Factors of Bank specific variables on Profitability: A CAMEL Framework

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ABSTRACT--The profitability of the Indian banking sector has always remained a matter of concern amongst the policy makers and the bankers. In the contemporary phase of financial instability, banks are facing a lot of pressure and competition leading vulnerability to the system. Banks are required to prove their operational efficiency even more to earn higher profits which in turn stimulates the capacity of absorb risks. Moreover, efficient banking leads to greater financial stability of the economy and thus support economic growth. The study tries to explore the impact of variables specified in CAMEL framework on banks profitability. All scheduled commercial banks viz., public (state-owned) banks, private banks and foreign banks will be covered under this study. The secondary data of all the banks covered has been analyzed with the help of multiple regression model.

Keywords: Financial ratios, CAMEL framework, banking variables, profitability.

I. INTRODUCTION

The banking sector is the main financial institution of a country. The whole country depends on their banking system for the growth of the economy. The better the financial health of a bank, the better the financial health of the economy (Vadrale, 2019). India's banking system comprises of different types of banks including cooperative as well as commercial banks (Helge & Padhye, 2016). The banking system of India has a strong base of its economy. It comprises of public (state-owned) banks, private banks and foreign banks. Recently, small finance banks has paved a new way in this world from the year 2017.

The year 2018 has shown a curse for the Indian banking sector. Not only did the profitability but also the financial performance of the banks has been under questions. The NPAs, according to the RBI statistical report, has shown a tremendous growth, which is rather twice of its previous year. According to the Statistical report, NNPAs to Total advances was 6.66% of the PSBs in the year 2017-18 as compared to 3.93% in the year 2016-17. Also the year-on-year growth of GNPAs of the private sector banks was higher than the public sector banks in the year 2016-17. The financial ratios shows the real picture of the performance of the banking sector.

There are numerous papers describing the profitability of the Indian banking sector along with the financial performance. This paper tries to cover the various financial ratios in the ambit of CAMEL Model for the financial performance of all scheduled commercial banks of India. The small finance banks has been not considered for the study as for the insignificant data by RBI. RBI uses CAMEL ratings to estimate the overall performance of the banking sector. In this regards, the main emphasis of the paper is on the bank specific factors in the light of CAMEL Model. The bank specific factors includes the internal factors which describes the overall performance of the bank.

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CAMEL Model stands for Capital Adequacy (CA), Asset quality (AQ), Management Soundness (MS), Earning Quality (EQ) and Liquidity Management (LM). This study also focused on how CAMEL model effects the different dimensions of the profitability of the banking industry. The profitability includes return on assets (ROA), return on equity (ROE) and net interest margin (NIM).

II.   REVIEW OF LITERATURE

For this study, we have reviewed various empirical studies of the financial performance of the banking sector that helped to understand how the financial performance has affected the profitability in the light of bank specific factors.

Boadi, Li & Lartey (2016) examined on the basis of bank specific factors, macroeconomic factors and risk assessment on the performance of the Ghana Rural commercial banks. The study concluded that the capital adequacy, asset quality, investment, gross domestic product growth rate, bank and Bank resilience have direct positive impact on the profitability. It also concluded that relationship between return on assets and capital adequacy, management efficiency and liquidity management, investments, bank size and gross domestic product growth rate are not strong enough. (Boadi, Li, & Lartey, 2016)

Nyagun & Liu (2019) analyzed the factors which have impacted the financial soundness of the banking sector with the help of CAMELS model. In this paper the author exploited the logistic regression model along with the Bayesian Model Averaging (BMA) approach for selection of the models. They have explored 22 commercial banks for the period of 12 years data. The results showed that the optimal model as exaggerated is modelled with reserves, deposit to equity, ownership, non- interest earning assets to total assets and book value of equity to total assets lagged one period; which shows a probability of 0.160. Along with this model four models have also been extracted. The authors also concluded that macroeconomics variables are not significant statistically. (Van-Thep & Day-Yang, 2019)

Bhatia & Mahendra (2017) investigated the bank specific factors and macroeconomic factors which affected the profit efficiency of the banking sector during 1991-92 to 2012-13. The author has pointed out that NPAs are the enduring problem for the economy. The authors has suggested Indian banks to focus on liquidity management, investment management and asset liability match. (Bhatia & Mahendru, 2017)

However, in the study Indriastuti & Ifada (2016) has pointed out CAMELS framework to predict the performance of the troubled banks. The study covers 35 commercial banks out of which 19 banks are preferable for the study on the basis of troubled banks for the period 2011-13. The results revealed that net profit margin is significant effect of trouble bank prediction, whereas other variables viz., capital adequacy ratio, non-performing assets, return on assets, quick ratio and net deviation position are not significant effect. (Indriastuti & Ifada, 2016)

2.1. Factor of Banks Profitability: dependent variable

This study considers profitability on the basis of Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) (Boora & Kavita, 2018; A. Kumar & Dhingra, 2016; Mayur & Saravanan, 2017; Robin, Salim, & Bloch, 2018; Seissian, Gharios, & Awad, 2018; Tan, 2018). ROA is considered as the most important indicator of profitability. It is the ratio of net profit to total assets (A. Kumar & Dhingra, 2016). It also reflects the

risk derived from the financial leverage (Boadi et al., 2016) which cannot be done by ROE (Athanasoglou, Brissimis, & Delis, 2005). ROE reveals effectiveness of a bank management which shows how its equity capital is used (Robin et al., 2018). A higher equity ratio of a bank should have a higher return on assets and a lower equity ratio have a lower ROA, based on the assumption that other's influence remain the same (Demirgüç-Kunt & Huizinga, 1998). Other profitability measure i.e. NIM is the net interest margin which can be furthermore defined as net interest income (interest income minus interest expenses) divided by total assets. Demirgüç-Kunt & Huizinga (1998) has explained that deviations in the NIM may reveal variations in NII or total assets and may be subject to the asset's quality i.e. loan default rate or tax rate (Demirgüç-Kunt & Huizinga, 1998).

2.2. *Factors of financial performance on profitability: independent variable*

An immense literature has been done on banks profitability all over the world. The early contributors on profitability (Berger, Demirguc-Kunt, Levine, & Haubrich, 2004; Berger, Hanweck, & Humphrey, 1987; Bourke, 1989; Molyneux & Thornton, 1992; Short, 1979). In these studies, they have clarified that the profitability can be measured in two parts i.e. internal and external factors. Later, internal and external factors was described as bank specific factors and macroeconomic factors (Ahmad, 2019; Bardhan & Mukherjee, 2016; Bawa, Goyal, Mitra, & Basu, 2019; Boadi et al., 2016; A. Kumar & Dhingra, 2016; V. Kumar & Kishore, 2019; Lee, 2018; Rachman, Kadarusman, Anggriono, & Setiadi, 2018). Furthermore, bank specific factors are classified in client specific and managerial specific (Ahmad, 2019) and industry specific factors (Bhatia & Mahendru, 2018).

Table 1: Showing the measurement of the variables for the CAMEL Model.

Variables	Measurements
Capital Adequacy	- Capital Adequacy Ratio - Tier 1 Capital Ratio - Tier 2 Capital Ratio
Asset Quality	- NNPAs to Net Advances - Total Investment to Total Assets
Management Soundness	- Total Expenses to Total Income - Operating Expenses to Total Expenses
Earning Quality	- Interest Income to Total Assets - Non-Interest Income to Total Assets
Liquidity Management	- Cash Deposit Ratio - Liquid Assets to Total Assets
Profitability	- Return on Assets - Return on Equity - Net Interest Margin

III.   RESEARCH METHODOLOGY

3.1. Method

The sample is collected from secondary sources of RBI websites, bank websites, and statistical report by RBI, research papers and journals. The various ratios were collected by the various reports provided by RBI.

3.2. Measurement

The study was totally based on secondary data. The total of 87 banks were taken into consideration for this study, out of which 21 banks are from public sector, 21 banks from private sector and 45 banks from foreign banks. The years covered under the study is 2004-05 to 2017-18. Various statistical tools have been implemented for this study i.e. descriptive. There are various study showing different measurement for the CAMEL Model. So this study tries to cover the overall measurement for the study.

3.3. Formulation of Multiple Linear Regression (MLR) Model

The MLR model is one of the technique which is widely used to analysis the multivariate regression variables (Mekparyup, Saithanu, & Buaphan, 2014). Multivariate regression analysis accounts for the variation of the independent variables in the dependent variable synchronically (Uyanık & Güler, 2013). According to the study, the MLR model equation is normally explained as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_n X_n + \varepsilon \qquad (1)$$

Y = dependent variable;

X_i = independent variable;

β_0 = intercept;

β_i = slope; regression coefficient;

ε = error term.

In this study, there are five independent variables based on the CAMEL framework i.e. Capital Adequacy (C_ADEQ), Asset Quality (A_QUAL), Management Efficiency (M_EFFI), Earning Quality (E_QUAL) and Liquidity Management (L_MANG) which are based on one dependent variable Profitability (PROF). These variables were further used to generate the MLR model equation as follows:

$PROF= \beta_0 + \beta_1 C\_ADEQ + \beta_2 A\_QUAL + \beta_3 M\_EFFI + \beta_4 E\_QUAL + \beta_5 L\_MANG + \varepsilon$ (2)

The model is analyzed with the help of SPSS software. The assumptions of the multiple linear regression were checked consequently: (1) normality of the error distribution with Kolmogorov-Smirnov (k-s) test (2) independence of errors supported by Durbin-Watson test (3) homocedasticity of the errors with the help of scatterplots of standardized residuals and standardized predictors (4) multicollinearity among predictor variables with the help of Variance Inflation Factor (VIF).

IV.   DATA ANALYSIS AND INTERPRETATION

The secondary data was analyzed in a stepwise way for regression model. Firstly, all the assumptions mentioned above have been tested to form a multiple regression model. The normality of the distribution was tested with the help of Kolmogorov

- Smirnov (k-s) test and Shapiro-Wilk

test.Table 2 discusses about the normality of the variables for the error distribution.

The results of the normality test shows that all the variables are significant i.e. all the variables are normally

Table 2: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Capital Adequacy	.344	698	.000	.193	698	.000
Profitability	.197	698	.000	.581	698	.000
Asset Quality	.200	698	.000	.707	698	.000
Management Efficiency	.237	698	.000	.629	698	.000
Earning Quality	.154	698	.000	.766	698	.000
Liquidity	.121	698	.000	.831	698	.000

a. Lilliefors Significance Correction

distributed. Secondly, the Durbin-Watson test was conducted to analyze the independence variables are not correlated. In other words, it is a test for the autocorrelation in the residuals from a statistical regression. In this study, the Durbin- Watson test is to verify whether there is a autocorrelation between the independent variables. The test shows that the result of Durbin- Watson is 1.8; which shows that there is no correlation detected in the secondary sample data. Thirdly, the homoscedasticity of the variables. As there is no definite test in the SPSS software; so scatterplot of standardized residuals and standardized predictors are determined. The below diagram shows the homoscedasticity of the data sample.
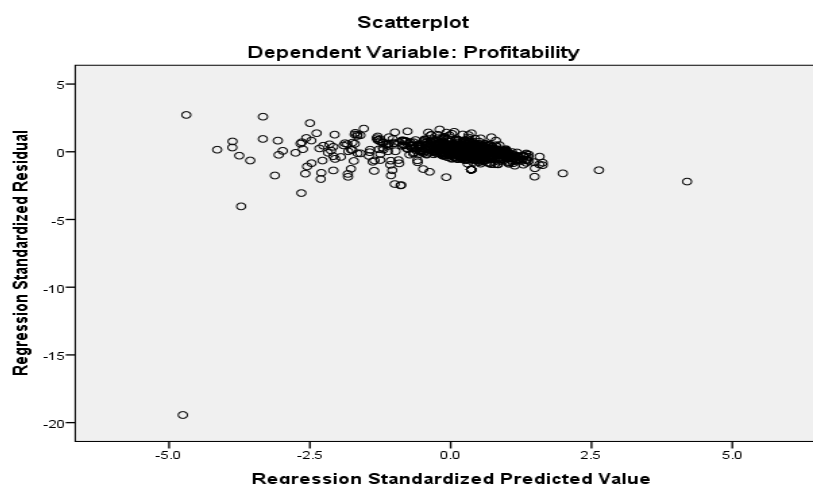
Lastly, the multicollinearity among the predictors (independent variables). This assumption have been tested with the help of Variance Inflation Factor (VIF) which can be interpreted as it should be between 0 to 10. The below table shows the VIF and the tolerance of the factors.

Table 3: Variance Inflation Factor and Tolerance with the dependent variable

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Capital Adequacy	.888	1.126
Asset Quality	.887	1.127
Management Efficiency	.643	1.556
Earning Quality	.750	1.333
Liquidity	.889	1.124

Dependent Variable: Profitability

The above table explain that there is no multicollinearity among the independent variable. The VIF is not more than 1.5 which shows the best results.

The data collected for the study were examined accordingly whether the assumptions has been satisfied or not. Further, we go for regression analysis.

The findings obtained by analyzing the multiple linear regression model from the data collected, we have anticipated the results.

Table 4: Multiple Linear Regression Analysis Result

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.815	1.132		5.139	.000
Capital Adequacy	.084	.019	.123	4.486	.000
Asset Quality	-2.419	.133	-.501	-18.211	.000
Management Efficiency	-27.055	2.350	-.372	-11.512	.000
Earning Quality	2.891	.221	.391	13.077	.000
Liquidity	.438	.142	.085	3.085	.002

R= 0.732; R2 = 0.535; Std. Error of Estimate = 4.425; F (0.05) = 159.337; Sig = 0.000

The interpretation of the table 4 clears the independent variables in the model are significantly predict the dependent variable (Profitability) according to the ANOVA statistics ($p < 0.05$). The degree of predicting the dependent variable is found to R = 0.73 in the magnitude of regression analysis. The degree of predicting the explained variance in the dependent variable is $R^2 = 0.535$; which is acceptable. By examining the coefficients, it may be explained that the model predicts the dependent variable very well.

The value of Beta (β) in Table 4 indicates the level of importance of the independent variables. The variable having highest β-value is the most important independent variable. The table 4 represent that capital adequacy, earning quality and liquidity management is positively related to the profitability whereas assets quality and management efficiency are negatively related. The analysis done in other way can be stated as capital adequacy and liquidity management contribute the least in the model i.e. 0.084 and 0.438 respectively.

The regression equation can be formed as below based on the standard regression analysis.

$$PROF = 5.815 + 0.084 \; C\_ADEQ - 2.419 \; A\_QUAL - 27.055 \; M\_EFFI + 2.891 \; E\_QUAL + 0.438 \; L\_MANG$$

V. CONCLUSION

The study mainly focuses on the impact of the financial performance of the public and private sector banks of India on its profitability. Profitability expresses the operational efficiency of the banks as they improve their quality to absorb the risks related. The present study is mainly grounded on the CAMEL framework to measure the financial performance of the Indian banking sector. The multiple linear regression is the best statistical tool to implement the impact of independent variable on the dependent variable.

The results of the MLR analysis depressed the assets quality and the management efficiency of the banking sector. Whereas the capital adequacy ratio is lowest amongst all the other measures. That means that it is very less correlated to the profitability. The liquidity management of the banking sector is somewhat related to the profitability. It is contributing to the profitability of the banking sector. The earning quality of the banks indicates a most important contribution in the model. The earning of the banks are mainly depended on the interest and non-interest income. So it is showing a positive response on the basis of earning.

This study has many limitations. Firstly, the study covers only public and private sector banks of India. Foreign banks are playing a vital role in the Indian banking sectors. Other small payment banks also can be studied on the basis of CAMEL framework. Secondly, the ratios covered under the study is not the last. Other ratios can be added to it in the model to get the results.

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