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EVALUATING THE IMPACT OF CAMEL RATIOS ON THE EFFICIENCY OF SELECTED INDIAN BANKS

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ABSTRACT

The downfall of banks and financial institutions and the freezing of capital markets during the global financial crisis of 2007–2009 had a significant influence on the actual economy across the world. This crisis has made it apparent how crucial stability risk is and has emphasized the significance of performance evaluation. For the policy formulation and framing of strategies, it is essential to identify the sound and weaker aspects of the banks. Various ratios based models have been developed for the analyses of the banking sector, which helps in identification of strength and weakness of the banks. This study makes use of the CAMEL Model to analyze the different aspects of performance and soundness as well as the impact of the CAMEL ratios contributing to the efficiency of the selected public and private sector banks for the period of 17 years from 2005-2006 to 2021-2022. Based on the composite rating of the CAMEL Models, It has been found that HDFC bank Ltd. shows excellent performance. The study concluded that In order to be more efficient, selected public sector banks should concentrate on the value of NPAs and Liquidity and at the same time, these banks should pay attention to the Earnings Quality but not by compromising the efficiency of earnings while the selected Private sector banks should take proper steps to improve the operating profit, net profit, total interest income and net interest margin for becoming more efficient.

Keywords: *CAMEL Model, Public Sector Bank, Private Sector Banks, Regression Analysis*

1. INTRODUCTION

The stability and soundness of the banking system are essential for the development of any country. The stability and soundness of the banks and financial institutions are related with the performance of the stock market. For various stakeholders like regulatory agencies, bank customers, shareholders, etc., the fairness of the banking system is a major concern. Thus, there is strict regulation of banking activity to avert financial crises across the globe. The downfall of banks and financial institutions and the freezing of capital markets during the global financial crisis of 2007–2009 had a significant influence on the actual economy across the world. This crisis has made it apparent how crucial stability risk is and has emphasized the significance of performance evaluation and the implementation of a consistent macro prudential policy to reduce such risk in the financial markets. For the policy formulation and framing of strategies, it is essential to identify the sound and weaker aspects of the banks. Various ratios based models have been developed for the analyses of the banking sector, which helps in identification of strength and weakness of the banks. The CAMEL Model is one of them, which helps for this purpose. It is a rating system which is used to rate financial institutions using the five categories. CAMEL is a composition of Capital adequacy, Asset quality, Management Efficiency, Earning quality and Liquidity. This study makes use of the CAMEL Model to analyze the different aspects of performance and soundness as well as the impact of the CAMEL ratios contributing to the efficiency of the selected public and private sector banks, which will help different stakeholders in taking their decision. It helps in evaluating the financial strength of the bank and also suggests necessary measures for improving its weaknesses.

2. LITERATURE REVIEW

Nguyen, A. H. et al. (2020) applied the CAMEL Model for assessing the performance of the Commercial Banks of Vietnam. 31 Vietnamese commercial banks for the period of six years 2013 to 2018 were selected for the study. As independent Variables, CAMEL's four key indicators were used to build the Fixed Effects Model (FEM), Ordinary

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Least Squares (OLS) and Random Effects Model (REM) while ROA, ROE, and NIM were taken as the dependent variables. The findings of this study showed that the performance of Vietnamese commercial banks was influenced by Capital Adequacy, Asset Quality, Liquidity, and Management Efficiency.

Majumder, T. H. & Rahman, M. (2017) applied the CAMEL model with a view to measure the financial performance and identify whether any significant differences exist in the performance of the selected fifteen banks of Bangladesh for the period of 2009-2013. The finding of the study revealed that as per the composite average of CAMEL, EBL secured the top position and RBL secured the last position and the result of ANOVA showed that there were significant differences in the performance of the selected banks.

Bahadori, M. et al. (2020) conducted a case study of Commercial and Non-commercial banks in Iran with a view to analyzing the financial soundness of the selected banks in accordance with the CAMEL Model. For this study, 11 commercial and 11 non-commercial banks were selected. The logistic regression model and correlation were used to explore the relationship between the variable. The study's findings showed a significant relationship between the components of the CAMEL model, consisting of Capital, Assets Quality, Management Quality and profit Quality and index of Capital Adequacy ratio for public and private non-commercial banks and credit institutions. It was also found that there were no significant differences between commercial and non-commercial banks' capital adequacy ratios and financial soundness.

Gupta, R. (2014) analyzed and evaluated the performance of the public sector banks of India using the CAMEL approach for a period of five years 2009-13. All 26 public sector banks had been analyzed using secondary sources of data. The Kolmogorov-Smirnov test was used for checking the normality in distribution and Anova had been used to know the significant differences in the performance of Public Sector Banks in India. The study's findings showed that there was a statistically significant difference in the CAMEL ratios of all the public sector banks in India, indicating that these banks' overall performance varied.

Kumar, S., & Sharma, R. (2014) studied the performance analysis of the top eight Indian banks through the CAMEL approach for the period of 2007-08 to 2012-13. In this study, the banks were selected based on Market Capitalisation as on 31 September 2013, who were freely traded on BSE. The CAMEL rating parameters had been used to judge the financial soundness of the selected banks. Based on the composite average of the CAMEL rating, It was found that SBI was ranked first followed by PNB and HDFC bank.

Marvadi, C. (2018) conducted a study for the identification of determinants of Bank Efficiency using the CAMEL Model for the selected Indian banks for the period of ten years i.e. 2005-06 to 2014-15. Four banks from public and private were selected for the study. This study was carried out to analyze the financial position and performance of selected banks and to identify the effects of the CAMEL variables on bank efficiency. Based on the composite rating of the CAMEL Model, It was found that HDFC was ranked first and KMB rated the last position from the selected banks. The result of regression analysis showed that Earnings Quality, Management Efficiency and Capital Adequacy were the most important determinants contributing to the efficiency of the selected banks.

3. RESEARCH METHODOLOGY

3.1 Research Designs

Descriptive and Causal research designs have been used for the study.

3.2 Objectives of the Study

- To analyze the financial position and performance of selected four Public and four Private sector banks using the CAMEL Model.
- To identify the effects of the CAMEL ratios on each of the selected Indian banks' efficiency.

3.3 Sample Size, Data Collection and Period of study:

In this study, four public and private sector banks have been selected from the Indian Banking sector. For the study, data have been collected from various annual reports published by the selected Indian banks. The study covers a period of 17 years from 2005-2006 to 2021-2022. The following banks have been selected for the study.

Name of Selected Public Sector Banks	Name of Selected Private Sector Banks
Canara bank	Axis bank Ltd.
Bank of India (BOI)	Housing Development Financial Corporation (HDFC) bank Ltd.
Indian bank	Kotak Mahindra Bank (KMB) Ltd.
State Bank of India (SBI)	Yes bank Ltd.

3.4 Tools and Techniques Used in the Study

The following two techniques have been used for the study.

(a) The CAMEL Model:

The CAMEL Model was developed in the U.S. for the purpose of the classification of the bank's overall condition but the use of the CAMEL Model is not restricted to the U.S only, it is also implemented by various regulators outside of the U.S. Following the suggestions of the Padmanabham Working Group (1995) committee, the RBI in India implemented the CAMEL Model in the year1996. The following table shows the five parameters of the CAMEL Model and their selected respective ratios, which are considered for this study.

Sr. No.	Parameters of the CAMEL Model	Selected Ratios

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1	**C**apital Adequacy Ratio	1.Capital Adequacy Ratio 2.Debt-Equity Ratio 3.Advance to Assets Ratio 4.Government Securities to Total Investments 5.Composite Capital Adequacy Ratio
2	**A**ssets Quality	1.Net NPAs to Total Assets 2.Net NPAs to Net Advances 3.Total Investments to Total Assets 4. Percentage Change in NPAs 5. Composite Asset Quality Ratio
3	**M**anagement Efficiency	1.Total Advances to Total Deposits 2.Profit per Employee 3.Business per Employee 4.Return on Net worth 5.Composite Management Quality Ratio
4	**E**arnings Quality	1. Operating Profit to Total Assets 2.Net Profit to Total Assets 3.Interest Income to Total Income 4.Net Interest Margin to Total Income 5.Composite Earning Quality
5	**L**iquidity	1. Liquid Assets to Total Assets 2. Liquid Assets to Total Deposits 3.Liquid Assets to Demand Deposits 4. Government Securities to Total Assets 5.Composite Liquidity

(b) Multiple Regression Analysis

In order to find out the impact of the CAMEL ratio on the efficiency of the selected banks, the following Multiple Regression Model has been used.

$ER = \alpha + \beta 1\ C_{it} + \beta 2\ A_{it} + \beta 3\ M_{it} + \beta 4\ E_{it} + \beta 5\ L_{it} + \varepsilon_{it}$

Where ER = Efficiency Ratio,

$$ER = \frac{\text{Non Interest Expense}}{\text{Non Interest Income+ Interest Income}}$$

C_{it} = **C**apital Adequacy Ratio

A_{it} = **A**ssets Quality

M_{it} = **M**anagement efficiency

E_{it} = **E**arnings Quality

L_{it} = **L**iquidity

ε_{it} = error term

4. DATA ANALYSIS AND INTERPRETATIONS

In this study, Data analysis is divided into two parts. The first part deals with the ranking of selected banks based on a different parameter of the CAMEL Model and the Second part deals with the identification of the impact of the CAMEL ratios on the efficiency of the selected banks through regression analysis.

4.1. CAMEL Model rating:

According to the CAMEL Model, first, all the respective ratios of CAMEL parameters have been computed and rank is given to each bank for each parameter. The composite average is calculated by averages of all five parameters for the selected banks and at last, the final rank has been given to each of the banks. The following table-1 shows the composite rating of the CAMEL Model for the selected public and private sector banks.

Table-1 Composite CAMEL rating

NAME OF SELECTED BANKS	C	A	M	E	L	AVERAGE	RANK
Axis bank Ltd.	6.25	4.75	3.25	4.25	5.25	4.75	6
HDFC bank Ltd.	4.125	2.75	2.75	2.5	5.5	3.525	1
KMB	2.75	4.5	3.75	2.5	6	3.9	2
Yes bank Ltd.	6.5	5	4.5	6	5.75	5.55	8
BOI	3.75	4.5	5.75	6.75	2.25	4.6	5
Canara bank	3.375	4.75	5.75	5.75	2.25	4.375	3
Indian bank	3.25	6	4.75	3.25	4.75	4.4	4
SBI	6	3.75	5.5	5	4.25	4.9	7

Above table -1 shows that according to the composite CAMEL Model rating, HDFC bank ltd. shows excellent performance followed by KMB, Canara bank, Indian bank, BOI, Axis bank, SBI and Yes bank ltd. Due to excellent

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performance in Earnings Quality, Assets Quality and Management Efficiency, HDFC bank has secured first rank from the selected banks while Due to poor performance in Capital Adequacy, Earning Quality and Liquidity, Yes bank has secured the last rank from the selected banks.

4.2 Regression Results:

In order to know which parameters of the CAMEL ratios contribute significantly to the efficiency of the selected banks of public and private sectors, regression analysis has been carried out.

The following Table- 2 shows the result of Descriptive Statistics for the selected banks of public and private sectors.

Table – 2: Descriptive statistics

	Public Sector banks			**Private Sector banks**		
	Mean	**Std. Deviation**	**C.V.**	**Mean**	**Std. Deviation**	**C.V.**
ER	20.37	3.79	18.60	21.32	10.37	48.62
C	64.66	13.24	20.48	73.72	23.30	31.61
A	15.88	16.46	103.62	28.62	59.14	206.63
M	31.87	11.67	36.63	39.16	10.88	27.79
E	22.90	0.75	3.29	22.30	1.35	6.05
L	56.28	23.47	41.71	28.18	10.93	38.79

The Smaller value of C.V. indicates a better measure of performance. From the five parameters of the CAMEL Model, Earning Quality is having a smaller value of C.V, which indicates the most consistency in the value of this variable for the selected banks of public and private sectors whereas Liquidity and Assets Quality has a higher value of C.V. for the selected banks of public and private sectors respectively, which indicates the least consistency of these parameters due to large variation.

The following Table -3 shows the result of the Coefficient of Correlation for the selected banks of public and private sectors.

Table -3: Coefficient of Correlation

	Public Sector banks						**Private Sector banks**					
	ER	**C**	**A**	**M**	**E**	**L**	**ER**	**C**	**A**	**M**	**E**	**L**
ER	1						1					
C	0.06 (0.31)	1					-0.070 (0.28)	1				
A	-0.44* (0.00)	0.04 (0.37)	1				0.142 (0.12)	0.306* (0.006)	1			
M	-0.333* (0.003)	-0.294* (0.007)	0.201* (0.05)	1			-0.038 (0.37)	-0.055 (0.32)	0.176 (0.08)	1		
E	-0.519* (0.00)	-0.199* (0.05)	0.414* (0.00)	0.473* (0.00)	1		0.253* (0.02)	-0.212* (0.04)	-0.041 (0.37)	0.127 (0.150)	1	
L	-0.144 (0.12)	0.092 (0.22)	-0.039 (0.38)	-0.333* (0.003)	-0.251* (0.019)	1	0.108 (0.19)	0.048 (0.35)	0.028 (0.41)	-0.066 (0.29)	-0.279* (0.01)	1

Level of significance = 5%

The above table-3 shows that Assets Quality, Management Efficiency and Earning Quality have a significant negative correlation with the efficiency ratio of selected banks of the public sector while Earning Quality has a significant positive correlation with the efficiency ratio of selected banks of private sector.The following Table - 4 shows the result of Regression analysis for the banks of selected public and private sectors.

Table -4: Regression Analysis Results

	Public Sector banks		**Private Sector banks**	
	β	**Sig.**	β	**Sig.**
(Constant)	74.453	0.000	-31.121	0.200
C	-0.013	0.663	-0.035	0.545
A	-0.055*	0.028	0.034	0.135
M	-0.069	0.072	-0.099	0.398
E	-2.064*	0.001	2.374*	0.017
L	-0.052*	0.002	0.176	0.137
R Square	0.432		0.135	
Sig. F Change	0.000		0.102	

Level of significance = 5%

The Estimated Models are as follow:

Public Sector banks: ER = 74.453 - 0.013C - 0.055A - 0.069M - 2.064E - 0.052L

Private Sector banks: ER = -31.121 - 0.35C + 0.034A - 0.099M + 2.374E + 0.176L

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Earning Quality is having a negative significant and positive significant impact on the efficiency ratio of the selected banks of public and private sectors respectively while Assets Quality and Liquidity have a significant negative impact on the efficiency ratio of selected banks of the public sector. Capital Adequacy and Management Efficiency have a negative insignificant impact on the Efficiency ratio of selected banks of both public and private sectors while Assets Quality and Liquidity have a positive insignificant impact on the efficiency ratio of selected banks of the private sector. The value of R-Square is 0.432 and 0.135 for selected banks of public and private sectors respectively, which indicates that 43.2% and 13.5% variation in the Efficiency Ratio is explained jointly by all independent variables and hence the model is moderate for selected banks of public sector and weak for the selected banks of the private sector. Earnings Quality is the highest contributing variable to the Efficiency Ratio of selected banks of both sectors.

The following Table - 5 shows the result of the Regression analysis for each of the selected banks.

Table - 5 Regression Result

	Axis Bank	HDFC Bank	KMB	Yes Bank	BOI	Canara Bank	Indian Bank	SBI
(Constant)	49.618	54.286	92.317	47.166	47.976	90.003	46.103	36.101
C	0.368 (0.057)	-0.17* (0.049)	-0.049 (0.798)	-0.099* (0.048)	-0.194 (0.147)	-0.115* (0.04)	0.159 (0.184)	-0.133 (0.247)
A	-0.03 (0.796)	0.004 (0.888)	0.006 (0.747)	-0.016 (0.524)	0.001 (0.992)	-0.066 (0.202)	-0.033 (0.361)	-0.145* (0.027)
M	-0.763* (0.018)	0.131* (0.028)	0.178 (0.314)	-0.233 (0.068)	-0.128 (0.323)	-0.033 (0.617)	0.175* (0.031)	0.167 (0.809)
E	-1.822 (0.623)	-1.122 (0.419)	-2.849 (0.075)	-0.503 (0.372)	-0.253 (0.864)	-2.724* (0.01)	-2.188 (0.08)	-0.249 (0.88)
L	0.069 (0.861)	0.077 (0.423)	-0.024 (0.91)	0.06 (0.416)	-0.057 (0.440)	-0.007 (0.846)	0.256* (0.02)	0.033 (0.507)
R Square	0.796	0.802	0.446	0.584	0.606	0.786	0.678	0.502
Sig. F Change	0.002	0.001	0.2	0.055	0.043	0.002	0.016	0.126

Level of significance = 5%

The Estimated Models are as follow:

Axis bank Ltd: ER = 49.618 + 0.368C -0.03A - 0.763M - 1.822E + 0.069L

HDFC bank Ltd: ER = 54.286 - 0.17C + 0.004A + 0.131M - 1.122E + 0.077L

KMB: ER = 92.317 - 0.049C + 0.006A + 0.178M - 2.849E - 0.024L

Yes bank Ltd.: ER = 47.166 - 0.099C - 0.016A - 0.233M - 0.503E + 0.06L

BOI: ER = 47.976 - 0.194C + 0.001A - 0.128M - 0.253E - 0.057L

Canara bank: ER = 90.003 - 0.115C - 0.066A - 0.033M - 2.724E - 0.007L

Indian bank: ER = 46.103 + 0.159C - 0.033A + 0.175M - 2.188E + 0.256L

SBI: ER = 36.101 - 0.133C - 0.145A + 0.167M - 0.249E + 0.033L

Above table -5 shows the β and T-value for all the parameters of the CAMEL Model. T-value is mentioned in the bracket in above table. Capital Adequacy have a negative significant impact on the efficiency ratio of HDFC, Yes bank and Canara bank; Assets Quality and Earning Quality has a negative significant impact on the efficiency ratio of SBI and Canara bank respectively; Management Efficiency has a negative significant impact on the efficiency ratio of Axis bank while the positive significant impact on the efficiency ratio of HDFC and Indian bank and at last Liquidity has a positive significant impact on the efficiency ratio of Indian bank. Earnings Quality is the highest contributing variable to the Efficiency Ratio of each of the selected banks.

FINDINGS

- Due to excellent performance in Earnings Quality, Assets Quality and Management Efficiency, HDFC bank has secured first rank from the selected banks while Due to poor performance in Capital Adequacy, Earning Quality and Liquidity, Yes bank has secured the last rank from the selected banks.
- Earning Quality and Assets Quality are the most and the least consistent contributing to the efficiency of each of the selected banks.
- Assets Quality, Management Efficiency and Earning Quality have a significant negative correlation with the efficiency ratio of selected banks of the public sector while Earning Quality has a significant positive correlation with the efficiency ratio of the selected private sector.
- Assets Quality, Earning Quality and Liquidity have a negative significant impact on the efficiency ratio of selected banks of public sector. Thus, a rise in the value of these parameters leads to a decrease in the efficiency of public sector banks and vice versa.
- Earning Quality is having a positive significant impact on the efficiency of selected banks of the private sector meaning thereby the efficiency of these banks will increase with the increase in the earning Quality of these banks.
- Earnings Quality is the highest contributing variable to the Efficiency Ratio for each of the selected banks.

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CONCLUSION

The present study is mainly carried out to analyze the relationship between the efficiency ratio and five parameters of the CAMEL Model for the time period of seventeen years i.e. 2005-06 to 2021-22. As per the composite rating of the CAMEL Model, HDFC bank shows excellent performance from the selected banks due to its outstanding performance in Earnings Quality, Assets Quality and Management Efficiency. According to the result of Regression analysis for the selected public sector banks, Assets Quality, Earning Quality and Liquidity have a negative significant impact on the efficiency ratio of selected public sector banks. Thus, In order to be more efficient, these public sector banks should concentrate on the value of NPAs and Liquidity. At the same time, the selected public sector banks should pay attention to the earnings Quality but not by compromising the efficiency of earnings while the selected Private sector banks should take proper steps to improve the operating profit, net profit, total interest income and net interest margin for becoming more efficient.

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