# Role of CAMEL Indicators on Profitability of Nepalese Commercial Banks

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## Abstract

This study examines the role of CAMEL indicators on profitability of Nepalese commercial banks. Return on assets and return on equity are the selected dependent variables. The selected independent variables are capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income. The study is based on secondary data of 13 commercial banks with 117 observations for the study period from 2014/15 to 2022/23. The data were collected from Bank Supervision Report published by Nepal Rastra Bank (NRB) and annual reports of the selected commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of CAMEL indicators on profitability of Nepalese commercial banks.

The study showed that capital adequacy ratio has a positive impact on return on assets and return on equity. It indicates that increase in capital adequacy ratio leads to increase in return on assets and return on equity. Similarly, assets quality has a positive impact on return on assets and return on equity. It indicates that better the assets quality, higher would be the return on assets and return on equity. Likewise, management efficiency has a positive impact on return on assets and return on equity. It indicates that increase in management efficiency leads to increase in return on assets and return on equity. Further, earning quality has a positive impact on return on assets and return on equity. It indicates that increase in earning quality leads to increase in return on assets and return on equity. In addition, liquidity ratio has a positive impact on return on assets and return on equity. It indicates that increase in liquidity ratio leads to increase in return on assets and return on equity. Moreover, net interest income has a positive impact on return on assets and return on equity. It indicates that increase in net interest income leads to increase in return on assets and return on equity.

*Keywords:* capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio, net interest income, return on assets, return on equity

## 1. Introduction

Bank plays a crucial role in the allocation of resources. Banks helps in economic development through engaging themselves in an intermediary role which enhances investment and growth. This implies that the institutions accept saving from economy, provide loan to the parties with insufficient capital that in turn influence economic activities (Tesfaye, 2018). Banks are the most leveraged industry of any economy, so stability and soundness is an important parameter in the banking system. The main goal of banks in today's financial condition is to maintain stability and make sure that they are resistant to outer shocks while at the same time being sensible and sound from inside (Alemu, 2015). The banking sector is the driving force for a country's economy. Bank performance greatly affects the level of public trust, so it is important for banks to maintain good performance (Safitri *et al.,* 2020). Poor bank performance will lead to failure and lead to financial crises that will have negative consequences for economic development. Profit is one of the main goals of the banking industry. Performance is the company's ability to earn profits or a measure of the effectiveness of company management. A high level of performance indicate that the bank is working efficiently. A high level of performance can also illustrate that the productivity of the bank is getting better, and can show the development of the bank itself. Therefore, performance is very important both for the bank itself and for the customers (Suyono *et al.,* 2017). Similarly, Athanasoglou *et al.* (2006) stated that the banking sector acts as the life blood of modern trade and commerce to provide them with a major source of finance. This

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increasing phenomenon of globalization has made the concept of efficiency more important both for the non-financial and financial institutions and banks are the part of them. Banks largely depends on competitive marketing strategy that determines their success and growth. The modalities of the banking business have changed a lot in the new millennium compared to the way they used to be in the years bygone (Hussain and Bhatti, 2010).

Akbar (2023) examined the relationship between the profitability and the capital adequacy ratio. The study showed that capital adequacy ratio has a positive and significant influence on profitability at state-owned banks in Indonesia in the 2015-2019 period. Similarly, Sitompul and Nasution (2019) analyzed the effect of Capital Adequacy Ratio (CAR), Operational Costs on Operating Income (BOPO), Non Performing Financing (NPF) and Financing to Deposit Ratio (FDR) to Profitability with Return on Assets (ROA) in Indonesian Commercial Banks. The study concluded that capital adequacy ratio has a significant impact on return on assets of Islamic Commercial Banks in Indonesia. Likewise, Khan *et al.* (2023) assessed the internal elements affecting Pakistani Islamic banks' performance. The study stated that asset quality are found to have a positive and substantial correlation with return on assets. Further, Ikapel *et al.* (2019) investigated the financial management efficiency and financial performance of commercial banks listed on the Nairobi Securities Exchange. The result demonstrated a significant and favorable correlation between commercial banks' financial performance as measured by return on equity (ROE) and return on assets (ROA). In addition, Saleh *et al.* (2020) examined the effect of earning quality on company's performance. The study showed that the quality of earnings has a positive impact on Return on Equity (ROE), Return on Assets (ROA), and Earnings per Share (EPS). Moreover, Kusairi and Ping (2020) assessed the impact of CAMEL on bank performance in developed countries using static panel method analysis. The results indicated that capital adequacy and earning quality have positive impact on bank performance.

Thinh *et al.* (2022) examined the impact of liquidity on profitability of Vietnamese listed banks. The study found that there is a positive correlation between liquidity and profitability measured by return on assets and return on equity. Similarly, Sathyamoorthi *et al.* (2020) analyzed the liquidity management and financial performance of commercial banks in Botswana. The study showed that there is a statistically significant and positive relationships of liquid assets to total assets ratio with return on assets and return on equity. Likewise, Obadiaru and Ogunyemi (2024) investigated the effect of interest and non-interest income on the profitability of banks in Nigeria. The study found that there is a significant relationship between interest income and profitability. Setiawan and Nupus (2021) examined how the loan-to-deposit ratio and capital adequacy ratio affected the profitability of banks. The study revealed that capital adequacy ratio has a positive and significant impact on the profitability of local banks. Similarly, Ezi *et al.* (2024) assessed the impact of non-performing loans (NPL) on the return on equity (ROE) of a few Nigerian commercial banks between 2010 and 2021, with particular attention to Fidelity Bank, Union Bank, and Wema Bank Plc. The study showed that Bank Size (SIZE) has a favorable impact on the return on equity whilst non-performing loans have negative impact on profitability of banks. Likewise, Orando *et al.* (2024) assessed the impact of asset quality on Kenyan listed commercial banks' financial performance. The study revealed that assets quality has a positive impact on financial performance.

Jayaraman *et al.* (2021) analyzed the impact of financial variables on firm profitability of the selected commercial banks in Oman. The study concluded that there is a positive association between interest income and firms' profitability. Moreover, Khan *et al.*

(2020) examined the impact of net interest income on the profitability of commercial banks in South Asia. The study revealed that net interest income has a positive impact on profitability, measured by return on assets (ROA) and return on equity (ROE). Haddawee and Flayyih (2020) investigated the relationship between bank deposits and profitability for commercial banks. The study found a strong correlation between deposits and profitability measures. Similarly, Dang *et al.* (2020) analyzed the effect of earnings quality on firm value. The study indicated that earnings quality has a significant and positive relationship with business value. Likewise, Naoaj (2023) analyzed the determinants of capital adequacy in commercial banks: A study of Bangladesh's banking sector. The study revealed that capital adequacy is significantly affected by several independent variables, with leverage and liquidity risk having a negative and positive relationship, respectively. Additionally, the study found a positive correlation between real GDP and net profit and capital adequacy, while inflation has a negative correlation. Further, Mir and Shah (2022) examined the relationship between capital adequacy and the performance of a few public and private sector banks in order to determine whether or not the maintenance of capital adequacy has a distinct impact on bank performance depending on the type of bank. The study concluded that there is a significant impact of capital adequacy on performance of the banks.

Nugroho *et al.* (2021) conducted a study on the effect of loan-loss provision, non-performing loans and third-party fund on performance. The result indicated that while non-performing loans (NPLs) and third-party funds (TPF) have a minor impact on the performance of the banks, a partial loan-loss provision has no discernible impact on performance of banks. Similarly, Asare *et al.* (2021) studied the intellectual capital and asset quality in an emerging banking market. The results showed that intellectual capital generally has no effect on the asset quality of Ghanaian banks. However, the analysis showed that there is strong positive correlations between asset quality and two aspects of intellectual capital when intellectual capital is broken down into its constituent parts. Thus, the asset quality of banks is positively impacted by the efficiency of structural capital and human capital. Likewise, Syuib and Munawaroh (2024) examined financial statement analysis to evaluate the health status of Pt Bank IbK Indonesia Tbk for the 2020–2022 period, using the camel approach. The study stated that there is a favorable correlation between capital value and IBK Indonesia bank health. Further, Harsono (2024) investigated the impact of risk, management quality, company size, and bank liquidity on the financial performance of banks during the 2018-2022 period. The analysis revealed that risk, particularly credit risk, has a significant negative effect on financial performance, while management quality showed a significant positive effect. Alternatively, although company size and bank liquidity positively influenced financial performance, their impact was not statistically significant. In addition, Chaity and Islam (2022) analyzed the bank efficiency and practice of earnings management. The study demonstrated that banks in Bangladesh are less likely to engage in earnings management in accordance with corporate governance standards if their management is more effective.

Yusuf *et al.* (2021) examined the determinant of Sharia Bank's financial performance during the Covid-19 Pandemic. The study revealed that the capital adequacy ratio, operating costs to operating income, and financing to deposit ratio have positive and significant impact on financial performance as measured by return on assets. In contrast, non-performing financing exhibited a negative but insignificant impact on return on assets. Similarly, Thisaranga and Ariyasena (2021) studied the impact of CAMEL parameters on both market-based and accounting-based performance of eight publicly listed commercial banks in Sri Lanka over the period 2014 to 2019. The study showed that market-based performance is positively and significantly influenced by capital adequacy, asset quality, and liquidity, while

the other CAMEL components had minimal impact. Additionally, earning ability has a significant positive correlation with accounting-based performance, while management efficiency has a negative correlation. Likewise, Willim *et al.* (2020) examined the impact implementation of corporate governance and corporate social responsibility on corporate value in banking sector with net profit margin and management quality as moderating variables. The results of the study showed that the impact of corporate governance disclosure has a positive and significant influence on company value whereas the disclosure of corporate social responsibility implementation has no meaningful impact on firm value. Further, Imani *et al.* (2020) assessed the capital, assets, management, earnings, and liquidity (CAMEL) framework to determine the financial health of Iran's commercial and non-commercial banks. The study showed that the CAMEL model's components: capital, asset quality, management quality of public and private commercial banks and the capital adequacy ratio index are significantly correlated with corporate value.

In the context of Nepal, Tyagi and Ghimire (2023) examined the financial performance of commercial banks in Nepal. The result indicated that maintaining a robust capital foundation and high asset quality improves profitability, while effective management techniques also contribute to financial performance. Similarly, Shrestha (2023) assessed the factors that affect the profitability of Nepali commercial banks. The study demonstrated that macroeconomic and bank-specific factors are crucial in influencing profitability. In addition, the study discovered that the profitability of banks in Nepal is significantly impacted by liquidity, management efficiency, assets quality and interest rate. Likewise, Gnawali and Shrestha (2022) analyzed the camel model and financial performance of Commercial Banks in Nepal. The study revealed that capital adequacy and asset quality have strong negative impact on return on assets. However, earning ability has a large beneficial impact on return on assets. Further, Khati (2020) analyzed the impact of liquidity on profitability of Nepalese Commercial Banks. The study revealed that asset quality has a negative and significant relationship with return on assets but a positive and substantial relationship with return on equity. The study also revealed that cash deposit ratio has a positive correlation with return on assets and return on equity. In addition, Budhathoki *et al.* (2020) investigated the impact of liquidity, leverage, and total assets size of the bank on profitability. The study showed that a greater loan-to-deposit ratio (indicating inadequate liquidity) negatively impacts the bank's return on assets, return on equity and net interest margin.

The above discussion shows that empirical evidences vary greatly across the studies on the role of CAMEL indicators on the profitability of commercial banks. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The major objective of the study is to examine the role of CAMEL indicators on the profitability of Nepalese commercial banks. Specifically, it examines the relationship of capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income with profitability of Nepalese commercial banks.

The remainder of this study is organized as follows: Section two describes the sample, data and methodology. Section three presents the empirical results and the final section draws the conclusion.

## 2. Methodological aspects

The study is based on the secondary data which were collected from 13 Nepalese commercial banks from 2014/15 to 2022/23, leading to a total of 117 observations. The study employed convenience sampling method. The main sources of data collected from the Bank Supervision Report published by Nepal Rastra Bank (NRB) and annual reports of the selected commercial banks. This study is based on descriptive as well as causal comparative research designs. Table 1 shows the list of commercial banks selected for the study along with the study period and number of observations.

Table 1

**List of commercial banks selected for the study along with study period and number of observations**

| S.N. | Name of the banks | Study period | Observations |
|---|---|---|---|
| 1 | Agricultural Development Bank Limited | 2014/15-2022/23 | 9 |
| 2 | Citizen Bank International Limited | 2014/15-2022/23 | 9 |
| 3 | Everest Bank Limited | 2014/15-2022/23 | 9 |
| 4 | Himalayan Bank Limited | 2014/15-2022/23 | 9 |
| 5 | Laxmi Sunrise Bank Limited | 2014/15-2022/23 | 9 |
| 6 | Machhapuchchhre Bank Limited | 2014/15-2022/23 | 9 |
| 7 | Nepal Bank Limited | 2014/15-2022/23 | 9 |
| 8 | NMB Bank Limited | 2014/15-2022/23 | 9 |
| 9 | Prime Commercial Bank Limited | 2014/15-2022/23 | 9 |
| 10 | Rastriya Banijya Bank Limited | 2014/15-2022/23 | 9 |
| 11 | Sanima Bank Limited | 2014/15-2022/23 | 9 |
| 12 | Siddhartha Bank Limited | 2014/15-2022/23 | 9 |
| 13 | Standard Chartered Bank Nepal Limited | 2014/15-2022/23 | 9 |
| | **Total number of observations** | | **117** |

Thus, the study is based on 117 observations.

*The model*

The model used in this study assumes that profitability depend upon CAMEL indicators. The dependent variables selected for the study are return on assets and return on equity. Similarly, the selected independent variables are capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity and net interest income. Therefore, the models take the following forms:

$ROA = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 ME + \beta_4 EQ + \beta_5 LIQ + \beta_6 NII + e_{it}$
$ROE = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 ME + \beta_4 EQ + \beta_5 LIQ + \beta_6 NII + e_{it}$
Where,
ROA = Return on assets as measured by the ratio of net income to total assets, in percentage.
ROE = Return on equity as measured by the ratio of net income to total equity, in percentage.
CAR = Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage.
AQ = Assets quality as measured by the ratio of total non-performing loan by total loan, in percentage.
ME = Management efficiency as measured by the ratio of operating expenses to operating income, in percentage.
EQ = Earning quality is measured as earning per share, in rupees.
LIQ = Liquidity ratio as measured by the ratio of liquid assets to total assets, in percentage.
NII = Net interest income is measured as the total amount earned in a year, Rs. in million.

The following section describes the independent variables used in this study along with hypothesis formulation.

*Capital adequacy ratio*

Capital adequacy ratio is a measure of a bank's financial strength, expressed as a percentage of its risk-weighted credit exposures. It is used to ensure that a bank has enough capital to absorb potential losses, maintain stability, and protect depositors. Akbar (2023) examined the relationship between the profitability and the capital adequacy ratio. The study showed that capital adequacy ratio has a positive and significant impact on profitability. Similarly, Sitompul and Nasution (2019) analyzed the effect of capital adequacy ratio, operational costs on operating income, non-performing financing and financing to deposit ratio to profitability measured by return on assets in Indonesian Commercial Banks. The study concluded that capital adequacy ratio has a significant impact on return on assets. Based on it, this study develops the following hypothesis:

$H_1$: There is a positive relationship between capital adequacy ratio and profitability of banks.

*Assets quality*

Pradhan *et al.* (2024) examined the impact of asset quality on the financial performance of Indian commercial banks to investigate how asset quality affect the commercial banks' financial performance. The findings showed that return on equity, net income to total assets, and return on assets are all significantly predicted by underwriting standards. Net income to total assets is significantly predicted by credit risk management policies and procedures. Similarly, Orando *et al.* (2024) assessed the impact of asset quality on Kenyan listed commercial banks' financial performance. The study found that financial performance of Kenyan commercial banks are directly and significantly impacted by asset quality. Likewise, Khan *et al.* (2023) investigated the internal elements affecting Pakistani Islamic banks' performance. The study revealed that asset quality are found to have a positive and substantial correlation with return on assets. Based on it, this study develops the following hypothesis:

$H_2$: There is a positive relationship between assets quality and profitability of banks.

*Management efficiency*

Management efficiency can be defined as the effectiveness and productivity of any organization, most especially a financial institution such as a bank in utilizing resources in order for the organization to achieve its goals and objectives, enhance its profits and also foster sustainable growth in the future. Harsono (2024) investigated the impact of risk, management quality, company size, and bank liquidity on the financial performance of banks during the 2018-2022 period. The study concluded that management quality showed a significant positive impact on financial performance of banks. Similarly, Bahadori *et al.* (2020) assessed the capital, assets, management, earnings, and liquidity (CAMEL) framework to determine the financial health of Iran's commercial and non-commercial banks. The CAMEL model's components: capital, asset quality, management quality, and profitability of public and private non-commercial banks and credit institutions also showed a strong correlation with the profitability index. Likewise, Ikapel *et al.* (2019) examined the financial management efficiency and financial performance of commercial banks listed on the Nairobi Securities Exchange. The result demonstrated a significant and favorable

correlation between commercial banks' financial performance as measured by return on equity and return on assets and management efficiency. Based on it, this study develops the following hypothesis:

$H_3$: There is a positive relationship between management efficiency and profitability of banks.

*Earning quality*

Saleh *et al.* (2020) examined the effect of earning quality on company's performance. The studied showed that quality of earnings has a positive impact on return on equity, return on assets and earnings per share which are proxies of a company's performance. Similarly, Kusairi and Ping (2020) assessed the impact of CAMEL on bank performance in developed countries using static panel method analysis. The results indicated that capital adequacy and earning quality have positive impact on banks' performance. Likewise, Dang *et al.* (2020) analyzed the effect of earnings quality on firm value. The findings indicated that earnings quality has a statistically significant and positive relationship with business value. Based on it, this study develops the following hypothesis:

$H_4$: There is a positive relationship between earning quality and profitability of banks.

*Liquidity ratio*

Thinh *et al.* (2022) examined the impact of liquidity on profitability. The study showed that there is a positive correlation between liquidity and profitability measured by return on assets and return on equity. Similarly, Sathyamoorthi *et al.* (2020) analyzed the liquidity management and financial performance. The study showed a statistically significant and positive relationships for liquid assets to total assets ratio with return on assets and return on equity. Based on it, this study develops the following hypothesis:

$H_5$: There is a positive relationship between liquidity ratio and profitability of banks.

*Net interest income*

Obadiaru and Ogunyemi (2024) investigated the effect of interest and non-interest income on the profitability of banks in Nigeria. The study found that there is a significant relationship between interest income and profitability. Similarly, Jayaraman *et al.* (2021) examined the impact of financial variables on firm profitability. The study concluded that there is a positive association between interest income and firms' profitability. Likewise, Khan *et al.* (2020) investigated the impact of net interest income on the profitability of commercial banks in South Asia. The study revealed that net interest income has a positive impact on profitability measured by return on assets and return on equity. Based on it, this study develops the following hypothesis:

$H_6$: There is a positive relationship between net interest income and profitability of banks.

## 3. Results and discussion

*Descriptive statistics*

Table 2 presents the descriptive statistics of the selected dependent and independent variables during the period 2014/15 to 2022/23.

Table 2

**Descriptive statistics**

This table shows the descriptive statistics of dependent and independent variables of 13 Nepalese commercial banks for the study period of 2014/15 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net profit to total asset, in percentage) and ROE (Return on equity as measured by the ratio of net profit to total equity, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), AQ (Assets quality as measured by the ratio of total non-performing loan by total loan, in percentage), ME (Management efficiency as measured by the ratio of operating expenses to operating income, in percentage), EQ (Earning quality is measured as earning per share, in Rs.), LIQ (Liquidity ratio as measured by the ratio of liquid assets to total assets, in percentage) and NII (Net interest income is measured as the total amount earned in a year, Rs. in million).

| Variables | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| **ROA** | 0.10 | 3.22 | 1.58 | 0.55 |
| **ROE** | 3.78 | 33.11 | 14.76 | 5.17 |
| **CAR** | 7.49 | 22.99 | 13.82 | 2.49 |
| **AQ** | 0.01 | 5.35 | 1.62 | 1.36 |
| **ME** | 20.35 | 78.25 | 40.94 | 8.15 |
| **EQ** | 5.30 | 78.83 | 27.28 | 12.77 |
| **LIQ** | 6.80 | 14.42 | 10.29 | 1.95 |
| **NII** | 564 | 58687 | 4903.08 | 5549.38 |

Source: SPSS output

*Correlation analysis*

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and the results are presented in Table 3.

Table 3

**Pearson's correlation coefficients matrix**

This table shows the bivariate Pearson's correlation coefficients of dependent and independent variables of 13 Nepalese commercial banks for the study period of 2014/15 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net profit to total asset, in percentage) and ROE (Return on equity as measured by the ratio of net profit to total equity, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), AQ (Assets quality as measured by the ratio of total non-performing loan by total loan, in percentage), ME (Management efficiency as measured by the ratio of operating expenses to operating income, in percentage), EQ (Earning quality is measured as earning per share, in Rs.), LIQ (Liquidity ratio as measured by the ratio of liquid assets to total assets, in percentage) and NII (Net interest income is measured as the total amount earned in a year, Rs. in million).

| Variables | ROA | ROE | CAR | AQ | ME | EQ | LIQ | NII |
|---|---|---|---|---|---|---|---|---|
| **ROA** | 1 | | | | | | | |
| **ROE** | 0.505** | 1 | | | | | | |
| **CAR** | 0.325** | 0.146 | 1 | | | | | |
| **AQ** | 0.054 | 0.118 | -0.033 | 1 | | | | |
| **ME** | 0.211* | 0.249** | -0.090 | 0.465** | 1 | | | |
| **EQ** | 0.564** | 0.575** | 0.024 | 0.154 | -0.100 | 1 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **LIQ** | 0.041 | 0.222* | 0.296** | 0.361** | 0.306** | -0.141 | 1 | |
| **NII** | 0.238** | 0.138 | -0.010 | 0.296** | 0.098 | -0.082 | 0.068 | 1 |

Note: The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent levels respectively.

Table 3 shows that capital adequacy ratio has a positive relationship with return on assets. It indicates that increase in capital adequacy ratio leads to increase in return on assets. Similarly, there is a positive relationship between assets quality and return on assets. It indicates that higher the assets quality, higher would be the return on assets. Likewise, management efficiency has a positive relationship with return on assets. It indicates that increase in management efficiency leads to increase in return on assets. Further, there is a positive relationship between earning quality and return on assets. It indicates that increase in earning quality leads to increase in return on assets. In addition, there is a positive relationship between liquidity ratio and return on assets. It indicates that increase in liquidity ratio leads to increase in return on assets. Moreover, net interest income has a positive relationship with return on assets. It indicates that increase in net interest income leads to increase in return on assets.

Likewise, the result also shows that capital adequacy ratio has a positive relationship with return on equity. It indicates that increase in capital adequacy ratio leads to increase in return on equity. Similarly, there is a positive relationship between assets quality and return on equity. It indicates that higher the assets quality, higher would be the return on equity. Likewise, management efficiency has a positive relationship with return on equity. It indicates that increase in management efficiency leads to increase in return on equity. Further, there is a positive relationship between earning quality and return on equity. It indicates that increase in earning quality leads to increase in return on equity. In addition, there is a positive relationship between liquidity ratio and return on equity. It indicates that increase in liquidity ratio leads to increase in return on equity. Moreover, net interest income has a positive relationship with return on equity. It indicates that increase in net interest income leads to increase in return on equity.

*Regression analysis*

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and results are presented in Table 4. More specifically, it shows the regression results of capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income with return on assets of Nepalese commercial banks.

Table 4

**Estimated regression results of capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income on return on assets of Nepalese commercial banks**

The results are based on panel data of 13 commercial banks with 117 observations for the period of 2014/15-2022/23 by using the linear regression model and the model is $ROA = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 ME + \beta_4 EQ + \beta_5 LIQ + \beta_6 NII + e_{it}$ where, the dependent variable is ROA (Return on assets as measured by the ratio of net profit to total asset, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), AQ (Assets quality as measured by the ratio of total non-performing loan by total loan, in percentage), ME (Management efficiency as measured by the ratio of operating expenses to operating income, in percentage), EQ (Earning quality is measured as earning per

share, in Rs.), LIQ (Liquidity ratio as measured by the ratio of liquid assets to total assets, in percentage) and NII (Net interest income is measured as the total amount earned in a year, Rs. in million).

| Models | Intercepts | Regression coefficients of | | | | | | Adj. $R\_bar^2$ | SEE | F-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CAR | AQ | ME | EQ | LIQ | NII | | | |
| 1 | 0.579 | 0.072 | | | | | | 0.098 | 0.526 | 13.595 |
| | (2.102)* | (3.687)** | | | | | | | | |
| 2 | 1.542 | | 0.022 | | | | | 0.006 | 0.556 | 4.339 |
| | (19.275)** | | (0.582) | | | | | | | |
| 3 | 2.165 | | | 0.014 | | | | 0.036 | 0.544 | 5.350 |
| | (8.365)** | | | (2.313)* | | | | | | |
| 4 | 0.91 | | | | 0.025 | | | 0.313 | 0.459 | 53.750 |
| | (9.043)** | | | | (7.332)** | | | | | |
| 5 | 1.457 | | | | | 0.012 | | 0.007 | 0.556 | 5.196 |
| | (5.245)** | | | | | (0.443) | | | | |
| 6 | 1.694 | | | | | | 2.378 | 0.048 | 0.541 | 6.192 |
| | (25.354)** | | | | | | (2.629)** | | | |
| 7 | 0.529 | 0.073 | 0.026 | | | | | 0.094 | 0.528 | 7.041 |
| | (1.864) | (3.702)** | (0.736) | | | | | | | |
| 8 | 1.266 | 0.068 | 0.078 | 0.019 | | | | 0.145 | 0.512 | 7.583 |
| | (3.320)** | (3.564)** | (1.969)* | (2.979)** | | | | | | |
| 9 | 0.432 | 0.067 | 0.022 | 0.110 | 0.23 | | | 0.414 | 0.424 | 21.050 |
| | (1.256) | (4.206)** | (0.665) | (1.900) | (7.268)** | | | | | |
| 10 | 0.307 | 0.061 | 0.012 | 0.012 | 0.024 | 0.022 | | 0.413 | 0.425 | 17.353 |
| | (0.857) | (3.588)** | (0.339) | (2.030)* | (7.300)** | (0.931) | | | | |
| 11 | 0.473 | 0.062 | 0.045 | 0.013 | 0.022 | 0.018 | 2.12 | 0.45 | 0.411 | 16.830 |
| | (1.343) | (3.772)** | (1.247) | (2.274)* | (6.987)** | (0.756) | (2.902)** | | | |

Notes:

i. Figures in parenthesis are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Return on assets is the dependent variable.

Table 4 shows that the beta coefficients for capital adequacy ratio are positive with return on assets. It indicates that capital adequacy ratio has a positive impact on return on assets. This finding is similar to the findings of Akbar (2023). Similarly, the beta coefficients for asset quality are positive with return on assets. It indicates that asset quality has a positive impact on return on assets. This finding is consistent with the findings of Orando *et al.* (2024). Likewise, the beta coefficients for management efficiency are positive with return on assets. It indicates that management efficiency has a positive impact on return on assets. This finding is similar to the findings of Harsono (2024). Further, the beta coefficients for earnings quality are positive with return on assets. It indicates that earning quality has a positive impact on return on assets. This finding is consistent with the findings of Saleh *et al.* (2020). In addition, the beta coefficients for liquidity ratio are positive with return on assets. It indicates that liquidity ratio has a positive impact on return on assets. This finding is consistent with the findings of Thinh *et al.* (2022). Moreover, the beta coefficients for net interest income are positive with return on assets. It indicates that net interest income has a positive impact on return on assets. This finding is similar to the findings of Jayaraman *et al.* (2021).

Table 5 shows the regression results of capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income on return on equity of Nepalese commercial banks.

Table 5

**Estimated regression results of capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income on return on equity of Nepalese commercial banks**

The results are based on panel data of 13 commercial banks with 117 observations for the period of 2014/15-2022/23 by using the linear regression model and the model is $ROE = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 ME + \beta_4 EQ + \beta_5 LIQ + \beta_6 NII + e_{it}$ where, the dependent variable is ROE (Return on equity as measured by the ratio of net profit to total equity, in percentage). The independent variables are CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), AQ (Assets quality as measured by the ratio of total non-performing loan by total loan, in percentage), ME (Management efficiency as measured by the ratio of operating expenses to operating income, in percentage), EQ (Earning quality is measured as earning per share, in Rs.), LIQ (Liquidity ratio as measured by the ratio of liquid assets to total assets, in percentage) and NII (Net interest income is measured as the total amount earned in a year, Rs. in million).

| Models | Intercepts | Regression coefficients of | | | | | | Adj. $R\_bar^2$ | SEE | F-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CAR | AQ | ME | EQ | LIQ | NII | | | |
| 1 | 18.947 | 0.303 | | | | | | 0.013 | 5.137 | 4.510 |
| | (7.054)** | (1.584) | | | | | | | | |
| 2 | 15.485 | | 0.448 | | | | | 0.005 | 5.156 | 4.632 |
| | (20.870)** | | (1.280) | | | | | | | |
| 3 | 21.215 | | | 0.158 | | | | 0.054 | 5.230 | 7.571 |
| | (8.869)** | | | (2.752)** | | | | | | |
| 4 | 8.408 | | | | 0.233 | | | 0.325 | 4.248 | 56.82 |
| | (9.044)** | | | | (7.538)** | | | | | |
| 5 | 20.82 | | | | | 0.589 | | 0.041 | 5.060 | 5.950 |
| | (8.240)** | | | | | (2.439)* | | | | |
| 6 | 15.39 | | | | | | 0.101 | 0.011 | 5.140 | 4.236 |
| | (24.210)** | | | | | | (2.629)** | | | |
| 7 | 19.822 | 0.312 | 0.467 | | | | | 0.200 | 5.120 | 4.162 |
| | (7.194)** | (1.633) | (1.340) | | | | | | | |
| 8 | 26.464 | 0.352 | 0.006 | 0.167 | | | | 0.066 | 4.996 | 4.742 |
| | (7.116)** | (1.884) | (0.017) | (2.586)** | | | | | | |
| 9 | 17.769 | 0.368 | 0.576 | 0.085 | 0.239 | | | 0.395 | 4.020 | 19.96 |
| | (5.573)** | (2.245)* | (1.817) | (1.614) | (7.907)** | | | | | |
| 10 | 17.572 | 0.378 | 0.594 | 0.087 | 0.240 | 0.038 | | 0.390 | 4.040 | 15.838 |
| | (5.151)** | (2.334)* | (1.770) | (1.612) | (7.739)** | (0.167) | | | | |
| 11 | 17.841 | 0.376 | 0.540 | 0.089 | 0.237 | 0.300 | 3.448 | 0.386 | 4.052 | 13.145 |
| | (5.143)** | (2.314)* | (1.523) | (1.634) | (7.540)** | (0.132) | (0.479) | | | |

Notes:

i. Figures in parenthesis are t-values.
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Return on equity is the dependent variable.

Table 5 shows that the beta coefficients for capital adequacy ratio are positive with return on equity. It indicates that capital adequacy ratio has a positive impact on return on equity. This finding is similar to the findings of Sitompul and Nasution (2019). Similarly, the beta coefficients for asset quality are positive with return on equity. It indicates that asset quality has a positive impact on return on equity. This finding is consistent with the findings of Khan *et al.* (2023). Likewise, the beta coefficients for management efficiency are positive with return on equity. It indicates that management efficiency has a positive impact on return on equity. This finding is similar to the findings of Ikapel *et al.* (2019). Further, the beta coefficients for earnings quality are positive with return on equity. It indicates that earning quality has a positive impact on return on equity. This finding is consistent with the findings of Kusairi and Ping (2020). In addition, the beta coefficients for liquidity ratio are positive with return on equity. It indicates that liquidity ratio has a positive impact on return on equity. This finding is similar to the findings of Sathyamoorthi *et al.* (2020). Moreover, the beta coefficients for net interest income are positive with return on equity. It indicates that net interest income has a positive impact on return on equity. This finding is consistent with the findings of Obadiaru and Ogunyemi (2024).

## 4. Summary and conclusion

Commercial banks are important financial intermediaries that play a greater role in economic development of any country. They collect funds from surplus units and provide loan to deficit units earning profit in between those function. During these activities, commercial banks carry a huge risk of loan default and difficulty in payment to depositors which may be affiliated to various factors such as instability in the government, instable economic condition or other bank related factors that may or may not be avoided. These risks may hinder the performance and ultimately the stability of banking system. Commercial banks must analyze the factors that may be associated with their performance to come up with a way to minimize the negative effects so that the overall financial system (in general) and economy (as a whole) will be stable. Bank plays a crucial role in the allocation of resources. Banks helps in economic development through engaging themselves in an intermediary role which enhances investment and growth. This implies this institutions accept saving from economy, provide loan to the parties with insufficient capital that in turn influence economic activities. Banks are the most leveraged industry of any economy, so stability and soundness is an important parameter in the banking system. The main goal of banks in today's financial condition is to maintain stability and make sure that they are resistant to outer shocks while at the same time being sensible and sound from inside. Banks play role in providing payment and settlement services which are necessary for households, business and the other financial institutions to settle day-today transactions.

This study attempts to analyze the role of CAMEL indicators on profitability of Nepalese commercial banks. The study is based on secondary data of 13 Nepalese commercial banks with 117 observations for the period from 2014/15 to 2022/23.

The major conclusion of this study is that capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income have positive impact on return on assets and return on equity. It indicates that increase in capital adequacy ratio, assets quality, management efficiency, earning quality, liquidity ratio and net interest income leads to increase in return on assets and return on equity. Similarly, the study also concluded that earning quality followed by capital adequacy ratio is the most influencing factor that explains the changes in the return on asset in the context of Nepalese commercial banks. Likewise, the study also concluded that earning quality followed by management efficiency is the most influencing factor that explains the changes in return on equity in the context of Nepalese commercial banks.

## References

Akbar, M., 2023. Analysis of the effect of capital adequacy ratio, non-performing loan and operating cost operating income, net interest margin to loan to deposit ratio of State-Owned Banks in Indonesia. *Journal of Social Research* 2(5), 1591-1607.

Alemu, D., 2015. Assessment of banking performance using capital adequacy in Ethiopia. *Economics* 4(6), 106-111.

Asare, N., M. M. Laryea, J. M. Onumah, and M. E. Asamoah, 2021. Intellectual capital and asset quality in an emerging banking market. *Asian Journal of Accounting Research* 6(1), 55-68.

Athanasoglou, P., M., Delis, and C. Staikouras, 2006. Determinants of financial performance in the South Eastern European region. *Munich Personal RePEc Archive* 1(1), 1-31.

Bahadori, M., G. Talebnia, and Z. Imani, 2020. A study of the financial soundness of banks in the framework of camel model (capital, assets, management, earnings and liquidity): The case study of commercial and non-commercial banks in Iran. *Academic Journal of Accounting and Economic Researches* 9(2), 64-75.

Budhathoki, P. B., C. K. Rai, K. P. Lamichhane, G. Bhattarai, and A. Rai, 2020. The impact of liquidity, leverage, and total size on banks' profitability: evidence from Nepalese commercial banks. *Journal of Economics and Business* 3(2), 545-555.

Chaity, N. S., and K. Z. Islam, 2022. Bank efficiency and practice of earnings management: a study on listed commercial banks of Bangladesh. *Asian Journal of Accounting Research* 7(2), 114-128.

Dang, H. N., T. T. C. Nguyen, and D. M. Tran, 2020. The impact of earnings quality on firm value: The case of Vietnam. *The Journal of Asian Finance, Economics and Business* 7(3), 63-72.

Ezi, C. T., O. K. Odebode, and B. O. Ishioro, 2024. Effects of non-performing loans on return on assets of selected commercial banks in Nigeria. *International Journal of Advanced Economics* 6(2), 12-25.

Gnawali, B., and R. K. Shrestha, 2022. Camel model and financial performance of commercial banks in Nepal. *SEIKO: Journal of Management and Business* 5(2), 670-680.

Haddawee, A. H., and H. H. Flayyih, 2020. The relationship between bank deposits and profitability for commercial banks. *International Journal of Innovation, Creativity and Change* 13(7), 226-234.

Harsono, I., 2024. The influence of risk, management quality, company size and bank liquidity on banking financial performance (2018-2022). *Economics Studies and Banking Journal* 1(1), 26-36.

Hussain, H. and G. A. Bhatti, 2010. Evidence on structure conduct performance hypothesis in Pakistani commercial banks. *International Journal of Business and Management* 5(9), 174-187.

Ikapel, O. F., G. S. Namusonge, and M. Sakwa, 2019. Financial management efficiency and financial performance of commercial banks listed on the Nairobi securities exchange. *International Journal of Research and Innovation in Social Science* 3(10), 2454-2462.

Jayaraman, G., I. Azad, and H. S. Ahmed, 2021. The impact of financial variables on firm profitability: an empirical study of commercial banks in Oman. *The Journal of Asian Finance, Economics and Business* 8(5), 885-896.

Khan, A., J. Smith, and R. Patel, 2020. The impact of Net Interest Income on the profitability of commercial banks in South Asia. *Journal of Banking and Finance* 45(2), 123-145.

Khan, S., A. Polat, and U. Bashir, 2023. Factors Affecting the Financial Performance of Islamic Banks in Pakistan. *FWU Journal of Social Sciences* 17(1), 62-76.

Khati, P., 2020. Impact of liquidity on profitability of Nepalese commercial banks. *IOSR Journal of Economics and Finance* 11(5), 26-33.

Kusairi, S., and K. G. Ping, 2020. Analysis of CAMEL components and commercial bank performance: panel data analysis. *Jurnal Organisasi Dan Manajemen* 16(1), 1-10.

Mir, S. M., and F. A. Shah, 2022. Does capital adequacy affect bank performance? A comparative study of select public and private sector banks in India. *DLSU Business and Economics Review* 31(2), 34-52.

Naoaj, M. S., 2023. Exploring the determinants of capital adequacy in commercial banks: a study of Bangladesh's banking sector. *European Journal of Business and Management Research* 8(2), 108-112.

Nugroho, M., D. Arif, and A. Halik, 2021. The effect of loan-loss provision, non-performing loans and third-party fund on capital adequacy ratio. *Accounting* 7(4), 943-950.

Obadiaru, E. D., and A. E. Ogunyemi, 2024. The effect of interest and non-interest income on the profitability of banks in Nigeria. *International Journal of Research Publication and Reviews* 5(2), 317-322.

Orando, N. O., A. Nyangau, and A. Maobe, 2024. Effect of asset quality on financial performance of listed commercial banks in Kenya. *International Academic Journal of Economics and Finance* 4(1), 404-419.

.

Pradhan, P., P. Jha, P. Sah, and R. B. Magar, 2024. Impact of corporate governance and timeliness of financial reporting on the performance of Nepalese commercial banks. *Nepalese Journal of Business* 11(2), 48-65.

Safitri, K. Y. D., I. M. Mertha, N. G. P. Wirawati, and A. A. Dewi, 2020. The impacts of debt to equity ratio, price earnings ratio, earning per share to the stock price on banking sectors listed in infobank15 Index 2014-2018. *American Journal of Humanities and Social Sciences Research* 4(5), 49-56.

Saleh, I., M. Abu Afifa, and F. Alsufy, 2020. Does earnings quality affect companies' performance? New evidence from the Jordanian market. *The Journal of Asian Finance, Economics and Business* 7(11), 33-43.

Sathyamoorthi, C. R., M. Mapharing, and M. Dzimiri, 2020. Liquidity management and financial performance: Evidence from commercial banks in Botswana. *International Journal of Financial Research* 11(5), 399-413.

Setiawan, Y., M. Mulyadi, and M. Nupus, 2021. The effect of capital adequacy ratio and loan to deposit ratio on banking profitability. *Bina Bangsa International Journal of Business and Management* 1(1), 79-89.

Shrestha, P. M., 2023. Examining the factors affecting the profitability of commercial banks. *Journal of Mathematics Instruction, Social Research and Opinion* 2(2), 105-114.

Sitompul, S., and S. K. Nasution, 2019. The effect of CAR, BOPO, NPF, and FDR on profitability of sharia commercial banks in Indonesia. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences* 2(3), 234-238.

Suyono, C., S. Teddy, and J. Irawati, 2017. Analisis Faktor yang Mempengaruhi Profitabilitas Perbankan (Sudi Bank Umum di Indonesia Period 2006-2010). *Procuratio* 5(2), 262-275.

Syuib, M. S., and L. Munawaroh, 2024. Financial statement analysis using camel method to assess health level at pt. bank IBK Indonesia TBK period 2020-2022. *Jurnal Ekonomi* 13(01), 167-183.

Tesfaye, T. T., 2018. Analysis of factors affecting financial performance evidence from selected Ethiopian insurance companies. *International Journal of Science and Research* 7(12), 834-852.

Thinh, T. Q., L. X. Thuy, and D. A. Tuan, 2022. The impact of liquidity on profitability-Evidence of Vietnamese listed commercial banks. *Banks and Bank Systems* 17(1), 94-103.

Thisaranga, K. D. I. U., and D. L. M. N. K. Ariyasena, 2021. Effect of camel model on bank performance: with special reference to listed commercial banks in Sri Lanka. *ICBR*, 188-213.

Tyagi, V., and S. Ghimire, 2023. Financial performance of commercial banks in Nepal. *International Journal of Business and Social Development* 1(2), 1-16.

Willim, A. P., A. Lako, and W. Wendy, 2020. Analysis of impact implementation of corporate governance and corporate social responsibility on corporate value in banking sector with net profit margin and management quality as moderating variables. *International Journal of Multicultural and Multireligious Understanding* 7(4), 116-124.