

Measuring Impact of CAMELS Model on Financial Performance of Indian Commercial Banks

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Abstract: The purpose of this study is to examine the effects of CAMELS components on the financial performance of Indian commercial banks. To fulfill the objectives of the study, secondary data were collected for the fiscal year 2016 to 2021 from four public sector and four private sector banks based on their market capitalization. To analyse the data two econometric models are constructed using return on assets (ROA) and return on equity (ROE) as proxies for commercial banks' financial performance as dependent variables and six CAMELS's key indicators (capital adequacy, asset quality, management efficiency, earning quality, liquidity, and sensitivity to market risk) as independent variables. To determine the extent to which the independent variables have an effect on the dependent variable, panel ordinal least square regression with their assumption has been used. The findings of the study revealed that the financial performance of Indian banking sector as evaluated by ROA and ROE is statistically and significantly affected by capital adequacy, liquidity and sensitivity to market risk, whereas asset quality, managerial efficiency and earning quality is found to have insignificant impact on the financial performance of Indian commercial banks. In order to perform better, it is suggested that the commercial banks should focus more on the variables that have a substantial impact on their financial performance.

Keywords: Random effect, ROA, ROE, liquidity, sensitivity to market risk, CAMELS.

Introduction

Since liberalization, the Indian banking sector has witnessed tremendous changes. With the nationalization of all major banks in 1960 by the Government of India, the Public sector banks have dominated India's banking industry. But, with the liberalisation of banking regulation in the 1990s, both new and existing private sector banks have grown swiftly and largely over the past 31 years by using revolutionary technology, progressive innovations, monetary tools and appropriate strategies. Gupta (2014) asserts that the deployment and efficient use of resources, as well as the performance of various economic sectors, are key factors in the

development of an economy. The banking industry, in particular facilitates monetary policies, develop capital, create money, and innovate. It is crucial to carefully assess and analyse how banks operate in order to maintain a sound financial system and a productive economy. Though the actions assessing bank performance are abundant, amongst these actions of administrative ordinance is the CAMELS rating system (Kiran, 2018). The CAMELS rating system, which was originally implemented in the U.S in 1979, is one of the measures of supervisory information (Dang, 2011). On the advice of the Padmanabhan Working Group Committee (1995), RBI adopted this model in 1996 (Kiran, 2018). With the passage of time, this model got improved. Initially, it was composed of five factors: capital adequacy, asset quality, management effectiveness, earnings, and liquidity. Sensitivity to market risk, or the "S" that makes it "CAMELS," was added to the framework in 1996 (John, 2020). Sound financial health and performance evaluation of a bank are important for depositors, shareholders, staff, and the overall economy of a country, since it determines a bank's capacity to compete in the market and plays a critical role in the sector's development. In response to this assertion, efforts have occasionally been made to assess each bank's financial performance and manage it appropriately (Mohiuddin, 2014). In keeping with this context, the current study uses the CAMELS Model to analyse the commercial banks in India and the impact of each component of CAMELS model on their financial performance. The current study shall prove helpful in expanding discussion of the CAMELS model and will significantly add to the body of knowledge already available about the financial performance of Indian commercial banks. Additionally, the study will be useful for academics, researchers, and policy makers both on a national and international scale.

Review of Literature

Roopa and Shankar (2020) believed that public sector banks have the skills necessary to compete with private sector banks. Mayakkannan and Jayasankar (2020) observed that the public sector banks outperformed private sector banks, but private sector banks emerge more quickly than public sector banks. Kumar (2020), Panboli and Birda (2019), Parikh (2018) found that as compared to private sector banks, public sector banks are less effective. John (2020) made an effort to evaluate the performance of a number of public sector banks, by putting the CAMELS model approach to use and identifying their flaws. He pointed out that India's public sector banks are not performing better as they are unable to manage their earnings efficiently and effectively. He recommended that appropriate actions are needed to improve the performance of these banks. Joshi and

Sankaranarayanan (2018) posit that factors like profit per employee, debt/equity, total asset to total deposit ratio, and net NPA to total advance ratios have an impact on how the selected banks behave. Kiran (2018) found that with the exception of the liquidity aspect, private sector banks outperformed public sector banks in all CAMEL model frameworks. Only one public sector bank, SBI, managed to get to the top five spots. The other public sector banks still need to improve their capital sufficiency, asset quality, managerial expertise, and earnings quality. The ability of the banks to create sustained profitability, according to the European Central Bank (2010), is the definition for describing bank performance. For a bank to be able to maintain continued operations and provide investors with a healthy return, profitability is crucial. Golin (2001) noted that profitability and earnings are the best metrics for assessing a bank's overall performance. Later, Jha and Hui (2012) argued that the analysis of financial ratios could provide investors with better investment options. The profitability of a commercial bank is measured using a variety of ratios. So, Anggono (2017) and Kumar (2017) proposed two alternative measures such as ROA and ROE to represent a bank performance variable. While in a study by Ongore and Kusa (2013), ROA, ROE, and NIM are the key parameters determining a commercial bank's profitability. The performance of a bank in earlier studies can also be determined by using additional metrics like Tobin's Q and economic value added. Loans make up the majority of the assets in the majority of banks, and return on assets measures net profit against asset inputs. Return on assets gauges how efficiently a bank manages its assets to generate profits (Golin, 2001). Return on assets is a key metric of managerial efficiency as it revealed how much profit a company generated for every dollar of its assets (Elyor, 2009). Bakar and Tahir (2009) used ROA as a dependent variable for bank performance. Return on equity compares equity investment to net profit (Golin, 2001). The ROE measures how well a bank used the money from its investors and shows the rate of return for the bank's shareholders (Elyor, 2009; Siddiqui and Shoaib, 2011).

Objectives of the Study

The study seeks to accomplish the following objectives:

- To examine the bank's performance in relation to capital adequacy.
- To study the asset quality position and the effect it has on the performance of the bank.
- To analyse the management efficiency position and how it affects the performance of the bank.
- To assess the earning quality situation and the effect it has on the operation of the bank.

- To evaluate the bank's performance in relation to the liquidity position.
- To analyse the sensitivity of the market risk position and how it affects the performance of the bank.

Hypothesis Formulation

Capital Adequacy (C): The foundation of banking is quickly changing in India. The increased role of the financial system in the Indian economy, the rising level of liberalization, combined with the rising levels of competition, have contributed to the globalisation of the Indian financial system, which has exposed banks to many types of risks (Balagurusamy, 2017). The main aim of every bank is to build investor confidence and prevent them from going bankrupt. Capital serves as a shield to protect investors and improve the global financial systems, soundness and competence (Tanwar & Jindal, 2019). Adequacy of a bank's capital is a key factor in determining its ability to pay. If the fiscal framework failed, the entire economy would collapse, thus administrative entities are interfering to maintain capital ratios (Badalashvili, 2016). Internal and external factors were utilised by Bashir and Hassan (2004) to forecast the profitability of Islamic banks between 1994 and 2001. They observed that high capital translates into high profitability which is also supported by Goddard et al. (2004), Pasiouras and Kosmidou (2007), and others who came to the same conclusion about the effectiveness of banks and CAR at European and UK banks, respectively. Various studies conducted by Kaur (2010), Sangmi & Nazir (2010), Soni (2012), Rozzani & Rahman (2013), and Rahman et al. (2015) also supports these findings. Hence, it is hypothesized that:

H₁: There exists a positive relationship between capital adequacy and bank's performance (ROA & ROE).

Asset Quality (A): Banks are financial institutions whose activities include the management of assets and obligations. They generally face a variety of challenges in both the internal and external business environment. The risks that affect their basic operations include credit risk, market risk, loan cost risk, default risk, functional gamble, and switching scale risk (Aruwa & Musa, 2014). The type of advances that banks make has a relationship with resource quality, and non-performing loans can be used to predict the type of credits (Kadioglu et al., 2017; Kadioglu et al., 2017; Adhikary, 2006). Olweny & Shipho (2011), Dang (2011) and Rozzani & Rahman (2013) observed that NPLs negatively affects bank's performance. Thus, it is hypothesized that:

H₂: Asset quality and financial performance of banks are inversely correlated (ROA & ROE).

Management Efficiency (M): The key to any organization's presentation is good administration. The effectiveness of management plays a big role in how an association turns out. Effectiveness of the executives refers to the administration's ability to plan for and respond quickly to a changing and dynamic environment (Chandani et al., 2014; Gadhia, 2015). This shows the management's capacity to identify, assess, and manage risk. As a matter of fact, great management performance plays a significant role in how well financial firms, particularly banks, perform. This is the rationale for the substantial place that the CAMELS model gives to estimate management skills (Kumar, 2017). Management inefficiency negatively affects the performance of banks as observed by Chandani et al. (2014), Liu & Pariyaprasert (2014), Olweny & Shiphoo (2011), Roman & Sargu (2013) and Venkatesh & Suresh (2014). Hence, it is hypothesized that:

H₃: The relationship between management and bank's performance (ROA & ROE) is negative.

Earnings Quality (E): An important factor in determining a bank's ability to buy consistently is the nature of its earnings. In essence, it determines a bank's productivity and clarifies its ability to be managed and its potential for income growth in the future (Kumar & Malhotra, 2017). A bank is enabled to support its capital and work on financial execution by a stable elevated level of earnings. Earnings have a favourable impact on the performance of banks, according to studies by Chandani et al. (2014), Jha & Hui (2012), Liu & Pariyaprasert (2014), Rozzani & Rahman (2013), and Venkatesh & Suresh (2014).

H₄: Bank's performance (ROA & ROE) is positively impacted by the earning quality.

Liquidity Management (L): Liquidity is the CAMELS model's second-to-last element (L). It is related to the ability to fulfill financial obligations. Fundamentally, liquidity influences financial adequacy and evaluates a bank's operational performance. It conveys how well-suited a bank is to meet its many obligations. Simply said, liquidity measures a bank's ability to meet customer withdrawal requests from ATMs and other financial obligations (Rudolf, 2009). The banks' liquidity, which also demonstrates the security and longevity of banks, assures investors that they can access their funds whenever a need arises. Too little liquidity increases the likelihood of bankruptcy, but too much liquidity has the opposite effect and is beneficial (Kumar & Malhotra, 2018). (Dang, 2001) observed that at US banks, profitability and a reasonable level of liquidity went hand in hand. Liquidity has been found to have a detrimental effect

on banks' performance (Chandani et al., 2014; Elyor, 2009; Golin, 2001; Jha & Hui, 2012; Liu & Pariyaprasert, 2014; Venkatesh & Suresh, 2014).

H₅: There exists a negative effect between liquidity and bank's performance (ROA & ROE).

Sensitivity to Market Risk (S): The sensitivity (S) component was subsequently added in 1997. As a result, the CAMEL model is now CAMELS. S stands for sensitivity to market risk, which is connected to interest rate volatility and other factors (Hays et al., 2009), particularly during the financial crisis. The degree to which commodity prices, interest rates, foreign currency rates, fixed assets, and management's capacity to recognise and manage these risks fluctuate is another way to assess the sensitivity to market risk (Masood et al., 2016). Despite the fact that the financial position statement's change in asset prices has a significant impact on banking activity, the sixth CAMELS component has not been taken into account in some prior research due to the challenges of measuring accounting and financial data. Avkiran and Cai (2012), Roman and Sargu (2013), Venkatesh and Suresh (2014), Chandani et al. (2014), and Kumari (2017) all contend that sensitivity affects a bank's performance. As a result, the sensitivity has an impact on the performance of the bank, according to the stated theory.

H₆: The performance of the bank (ROA & ROE) is impacted by sensitivity.

Research Methodology

The purpose of this study is to determine how the CAMELS component would affect the financial performance of selected banks in India from 2016 to 2021. On the basis of market capitalization, four banks from each category – 12 public sector banks and 21 private sector banks – have been chosen as samples. Descriptive statistics, including minimum, maximum, mean, and standard deviation of the variables, as well as inferential statistics, were applied to examine the data once all relevant information had been gathered. An examination of the correlation between the dependent and independent variables is then performed. In order to determine the extent of the independent variables' influence on the dependent variable, ordinary least square regression with their assumption has been used. SPSS and STATA were used to analyse data that was gathered from various sources.

The acquired data have been analysed using the ordinary least squares model in accordance with the type of data, which is panel data. Panel data, commonly referred to as longitudinal data, include both cross-sectional and time series aspects. They appear when we measure the same group of individuals or items across time (Brooks, 2008).

Table 1.1: Variables, Codes and Measurement

<i>Variables</i>	<i>Codes</i>	<i>Measurements</i>	<i>Sources</i>
Dependent V			
Return on Asset	ROA	Net Profit after tax (PAT)/ Total Assets *100	Kumar, 2017.
Return on Equity	ROE	Profit after tax/ total average equity *100	Ramazan and Gulden, 2019.
Independent V			
Capital adequacy	Capital	[(Tier 1 + Tier 2)/ Risk weighted Asset]*100	Kumar & Malhotra, 2017; Balagurusamy, 2017
Asset quality	Asset	Net NPA/Total Assets*100	Panboli & Birda, 2019; Kiran, 2018
Management efficiency	Mgt	Total Income/ No. of Employees	Kiran, 2018
Earnings	Ear	Interest Income/Total (Average) Assets *100	Puspitasari <i>et al.</i> , 2021
Liquidity	Liq	Liquid Assets/Total Deposit*100	Gadhia, 2015
Sensitivity to market risk	Sen	Securities Other Than Government/ Total Asset	Balagurusamy, 2017

Accordingly, the following two equations are developed;

$$ROA_{it} = \beta_0 + \beta_1 * CAPITAL_{it} + \beta_2 * ASSET_{it} + \beta_3 * MGT_{it} + \beta_4 * EAR_{it} + \beta_5 * LIQ_{it} + \beta_6 * SEN_{it} + e_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 * CAPITAL_{it} + 5\beta_2 * ASSET_{it} + 5\beta_3 * MGT_{it} + 5\beta_4 * EAR_{it} + \beta_5 * LIQ_{it} + \beta_6 * SEN_{it} + e_{it} \quad (2)$$

Where i indicates the bank, t is the time period/year, e is the mixture of series data and cross sectional data error term, 0 is constant term and β is the explanatory variables' coefficient..

Results and Discussions

This section includes the descriptive analysis, the regression analysis, model testing, and explanations of the derived results.

Table 1.2 revealed 0.55 as the mean value of ROA and 1.24 as the standard deviation. The ratio's minimum and highest values are, -2.95 and 2.01 respectively. The ROE statistic had a mean of 0.02 and a standard deviation of 0.16. The ratio has a range from -.52 at its lowest point to .19 at its highest point. The capital adequacy mean value and standard deviation are 14.56 and 2.96, respectively. A bank's capital adequacy must be at least 9%. A mean value of 14.56% exceeds the minimum required level. The

Table 1.2: Descriptive Statistics

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
ROA	48	-2.950	2.010	.55583	1.243873
ROE	48	-.52	.19	.0252	.16345
C	48	9.200	22.300	14.56042	2.964221
A	48	.001	8.160	.32925	1.423085
M	48	7.510	23.730	14.27042	3.825341
E	48	.001	.132	.06796	.027915
L	48	.071	.250	.12690	.045376
S	48	.676	.854	.79713	.035181
Valid N (listwise)	48				

*Source: Data analysis

mean value of asset quality arrived at .32, and the standard deviation as 1.42. The ratio has a minimum value of 0.001 and a maximum value of 8.160. The mean and standard deviation for management effectiveness are found to be 14.27 and 3.82, respectively. The ratio has a minimum value of 7.51 and a maximum value of 23.73, respectively. The earnings have a mean of .067 and a standard deviation of 0.027, with the least value being .001 and the greatest being 0.132. Liquidity has a mean of 0.12 and a standard deviation of 0.045, with a range of 0.071 to 0.250. The mean and standard deviation for sensitivity to market risk are arrived at .797 and .035, respectively. The ratio's minimum and maximum values are .676 and .854 respectively.

Inferential Statistics Results

Validation of Data for Statistical Analysis

The accuracy of the data must first be confirmed before moving on to data analysis, research model estimation, and hypothesis testing. This is accomplished by using a number of tests, including the multi-collinearity, the autocorrelation, heteroskedasticity and Pearson's correlation of independent variables. Data is shown using the Panel Data technique.

Multi-Collinearity

This issue arises when there is a very strong correlation between the explanatory factors. The Pearson correlation and variance inflation factor are used to examine the type of correlation that exists between the dependent and independent variables as well as to determine whether multi-collinearity is caused by this correlation.

Table 1.3: Pearson Correlation for Independent Variables

	<i>Capital</i>	<i>Asset</i>	<i>Mgt</i>	<i>Ear</i>	<i>liquidity</i>	<i>Sen</i>
Capital	1					
Asset	-0.32783	1				
Mgt	-0.32128	-0.03616	1			
Ear	-0.11454	-0.20403	-0.18343	1		
liquidity	0.129471	0.038341	-0.12368	-0.02957	1	
Sen	0.344433	-0.14418	-0.34772	-0.09742	0.449173	1

*Source: Data analysis

The table 1.3 demonstrates that all correlation coefficients between the independent variables are less than 0.8, which excludes the possibility of multi-collinearity or at least provides no evidence that it exists.

The assumption of the independence of each independent variable determines how strong the general linear model is. In the absence of this, the general linear model is inapplicable and cannot be deemed suitable for the process of information estimation (Sifu & Mishal, 2003). By calculating the VIF value for each of the independent variables, the collinearity statistics test was performed to achieve that. The VIF value for each independent variable is less than (5), as shown in the table, indicating that there is no inherent correlation between the variables in the study models.

Table 1.4: Variance Inflation Factor Test

<i>Variables</i>	<i>VIF(Model 1)</i>	<i>VIF(Model 2)</i>
C	1.43	1.43
A	1.31	1.31
M	1.38	1.38
E	1.22	1.22
L	1.27	1.27
S	1.57	1.57

*Source: Data analysis

Table 1.4 depicts that there is no problem of Multicollinearity in the data set as all the values of VIF are less than 5. These values indicate the absence of Multicollinearity.

Table 1.5: Autocorrelation (Durbin-Watson) Test

<i>Durbin-Watson d-statistics</i>	<i>Model 1</i>	<i>Model 2</i>
	1.96	2.27

*Source: Data analysis

The Durbin Watson for Model 1 arrived 1.96 and for Model 2, it is 2.27. For both models Durbin Watson value is in accepted range i.e. 1.5 to 2.5. This indicates there is no autocorrelation problem.

Heteroskedasticity

Table 1.6: Breusch-Pagan / Cook-Weisberg Test for Heteroskedasticity (Model 1)

Variables: fitted values of ROA	Model 1	Model 2
chi2(1)	2.17	12.98
Prob> chi2	0.1405	.0003

*Source: Data analysis

Regression Results

MODEL 1

Table 1.7: Hausman (1978) Specification Test

	Coef.
Chi-square test value	7.043
P-value	.317

*Source: Data analysis

The result of Hausman test indicates a Chi2 of 7.04 with probability of 0.3169. According to Brooks (2008) if p-value for the test is greater than 1%, it indicates that the random effects model is appropriate. So, for this model Random Effect model is appropriate with p-value of .3169 which is greater than 0.001.

Table 1.8: Regression results

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Capital	.284	.043	6.56	0	.199 .369	***
Asset	-.041	.065	-0.63	.527	-.17 .087	
Mgt	-.039	.032	-1.22	.221	-.101 .023	
Ear	2.77	3.285	0.84	.399	-3.669 9.209	
liquidity	-4.382	2.348	-1.87	.062	-8.984 .22	*
Sen	7.443	3.703	2.01	.044	.186 14.7	**
Constant	-8.582	3.266	-2.63	.009	-14.984 -2.181	***
Mean dependent var	0.556		SD dependent var		1.244	
Overall r-squared	0.774		Number of obs		48	
Chi-square	51.036		Prob> chi2		0.000	
R-squared within	0.275		R-squared between		0.881	

*** $p < .01$, ** $p < .05$, * $p < .1$

*Source: Data analysis

For checking whether panel least squares is appropriate for the data or Random effect model, we applied Breusch-Pagan (BP) test wherein the hypothesis are set as:

Null hypothesis: POLS is appropriate than REM.

Alternate hypothesis: POLS is not appropriate than REM.

Decision rule: if p-value is greater than .05 then accept the null hypothesis and go for POLS.

If p-value is less than .05 then reject the null hypothesis and go for REM.

Table 1.9: Breusch and Pagan Lagrangian Multiplier Test for Random Effects

	<i>Coef.</i>
chibar2(01)	0.60
Prob> chibar2	0.2194

*Source: Data analysis

Here p-value is 1 which is more than .05 which signifies that POLS is appropriate for the model

Table 1.10: Linear Regression

ROA	<i>Coef.</i>	<i>St.Err.</i>	<i>t-value</i>	<i>p-value</i>	[95% <i>Conf Interval</i>]	<i>Sig</i>
Capital	.302	.035	8.65	0	.231 .372	***
Asset	-.069	.069	-0.99	.326	-.209 .071	
Mgt	-.004	.027	-0.15	.883	-.058 .05	
Ear	3.201	3.412	0.94	.354	-3.689 10.09	
liquidity	-8.641	2.147	-4.02	0	-12.977 -4.306	***
Sen	12.23	3.067	3.99	0	6.036 18.425	***
Constant	-12.626	2.572	-4.91	0	-17.821 -7.432	***
Mean dependent var	0.556		SD dependent var		1.244	
R-squared	0.803		Number of obs		48	
F-test	27.921		Prob> F		0.000	
Akaike crit. (AIC)	92.086		Bayesian crit. (BIC)		105.184	

*** p<.01, ** p<.05, * p<.1

*Source: Data analysis

$$ROA_{it} = -12.626 + .3015CPA_{it} - .0689ASQ_{it} - .00393MGE_{it} + 3.200EAR_{it} - 8.6414LIQ_{it} + 12.23SEN_{it} + e_{it}$$

MODEL 2

Table 1.11: Hausman (1978) Specification Test

	<i>Coef.</i>
Chi-square test value	13.721
P-value	.033

*Source: Data analysis

The result of Hausman test indicates a Chi2 of 13.72 with probability of 0.0329. According to Brooks (2008) if p-value for the test is greater than 1%, it indicates that the random effects model is appropriate. So for this model Random Effect model is appropriate with p-value of 0.0329 which is greater than 0.001.

Table 1.12: Regression Results

Roe	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Capital	.037	.005	6.78	0	.026	.047	***
Asset	-.021	.011	-1.91	.056	-.042	.001	*
Mgt	.006	.004	1.46	.143	-.002	.014	
Ear	.392	.53	0.74	.46	-.647	1.432	
liquidity	-.994	.334	-2.98	.003	-1.649	-.34	***
Sen	1.594	.477	3.34	.001	.659	2.528	***
Constant	-1.76	.4	-4.40	0	-2.544	-.976	***
Mean dependent var	0.025		SD dependent var		0.163		
Overall r-squared	0.725		Number of obs		48		
Chi-square	107.930		Prob> chi2		0.000		
R-squared within	0.170		R-squared between		0.965		

*** p<.01, ** p<.05, * p<.1

*Source: Data analysis

For checking whether panel least squares is appropriate for the data or Random effect model, we applied Breusch-Pagan (BP) test wherein the hypothesis are set as:

Null hypothesis: POLS is appropriate than REM.

Alternate hypothesis: POLS is not appropriate than REM.

Decision rule: if p-value is greater than .05 then accept the null hypothesis and go for POLS.

If p-value is less than .05 then reject the null hypothesis and go for REM.

Table 1.13: Breusch and Pagan Lagrangian Multiplier Test for Random Effects

	Coef.
chibar2(01)	0.00
Prob> chibar2	1.00

*Source: Data analysis

Here p-value is 1 which is more than .05 which signifies that POLS is appropriate for the model.

Table 1.14: Linear regression

<i>roe</i>	<i>Coef.</i>	<i>St.Err.</i>	<i>t-value</i>	<i>p-value</i>	[95% <i>Conf</i>	<i>Interval</i>]	<i>Sig</i>
Capital	.037	.006	6.25	0	.025	.049	***
Asset	-.021	.012	-1.68	.1	-.045	.004	
Mgt	.006	.004	1.62	.113	-.001	.014	
Ear	.392	.714	0.55	.586	-1.049	1.834	
liquidity	-.994	.356	-2.80	.008	-1.713	-.276	***
Sen	1.594	.84	1.90	.065	-.103	3.291	*
Constant	-1.76	.673	-2.62	.012	-3.118	-.402	**
Mean dependent var	0.025		SD dependent var		0.163		
R-squared	0.725		Number of obs		48		
F-test	13.139		Prob> F		0.000		
Akaike crit. (AIC)	-86.590		Bayesian crit. (BIC)		-73.491		

*** p<.01, ** p<.05, * p<.1

*Source: Data analysis

$$ROE_{it} = -1.76 + .3675*CPA_{it} - .2061*ASQ_{it} + .00603*MGE_{it} + .3921*EAR_{it} - .994*LIQ_{it} + 1.5936*SEN_{it} + e_{it}$$

Overall Findings of the Study

Capital Adequacy to Risk Weighted Ratio (CRAR): With a mean percentage of 18.17, it shows that Kotak Mahindra Bank is in first place, followed by ICICI Bank, which has a mean percentage of 17.43. In the same manner, HDFC Bank, Indusind Bank, BOB, SBIN, and PNB are awarded the third, fourth, fifth, sixth, and seventh positions. IOB Bank was the least successful of all the banks chosen for the survey, with a mean percentage of 10.94.

Net NPA to Asset Ratio: It reveals that HDFC Bank is in the lead with a mean percentage of 0.002887, followed by Kotak Mahindra Bank with a mean percentage of 0.006759. In the same manner, SBIN, Indusind, BOB, PNB, and ICICI are awarded the third, fourth, fifth, sixth, and seventh positions. IOB Bank was the least successful of the study's banks with a mean percentage of 2.346697.

Business per Employee: With a mean percentage of 18.43, it shows that SBIN is in first place, followed by BOB, which has a mean percentage of 18.2. PNB, HDFC Bank, IOB, Indusind Bank, and ICICI are granted the third, fourth, fifth, sixth, and seventh positions, respectively. With a mean percentage of 8.987 among all the banks chosen for the survey, Kotak Mahindra Bank was in last place.

Interest Income to Total Asset Ratio: It reveals that Kotak Mahindra Bank is in the lead with a mean percentage of 0.08566667, followed by Indusind Bank with a mean percentage of 0.0905. BOB, ICICI, IOB, HDFC and PNB are placed third, fourth, fifth, sixth, and seventh, respectively.

Out of all the banks selected for the study, SBIN had the lowest average percentage with a value of 0.06866667.

Liquid Asset to Total Deposit Ratios: According to the results, BOB is in second place with a mean percentage of .172, only behind ICICI bank, which is in first place with a mean percentage of .176. Additionally, ranked third through seventh are Kotak Mahindra, PNB, Indusind, IOB, and HDFC Bank. The mean percentage for SBIN is .083, making it the least successful.

Securities other than Government to Total Asset Ratio: IOB takes the top spot with a mean percentage of .742, followed by PNB with a mean percentage of .779. The third, fourth, fifth, sixth, and seventh-placed banks are SBIN, HDFC Bank, Kotak Mahindra Bank, BOB, and Indusind Bank. With a mean percentage of .837, ICICI Bank finished bottom out of all the banks selected for the survey.

Return on Asset Ratio: With a mean percentage of 1.93, HDFC Bank is discovered to be in the lead. Kotak Mahindra Bank is in second place with a mean percentage of 1.677. Rankings for the top seven financial institutions are Indusind Bank, ICICI Bank, SBIN, BOB, and PNB. IOB performed poorly among the banks analysed, with a mean percentage of -1.423.

Return on Equity: With a mean percentage of .17, HDFC Bank comes in first, followed by Indusind with a mean percentage of .14. The third, fourth, fifth, sixth, and seventh-placed banks are Kotak Mahindra Bank, ICICI, SBIN, BOB, and PNB. IOB finished bottom among the study's selected banks, with a mean percentage of .837.

Hypothesis Testing

There exists a positive relationship between capital adequacy and bank's performance (ROA & ROE)

Since capital adequacy as evaluated by CRAR has a statistically significant positive impact on performance as measured by ROA (model 1) and ROE (model 2), with p-values of 0.000 and 0.000 and coefficients of 0.30 and .036 respectively, H01 is accepted for both models 1 and 2. This discovery is in line with those put forth in the past, including those of Rahman et al. (2015), Sangmi and Nazir (2010), Kaur (2010), Soni (2012), and Rozzani (2015).

Asset quality and financial performance of banks are inversely correlated (ROA & ROE).

Since net NPAs to total assets have a statistically insignificant negative impact on performance as measured by ROA (model 1) and ROE (model 2), with p-values of 0.326 and 0.100, and coefficients of -.068 and -.020, respectively, H02 is accepted for both models 1 and 2. Thisaranga and Ariyasena (2021), Boateng (2019), and Bekana (2020) findings are in agreement with it.

The relationship between management and bank's performance (ROA & ROE) is negative

Since business per employee has an insignificant negative impact on performance as evaluated by ROA with a p-value of 0.883 and a coefficient of -.0039 and an insignificant positive impact as measured by ROE with a p-value of .113 and a coefficient of .0060, H03 is only partially accepted. This conclusion is corroborated by Jaouad and Lahsen (2018), and Ashenafi (2020), who found that management efficiency had a negative impact on both ROA and ROE. However, in our analysis, management efficiency had a positive association with ROE.

Bank's performance (ROA & ROE) is positively impacted by the earning quality

In both models 1 and 2, H₀4 is accepted because interest income to total assets has an insignificant positive impact on performance as evaluated by ROA (models 1) and ROE (models 2), with p-values of 0.354 and .586 and coefficients of 3.2 and .392 respectively. According to Jha and Hui (2012), Rozzani and Rahman (2013), Liu and Pariyaprasert (2014), and others, banks need to make enough money to remain competitive for a longer period of time, reward shareholders, and safeguard and enhance their capital.

There exists a negative effect between liquidity and bank's performance (ROA & ROE)

Since the ratio of liquid assets to total deposits has a significant negative impact on performance as measured by ROA (models 1) and significant negative impact on ROE (models 2), with p-values of 0.000 and .008 and coefficients of -8.64 and -.994 respectively, H04 is accepted for both models 1 and 2. This result is consistent with other research that discovered a negative relationship between liquidity and bank performance (Elyor, 2009; Golin, 2001; Jha & Hui, 2012; Liu & Pariyaprasert, 2014).

The performance of the bank (ROA & ROE) is impacted by sensitivity

H06 is only partially accepted because the ratio of non-government securities to total assets has a statistically significant positive impact on performance as measured by ROA with a p-value of 0.000 and a coefficient of 12.23, but has a negligible impact on performance as measured by ROE with a p-value of .065 and a coefficient of 1.59. According to Bhattarai's research (2019), which demonstrated a negative correlation between sensitivity coefficient and the financial performance of commercial banks, the results of this study are incongruent with that finding. Despite the fact that the following research only showed that sensitivity has a statistically

significant impact on the bank's performance (Avkiran & Cai, 2012; Kumari, 2017; Roman & Sargu, 2013).

Recommendations

Capital adequacy: The analysis results, as well as the regression results showed that capital adequacy positively affects the performance of Indian commercial banks. This means that more the CRAR, better the performance of banks as measured by ROA and ROE. It is advised that public sector banks should concentrate on capital management by developing strategies relevant to capital adequacy as a result of the study's discovery that they are lagging behind their private sector competitor in this area.

Asset quality: The regression analysis's findings indicate that NPAs have a negative link with bank performance, and it has been noted that public sector banks' net non-performing assets (NPA) have risen to concerning heights. Therefore, it is recommended that they must take immediate action to create efficient rules and solutions to meet depositor expectations. IOB and PNB must concentrate more on recovering NPAs through adequate recovery mechanisms because they are more at risk.

Management efficiency: According to the regression analysis, business per employee has a positive link with bank performance (ROE), and private sector banks perform poorly in terms of their business per employee ratio. It is advised that private sector banks maintain a competitive business per employee ratio because a shortage of staff could cause banks to offer better customer service, which would damage their quality and reputation.

Earning quality: According to the regression results, this factor positively affects the performance of the selected banks. This means that when the earnings increases, the operational efficiency of banks will also increase and vice versa, so the goal of this solution is to provide more loans to the customer through proper dealing, maintaining good relationship with them and making the customers aware regarding different schemes launched for them and reducing operating expenses to some extent, if possible. It is also observed that public sector banks are not performing well in terms of earnings as compared to private sector banks. Hence it is recommended to focus on this aspect as earnings ensure survival of the banks in the long run.

Decreased liquidity: As analyzed above, the liquidity of commercial banks gradually increases over the years, and, according to the regression results, this factor negatively affects the performance of the Indian banking system. This means that when the liquidity decreases, the operational efficiency of banks will increase and vice versa, so the goal of this solution is to decrease the liquidity of commercial banks by investing in securities or any other instruments, thereby boosting their performance.

Increased Sensitivity to Market Risk: As analyzed above, the sensitivity to market risk positively affects the performance of the Indian banking system. This means that the more sensitive the banks are, the more profitable they will become as it is observed that banks invest more in less riskier securities such as government securities, where risk and returns both are low. Hence, it is recommended for them to invest in non-government securities with proper risk management, thereby boosting their performance.

Among all the factors discussed above, banks need to focus more on capital adequacy, liquidity and sensitivity to market risk as they are having significant impact on the performance of banks in India.

Limitation of the Study

- The study is limited to only four public and four private sector banks due to time and budget limitations, but future research could test the findings on more public and private sector banks.
- The position achieved by the banks in the survey is only valid for this six-year period, from April 1, 2016, to March 31, 2021, during which the data was collected. So, data from various time periods could be used in future studies.
- The study only includes public and private sector banks; therefore, it should be expanded to include foreign sector banks and regional rural banks to produce more insightful results.
- Market capitalization was the criterion employed in this study to choose the banks. Future bank selection may include other selection factors such as high asset value, market value, profitability, investment return, and others.
- The dependent variables in this study are return on equity and return on asset. The success of the bank may be represented differently in future research utilising additional variables as Tobin's Q, economic value added, net interest margin, etc.

Conclusion

To sum up, it is culminated that the present study looks into how CAMELS components affect the financial performance of commercial banks in India. The outcomes support the impact of the CAMELS criteria on these commercial banks' performance. The financial performance (ROA and ROE) is regarded as a dependent variable, while the CAMELS model parameters include Capital sufficiency, Asset quality, Management efficiency, Liquidity, and Sensitivity to Market Risk. Eight commercial banks make up the study's

sample, of which four are from the public and four are from the private sectors. Six-year financial statistics (from 2016 to 2021) from their annual reports, which are available on their official websites are gathered. Capital adequacy as measured by CRAR has significant effect on financial performance of public and private sector banks, which is measured by ROA and ROE. Asset quality which is measured by net NPAs to total assets has insignificant effect on performance of public and private sector bank measured by ROA and ROE. Business per employee which is a proxy of management efficiency, significantly affected both by ROA and ROE. Earnings as measured by interest income to total asset have an insignificant impact on both ROA and ROE, whereas liquidity has significant impact. Sensitivity to market risk has significant impact on ROA and insignificant impact on performance of public and private sector bank, when measured by ROE.

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