

## ANALYSIS OF FINANCIAL PERFORMANCE OF COMMERCIAL BANKS OF NEPAL USING CAMEL APPROACH

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*This paper aims to analyze the performance of the commercial banks using CAMEL framework and analyze their performance on average basis with selected samples. The financial sectors have always been the economic drive of Nepal holding large share market of the country. The good performance of the financial institutions must for the strong and growing economy. Therefore, this research paper makes analysis of the variables of the CAMEL framework to find the important factors influence the commercial bank's performance.*

*The data analysis reveals that the main factor affecting both ROA and ROE are earning quality and rest capital adequacy, assets quality and liquidity have moderating influence on performance of banks. The management efficiency show minimal impact on the ROA and ROE as per the findings. The factors that were selected for this research paper may have minimal influence but other factors of the management may have direct influence on performance of the banks.*

### 1. Introduction

In general the word bank means financial institution dealing with money. The financial performance of the financial institutions is playing the important role for the economy. Jain and Jaishwal (2016), the financial sector is the backbone of the economy. The whole scenarios of the economy activities and the development of a country can be ascertained by the condition of banking sector. In Nepal, the economic is directly influenced by the bank's performance, and on top of that "A" class banks are main banks category that is withstanding the its economy. There are different types of banks like central bank, commercial banks, Development banks, Investment Banks and co-operative banks. These financial institutions' main function is to play a role of financial intermediaries; providing public borrowing and lending.

Funso, Kolade and Ojo (2012) stated that the intermediation role of financial institutions can be said as catalyst of economic growth. According to Zeinab (2006) despite of some limitations

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such as macroeconomic instability, the fragility of stock markets, the limitation of capital markets, and the inefficiency of development banking systems in underdeveloped countries, banking system in underdeveloped countries remain integral components of the general economic systems and they can be considered as a key element in any development effort. The growth of financial sector in Nepal is much better compare to other sectors despite of timely different conflicts and political insurgency. Number of banks emerged in Nepal with the increasing demand of customers and different services with changing lifestyles of people. Commercial banks are major financial institutions which occupy the quite an important place in the framework of every economy because they provide capital for the development of industry trade and other resource deficit sectors to the public. The function of the commercial banks has been enhanced in Nepal to sustain the increasing need of the service sector and the economy in general (Economic Survey, 2008).

Sun (2011) Performance evaluation of enterprises are must for incentives to operators and performance information to the shareholders. The performance evaluation of banks shows how well the banks are making use of assets, shareholder's equities and liabilities, revenue and expenses. Lin et al (2005)

According to Misra and Aspal(2013) explains that the stage of development of banking industry is a good reflection of the development of the economy. The overall performance of financial institution may not reflect by financial statement, so that major question emerges whether these are adequate to reflect the overall performance of company. Hence, there is need to identify the overall conditions strengths, weakness, opportunity and threats of banks. For these purpose, several financial and statistical tools and techniques were developed by different experts and financial institutions all over the world, one of them is CAMEL. This study aims to assets the financial conditions and overall performance of sampled commercial bank in the framework of CAMEL.

The major objective of the commercial banks is to make higher profit and maintain the better bank's performance. Therefore, this study intend to analyze of factors of CAMEL approach to find the implication and the contribution to the performance of the commercial banks. The study explores the following research questions.

- What is the descriptive view of the selected variables of CAMELS approach?
- Which independent variables could significantly affect the bank's performance?

- Which dependent variable; ROA or ROE is affected by the factors of CAMEL approach?

## 2. Objective of the Study

The general objective of this study is to examine the financial performance of the selected commercial banks through CAMEL test and compare with each other. To accomplish the main objective, specific objective of this study are;

- To analyze the capital adequacy, assets quality, management quality, earning capability and liquidity position of commercial banks.
- To use the financial indicators of CAMEL to measure bank's performance.
- Based on analysis and conclusion drawn, recommend the related banks for the better improvement.

## 3. Review of Related Studies

Anteneh, Arega and Yonas, (2011), the pioneer researches made the evaluation of the performance of the selected commercial banks of the Ethiopia using the CAMEL framework for the period of 2000-2010 and they found that independent variables in CAMEL framework have highly explained the performance variables i.e., return on assets and return on equity.

Hirtle and Lopez examine and stressed about the usefulness of the previous CAMEL rating for assessing the bank's present situation. The focused was on the confidentiality of the CAMEL rating to senior management only for protecting the business strategies and appropriate supervisory of staff. Over the period of 1989 to 1995, it indicate that the private supervisory information during the last on-site exam remains useful with the respect to the current condition of the bank up to 6 to 12 quarters. In conclusion, it summarizes those CAMELS rating is clearly useful in supervisory monitoring of current condition.

The academic studies have been done regarding the performance evaluation whether extent private supervisory information is useful in the supervisory monitoring of banks or not. Barker and Holdsworth (1993) found the evidence that CAMELS ratings are useful with regard to estimating bank failure, even after controlling for a wide range of publicly available information about the condition and performance of banks. According to some studies, viability of information of CAMELS ratings is short lived. Cole and Gunther (1996, 1998) analyzed a similar question and found that even if CAMELS ratings contain useful information, they depreciate quickly. Moreover CAMELS can be used for past ratings. Hirtle and Lopez (1999) examined the utility of past CAMELS ratings for evaluating banks' current conditions. Decamps

et al. (2004) have supervisors choosing intervention thresholds to maintain adequate incentives for bank risk taking and study the effects of ex-post liquidity assistance and forbearance.

Dahiyat (2012) examined each parameter of CAMELS system (Capital adequacy, asset quality, management quality, earning, liquidity and sensitivity to market risks) by conducting literatures and empirical studies, and relying on interviews with responsible persons in Jordan securities commission and brokerage firms. Barr et al. (2002) described the CAMELS rating system used by bank examiners and regulators; and finds that banks with high efficiency scores also have strong CAMELS ratings.

Huang, Wen, and Yu (2012) examine the financial determinants of bank performance in Taiwan from the period of 2005-2007 (pre-crisis period) and during 2008-2010 (post-crisis period). The findings show that the relationship between the return on assets and certain CAMEL ratios remain strong. Moreover, in terms of asset quality, it shows that there is high protection against external shocks during the pre- and post- crisis period.

Jie Liu (2011) made research from independent variables of CAMEL Approach on bank performance on China's banking sector. The study made on 13 Chinese banks listed in Sanghai Stock Exchange for the period of 2008 to 2011 was based on the internal determinants of CAMEL rating and bank performance. The measurement of these determinants using multiple regression model result to the findings that shows the return on assets can be influenced by shareholder's risk-weighted capital adequacy ratio, NPL to total loan ratio, cost to income ratio, net interest rate margins, and loans to deposits ratio.

Berger and Davies evaluated the impact of CAMEL rating changes on the parent holding company's stock price. They separated stock price changes into two component a private information' effect (which identified the public's awareness of new information discovered by examiners), and a 'regulatory discipline' effect which valued a regulators' presumed ability to force a bank to changes its behavior). Berger and Davies' empirical results provided only weak evidence of a regulatory discipline effect, but they found a strong private information effect. However, the information effect applied only to CAMEL downgrades, which tend to precede stock prices declines. Berger and Davies found no movement in the stock price following a CAMEL upgrade.

Christopher Ifeacho (2014) investigates the impact of bank-specific variables and selected macroeconomic variables on the South African banking sector for the period 1994-2011 using

the capital adequacy, asset quality, management, earnings, and liquidity (CAMEL) model of bank performance evaluation. The study employs data in annual frequency from South Africa's four largest banks, namely, ABSA, First National Bank, Nedbank, and Standard Bank. These banks account for over 70% of South Africa's banking assets. Using return on assets (ROA) and return on equity (ROE) as measures of bank performance, the study finds that all bank-specific variables are statistically significant determinants of bank performance. Specifically, the study shows that asset quality, management quality, and liquidity have a positive effect on both measures of bank Performance, which is consistent with a priori theoretical expectations. Capital adequacy, however, exhibits a surprising significant negative relationship with ROA, while its relationship with ROE is significant and positive as expected. Except for interest rates (in the ROA model), unemployment rate (in the ROA model), and the rate of inflation (in the ROE model), the rest of the macroeconomic variables are statistically insignificant. The study reveals that bank performance is positively related to interest rates and negatively related to unemployment rates and interest rates.

Said and Tumin (2011) utilize the return on average assets (ROAA) and return on average equity (ROE) as the proxy to examine the performance of commercial banks in Malaysia and China from 2001-2007. The findings imply that the financial ratios have different impact on the performance of banks in both countries except for capital and credit ratios. It shows that the bank performance in China tends to be influenced by the operating ratios but there is no significant influence on the bank performance in Malaysia.

Suvita Jha and Xiaofeng Hui (2012) compare the financial performance of different ownership structured commercial banks in Nepal based on their financial characteristics and identify the determinants of performance exposed by the financial ratios, which were based on CAMEL Model. Eighteen commercial banks for the period 2005 to 2010 were financially analyzed. In addition, econometric model (multivariate regression analysis) by formulating two regression models used to estimate the impact of capital adequacy ratio, non-performing loan ratio, interest expenses to total loan, net interest margin ratio and credit to deposit ratio on the financial profitability namely return on assets and return on equity of these banks. The result shows that public sector banks are significantly less efficient than their counter-part however domestic private banks are equally efficient to foreign-owned (joint venture) banks. Furthermore, the estimation results reveal that return on assets was significantly influenced by capital adequacy

ratio, interest expenses to total loan and net interest margin, while capital adequacy ratio had considerable effect on return on equity.

Pant Radish argued that after 2010, there will be new international entrants in the market, we must remain very competitive, and we have to operate at international standards. However, he does not think we need to fear. He believed combined capital of all Nepalese commercial banks would not even equal to the capital of a small bank in developed countries. It somehow, Nepal is able to capitalize on the growth of China and India, there is no turning back for the banking sector. There will be opportunities for all types of banks. So, we need to work together to address the challenges of that WTO." 2008 was an extraordinarily tumultuous year, full of shocks & surprises. None of us have even quite seen the scale of dislocation & disruption in financial market that we have experienced this year. To put things in perspective, there has been more volatility in the US equity market in the three month since Lehman went bankrupt in the mid-September, than in the previous 45 years put together,. Moreover, with the disappearance or effective nationalization of several major players, and the demise of the US broke, dealer model, the global industry has changed fundamentally & irreversibly.

Maryam Azizi and DR. Yusef Ahadi Sarkani (2014) review the financial performance of Mellat Bank using CAMEL model and each of the model dimensions examined using trend analysis method and both mean and standard deviation statistics. In the process they determined all the model criteria had an ascending trend in the period under study. In the inferential statistics section, again the relationship between model variables and the financial performance of Mellat Bank was studied and examined using two linear and multiple regressions as well as OLS method. Results of the study indicate that there is a positive significant relationship between the indices of liquidity, quality of management and earnings with financial performance. Yet, no relationship was seen between capital adequacy and assets quality with bank financial performance and multiple regression test showed only a positive significant relationship with financial performance in management quality section. As a result, Mellat Bank has better financial performance in management quality section.

Zaman and Segavan (2013), the research of comparison between conventional and Islamic bank of Pakistan in terms of CAMEL parameters and found that Islamic banks performed better in

terms of operational efficiency (Management quality), asset quality, and liquidity. CAMEL framework can perform the comparison of banks.

### **Articles Review in Context of Nepal**

Baral (2005) CAMEL framework is the most widely used framework for the performance evaluation. The Central bank of Nepal (NRB) has also implemented CAMEL Framework for performance evaluation of the banks and other financial institutions.

Dhungana Bhisma argues CAMEL rating system plays key role for bank supervision. According to him, The NRB as a central bank has the important task of regulating & supervising the banking system of Nepal. NRB assess the overall strength of the banking system as well as the safety and soundness of each individual bank and financial institution, In order to discharge this role. To help in this endeavor, a uniform rating system for all banks and financial institution has been used. Under this modality, supervisors assign individual numerical rating to the key areas of Capital, Assets, Management, Earnings, liquidity and sensitivity to the market risk (CAMELS) as well as assigning an overall composite rating to each banking institution. In this way, the NRB has been able to categorized banks and financial institutions into group based on their overall strength, quality and operating soundness. The rating system known as CAMEL has served as a supervisory tool to help identify those banks that are having problems and require increased supervision. To date, early warning signals are drawn & monitored from the CAMEL rating through on-site inspection and CAMEL rating through offsite supervision.

### **4. Research Gap**

The researchers and scholars have performed the research an analysis through CAMEL approach and findings of the overall performance of banks are made. As this approach is popular among the scholars and researchers for analyzing the banks performance in the market with the various ratios that indicates the Camels framework.

This research too determines the overall performance of the commercial banks selected with various CAMELS approach during the period of 2012/13 to 2016/17. The study highlights the functioning of the commercial banks and their performance in terms of various perspective of CAMEL framework. Though many researcher have already made analysis on these terms, the study of selected banks and the research period and the relationship of share capital, performance of bank, profitability of bank, Net Interest Margin and Profit per employees will be determined. No researchers has done the analysis of CAMEL approach with selected

commercial banks with the same time range so far in Nepal. So, this paper would try to find the main indicators that would have high influence in performance of commercial banks of Nepal. And it will advise for some major measures for the indicators to focus for high profitable business and growth.

## 5. Theoretical Review

This part presents the theoretical aspects of the study including concepts on commercial bank, functions of commercial banks and concepts of CAMEL rating system. This research is based on findings of journal published by International Business Research, Canadian Centre of Science and Education on “CAMEL Analysis on Performance of ASEAN Public Listed Banks”. Rossazana Ab-Rahim, Norlina Kadri, Amy-Chin Ee-Ling, and Abdul Alim Dee (2018) conducted the research on CAMEL approach and financial ratios with secondary data available of 63 public listed banks of ASEAN banks. Ranks to each countries were given for the average result to each five perspective; Capital adequacy, Assets Quality, Management Efficiency, Earnings and Liquidity. As per study CAMEL has been common rating system applied by government, regulators and researchers in measuring the soundness of the banks. Dang (2011) noted that the scholars often used the CAMEL framework to proxy bank specific variables. These variables are internal factors, which are under the control of the banks to manipulate and are different from each bank.

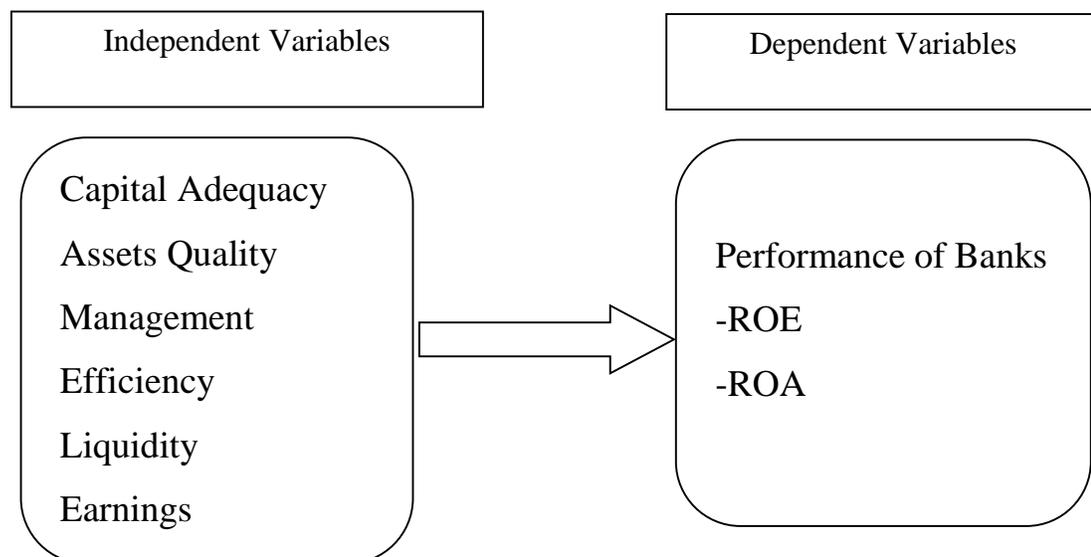


Figure1: *Theoretical framework of CAMEL Approach*

## 6. Research Hypothesis

The research tested the following hypothesis for fulfilling the objective of the study;

- H0<sub>1</sub>: There is no significant relationship between capital adequacy ratio and return on equity.
- H0<sub>2</sub>: There is no significant relationship between Advance to Total Assets ratio and return on equity.
- H0<sub>3</sub>: There is no significant relationship between total investment to total assets ratio and return on equity.
- H0<sub>4</sub>: There is no significant relationship between total loan loss provision to total non-performing loans ratio and return on equity.
- H0<sub>5</sub>: There is no significant relationship between Non-performing assets to total loans ratio and return on equity.
- H0<sub>6</sub>: There is no significant relationship between cost of funds and return on equity.
- H0<sub>7</sub>: There is no significant relationship between staff expenses to total operating expenses and return on equity.
- H0<sub>8</sub>: There is no significant relationship between net interest margin and return on equity.
- H0<sub>9</sub>: There is no significant relationship between operating profit to total assets and return on equity.
- H0<sub>10</sub>: There is no significant relationship between liquid assets to total deposit and return on equity.
- H0<sub>11</sub>: There is no significant relationship between total loans to total deposits and return on equity.
- H0<sub>12</sub>: There is no significant relationship between capital adequacy ratio and return on assets.
- H0<sub>13</sub>: There is no significant relationship between Advance to Total Assets ratio and return on assets.
- H0<sub>14</sub>: There is no significant relationship between total investment to total assets ratio and return on assets.
- H0<sub>15</sub>: There is no significant relationship between total loan loss provision to total non-performing loans ratio and return on assets.
- H0<sub>16</sub>: There is no significant relationship between Non-performing assets to total loans ratio and return on assets.
- H0<sub>17</sub>: There is no significant relationship between cost of funds and return on assets.

H0<sub>18</sub>: There is no significant relationship between staff expenses to total operating expenses and return on assets.

H0<sub>19</sub>: There is no significant relationship between net interest margin and return on assets.

H0<sub>20</sub>: There is no significant relationship between operating profit to total assets and return on assets.

H0<sub>21</sub>: There is no significant relationship between liquid assets to total deposit and return on assets.

H0<sub>22</sub>: There is no significant relationship between total loans to total deposits and return on assets.

## 7. Model Specification

The study uses two models for testing purposes;

$$\text{Model 1: ROA} = \beta_0 + \beta_1\text{CA} + \beta_2\text{AQ} + \beta_3\text{MC} + \beta_4\text{EQ} + \beta_5\text{LQ} + \varepsilon$$

$$\text{Model 2: ROE} = \beta_0 + \beta_1\text{CA} + \beta_2\text{AQ} + \beta_3\text{MC} + \beta_4\text{EQ} + \beta_5\text{LQ} + \varepsilon$$

Where, CA= Capital Adequacy, AQ= Assets Quality, MC= Management Efficiency, EQ= Earnings and LQ= Liquidity.

## 8. DATA ANALYSIS AND FINDINGS

### Correlation between variables

Table 1: *Correlation between independent variables with dependent variables (ROA and ROE)*

	ROE	ROA	CA1	CA2	AQ1	AQ2	AQ3	MC1	MC2	EQ1	EQ2	LQ1	LQ2
ROE	1	.596**	-0.05	-0.21	-.280*	-.332*	-0.253	0.062	-.340*	.668**	.635**	.603**	0.048
		0	0.716	0.143	0.049	0.018	0.076	0.67	0.016	0	0	0	0.742
ROA		1	0.195	-0.1	-.297*	-0.18	-0.126	-0.12	-0.16	.680**	.880**	.420**	-0.06
			0.174	0.504	0.036	0.208	0.382	0.411	0.275	0	0	0.002	0.68
CA1			1	-0.03	-0.156	.471**	-.392**	-.355*	0.192	0.218	0.165	-0.079	-0.084
				0.825	0.281	0.001	0.005	0.011	0.182	0.128	0.252	0.587	0.562
CA2				1	-.366**	-0.03	.279*	0.046	0.271	-0.07	-0.12	0.037	.726**
					0.009	0.844	0.05	0.75	0.057	0.627	0.411	0.798	0
AQ1					1	0.059	0.033	-0.2	-0.07	-.342*	-0.23	-.290*	-.549**

	0.684	0.822	0.174	0.613	0.015	0.109	0.041	0
AQ2	1	-.453**	-0.23	0.053	-0.19	-0.08	-.400**	-0.049
		0.001	0.108	0.713	0.183	0.603	0.004	0.737
AQ3		1	.283*	0.231	-0.2	-0.19	0.055	.281*
			0.046	0.106	0.174	0.176	0.702	0.048
MC1			1	-0.06	0.017	-0.09	0.085	.318*
				0.681	0.908	0.514	0.559	0.024
MC2				1	-.287*	-.292*	-.378**	0.204
					0.043	0.039	0.007	0.155
EQ1					1	.630**	.618**	0.003
						0	0	0.982
EQ2						1	.501**	-0.108
							0	0.454
LQ1							1	0.137
								0.344
LQ2								1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

The above table shows the correlation matrix between dependent variable and independent variables, where, CA1=Capital Adequacy Ratio, CA2=Advance to Total Assets, AQ1=Total Investment to Total Assets ratios, AQ2=Total loan loss provision to Total NPL, AQ3=Non Performing Assets to Total Loans, MC1=Cost of Funds, MC2=staff expenses to total operating expenses, EQ1=Net Interest Margin, EQ2=Operating Profit to Total Assets, LQ1=Liquid Assets to Total Deposit, LQ2=Total Loans to total deposits.

The correlation coefficient return on equity and capital adequacy ratio is -0.05, which means there is negative correlation return on equity and capital adequacy ratio. The corresponding p-value is 0.716, which is greater than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant relationship between return on equity and capital adequacy ratio.

The correlation coefficient return on equity and advance to total assets is -0.21, which means there is negative correlation return on equity and advance to total assets. The corresponding p-

value is 0.143, which is greater than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant relationship between return on equity and advance to total assets.

The correlation coefficient return on equity and total investment to total assets ratios is -0.280, which means there is negative correlation return on equity and total investment to total assets ratios. The corresponding p-value is 0.049, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant association between return on equity and total investment to total assets ratios.

The correlation coefficient return on equity and total loan loss provision to total net performing loans is -0.332, which means there is negative correlation return on equity and total loan loss provision to total net performing loans. The corresponding p-value is 0.018, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant association between return on equity and total loan loss provision to total net performing loans.

The correlation coefficient return on equity and non-performing assets to total loans is -0.253, which means there is negative correlation return on equity and non-performing assets to total loans. The corresponding p-value is 0.076, which is greater than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant association between return on equity and non-performing assets to total loans.

The correlation coefficient return on equity and cost of funds is 0.062, which means there is positive correlation return on equity and cost of funds. The corresponding p-value is 0.67, which is greater than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant association between return on equity and cost of funds.

The correlation coefficient return on equity and staff expenses to total operating expenses is -0.340, which means variables are negatively correlated. The corresponding p-value is 0.016, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant association between return on equity and staff expenses to total operating expenses.

The correlation coefficient return on equity and net interest margin is 0.668, which replicates that dependent and independent variables are positively correlated. The corresponding p-value is 0.000, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant association between return on equity and net interest margin.

The correlation coefficient return on equity and operating profit to total assets is 0.635, which replicates that dependent and independent variables are positively correlated. The corresponding p-value is 0.000, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant link between return on equity and operating profit to total assets.

The correlation coefficient return on equity and liquid assets to total deposits is 0.603, which replicates that dependent and independent variables are positively correlated. The corresponding p-value is 0.000, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant link between return on equity and liquid assets to total deposits.

The correlation coefficient return on equity and total loans to total deposits is 0.048, which replicates that these dependent and independent variables are positively correlated. The corresponding p-value is 0.742, which is higher than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant link between return on equity and total loans to total deposits.

## **9. Results of correlation of independent variables with ROA**

The correlation coefficient return on assets and capital adequacy ratio is 0.195, which replicates that dependent and independent variables are positively correlated. The corresponding p-value is 0.174, which is higher than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant link between return on assets and capital adequacy ratio.

The correlation coefficient return on assets and advance to total assets is -0.100, which means there is negative correlation return on assets and advance to total assets. The corresponding p-value is 0.504, which is greater than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant relationship between return on assets and advance to total assets.

The correlation coefficient return on assets and total investment to total assets ratios is  $-0.297$ , which means there is negative correlation return on assets and total investment to total assets ratios. The corresponding p-value is  $0.036$ , which is lower than level of significance ( $\alpha$ ) =  $0.05$ , signifying that there is significant association between return on assets and total investment to total assets ratios.

The correlation coefficient return on assets and total loan loss provision to total net performing loans is  $-0.018$ , which indicates that dependent and independent variables are negatively correlated. The corresponding p-value is  $0.208$ , which is greater than level of significance ( $\alpha$ ) =  $0.05$ , signifying that there is no significant association between return on assets and total loan loss provision to total net performing loans.

The correlation coefficient return on assets and non-performing assets to total loans is  $-0.126$ , which means there is negative correlation return on assets and non-performing assets to total loans. The corresponding p-value is  $0.382$ , which is greater than level of significance ( $\alpha$ ) =  $0.05$ , signifying that there is no significant association between return on assets and non-performing assets to total loans.

The correlation coefficient return on assets and cost of funds is  $-0.120$ , which means there is negative correlation return on assets and cost of funds. The corresponding p-value is  $0.411$ , which is greater than level of significance ( $\alpha$ ) =  $0.05$ , signifying that there is no significant association between return on assets and cost of funds.

The correlation coefficient return on assets and staff expenses to total operating expenses is  $-0.016$ , which means variables are negatively correlated. The corresponding p-value is  $0.275$ , which is higher than level of significance ( $\alpha$ ) =  $0.05$ , signifying that there is no significant association between return on assets and staff expenses to total operating expenses.

The correlation coefficient return on assets and net interest margin is  $0.680$ , which replicates that dependent and independent variables are positively correlated. The corresponding p-value is  $0.000$ , which is lower than level of significance ( $\alpha$ ) =  $0.05$ , signifying that there is significant association between return on assets and net interest margin.

The correlation coefficient return on assets and operating profit to total assets is 0.880, which replicates that dependent and independent variables are positively correlated. The corresponding p-value is 0.000, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant link between return on assets and operating profit to total assets.

The correlation coefficient return on assets and liquid assets to total deposits is 0.420, which replicates that dependent and independent variables are positively correlated. The corresponding p-value is 0.002, which is lower than level of significance ( $\alpha$ ) = 0.05, signifying that there is significant link between return on assets and liquid assets to total deposits

The correlation coefficient return on equity and total loans to total deposits is -0.060, which replicates that these dependent and independent variables are positively correlated. The corresponding p-value is 0.68, which is higher than level of significance ( $\alpha$ ) = 0.05, signifying that there is no significant link between return on equity and total loans to total deposits.

## 10. Regression Analysis of Return on Equity (ROE) Model

The purpose of using regression model is to predict and estimate the effect of some explanatory variable on the dependent variable. The result and presentation of regression analysis of the ROA and ROE model is used to explain The CAMELS variables of the commercial banks of Nepal.

Table 2: Regression Results of Model ROE

	Beta	T-Value	Sig	VIF
(Constant)	0.1320	1.6210	0.1130	
CA1	-0.1510	-1.3620	0.1810	1.8900
CA2	-0.3980	-3.1680	0.0030	2.4250
AQ1	0.0270	0.2410	0.8110	1.8910
AQ2	-0.2910	-2.5790	0.0140	1.9640
AQ3	-0.3350	-3.1330	0.0030	1.7560
MC1	-0.0660	-0.6780	0.5020	1.4650
MC2	0.0220	0.2180	0.8290	1.5710

EQ1	0.2680	2.1120	0.0410	2.4830
EQ2	0.3490	3.1770	0.0030	1.8580
LQ1	0.1270	1.0370	0.3060	2.3060
LQ2	0.4540	3.1070	0.0040	3.2920
<hr/>				
R Square	0.7530			
Sig	0.0000			
F-statistic	10.5380			
Durbin-				
Watson	1.5850			
N	50			

*Based on above findings following regression have been developed:  $ROE = 0.1320 - 0.1510CA1 - 0.3980CA2 + 0.0270AQ1 - 0.2910AQ2 - 0.3350AQ3 - 0.0660MC1 + 0.0220MC2 + 0.2680EQ1 + 0.3490EQ2 + 0.1270LQ1 + 0.4540LQ2 + \epsilon$*

*Where, CA1=Capital Adequacy Ratio, CA2=Advance to Total Assets, AQ1=Total Investment to Total Assets ratios, AQ2=Total loan loss provision to Total NPL, AQ3=Non Performing Assets to Total Loans, MC1=Cost of Funds, MC2=staff expenses to total operating expenses, EQ1=Net Interest Margin, EQ2=Operating Profit to Total Assets, LQ1=Liquid Assets to Total Deposit, LQ2=Total Loans to total deposits.*

The coefficient analysis by regression model determines the relationship between dependent variables to each independent variables when all other variables remains constant. The regression results of ROE show that R-square was 0.7530, which means that 75.30% of the total variation in the value of ROE was attributed to the effect of the independent variables. As per significant value, management efficiency; (MC2=staff expenses to total operating expenses and MC1=cost of funds), assets quality ratios; (AQ1=total investment to total assets ratios), liquidity ratio; (LQ1=Liquid Assets to Total Deposit) and capital adequacy; (CA1=capital adequacy ratio) has a significant correlation with the return on equity of banks. The other factors that influence the dependent variables are F value and significance level; 10.5380 and 0.0000 which states the acceptance of regression equation as  $\text{sig} = 0.0000 < 0.05$  which validates the regression model fits.

The sig, p-value= 0.0000 for all the independent variables with relation to return on equity, it shows that there is significant relationship between dependent and independent variables. As per general rule of thumb, that Variance Inflation Factor (VIF) exceeding 4 requires further investigation and exceeding 10 indicates the signs of serious multi-collinearity requiring correction or changes in variables. The result of data analysis shows that VIF of all independent variables are less than 4 so there is no requirement of any changes and the data are valid for analysis.

Regression coefficient of Capital Adequacy Ratio (CA1) in the regression coefficient analysis is -0.1510, which indicates that if we increase capital adequacy ratio by one unit, the average influence on return on assets will decrease by 0.1510 units.

Regression coefficient of Advance to Total Assets (CA2) in the regression coefficient analysis is -0.3980, which indicates that if we increase advance to total assets ratio by one unit, the average influence on return on assets will decrease by 0.3980 units.

Regression coefficient of Total Investment to Total Assets ratios (AQ1) in the regression coefficient analysis is 0.0270, which indicates that if we increase total investment to total assets ratio by one unit, the average influence on return on assets will increase by 0.0270 units.

Regression coefficient of Total loan loss provision to Total NPL ratio (AQ2) in the regression coefficient analysis is -0.2910, which indicates that if we increase total loan loss provision to total non-performing loan ratio by one unit, the average influence on return on assets will decrease by 0.2910 units.

Regression coefficient of Non-Performing Assets to Total Loans ratio (AQ3) in the regression coefficient analysis is -0.3350, which indicates that if we increase total loan loss provision to total non-performing loan ratio by one unit, the average influence on return on assets will decrease by 0.3350 units.

Regression coefficient of Cost of Funds (MC1) in the regression coefficient analysis is - 0.0660, which indicates that if we increase total interest expenses to total borrowing ratio by one unit, the average influence on return on assets will decrease by 0.0660 units.

Regression coefficient of staff expenses to total operating expenses (MC2) in the regression coefficient analysis is 0.0220, which indicates that if we increase staff expenses to total operating expenses ratio by one unit, the average influence on return on assets will increase by 0.0220 units.

Regression coefficient of Net Interest Margin (EQ1) in the regression coefficient analysis is 0.2680, which indicates that if we increase total net interest margin ratio by one unit, the average influence on return on assets will increase by 0.2680 units.

Regression coefficient of Operating Profit to Total Assets (EQ2) in the regression coefficient analysis is 0.3490, which indicates that if we increase total net operating profit total assets ratio by one unit, the average influence on return on assets will increase by 0.3490 units.

Regression coefficient of Liquid Assets to Total Deposit (LQ1) in the regression coefficient analysis is 0.1270, which indicates that if we liquid assets to total deposits ratio by one unit, the average influence on return on assets will increase by 0.1270 units.

Regression coefficient of Total loans to Total Deposit (LQ2) in the regression coefficient analysis is 0.4540, which indicates that if we total loans to total deposits ratio by one unit, the average influence on return on assets will increase by 0.4540 units

Moreover, the Durbin-Watson statistics are located under the table of each regression analysis and are used to detect the presence of autocorrelation. The value of this test could help us to find out the existence of problem between the data. The Durbin-Watson results ranges in value from 0 to 4. A value near 2 specifies non-autocorrelation. A value toward 0 shows positive autocorrelation and a value toward 4 show negative autocorrelation. The value of Durbin-Watson statistics is 1.5850 shows that there is non-autocorrelation.

## 11. Regression Analysis of Return on Assets (ROA) Model

Table 4: Regression Results of Model ROA

Model ROA				
	Beta	T-Value	Sig	VIF
(Constant)	0.0040	0.8340	0.4090	
CA1	0.0310	0.3610	0.7200	1.8900
CA2	-0.0900	-0.9350	0.3560	2.4250
AQ1	-0.0760	-0.8890	0.3790	1.8910
AQ2	-0.1670	-1.9270	0.0610	1.9640
AQ3	0.0480	0.5880	0.5600	1.7560
MC1	-0.1040	-1.3840	0.1740	1.4650
MC2	0.0620	0.7950	0.4320	1.5710
EQ1	0.2630	2.6930	0.0100	2.4830
EQ2	0.7980	9.4500	0.0000	1.8580
LQ1	-0.2070	-2.1990	0.0340	2.3060
LQ2	0.0790	0.7060	0.4850	3.2920
R Square	0.8540			
Sig	0.0000			
F-statistic	20.2040			
Durbin-Watson	1.6170			
N	50			

On the basis of above findings following regression have been developed:

$$ROA = 0.0040 + 0.0310CA1 - 0.0900CA2 - 0.0760AQ1 - 0.1670AQ2 + 0.0480AQ3 - 0.1040MC1 + 0.0620MC2 + 0.2630EQ1 + 0.7980EQ2 - 0.2070LQ1 + 0.0790LQ2 + \varepsilon$$

Where, CA1=Capital Adequacy Ratio, CA2=Advance to Total Assets, AQ1=Total Investment to Total Assets ratios, AQ2=Total loan loss provision to Total NPL, AQ3=Non Performing Assets to Total Loans, MC1=Cost of Funds, MC2=staff expenses to total operating expenses, EQ1=Net Interest Margin, EQ2=Operating Profit to Total Assets, LQ1=Liquid Assets to Total Deposit, LQ2=Total Loans to total deposits

The regression results of ROA show that R-square was 0.8540, which means that 85.40% of the total variation in the value of ROA was attributed to the effect of the independent variables. As

per significant value, earning ratios; (EQ1=Net Interest Margin and EQ2=Operating Profit to Total Assets) and liquidity ratio (LQ2=Total Loans to total deposits) has a significant correlation with the return on assets of banks. The other factors that influence the dependent variables are F value and significance level; 20.2040 and 0.0000 which states the acceptance of regression equation as  $\text{sig} = 0.0000 < 0.05$  which validates the regression model fits.

Regression coefficient of Capital Adequacy Ratio (CA1) in the regression coefficient analysis is 0.0310, which indicates that if we increase capital adequacy ratio by one unit, the average influence on return on assets will increase by 0.0310 units.

Regression coefficient of Advance to Total Assets (CA2) in the regression coefficient analysis is -0.0900, which indicates that if we increase advance to total assets ratio by one unit, the average influence on return on assets will decrease by 0.0900 units.

Regression coefficient of Total Investment to Total Assets ratios (AQ1) in the regression coefficient analysis is -0.0760, which indicates that if we increase total investment to total assets ratio by one unit, the average influence on return on assets will decrease by 0.0760 units.

Regression coefficient of Total loan loss provision to Total NPL ratio (AQ2) in the regression coefficient analysis is -0.1670, which indicates that if we increase total loan loss provision to total non-performing loan ratio by one unit, the average influence on return on assets will decrease by 0.1670 units.

Regression coefficient of Non-Performing Assets to Total Loans ratio (AQ3) in the regression coefficient analysis is 0.0480, which indicates that if we increase total loan loss provision to total non-performing loan ratio by one unit, the average influence on return on assets will increase by 0.0480 units.

Regression coefficient of Cost of Funds (MC1) in the regression coefficient analysis is -0.1040, which indicates that if we increase total interest expenses to total borrowing ratio by one unit, the average influence on return on assets will decrease by 0.1040 units.

Regression coefficient of staff expenses to total operating expenses (MC2) in the regression coefficient analysis is 0.0620, which indicates that if we increase staff expenses to total operating expenses ratio by one unit, the average influence on return on assets will increase by 0.0620 units.

Regression coefficient of Net Interest Margin (EQ1) in the regression coefficient analysis is 0.2630, which indicates that if we increase total net interest margin ratio by one unit, the average influence on return on assets will increase by 0.2630 units.

Regression coefficient of Operating Profit to Total Assets (EQ2) in the regression coefficient analysis is 0.7980, which indicates that if we increase total net operating profit total assets ratio by one unit, the average influence on return on assets will increase by 0.7980 units.

Regression coefficient of Liquid Assets to Total Deposit (LQ1) in the regression coefficient analysis is -0.2070, which indicates that if we liquid assets to total deposits ratio by one unit, the average influence on return on assets will decrease by 0.2070 units.

Regression coefficient of Total loans to Total Deposit (LQ2) in the regression coefficient analysis is 0.0790, which indicates that if we total loans to total deposits ratio by one unit, the average influence on return on assets will increase by 0.2070 units

For more analysis, the Durbin-Watson statistics are used and the value of 1.6170 shows that there is no autocorrelation between dependent and independent variables.

## 12. Summary of Hypothesis

The result of the impact of independent variables and dependent variable have been analyzed and the result of hypothesis testing are determined. They are summarized and shown in below table.

Table 1 *Summary of the Results of Hypothesis Testing on Return on Equity*

Hypothesis	P-value	Remarks
H0 <sub>1</sub> : There is no significant relationship between capital adequacy ratio and return on equity.	0.1810	Accept

H0 <sub>2</sub> : There is no significant relationship between Advance to Total Assets ratio and return on equity.	0.0030	Reject
H0 <sub>3</sub> : There is no significant relationship between total investment to total assets ratio and return on equity.	0.8110	Accept
H0 <sub>4</sub> : There is no significant relationship between total loan loss provision to total non-performing loans ratio and return on equity.	0.0140	Reject
H0 <sub>5</sub> : There is no significant relationship between Non-performing assets to total loans ratio and return on equity.	0.0030	Reject
H0 <sub>6</sub> : There is no significant relationship between cost of funds and return on equity.	0.5020	Accept
H0 <sub>7</sub> : There is no significant relationship between staff expenses to total operating expenses and return on equity.	0.8290	Accept
H0 <sub>8</sub> : There is no significant relationship between net interest margin and return on equity.	0.0410	Reject
H0 <sub>9</sub> : There is no significant relationship between operating profit to total assets and return on equity.	0.0030	Reject
H0 <sub>10</sub> : There is no significant relationship between liquid assets to total deposit and return on equity.	0.3060	Accept
H0 <sub>11</sub> : There is no significant relationship between total loans to total deposits and return on equity.	0.0040	Reject

Table 2: *Summary of the Results of Hypothesis Testing on Return on Assets*

Hypothesis	P-value	Remarks
H0 <sub>12</sub> : There is no significant relationship between capital adequacy ratio and return on assets.	0.7200	Accept
H0 <sub>13</sub> : There is no significant relationship between Advance to Total Assets ratio and return on assets.	0.3560	Accept

H0 <sub>14</sub> : There is no significant relationship between total investment to total assets ratio and return on assets.	0.3790	Accept
H0 <sub>15</sub> : There is no significant relationship between total loan loss provision to total non-performing loans ratio and return on assets.	0.0610	Accept
H0 <sub>16</sub> : There is no significant relationship between Non-performing assets to total loans ratio and return on assets.s	0.5600	Accept
H0 <sub>17</sub> : There is no significant relationship between cost of funds and return on assets.	0.1740	Accept
H0 <sub>18</sub> : There is no significant relationship between staff expenses to total operating expenses and return on assets.	0.4320	Accept
H0 <sub>19</sub> : There is no significant relationship between net interest margin and return on assets.	0.0100	Reject
H0 <sub>20</sub> : There is no significant relationship between operating profit to total assets and return on assets.	0.0000	Reject
H0 <sub>21</sub> : There is no significant relationship between liquid assets to total deposit and return on assets.	0.0340	Reject
H0 <sub>22</sub> : There is no significant relationship between total loans to total deposits and return on assets.	0.4850	Accept

## 12. SUMMARY AND CONCLUSION

### Summary of Major Findings

The study evaluates the performance of selected commercial banks operating in Nepal and the study uses the CAMEL framework to examine the relationship between CAMEL variables and bank performance of Nepal. The framework, known to be the best technique for evaluating bank performance.

Results from this study suggested four contributing factors for better performance of commercial banking institutions in Nepal, namely capital adequacy, asset quality, earnings quality and liquidity. Within these four factors, earning is the main contributing component for influencing directly to performance of banks.

The regression analysis of selected data of the commercial banks indicated that all components of earning quality have significant relation with both variables; return on assets and return on

equity, which suggested that net interest margin and operating profit to total assets, is important to review for maintaining performance of banks. In relation with return on assets, it observed that except earning only one components of liquidity; liquid assets to total deposit significantly influence the return on assets of the bank.

Concerning ROE, the result is different from ROA it shows significant relationship with capital adequacy (advance to assets ratio), assets quality (non-performing assets to total loans and total loan loss provision to non-performing loan) and liquidity (total loans to total deposits). It shows that various factors affects return on equity resulting better bank's performance. The change in these ratios improves the return on equity, providing more benefits to shareholders and bank's profit.

The correlation analysis of CAMEL framework with performance of bank's variables shows similar results. With similar result to regression analysis, ROA is influence by all selected components of earnings and one components of liquidity; liquid assets to total deposit and assets quality (total investment to assets ratios). The change in one percent of liquid assets to total deposit will improve the return on assets by 3.4%.

The result from the correlation of independent variables and return on equity observed to be have influence by four factors of CAMEL; assets quality, management efficiency, earnings and liquidity. The assets quality and earnings seems to have significant link with performance of banks as per the conclusion drawn.

### **Conclusion**

The result presented the entire objective, which stated in Chapter1. The main objective were to make CAMEL analysis on performance of banks. The influence of the variables of CAMEL for rating the impact on the return on assets and return on effect. The outcome of research clearly showed the factors that mainly affect the performance of banks entirely. From result we can conclude that earning quality of the banks mainly affect their performance. Other factors too have the influence for the bank's performance; capital adequacy, assets quality and liquidity other than earning.

The objective of measure bank's performance through the financial indicators of banks were conducted which stated the result of indication to those variables that actually influenced the bank's performance. The result showed that earning and liquidity positions mainly result to the high influence to return on assets while assets quality, liquidity and earning influence more to

increase return on equity. As a result that we can conclude that proper calculation and measurement of these indicator are important for maintaining bank's performance and growth.

### **Recommendations**

The study revealed that assets quality ratio, earning ability and liquidity were key factors for driving the bank's performance of commercial banks of Nepal. For the commercial banks of Nepal through this research, it is suggested that managers must pay their due attention to these factors of CAMEL model.

- Management competency was not significant as per the study and rejected the hypothesis but there is the possibility that the ratio used is not suitable for the commercial banking situation in Nepal for the period of study. The bank's performance would be impacted negatively if the operating expenses would not be covered by equity's income so, further study should use another ratio under the factor of management competency to test the best ratio in order to evaluate bank performance.
- Additionally, another factor should be considered for the next study, such as including corporate governance in the evaluation to get the various results for bank performance in Nepal. The sixth dimension of the CAMEL, sensitivity to risk is not included in this study so future researchers can also consider for their research.
- All the data used for analysis were based on secondary financial data so the future researchers can use the primary data such as interview to give more relevant perspectives to the actors of management efficiency and other financial indicators of CAMELS analysis.

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