

Does CAMEL affect financial performance of banks in emerging economy? From post IFRS adoption audited financial statement.

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Research

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Abstract

To sustain the development of the economy, the performance and health of banks has to be patterned and assessed periodically. This study aimed to examine the impact of CAMEL components on banks performance in Ethiopia. The distinctive feature of this study is use of data that is from post IFRS adoption audited financial statement and it ensure the reliability and accuracy of data. From total 22 banks, 13 were taken as sample of the study based on availability and accessibility of their data for the period 2018 to 2021 which is post IFRS adoption. Ordinary least square regression with their assumption has been employed to investigate the level of impact of independent variables (Capital adequacy, Assets quality, Management Efficiency, Earnings ability and Liquidity) on the dependent variable (ROA & ROE). The study found that Capital adequacy, Asset quality and management efficiency have statistically significant effect on performance measured by ROA and ROE. Earning ability and Liquidity has no significant effect on performance measured by ROA and ROE. So it is advisable for banks to give their attention to Capital adequacy, Asset quality and management efficiency to improve their performance

1. Introduction

Banks play a great role in economy of a country since it serve as an intermediaries between fund seekers and those having surplus fund. Primary function of the banks is connecting the surpluses arising in the economy into deficit units in the economy. This central function has been endangered due to the rising level of loan defaults. A developing economy cannot survive without a successful banking system since the healthiness of the banking system in any country reflects the healthiness of the country's economy (Kwadwo, 2019). They are known worldwide as drivers of economic growth and job creation, in so doing contribute towards mitigation of poverty. This shows that commercial banks are keys to economic growth and are expected to be stable and financially sound (Ashenafi, 2020). Therefore it is essential to measure the financial performance of the commercial banks, reflect on their performance and determine factor those affects their performance.

To sustain the development of the economy, the performance and health of banks has to be patterned and assessed periodically. There are different methods used by different supervisory groups. Among those approaches, most favored factors used by the regulators and different scholars are CAMEL (capital adequacy, asset quality, management quality, earnings and liquidity) rating criterion to assess and evaluate the performance and financial soundness of the activities of the bank (Melaku and Melaku, 2017).

The term CAMELS is an acronym, which is made up of the following elements: Capital adequacy, Assets quality, Management Efficiency, Earnings ability, Liquidity, Sensitivity (sensitivity to market risk especially interest rate risk) (Ashenafi.2020).

Traditional technique of applying financial ratios to appraise banks performance has been long experienced, with practitioners using CAMELS rating to measure performance of banks'. CAMELS bank

rating is used by bank's management to evaluate financial health and performance (Malihe, 2015).

In the continuous developments in the banking business, the safety and stability of the banking system depends on the success of banks in adopting sound and effective strategies and systems to manage their capital, management of various types of banking risks, and policies to improve the quality of assets in order to reduce the weights of their risks, and to develop accounting systems and practices of transparency and financial disclosure (Osama, Hussein and Ayad, 2021)

The rapid growth with new technology of banking sector may result in bank failure that result economic failure. This indicates the failure of banks leads to deposit withdrawals and the bank have to sell assets to threaten these withdrawals. The resulting fire sales lead to declines in asset prices, reducing the value of banks' assets. This in turn corrodes the equity base of the banks and results a solvency problem. This study aimed to determine the effect of CAMELS on performance of Ethiopian commercial banks.

2. Literatures And Hypothesis

2.1 Theoretical Literature

The banking sector in Africa is at a stimulating level of development where opportunities are increasing. Their digitization enhances customers' consciousness, invites foreign investments, contributes to financial presence, and better means of easy access to financial services. Banks have taken off in the southern and northern regions of Africa. However, the East Africa banking sector is more innovative, where people are being charmed by mobile banking usage than other technological methods that require repetitive maintenance and costs of security. East African societies favor transacting money over the telephone network. The recent global financial crisis absorbed financial institutions where banks' loans and financial assets get worse. During this period, customers took their deposits away from banks; interest rate degraded the value of securities controlled by commercial banks, which resulted in a peak of liabilities (Jean et.al 2020). The banking system is crucial to the economic development of the world. It is unbearable to visualize the commercial, industrial and agricultural development of a country with absence of a well-organized banking system. The banking area is a more complex and fastest-growing sector. Its financial success and performance are vital to depositors, employees, shareholders as well as the whole economy. Thus evaluating financial soundness and performance in the banking sector is an interesting issue (Thisaranga and Ariyasena, 2021).

Bank performance is demarcated as the key driver of profitability generated from their operations. In addition, it is the pillar and the purpose of any banking activity (Ferrouhi, 2018). A Performance measure is the specific quantitative representation of a capacity, process, or result believed relevant to the valuation of performance. Currently, the most commonly used method of evaluating the overall performance of financial institutions as proven in different literatures is CAMEL rating system (Ashenafi, 2020).

Return on assets (ROA) and return on equity (ROE) are used as performance indicators. The indicators can be briefly explained as follows: ROA is the ratio between the profit after tax to total/average assets and ROE is expressed as the ratio of profit after tax to total/average equity (Ramazan and Gulden, 2019).

In the 1940s, the number of failed U.S. banks had increased and created a sensitive insight of banks' supervisors, regulators, and stakeholders. Additionally, the 2007–2008 global financial crises have triggered both national and international economies' realization of the importance of banking performance from its activities that need supervised mechanisms. The existence of the CAMELS rating system clarifies and categorizes financial conditions of the entire banks' activities and measures the banking sector's financial performance and market discipline (Nguyen, 2021).

The camel components are described as following:

Capital adequacy is the capital predictable to sustain balance with the risks exposure of the financial institution such as market risk, credit risk and operational risk, in order protect the financial institution's debt holder and to engross the potential losses. Capital adequacy ratio consists of the types of financial capital considered as the most reliable and liquid, primarily shareholders' equity (Bishnu, 2019).

Asset Quality reflects the magnitude of credit risk prevalent in the bank due to its composition and quality of loans, advances, investments, and off-balance sheet activities. Following ratios are considered for the purpose of analysis (a) Net NPAs to Net Advances (b) Net NPAs to Total Assets (c) Total Investments to Total Assets (Fentahun and Venkateswarlu, 2019).

Management Efficiency is a basic component of the Camel model that ensures the growth of a bank. The competition in the banking sector reinforces the need to improve productivity of banks through measures which aim to reduce the operating cost and improve the profitability of the banks. The operating cost to total asset is used to evaluate the management efficiency (Kumar&Malhotra, 2017). And also it can be measured as Deposits Interest Expenses to Total Deposits (Thisaranga & Ariyasena., 2021).

Earnings: is one of the most important ratios that measure the performance of the bank. The profitability is the main objective of the banks and the prime source of increase in capital of a bank. The ratio that is used to evaluate the earnings is interest margin to gross income (Isanzu, 2016).

Liquidity ratio measures the bank's capability to meet their current obligation. Banks make money by providing fund and mobilizing deposit for creditors, thus the bank desires to be sensible to make the payment when depositors demands for. The incapability of the bank to meet the demand of depositor results the liquidity risk. So, the fund management practice should certify an institution is capable to conserve a level of liquidity adequate to meet its financial obligations in a timely and capable of quickly liquidating assets with insignificant loss (Mulalem, 2015).

2.2 Empirical Literature

Many studies were nationally and internationally conducted on effect of CAMEL on financial performance of banking sectors. Some of them were concluded as following;

Ashenafi N. (2020) examined the determinants of financial performance of private commercial banks in Ethiopia. In this study all 16 operational private commercial banks in Ethiopia are included and EPS, ROA and ROE are taken as indicator of financial performance of private commercial banks in Ethiopia. The study conducted bank specific CAMEL factors for period from 2016 to 2020 and investigate them with fixed effect balanced regression model using SPSS 20. The finding of the study reveals that financial performance is significantly affected by capital adequacy, management efficiency and liquidity position of private commercial bank. In other way the effect of asset quality and earning is weak and irrelevant. For the improvement the financial performance of private commercial banks in Ethiopia, the researcher recommends banks to have better capital adequacy, management efficiency and liquidity position.

According to Mohammed A. and Mohammed M. (2020) investigates the relationship between the financial performance of Islamic finance and economic growth in all of Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia within the endogenous growth model framework. The Applied dynamic panel system GMM is used to estimate the impact of the financial performance of Islamic finance on economic growth using quarterly data. CAMEL's system parameters were employed as variables of the financial performance of Islamic finance and gross domestic product (GDP) as a proxy of economic growth. The sample includes all Islamic banks operating in the five countries. They found that the only significant factor of the financial performance of Islamic finance, which affects the endogenous economic growth, is profitability through return on equity (ROE). And also indicates the necessity of stimulating other financial performance factors of Islamic finance to achieve a significant contribution to economic growth.

Thisaranga, K. and Ariyasena, D. (2021) studied the effect of camel model on bank performance with special reference to listed commercial banks in Sri Lanka. Secondary data was obtained and used from audited annual financial statements of the listed commercial banks. Capital Adequacy, Assets Quality, Management Efficiency, Earning ability, and Liquidity status were used to evaluate the bank performance and Return on Equity (ROE) is used as an accounting-based performance indicator as well as Tobin's Q ratio is used as a market-based performance indicator. The finding of the research indicates that Capital adequacy, Assets quality, and Liquidity status have a positive significant impact on market-based performance whereas other CAMEL indicators have an insignificant impact on market-based performance. Moreover, Management efficiency is negatively related to accounting-based performance, and earning ability is positively related to accounting-based performance at a significant level however other CAMEL indicators have an insignificant impact on the accounting-based performance of Sri Lanka commercial banks.

Jean P, et. al (2020) investigated the Camel Rating System and Financial Performance of Rwandan Commercial Banks. This study was covered 11 commercial banks operating in Rwanda and adopted secondary data published by the Central Bank of Rwanda. Descriptive research design and panel

regression were used to evaluate the correlation between the predictor and outcome variables. The findings of this study concluded that capital adequacy and asset quality are positively correlated to determine the value of financial performance. Management efficiency, earnings management and liquidity management have a negative correlation. However, capital adequacy, asset quality, management efficiency are statistically significant to predict the ROA at a 5% level. The researchers recommends that both the banks' management and financial regulatory body should work together to formulate policies that would help improving banking sector efficiency without violating the right of their clients.

Anh Huu Nguyen, Hang Thu Nguyen and Huong Thanh Pham (2020) conducted Applying the CAMEL model to assess performance of commercial banks: empirical evidence from Vietnam. In this study three econometric models were built using four CAMEL's crucial indicators as independent variables (capital adequacy, asset quality, management effectiveness, bank liquidity) and return on assets (ROA), return on equity (ROE), and net interest margin (NIM) as proxies for commercial banks' financial performance as dependent variables. They found that capital adequacy, asset quality, liquidity and management efficiency affect the performance of Vietnamese commercial banks.

Abedalfattah Zuhair Al-abedallat (2019) studied the factors affecting the performance of the Jordanian banks using camel's model. Bank performance was measured by returns on the assets, returns on equity, and net income the components of Camels model were used as independent variables. The finding of the study indicates that the Jordanian banks have Capital Adequacy Ratio above 12%, and that the Jordanian banks generally have low ratios of the return on equity and the return on the assets because of the high level of liquidity, the increased income tax in Jordan, severe reservation in fund investment, and that the commercial banks have an advantage over Islamic banks in the components of Camels model and the performance measures. The study recommended applying Camels model completely by the Central Bank to assess the performance of banks in Jordan, and to increase its attention on the performance of the Islamic banks.

Melaku Alemu and Melaku Aweke (2017) conducted their study on financial performance analysis of private commercial banks of Ethiopia: camel ratings. The study was measured the financial performance of six sampled private banks using the audited financial reports of 10 years period from 2007 to 2016. As per the merged rating of CAMEL, the finding of the study discovered that NIB bank stood on the first followed by United bank, whereas Awash bank and Bank of Abyssinia stood the least. On both panel model estimations, NIEGE, LEVRAGE, NPEP, TLBRA, TDBRA, NIITA, and LATD explanatory variables were significant in determining the profitability indicators- ROE and ROA. Asset quality indicators were insignificant in determining the profitability ratios.

Fentahun Alebachew and P. Venkateswarlu(2019) examined financial performance analysis of commercial banks in Ethiopia using camel rating. A total of 15 commercial banks whose operating year is at least five years have been selected as a sample. The study showed that the majority of banks are performing well. Specifically private commercial banks are the top five performers of which NIB ranked at the top.

Bekana Dembel (2020) evaluated causes affecting the efficiency and performance of Ethiopian commercial banks. 9 years audited financial data from 2010 to 2018 was used to analyze the effect of explanatory variables on the explained variables using explanatory research design with quantitative research approach. In this study performance of the banks was measured by ROA and efficiency ratio. Capital adequacy, management capacity, earning quality, assets quality, liquidity position, GDP and age of banks were used using different measurement techniques. Random effect GLS regression result revealed that assets quality, management capability and earning quality significantly affect the performance of the banks measured by ROA. Capital adequacy, GDP and age of the banks have no impact on the ROA. Earning quality and Management capability have positive effect on the performance of the banks.

Kwadwo Boateng (2019) investigated Credit Risk Management and Performance of Banks in Ghana using 'Camels' Rating Model Approach. A total of ten banks were selected for a seven-year period. A standard multiple regressions were employed in the study to analyses the effect the various components of the CAMELS model have on the performance of banks in Ghana. The findings of the study indicated that Earning stood out as the highly significant factor that affects the performance of banks in Ghana. Management efficiency, assets quality, capital adequacy and liquidity were equally found to be significantly affecting the performance of Ghanaian banks.

2.3 Hypothesis

This study consist the following research hypothesis;

H01: Capital adequacy has statistically significant effect on performance of the banks (ROA &ROE)

H02: Asset quality has statistically significant effect on performance of the banks (ROA &ROE)

H03: Management efficiency has statistically significant effect on performance of the banks (ROA &ROE)

H04: Earning ability has statistically significant effect on performance of the banks (ROA &ROE)

H05: Liquidity has statistically significant effect on performance of the banks (ROA &ROE)

2.3 Conceptual framework

This study was conducted to determine the effect of CAMEL components (Capital adequacy, Assets quality, Management Efficiency, Earnings ability and Liquidity) on performance of banks which is measured in terms of ROA and ROE

3. Methodology

This study was conducted the effect of CAMEL components on banks performance in Ethiopia for the period 2018 to 2021 which is post IFRS adoption. There are 22 banks those are registered by national bank of Ethiopia. Out of them banks those have available and access data for the study period were

obtained for the study. Accordingly 13 banks have been taken as sample of the study. After all necessary data has been collected descriptive statistics (minimum, maximum, mean, standard deviation of the variables) and inferential statistics were used to analyze. Then, a correlation analysis was used to analyze relationship between dependent and independent variables. Lastly, ordinary least square regression with their assumption has been employed to investigate the level of impact of independent variables on the dependent variable. Data collected from different sources was analyzed by using STATA software package.

Table 3.1
Variables codes and measurements

| Variables | Codes | Measurements | Sources |
|-----------------------|--------------|-----------------------------------|---|
| Dependent V | | | |
| Return on Asset | ROA | Net income/total asset | Ashenafi (2020), Asima (2021) Jean P, et. al (2020). |
| Return on Equity | ROE | Net income/equity | Ashenafi (2020), Asima (2021) , Thisaranga and Ariyasena (2021). |
| Independent V | | | |
| Capital adequacy | CPA | Total capital/total assets | Ashenafi (2020), Yee (2019), Melaku and Melaku (2017) |
| Asset quality | ASQ | Fixed asset/ Total assets | Melaku (2017), Fentahun and Venkateswarlu (2019) |
| Management efficiency | MGE | Interest expenses/ Deposits | Thisaranga U. & Ariyasena K., (2021) |
| Earning | EAR | Net interest income / Total Asset | Melaku and Melaku (2017) Fentahun and Venkateswarlu (2019) |
| Liquidity | LIQ | Liquid assets/total assets | Ngoboka, et. al.(2020), Rasli et.al (2020). |

Based on the nature of data, which is panel data, ordinary least square model has been used to analyze the collected data. Panel data, also known as longitudinal data, have both time series and cross-sectional dimensions. They arise when we measure the same collection of people or objects over a period of time (Brooks, 2008).

Econometrically, expressed as;

$$y_{it} = \alpha + \beta x_{it} + u_{it}$$

where y_{it} is the dependent variable, α is the intercept term, β is a $k \times 1$ vector of parameters to be estimated on the explanatory variables, x_{it} ; $t = 1, \dots, T$; $i = 1, \dots, N$.

Accordingly the following two equations were developed;

$$ROA_{it} = \beta_0 + \beta_1 CPA_{it} + \beta_2 ASQ_{it} + \beta_3 MGE_{it} + \beta_4 EAR_{it} + \beta_5 LIQ_{it} + e_{it} \dots \dots \dots 1$$

$$ROE_{it} = \beta_0 + \beta_1 CPA_{it} + \beta_2 ASQ_{it} + \beta_3 MGE_{it} + \beta_4 EAR_{it} + \beta_5 LIQ_{it} + e_{it} \dots \dots \dots 2$$

Where, β_0 is constant term, β is coefficient of explanatory variables, i represents bank, t represents time period/year and e is the combination of series data and cross sectional data error term.

4. Results And Discussions

This part contains the descriptive statistics and regression results with their necessary tests of the model, and discussions of the generated results.

4.1. Descriptive statistics

Table 4.1
Descriptive statistics of dependent and independent Variables

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------|-----|----------|-----------|----------|----------|
| ROA | 52 | .0234565 | .0062325 | .0072406 | .038399 |
| ROE | 52 | .1745503 | .0385571 | .0520148 | .2808104 |
| CPA | 52 | .1366613 | .0315956 | .0787149 | .214108 |
| ASQ | 52 | .0335994 | .0187237 | .0100245 | .0722947 |
| MGE | 52 | .0423837 | .0086 | .0244314 | .0597657 |
| EAR | 52 | .0491482 | .0076672 | .0323588 | .0662898 |
| LIQ | 52 | .3942504 | .1559658 | .0987046 | .6311076 |

According to Table 4.1 ROA had a mean value of 0.0234565 and standard deviation of 0.0062325. The minimum value and maximum value of the ratio are 0.0072406 and 0.038399 respectively. ROA ratio of above 1% is considered as good return and the finding of this study shows ROA ratio (mean) of 2.2% which is above 1%. ROE had a mean value of 0.1745503 and standard deviation of 0.0385571. The minimum value of the ratio is 0.0520148 and maximum value of the ratio is 0.2808104. The mean value

and standard deviation of CPA are 0.1366613 and 0.0315956. The minimum requirements of Banks capital adequacy is 8%. Mean of 13.66% is above minimum requirement. ASQ had a mean value of 0.0335994 and standard deviation of 0.0187237. The minimum value of the ratio is 0.0100245 and maximum value of the ratio is 0.0722947. MGE had a mean value of 0.0423837 and standard deviation of 0.0086. The minimum value and maximum value of the ratio are 0.0244314 and 0.0597657 respectively. The EAR having a mean of 0.0491482, with the minimum value is 0.0323588 and maximum is 0.0662898 while having a standard deviation of 0.0076672. The mean of LIQ is 0.3942504, it is above the regulatory requirement of 25% and standard deviation is 0.1559658 with minimum value of 0.0987046 and maximum value of 0.6311076.

4.2 Inferential statistics results

4.2.1 Hausman test

In order to identify the appropriate model either fixed effect model or random effect model for the study Hausman test was conducted.

Table 4.2
Hausman model specifications

| Model 1 | Coefficients — | | | |
|---------|----------------|-----------|---------------------|----------------------------|
| | (b) fe | (B) re | (b-B) Difference | sqrt(diag(V_bV_B)) S.E. |
| CPA | .1586578 | .1231965 | .0354613 | .0384806 |
| ASQ | -.1898736 | -.0837204 | -.1061532 | .0736093 |
| MGE | -.1241889 | -.1838794 | .0596905 | .0984649 |
| EAR | -.0558391 | -.0693419 | .0135028 | .1094721 |
| LIQ | .0053824 | -.0035913 | .0089737 | .0041397 |
| Model 2 | | | | |
| CPA | -.0084334 | -.35897 | .3505366 | .2584754 |
| ASQ | -1.19833 | -.6812562 | -.5170735 | .4960848 |
| MGE | -1.418634 | -1.711596 | .2929618 | .6549008 |
| EAR | -.5770949 | -.7898609 | .212766 | .7303356 |
| LIQ | .0317044 | -.028697 | .0604014 | .0272569 |

| Hausman test summary | | |
|---|--|-------------|
| b = consistent under Ho and Ha; obtained from xtreg | | |
| B = inconsistent under Ha, efficient under Ho; obtained from xtreg | | |
| Test Ho: difference in coefficients not systematic | | |
| | $\text{chi2}(5) = (b - B)'[(V_b - V_B)^{-1}](b - B)$ | Prob > chi2 |
| Model 1 | 10.25 | 0.0685 |
| Model 2 | 10.09 | 0.0728 |

The result of Hausman test in Table 4.2 indicates a Chi2 of 10.25 and 10.09 with probability of 0.0685 and 0.0728 for Model 1 and Model 2 respectively. According to Brooks (2008) if *p*-value for the test is greater than 1%, it indicates that the random effects model is appropriate. So for both models of this study Random Effect model is appropriate with *p*-value of 0.0685 and 0.0728 for Model 1 and Model 2 respectively which are greater than 0.001.

Table 4.3
Random Effect model regression result

| Model 1 | | | | | | |
|---|-----------|-----------|-------|---------|----------------------|-----------|
| ROA | Coef. | Std. Err. | Z | P > z | [95% Conf. Interval] | |
| CPA | .1231965 | .0291922 | 4.22 | 0.000* | .0659808 | .1804122 |
| ASQ | -.0837204 | .050417 | -1.66 | 0.097** | -.182536 | .0150952 |
| MGE | -.1838794 | .1012128 | -1.82 | 0.069** | -.3822527 | .014494 |
| EAR | -.0693419 | .1006006 | -0.69 | 0.491 | -.2665154 | .1278316 |
| LIQ | -.0035913 | .0055205 | -0.65 | 0.515 | -.0144113 | .0072288 |
| _cons | .0220506 | .0083243 | 2.65 | 0.008 | .0057353 | .0383659 |
| Model 2 | | | | | | |
| CPA | -.35897 | .209496 | -1.71 | 0.087** | -.7695746 | .0516346 |
| ASQ | -.6812562 | .3627832 | -1.88 | 0.060** | -1.392298 | .0297858 |
| MGE | -1.711596 | .7191854 | -2.38 | 0.017* | -3.121174 | -.3020186 |
| EAR | -.7898609 | .717965 | -1.10 | 0.271 | -2.197046 | .6173247 |
| LIQ | -.028697 | .0389399 | -0.74 | 0.461 | -.1050177 | .0476237 |
| _CONS | .3691752 | .0593349 | 6.22 | 0.000 | .2528809 | .4854695 |
| * Significant at 5%, Significant at **10% | | | | | | |

As per Table 4.3 Random Effect model regression result the hypothesis test results are discussed as following;

H01: Capital adequacy has statistically significant effect on performance of the banks (ROA & ROE)

H0 is accepted for both models 1&2 since CPA, measured by capital to total asset, has statistically significant effect on performance which is measured by ROA (models 1) and ROE (models 2), with p-value of 0.000 and 0.0870, and coefficient of 0.1231965 and -.35897 respectively. CPA has positive significant relationship with performance measured by ROA and negative significant relationship with performance measured by ROE. This finding is consistent with previous studies conducted by Ashenafi (2020), Boateng (2019) and Nguyen (2020).

H02: Asset quality has statistically significant effect on performance of the banks (ROA & ROE) ASQ (fixed asset to total assets) has statistically significant effect performance measured by ROA (p-value 0.097) and ROE (p-value 0.060). It has negative relationship with both ROA and ROE having

coefficient of $-.0837204$ and $-.6812562$ respectively. So H_0 was accepted. It is in line with finding of Thisaranga and Ariyasena (2021), Boateng (2019) and Bekana (2020).

H_{03} : Management efficiency has statistically significant effect on performance of the banks (ROA & ROE)

Both ROA & ROE are significantly affected by management efficiency (MGE), measured by interest expense to customer deposits, with p-value of 0.069 for ROA and 0.017 for ROE. MGE has negative relationship with ROA and ROE. H_0 should have to be accepted. This finding supported by Jean P, et. al (2020), Jaouad and Lahsen(2018) and Ashenafi (2020).

H_{04} : Earning ability has no statistically significant effect on performance of the banks (ROA & ROE)

Earning ability (EAR), net interest income to total assets, has no significant effect on performance measured by ROA and ROE. So there is no evidence to accept H_0 . This finding is the same with finding of Jean P, et. al (2020) and Ashenafi (2020).

H_{05} : Liquidity has no statistically significant effect on performance of the banks (ROA & ROE)

Liquidity (LIQ), which is measured by current asset to total assets, has no significant effect on performance measured by ROA and ROE. So there is no evidence to accept H_0 . Consistent with study conducted by Bishnu (2019).

4.2.2 Multi-collinearity

This problem occurs when the explanatory variables are very highly correlated with each other. It indicates the degree of strength of the relationship between the dependent variable and the independent variables. In an effort to analyze the nature of the correlation between the dependent and the independent variables and also to ascertain whether or not multi-collinearity exists as a result of the correlation among variables

Table 4.4
Correlation matrix

| | ROA | ROE | CPA | ASQ | MGE | EAR | LIQ |
|-----|---------|---------|---------|---------|---------|---------|--------|
| ROA | 1.0000 | | | | | | |
| ROE | 0.5187 | 1.0000 | | | | | |
| CPA | 0.6267 | -0.3131 | 1.0000 | | | | |
| ASQ | -0.4675 | -0.2218 | -0.3788 | 1.0000 | | | |
| MGE | -0.0389 | -0.4802 | 0.3375 | 0.2066 | 1.0000 | | |
| EAR | -0.2980 | -0.1286 | -0.2899 | 0.2486 | 0.1246 | 1.0000 | |
| LIQ | -0.1427 | 0.1171 | 0.0884 | -0.5223 | -0.4184 | -0.2328 | 1.0000 |

Table 4.4 shows that all correlations coefficients among the independent variables are less than 0.8; this indicates the absence of multi-collinearity problem or no evidence of presence of multi-collinearity among the independent variables.

Table 4.5
Variance inflation factor test

| Variables | VIF | | 1/VIF | |
|-----------|---------|---------|----------|----------|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| ASQ | 1.68 | 1.68 | 0.596519 | 0.596519 |
| LIQ | 1.61 | 1.61 | 0.619701 | 0.619701 |
| CPA | 1.61 | 1.61 | 0.620466 | 0.620466 |
| MGE | 1.55 | 1.55 | 0.645590 | 0.645590 |
| EAR | 1.18 | 1.18 | 0.848035 | 0.848035 |
| Mean VIF | 1.68 | 1.53 | | |

According to Table 4.8 the model has no the problem of multi-collinearity since all value of VIF are less than 10 and 1/VIF values are less than 1. This values indicates the absence of multi-collinearity.

Table 4.6
Normality (Shapiro Wilk) test

| Variable | Obs | W | V | Z | Prob > z |
|----------|-----|---------|-------|-------|----------|
| ROA_hat | 52 | 0.96972 | 1.469 | 0.822 | 0.20557 |
| ROE_hat | 52 | 0.96358 | 1.767 | 1.217 | 0.11188 |

Data follow normal distribution if the Shapiro_Wilk test probability is greater than 5%. As it is shown in Table 4.5 probability of the Shapiro_Wilk is 0.20557 for Model 1 and 0.11188 for Model 2. The results of both models are less than 0.05 and this means based on the distribution of the residuals data is normally distributed or two tests indicated the absence of non-normality.

Table 4.7
Autocorrelation (Durbin-Watson) test

| Durbin-Watson d-statistics | Model 1 | Model 2 |
|----------------------------|--------------------|--------------------|
| | (6, 52) = 1.726203 | (6, 52) = 1.684471 |

The Durbin Watson for Model 1 was 1.726203 and for Model 2 was 1.684471. For both models Durbin Watson value is in accepted range 1.5 to 2.5. This indicates there is no autocorrelation problem.

Table 4.8
Heteroskedasticity (Breusch-Pagan/Cook-Weisberg) test

| Breusch-Pagan/Cook-Weisberg test | Model 1 | | Model 2 | |
|----------------------------------|---------|-------------|---------|-------------|
| | chi2(1) | Prob > chi2 | chi2(1) | Prob > chi2 |
| | 0.02 | 0.8015 | 0.06 | 0.8953 |

The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was conducted. The test carried out on the OLS result reported a chi-square value of 0.02 and p-value of 0.8015 for Model 1 and chi-square value of 0.06 and p-value of 0.8953 for Model 2 that is not statistically significant and this reveals that there is the absence of heteroskedasticity.

5. Conclusion, Recommendation And Direction For Further Studies

5.1 Conclusion

This study aimed to investigate the impact of CAMEL components on performance of banking sector in Ethiopia for 2018–2021 time periods which after the adoption of international financial reporting system. Accordingly it consists two measurements of performance (ROA and ROE) as dependent variable and CAMEL components (capital adequacy, asset quality, management efficiency, earning ability and liquidity) as independent variables.

The regression result using random effect model generates the following findings;

Capital adequacy (CPA) has statistically significant effect on performance which is measured by ROA and ROE. CPA has positive significant relationship with performance measured by ROA and negative significant relationship with performance measured by ROE.

Asset quality (ASQ) has statistically significant effect on performance measured by ROA and ROE. It has negative relationship with both ROA and ROE.

Both ROA & ROE are significantly affected by management efficiency (MGE). MGE has negative relationship with ROA and ROE.

Earning ability (EAR), net interest income to total assets, has no significant effect on performance measured by ROA and ROE.

Liquidity (LIQ), which is measured by current asset to total assets, has no significant effect on performance measured by ROA and ROE.

5.2 Recommendation

Based findings of the study the researcher forwarded the following recommendations for banking sector;

From all five independent variables three of them (Capital adequacy (CPA), Asset quality (ASQ) and management efficiency (MGE)) were significantly affects the performance of banks in Ethiopia. So it is advisable for banks to give their attention to Capital adequacy (CPA), Asset quality (ASQ) and management efficiency (MGE) to improve their performance

5.3 Direction for future researcher

The researcher recommends further researcher to conduct their studies with related issue by adding other variables from external factors as well as internal factors and expand time period of the study to add results to previous studies and come with new findings.

Declarations

Availability of data and materials: All data has been received from annual reports of banks audited financial statement.

Competing interests: I declare that there is no conflict of interest since it is my original work

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Acknowledgements: The manuscript submitted for publication is my own original work which I agreed to publish on this journal. This work has not been submitted anywhere else. I am responsible for all material presented in the manuscript.

References

1. Al-abadallat, A. Z. (2019). The Factors Affecting the Performance of the Jordanian Banks using Camels Model. *European Journal of Scientific Research*, 152(2), 116–127
2. Alemu, M., & Aweke, M. (2017). Financial performance analysis of private commercial banks of Ethiopia: Camel ratings. *International Journal of Scientific and Research Publications*, 7(10), 367–395
3. Ali, S., A (2015). Effects of credit risk management on financial performance of the Jordanian commercial banks. *Investment Management and Financial Innovations*, 12(1–2), 338–345
4. Ashenafi, N. (2020). Determinants of Financial Performance of Private Commercial Banks in Ethiopia: CAMEL Approach. *International Journal of Research in Business and Management*, 7(4),

5. Bekana, D. (2021). Factors Affecting the Performance of Commercial Banks (A Case Study on Commercial Banks in Ethiopia): CAMEL Ratings. *Research Journal of Finance and Accounting*, 11(5), 1–11
6. Bishnu, P. (2019). Effect of Credit Risk Management on Financial Performance of Commercial Banks in Nepal. *European Journal of Accounting, Auditing and Finance Research*, 7(5), 87–103
7. Boateng, K. (2019). Credit Risk Management and Performance of Banks in Ghana: the 'Camels' Rating Model Approach. *International Journal of Business and Management Invention*, 8(2), 41–48
8. Brooks, C. (2008). *Introductory Econometrics for finance: 2nd Ed*, Cambridge
9. Fentahun, A., & Prof, V. P. (2019). Financial Performance Analysis of Commercial Banks Using Camel Rating: an Empirical Study from Ethiopia. *Journal of the Emerging Technologies and Innovative Research*, 6(3), 249–261
10. Ferrouhi, E. M. (2018). Determinants of banks' profitability and performance: An overview. *MPRA Paper*, 89470, 1–15
11. Hossain, M., Y (2022). Impact of credit risk management on financial performance: A study of commercial banks in Bangladesh. *Interdisciplinary Journal of Applied and Basic Subjects*, 2(1), 14–22
12. Isanzu, N. J. (2016). Analysis using camel model: evidence from large commercial banks in Tanzania. *International Journal of Research in Commerce & Management*, 7(1), 71–75
13. Jaouad, E., & Lahsen, O. (2018). Factors Affecting Bank Performance: Empirical Evidence from Morocco. *European Scientific Journal*, 14(14), 255–267
14. Ngoboka, J. P. H. (2020). Camel Rating System and Financial Performance of Rwandan Commercial Banks. *IOSR Journal of Economics and Finance (IOSR-JEF)*, 11(6), 01–13
15. Kumar v, & Malhotra, B. (2017). A camel Model analysis of Private Banks in India. *International Journal of Economic and Business Review*, 5(7), 87–93
16. Malihe, R. (2015). Camels' Analysis in Banking Industry. *Global Journal of Engineering Science and Research Management*, 2(11), 11–26
17. Mohammed, A., & Mohammed, M. (2020). Economic growth and financial performance of Islamic banks: a CAMELS approach. *Islamic Economic Studies*, 28(1), 47–62
18. Mulualem, M. (2015). Analyzing Financial Performance of Commercial Banks in Ethiopia: CAMEL Approach (*Master thesis*). Addis Abeba University
19. Nguyen, K. Q., T (2021). Determinants of bank performance in Vietnamese commercial banks: an application of the camels' model. *Cogent Business & Management*, 8(1), 1–36
20. Nguyen, H. T., Nguyen, H. T., & Pham, H. T. (2020). Applying the CAMEL model to assess performance of commercial banks: Empirical evidence from Vietnam. *Banks and Bank Systems*, 15(2), 177–186
21. Osama, A. J., Ayad, A. H., & Hussein, A. M. (2021). CAMELS Model and its Impact on the Evaluation of Banking Performance. *Administration and Economics Journal*, pp.533–543

22. Ramazan, E., & Gulden, P. (2019). Effect of Credit Risk on Financial Performance of Deposit Banks in Turkey. *Procedia computer science*, 158, 979–987
23. Thisaranga, U., & Ariyasena, K. (2021). Effect of Camel Model on Bank Performance: With Special Reference to Listed Commercial Banks in Sri Lanka. *International Conference on Business Research*, pp. 188–213

Figures

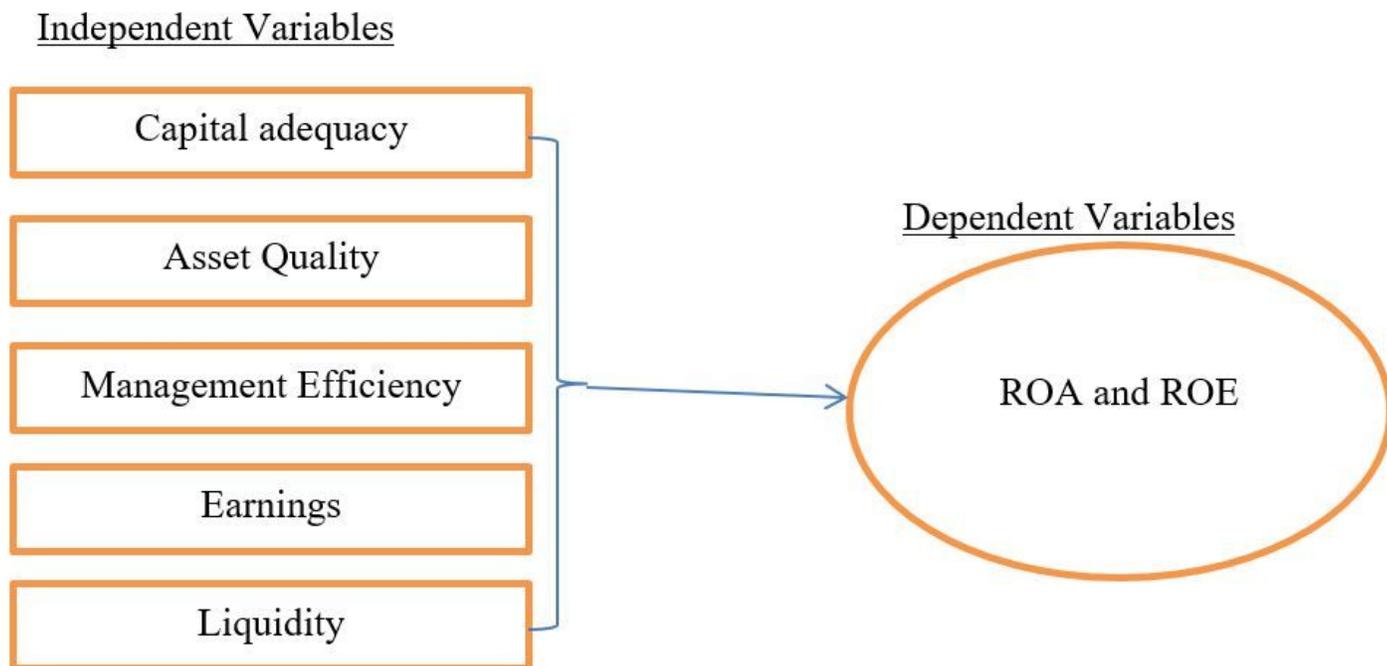


Figure 1

Conceptual framework, source: own researcher (2022)