banks

H_o: There is no significant difference between earnings quality of selected banks

H₁: There is a significant difference between earning quality of selected banks

H_o: There is no significant difference between liquidity of selected banks

H₁: There is a significant difference between liquidity of selected banks.

ANALYSIS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under the following heads:

Capital adequacy :

Various ratios representing the capital adequacy of selected banks are presented in Table 1. Under Basel III, the minimum capital adequacy ratio that banks should maintain is 10 per cent (Master circular, Reserve Bank of India, 2017).

From the Table 1 it could be clearly found that all the eight banks have maintained higher than the minimum criteria. Out of the eight banks, Bank of Baroda secured the top position with the highest average CAR of 12.98 followed by State Bank of India (12.66) and Punjab National Bank (11.88). Bank of India stood at the bottom position with a least average CAR of 10.63. Therefore, Bank of Baroda followed by State bank of India could be considered safe and less likely to become insolvent if unexpected losses occur.

In terms of Debt-Equity, the ratio of 1.5 or lower is considered to be financially sound and ratios higher than 2 are less favourable. State Bank of India mounted at the top position with least average of 1.39 followed by IDBI (1.53) and Punjab National Bank (1.56). On the contrary, Syndicate Bank stood at the least position with higher debt equity ratio of 2.28. Hence, it could be inferred that, State Bank of India was using less leverage and has a strong equity position.

In case of total advances to total assets, Bank of Baroda attained first position with lowest average of 0.58 followed by the IDBI and Canara Bank (0.59). Syndicate Bank was at the bottom with the average of 0.67. Thus it could be inferred that Bank of Baroda, IDBI and

Table 1 : Capital adequa	cy ratios of publ	ic sector bank	s and their ran	king					
Banks	CAR (%)		Debt to eq	uity ratio	Total advance to total	Total advance to total asset ratio (%)		Overall ranking	
Daiks	Average	Rank	Average	Rank	Average	Rank	Average	Rank	
State Bank of India	12.66	2	1.39	1	0.62	5	2.0	2	
Bank of Baroda	12.98	1	1.59	4	0.58	1	4.3	1	
Punjab National Bank	11.88	3	1.56	3	0.62	5	3.0	4	
IDBI	11.79	4	1.53	2	0.59	2	4.0	2	
Canara Bank	11.51	6	1.84	6	0.59	2	6.0	5	
Union Bank	10.96	7	1.86	7	0.65	7	5.3	7	
Bank of India	10.63	8	1.80	5	0.61	4	6.0	6	
Syndicate Bank	11.55	5	2.28	8	0.67	8	4.7	7	

Source: Annual report of the above banks (2013 – 2017)



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Canara Bank has a relatively lower degree of risk and eventually they might be able to repay their debts.

On the basis of group averages of three subparameters of capital adequacy, Bank of Baroda, State Bank of India and IDBI was at the top and subsequent positions, respectively and Union Bank and Syndicate Bank stood at the least position due to its poor performance in capital adequacy and higher debt equity ratio.

Asset quality:

The international prescribed level of gross NPA is 5 per cent. Net NPA indicates the degree of riskiness in the credits portfolio of the bank. Higher net NPA ratio indicates the higher quantity of risk. Ideally the ratio of Net NPA to Net advance should not be more than 3 per cent. Total investments to total assets ratio compares the liquid assets being held by an individual against the total assets accumulated. One should at least hold 20 per cent of the total assets in the form of liquid assets. Various ratios representing the asset quality of selected banks and their ranks are depicted in Table 2.

Syndicate Bank ranked number one by having less than the prescribed level (4.59) whereas the other selected banks were having higher Gross NPA. From the table it could be inferred that Syndicate Bank has the high quality credit portfolio while IDBI has a very poor credit portfolio. In case of Net NPA Syndicate Bank (2.78) and Bank of Baroda (2.89) stood at the top position. All the other selected banks have the Net NPA ratio higher than the prescribed level with IDBI remained in the highest degree of riskiness. Considering the total investments to total assets ratio IDBI and Canara Bank have the highest percentage (0.29) and Bank of Baroda has a low percentage (0.19).

On the basis of group ranking, the asset quality of Syndicate Bank and Canara Bank were higher whereas Bank of India's asset quality is comparatively poor than the selected banks.

Management efficiency:

Various parameters of management efficiency are

Table 2: Asset quality ratio	s of public sector b	anks and their	ranking						
Banks	Gross NPA ratio (%)		Net NPA ra	Net NPA ratio (%)		Total investments to total asset ratio (%)		Group ranking	
	Average	Rank	Average	Rank	Average	Rank	Average	Rank	
State Bank of India	5.91	4	3.19	3	0.23	5	4.0	3	
Bank of Baroda	5.90	3	2.89	2	0.19	8	4.3	4	
Punjab National Bank	8.30	7	5.14	7	0.25	3	5.7	6	
IDBI	8.94	8	5.39	8	0.29	1	5.7	6	
Canara Bank	5.60	2	3.97	5	0.29	1	2.7	1	
Union Bank	6.39	5	3.69	4	0.24	4	4.3	4	
Bank of India	7.56	6	4.42	6	0.20	7	6.3	8	
Syndicate Bank	4.59	1	2.78	1	0.22	6	2.7	1	
Source: Annual report of the	above banks (2013	2017)							

Source: Annual report of the above banks (2013 – 2017)

Table 3: Management efficient	ncy ratios of public sect	or banks and their	ranking				
Banks	Asset turnove	r ratio (%)	Net profit marg	gin ratio (%)	Overall ranking		
Daiks	Average	Rank	Average	Rank	Average	Rank	
State Bank of India	0.08	2	6.39	4	3	3	
Bank of Baroda	0.07	8	9.56	2	5	7	
Punjab National Bank	0.08	2	9.84	1	1.5	1	
IDBI	0.08	2	-3.36	8	5	7	
Canara Bank	0.08	2	3.42	6	4	5	
Union Bank	0.09	1	5.16	5	3	3	
Bank of India	0.08	2	0.24	7	4.5	6	
Syndicate Bank	0.08	2	7.32	3	2.5	2	

Source: Annual Report of the above banks (2013-17)

shown in Table 3. The Asset turnover ratio can be used as an indicator of efficiency in which the bank is deploying its assets in generating revenue. So a higher rate is always favourable. Management efficiency of Punjab National Bank, Syndicate Bank, SBI and Union Bank were good.

Earnings quality :

Table 4 represents the various parameters of Earnings quality of selected banks. ROA gives an idea as to how efficient management is at using its assets to generate earnings and return on equity (ROE) is a measure of profitability that calculates how many dollars of profit a company generates with each dollar of shareholders' equity.

Bank of Baroda ranked highest in case of return on assets with the average of 0.76 followed by State Bank of India (0.62) and Punjab National Bank (0.55). In contrast, IDBI has shown a very least average of -0.22 and stood at the bottom most position followed by Syndicate bank (0.12).

In case of return on equity, Bank of Baroda was at the first position followed by Punjab National Bank and State Bank of India. Alike return on assets, in case of return on equity also the syndicate bank (-7.78) and IDBI (-4.99) stood at the least position. From the overall ranking it could be concluded that the earnings quality of Bank of Baroda is the highest followed by State Bank of India and Punjab National Bank.

Liquidity:

Table 5 displays the liquidity position of the selected banks. The prescribed level of current ratio should be more than one. Regrettably none of the banks have the minimum level of that ratio. From the table it could be seen that IDBI and Union Bank stood at the highest liquidity position with the maximum average ratio of 0.07 followed by Syndicate Bank (0.06). Punjab National Bank (0.02) and Bank of Baroda (0.03) were at the lowermost position. In case of quick ratio Punjab National Bank (28.98) stood first followed by Bank of India (28.06) and Syndicate Bank (27.09). From overall ranking it could

Daraha	Return on as	sets (%)	Return on equity (%)	Overall ranking		
Banks	Average	Rank	Average	Rank	Average	Rank	
State Bank of India	0.62	2	9.10	3	2.5	2	
Bank of Baroda	0.76	1	10.58	1	1	1	
Punjab National Bank	0.55	3	9.44	2	2.5	2	
IDBI	-0.22	8	-4.99	7	7.5	7	
Canara Bank	0.31	5	3.85	6	5.5	6	
Union Bank	0.31	5	7.89	4	4.5	4	
Bank of India	0.33	4	5.90	5	4.5	4	
Syndicate Bank	0.12	7	-7.78	8	7.5	7	

Table 5 : Liquidity ratios of public sector banks and their ranking

Popla	Current	ratio	Quick	ratio	Overall Ranking	
BallKS	Average	Rank	Average	Rank	Average	Rank
State Bank of India	0.05	4	11.55	8	6	7
Bank of Baroda	0.03	7	22.08	6	6.5	8
Punjab National Bank	0.02	8	28.98	1	4.5	5
IDBI	0.07	1	16.93	7	4	4
Canara Bank	0.04	5	24.01	4	4.5	5
Union Bank	0.07	1	22.23	5	3	1
Bank of India	0.04	5	28.06	2	3.5	3
Syndicate Bank	0.06	3	27.09	3	3	1

Source: Annual Report of the Banks (2013-17)



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be concluded that the liquidity position of Union and Syndicate Banks were very good followed by Bank of India.

Overall performance:

Table 6 illustrates the overall ranking for each parameter of CAMEL model. It could be clear from the table that the Punjab National Bank's overall financial performance was very good followed by State Bank of India and IDBI's financial soundness was very poor in the year 2013-17.

t -test analysis:

Capital adequacy:

 H_0 : There is no significant difference between capital adequacy of selected banks

H₁: There is a significant difference between capital adequacy of selected banks

Table 7a revealed the t test analysis for capital adequacy of selected banks. The results are discussed below. From the table it is clear that the mean capital adequacy ratio of the selected banks was higher than the population score of 10. Bank of Baroda has the highest mean score (12.98) followed by State Bank of India (12.66) and the lowest mean score was observed in Bank of India (10.63) and Union Bank (10.96). Thus, it is concluded that in case of State Bank of India, Bank of Baroda, Punjab National Bank, IDBI, Canara Bank and Syndicate Bank, there was a statistically significant difference between means (p<0.05) and therefore null hypothesis is rejected. However, in case of Bank of India and Union Bank of India there was not a statistically significant difference between means (p>0.05) and hence the null hypothesis is accepted.

In terms of debt equity ratio the highest mean ratio was observed in Union Bank (1.86) and lowest mean score was observed in State Bank of India (1.39). In case of total advances to total assets ratio the highest mean score was observed in Syndicate Bank (0.67) and the lowest mean score (0.59) was observed in IDBI and Canara Bank. Hence, it is concluded that there was not a statistically significant difference between means of the selected banks and hence, Null hypothesis is rejected.

Asset quality:

 H_0 : There is no significant difference between asset

Table 6: Overall performa	nce of public secto	r banks					
Banks	С	А	М	Е	L	Average	Rank
State Bank of India	2.0	4.0	3	2.5	6	3.5	2
Bank of Baroda	4.3	4.3	5	1	6.5	4.22	5
Punjab National Bank	3.0	5.7	1.5	2.5	4.5	3.44	1
IDBI	4.0	5.7	5	7.5	4	5.24	8
Canara Bank	6.0	2.7	4	5.5	4.5	4.54	6
Union Bank	5.3	4.3	3	4.5	3	4.02	3
Bank of India	6.0	6.3	4.5	4.5	3.5	4.96	7
Syndicate Bank	4.7	2.7	2.5	7.5	3	4.08	4

Table 7a : t-test analysis (CAR)

Domina	Cap	ital adequacy	ratio	Γ	Debt equity ratio			Total advances to total assets ratio		
Baliks	Mean	t value	p value	Mean	t value	p value	Mean	t value	p value	
State Bank of India	12.66	11.536	0.000	1.39	4.122	0.000	0.62	9.624	0.001	
Bank of Baroda	12.98	14.721	0.000	1.59	4.771	0.000	0.58	6.653	0.003	
Punjab National Bank	11.88	7.222	0.002	1.56	2.168	0.000	0.62	9.509	0.001	
IDBI	11.79	4.608	0.010	1.53	1.468	0.000	0.59	14.230	0.000	
Canara Bank	11.51	2.965	0.041	1.84	3.334	0.000	0.59	14.230	0.000	
Union Bank	10.96	2.467	0.069	1.86	6.254	0.000	0.65	23.717	0.000	
Bank of India	10.63	1.358	0.246	1.80	6.591	0.000	0.61	8.199	0.001	
Syndicate Bank	11.55	3.763	0.020	2.28	1.976	0.000	0.67	22.862	0.000	

Significant at 0.05% level



quality of selected banks

 H_1 : There is a significant difference between asset quality of selected banks

Table 7b exemplified the t test analysis for asset quality of selected banks. The results are discussed below. From the table it is clear that the mean asset quality of the selected banks was higher than the population score of <3 except Syndicate Bank and bank of Baroda. Syndicate bank has the lowest and prescribed mean score (2.78) followed by Bank of Baroda (12.66) and the highest mean score was observed in IDBI (5.39) followed by Punjab National Bank (5.14). Hence, there was not a statistically significant difference between means (p>0.05) of selected banks and hence, the Null hypothesis is accepted.

Likewise in case of gross NPA ratio, mean score of the selected banks was higher than the population score of <5 except Syndicate Bank. Thus, it is concluded that there was not a statistically significant difference between means (p>0.05) of selected banks and hence the Null hypothesis is accepted.

In case of total investment to total asset ratio, the

mean score was higher than the prescribed level (>20%). The highest mean score was observed in IDBI (0.29) and the lowest score was observed in Bank of Baroda. Thus, it is concluded that there was not a statistically significant differences in the mean score of State Bank of India, Punjab National Bank, Union Bank and Syndicate Bank (<0.05) and hence the Null hypothesis is rejected.

Management efficiency:

 H_0 : There is no significant difference between Management efficiency of selected banks

 H_1 : There is a significant difference between Management efficiency of selected banks

Table 7c portrayed the t test analysis for management efficiency of selected banks. The results are discussed below. From the table it is clear that the mean Management efficiency ratio of the selected banks was higher than the population score of >0.08. All the selected banks have more or less similar mean score. In case of State Bank of India and Bank of Baroda, there was a statistically significant difference between means

Table 7b: T-test analysis (Ass	Table 7b: T-test analysis (Asset quality)										
Danka	Net NPA ratio				Gross NPA ratio			Total investment to total ratio			
Daliks	Mean	t value	P value	Mean	t value	P value	Mean	t value	P value		
State Bank of India	3.19	0.338	0.752	5.91	1.051	0.353	0.23	5.667	0.05		
Bank of Baroda	2.89	-0.134	0.900	5.90	0.506	0.640	0.19	-1.222	0.28		
Punjab National Bank	5.14	1.654	0.174	8.30	1.794	0.147	0.25	7.071	0.02		
IDBI	5.39	1.110	0.329	8.94	1.258	0.277	0.29	4.916	0.08		
Canara Bank	3.97	0.928	0.406	5.60	0.368	0.732	0.28	4.914	0.07		
Union Bank	3.69	0.731	0.505	6.39	0.904	0.417	0.24	6.332	0.03		
Bank of India	4.42	1.160	0.311	7.56	1.106	0.331	0.20	-1.633	0.17		
Syndicate Bank	2.78	-0.251	0.814	4.59	-0.323	0.763	0.22	6.532	0.03		

Significant at 0.05% Level

Table 7c : T-test analysis (Management efficiency)

Donka		Asset turnover ratio			Net profit margin	
Daliks	Mean	t value	p value	Mean	t value	p value
State Bank of India	0.088	4.000	0.01	6.39	2.754	0.51
Bank of Baroda	0.086	-5.715	0.05	9.56	4.509	0.01
Punjab National Bank	0.082	0.535	0.62	9.84	4.922	0.08
IDBI	0.080	0.000	1.00	-3.36	-0.934	0.40
Canara Bank	0.084	1.000	0.37	3.42	0.733	0.50
Union Bank	0.086	2.449	0.07	5.16	3.257	0.03
Bank of India	0.080	-2.449	0.07	0.24	-0.293	0.78
Syndicate Bank	0.820	1.000	0.37	7.32	3.475	0.02

Significant at 0.05% level



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(p<0.05) and therefore, Null hypothesis is rejected for the same and the remaining banks were insignificant. In case of net profit margin the highest mean score was observed in Punjab National Bank (9.84) followed by Bank of Baroda (9.56) and the lowest mean score was observed in case of IDBI (-3.36). It is concluded that there was not a statistically significant difference in the mean score in case of Bank of Baroda, Punjab National Bank, Union Bank and Syndicate bank. Hence, the Null hypothesis is rejected in case of the same and remaining banks were insignificant.

Earnings quality:

 H_0 : There is no significant difference between earnings quality of selected banks

 H_1 : There is a significant difference between earnings quality of selected banks

Table 7d demarcated the t test analysis for earnings quality of selected banks. The results are discussed below. From the table it is clear that Bank of Baroda has the highest mean score (0.76) followed by State Bank of India (0.62) and Punjab National Bank (0.55) and the lowest mean score was observed in IDBI (-0.22). Thus, it is concluded that in case of State Bank of India, Bank of Baroda, Punjab National Bank and union bank, there was a statistically significant difference between means (p<0.05) and, therefore, Null hypothesis could be rejected. However, in case of other four banks, there was not a statistically significant difference between means (p>0.05) and hence, the Null hypothesis is accepted.

In case of return on equity, in case of State Bank of India, Bank of Baroda, Punjab National Bank there was a not a statistically significant difference between the mean scores and hence, the Null hypothesis is rejected (<0.05) and for remaining banks the Null hypothesis is accepted.

Liquidity:

 H_0 : There is no significant difference between liquidity of selected banks

 H_1 : There is a significant difference between liquidity of selected banks

Table 7e depicted the t test analysis for Liquidity of selected banks. The results are discussed below. From the table it is clear that IDBI and Union Bank has the highest mean score (0.07) followed by Syndicate Bank

Table 7d : T-test analysis (Ea	arnings quality)							
Banks		Return on assets		Return on equity				
Dairks	Mean	t value	p value	Mean	t value	p value		
State Bank of India	0.62	6.992	0.02	9.10	5.402	0.06		
Bank of Baroda	0.76	10.186	0.01	10.58	3.066	0.03		
Punjab National Bank	0.55	3.790	0.01	9.44	3.625	0.02		
IDBI	-0.22	-0.539	0.61	-4.99	-1.448	0.22		
Canara Bank	0.31	1.362	0.24	3.85	-0.292	0.78		
Union Bank	0.31	3.403	0.02	7.89	2.095	0.10		
Bank of India	0.33	1.289	0.26	5.90	0.162	0.87		
Syndicate Bank	0.12	1.289	0.26	-7.78	0.928	0.40		

Significant at 0.05% Level

Table 7e : T-test analysis (Liquidity)			
Banks	Mean	t value	Significance
State Bank of India	0.05	7.962	0.001
Bank of Baroda	0.03	4.743	0.009
Punjab National Bank	0.02	9.798	0.001
IDBI	0.07	2.858	0.046
Canara Bank	0.04	9.000	0.001
Union Bank	0.07	5.715	0.005
Bank of India	0.04	8.944	0.001
Syndicate Bank	0.06	1.631	0.178

Significant at 0.05% Level



(0.06) and the lowest mean score was observed in Punjab National Bank (0.02). Thus, it is concluded that banks except syndicate bank, there was a statistically significant difference between means (p<0.05) and, therefore, Null hypothesis could be rejected. In case of quick ratio, State Bank of India, Bank of Baroda, Punjab National Bank and Bank of India has no significant difference between the mean values and the null hypothesis is rejected for these banks.

Conclusion:

This research has been focused on eight public sector banks that operate in India, for which the research aimed to highlight their soundness through certain representative indicators that express the main content of the five parameters of the CAMEL framework.

In case of capital adequacy, it is inferred that all the selected banks were well capitalized and had an increased capacity to absorb potential losses resulted from the performed activity. However, Bank of Baroda, State Bank of India and IDBI was at the top position. Further, State Bank of India, Bank of Baroda, Punjab National Bank, IDBI, Canara Bank and Syndicate Bank, there was a statistically significant difference between means (p<0.05) and, therefore, Null hypothesis is rejected. However, in case of Bank of India and Union Bank of India there was not a statistically significant difference between means (p>0.05) and hence the Null hypothesis is accepted. In terms of debt equity ratio and total advances to total assets ratio, there was a not a statistically significant difference between means of the selected banks and hence, Null hypothesis is rejected.

In terms of asset quality, our analysis pointed out in particular that Syndicate Bank and Canara Bank recorded the highest asset quality in terms of three indicators analyzed. In addition, it could be concluded that a there was not a statistically significant difference between means (p>0.05) of selected banks and hence, the Null hypothesis could be accepted.

The analysis of management efficiency shown that Punjab National Bank, Syndicate Bank, State Bank of India were efficient and the weakest results were recorded by Bank of Baroda, IDBI and Bank of India. In case of State Bank of India and Bank of Baroda, there was a statistically significant difference between means (p<0.05) and, therefore, Null hypothesis could be rejected for the same and the remaining banks were insignificant.

The indicators regarding earnings quality highlighted that the strongest financial performances were recorded by Bank of Baroda followed by Punjab National Bank and State Bank of India and lowest performances were recorded by IDBI, Syndicate bank and Canara Bank. Thus, in case of State Bank of India, Bank of Baroda, Punjab National Bank and union bank, there was a statistically significant difference between means (p<0.05) and, therefore Null hypothesis could be rejected. However, in case of other four banks, there was not a statistically significant difference between means (p>0.05) and hence, the Null hypothesis could be accepted.

In case of return on equity, in case of State Bank of India, Bank of Baroda, Punjab National Bank there was a not a statistically significant difference between the mean scores and hence, the Null hypothesis is rejected (<0.05) and for remaining banks the Null hypothesis is accepted.

The liquidity analysis emphasized vulnerabilities especially in case of Bank of Baroda and State Bank of India. Union Bank and Syndicate Bank stood at the top. It could be concluded that banks except syndicate bank, there was a statistically significant difference between means (p<0.05) and, therefore, Null hypothesis could be rejected.

Finally, from the overall ranking for each parameters of CAMEL model it could be inferred that Punjab National Bank's overall financial soundness was outstanding followed by State Bank of India and the financial soundness of IDBI was pitiable in the recent years.

This study resulted in not only highlighting the strengths, but especially the vulnerabilities of the selected banks and thus, the main segments of the banking activity on which the decision making concerns from the banking system must be focused in order to record an improvement and increase of their soundness

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