

FACTORS INFLUENCING PROFITABILITY OF COMMERCIAL BANKS IN KENYA

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Abstract - The study examined the relationship between macroeconomic variables, bank-specific factors, and the profitability of commercial banks in Kenya. The objective was to determine how these variables interact and impact the profitability of commercial banks in Kenya. The study used return on assets as a proxy for bank profitability. Bank-specific factors include asset quality, deposits, capital adequacy, and bank size. Macroeconomic factors considered are GDP, exchange rate, and inflation rate. Panel data was collected from 31 commercial banks for the period 2014-2022. The study employed random effects, fixed effects, and pooled OLS models for analysis. The results indicate that all bank-specific factors had a statistically significant impact on return on assets, apart from capital adequacy and deposits. Among the macroeconomic variables, the exchange rate had a significant negative effect, while inflation had a significantly positive impact on bank profitability. The results, however, are restricted to the banking industry in Kenya.

Keywords: Bank-specific factors, Macroeconomic factors, ROA, Panel data.

1. Introduction

The prosperity and the growth of the financial sector are critical to the global economy as well as the individual country's economy (Raihanath & Pavithran, 2014). According to Rifat (2017), commercial banks have been instrumental in driving Kenya's financial development and economic growth by bridging the gap between savers and borrowers. This contributes to financial stability and economic growth by ensuring a smooth flow of money throughout the system (Masood & Ashraf, 2012).

The stable and efficient financial system in the country determines how well its economy performs (Ross et al., 2000). A reliable and efficient banking system must meet three goals: turn a sufficient profit, provide customers with excellent service, and have adequate cash reserves to lend to borrowers. Profit is a deciding factor necessary for any financially competitive enterprise operating at the micro level. All banks want to make enough money to stay in business, especially with the financial markets becoming increasingly competitive. A robust banking system should tolerate unfavourable external shocks and keep the bank's performance stable overall (Lee & Kim, 2013).

The factors affecting bank profitability in developed countries have been extensively researched; however, there is still a significant research gap in developing countries (Abdullah et al., 2014). Policymakers and financial institutions in this sector require a better understanding of those factors to be able to implement measures that will

improve bank performance and financial stability (Haque & Farzana, 2018). Consequently, researchers employed an array of standards to evaluate the critical factors influencing financial institutions' sustainability and stable operation (Wang et al., 2023); they determined that the organization's performance depends heavily on external and internal factors.

The banking sector in Kenya has experienced significant growth in profitability over the past nine years. However, this growth has not been evenly distributed, with larger banks significantly performing better than small and medium-sized counterparts (CBK, 2022). This difference indicates the impact of significant factors influencing bank profitability. Although previous studies, such as those by Flamini et al. (2009), highlight the role of both bank-specific and industry-related factors, their insights are primarily based on other countries data and may not fully reflect the situation in commercial banks in the context. It indicates that no local research has been conducted on the primary factors that influence Kenyan commercial bank profitability up to 2022.

This research aims to determine factors that affect the profitability of commercial banks in Kenya from 2014 to 2022. This research seeks to address the gap in the existing literature, specifically in the context of Kenya's growing economy.

This paper is structured into the following sections: The first section introduces the work, while the second section

analyses and summarizes the literature review. The study's methodology covers sample selection, data collection, model design, and econometric methods, and the third section discusses the variables that influence the profitability of Kenya's commercial banks. Regarding the study's objectives, section four discusses the data analysis and model test. Section 5 provides an explanation of the model results and the validation of the proposed hypotheses. Section 6 implication, while Section 7 presents the conclusion. The final section discusses the limitations of the study and provides suggestions for future research directions.

2. Literature Review

2.1. Empirical reviews and hypothesis development

The factors affecting a bank's profitability in different countries and regions worldwide have been the focus of many study studies. Despite being divided into three categories by the literature review, some research used a sample of several countries to analyze it empirically in a specific study. As an illustration, Masood & Ashraf (2012) and Perera & Wickramanayake (2016) examined 14 and 122 countries, respectively. Subsequently, research focused on specific regions. For instance, Petria et al. (2015) assessed the 27 EU member states, and Elisa & Guido (2016) studied Europe. Finally, researchers have only examined a single country, for instance, Abid et al. (2014) and Bougateg (2017).

However, bank performance can be replaced with other variables. Many experts acknowledge that ROA is the most significant Rashid & Jabeen, (2016). However, earlier research has reported conflicting findings examining various macroeconomic and bank-specific factors of bank profitability (Paolucci & Menicucci, 2016; Singh & Sharma, 2016).

2.1.1 Capital adequacy (CAD) and profitability of Banks

A Company has to efficiently manage its financial obligation to continue operating properly, improving its value as a whole; sufficient current assets are required (Mukumbi et al., 2020). According to Gwatinga (2020) and Gupta & Chandra(2024), selecting appropriate ratios is significant when evaluating a company's capital strength. O'Connell (2023) examined the relationship between CAD and bank profitability and also examined many factors that affected the profitability of UK commercial banks. The research discovered that research has a positive and significant relationship with the profitability of the bank. Siddique et al. (2022) noted a strong positive relationship between the two variables in South Asian countries that's CAD and ROA, and their outcomes align with those of (Doğan & Yildiz, 2023).

According to Zampara et al. (2017), there was a negative correlation between CAD and company profitability in Jordan, consistent with Akther et al. (2023). Furthermore, CAD and company profitability in Jordan and Egypt did not significantly correlate, according to studies conducted by Al-Taani (2013).

2.1.2 Assets quality (AQ) and profitability of Banks

Loans increase the generation of profit for the banks, and there are two risks: liquidity risk and credit risk. Risk management is important for banking operations because it significantly impacts the banking industry's operational effectiveness (Almaqtari et al., 2018). Many studies used bank profitability and AQ to generate a range of results; for instance, Doğan & Yildiz (2023) discovered a significant positive correlation in Turkey. While Merin (2016) determined a robust negative correlation in Ethiopia, the results are comparable to those of Abel & Le Roux(2016), who demonstrated a strong positive relationship.

2.1.3 Deposits (DEP) and Profitability of Banks

Economic theory states that there is a positive correlation between profitability and risks. Additionally, deposits are among the indicators significantly impacting a bank's capacity to generate profits. Many researchers have examined how deposits impact bank profits(Paolucci & Menicucci, 2016). Osuma et al. (2018) studied Nigerian banks and established a statistically significant positive correlation between deposits and profitability using regression analysis with pane data. Hirindu & Kushani (2017) also reveal a positive significant relationship. Nonetheless, Pelin et al. (2021) discovered a significant impact on the negative correlation between the profitability of Pakistan's commercial banks and the DEP.

2.1.4 GDP and Profitability of Banks

The wealth effect theory describes how banks' GDP growth and profitability are related. According to this theory, an increase in GDP indicates growth in the economy, which increases the market demand and drives more investment (Ozili & Ndah, 2022). Banks have been mainstream in providing funds through loans to businesses to expand their investment, which in return contributes to the growth of the banking sector (Ozili & Ndah, 2022). empirical research on GDP and bank performance has yielded inconsistent results. Sarkar & Rakshit (2023) discovered a significant relationship between bank profitability and GDP. Similarly, it has been demonstrated that there was a positive correlation between GDP and bank performance (Doğan & Yildiz, 2023). Sufian & Habibullah(2009) showed that the GDP of Bangladesh and the profitability of commercial banks are not correlated, in contrast to the findings of Almaqtari et al. (2018), who discovered significant and negative correlations.

2.1.5 Inflation rate (INF) and profitability of Banks

According to the quantity theory of money, inflation is driven by the government's disproportionate expenditure in relation to the country's production. This eventually results in a rise in the number of people with surplus income, which drives up the price of products and services and improves output. The INF has been used extensively in prior studies of bank profitability, with various levels of accomplishment (Rekik & Kalai, 2018). Using a dynamic GMM estimate, (Rashid & Jabeen, 2016) evaluated the relationships between profitability and INF in countries that are members of the Gulf Cooperation Council and discovered a significant negative relationship; the results were in line with those of (Sarkar & Rakshit, 2023).

Conversely, (Sufian & Habibullah (2009) discovered the reverse in Bangladesh, indicating that the profitability of Bangladeshi commercial banks and INF do not significantly correlate.

2.1.6 Bank Size (BS) and the profitability of banks

Masood et al. (2015) examined how bank-specific factors affect bank profitability, and the findings show that these parameters significantly increase profitability. Khizer et al. (2011) studied the commercial and private banks in Pakistan. The findings of their analysis indicate a positive correlation between a bank's asset size and profitability. Khrawish & Al-Sa'di (2011) discovered that return on assets and bank size have a significant and positive relationship.

2.1.7 Exchange rate (ER) and profitability of Banks

The purchasing power of each currency and the inflation across countries has been illustrated by the International Fisher Effect theory (Salas-Ortiz & Gomez-Monge, 2015). This theory argues that foreign currencies frequently depreciate value at high nominal interest rates because of the expected inflation they create (Madura, 2022). For instance, Rashid & Jabeen (2016) employed a technique known as dynamic GMM to determine the relationship between exchange rates and bank profitability. Similarly, the author discovered that the profits of commercial banks of Gulf Cooperation Council countries were significantly impacted by foreign exchange rates. Paolucci & Menicucci (2016) showed the significance of the foreign exchange rates positively influenced the profitability of European banks. Conversely, however, it was revealed that there is a clear and negative correlation between exchange rates and bank performance in Iran and India (Keshtgar et al., 2020; Al-Homaidi et al., 2020).

3. Methodology

3.1 Research design

The study employed a descriptive research design using balanced panel data from 31 commercial banks in Kenya over the period of nine years from 2014 to 2022. To accomplish its objective, the research depends on the secondary panel data collected from the to the annual supervisory reports from the Central Bank of Kenya and Kenya National Bureau of Statistics (KNBS) for selected banks.

3.2 Dependent variable

3.2.1 Return on Assets (ROA)

The study used ROA as a proxy for profitability. Return on assets (ROA) is the total net profit for a year divided by the total value of its assets (Table 1). A significant number of researchers have explored the profitability of the banking industry using return on assets as a dependent variable (Yüksel et al., 2018; Dsouza et al., 2022).

3.3.1 Bank-specific factors

Bank-specific factors used in this research include capital adequacy, deposit Bank Size, and asset quality.

Assets quality: Nyasaka (2017) defined asset quality as loan quality, which is the total risk related to the different assets that an individual or organization possesses. Loans increase a bank's profitability and include credit and liquidity risks. Risk management is important for banking operations since it impacts the banking industry's operational effectiveness (Al-Matari, 2021). Merin (2016) discovered that asset quality affects the performance of banks adversely.

Deposits: A bank with higher deposits has more liquidity, which reduces risk and increases profitability. Profitability and risks have a positive correlation, according to economic theory. Additionally, businesses with greater DEP levels are safe and indicate outstanding financial stability; however, sufficient deposits are required to ensure long-term sustainability in the current competitive environment. According to Paolucci & Menicucci (2016), higher DEP levels enhance bank loans and improve operational and economic performance. O'Connell (2023) found that the DEP and the performance of commercial banks have an insignificant relationship.

Capital adequacy: The ratio of equity to total assets is one measure used to evaluate capital sustainability. According to capital structures, a company must have sufficient current assets to satisfy its liabilities. As a result, the company's overall value increases, and performance remains consistent (Li et al., 2022). Assessing capital strength is an essential ratio (Gupta & Chandra, 2024). There have been conflicting findings from research regarding the relationship between firm profitability and CAD (Siddique et al., 2022) reported

that firm profitability and CAD have a positive statistically significant relationship.

Bank Size (BS):The capital strength of a bank can be determined in a given year through the natural logarithm of total assets, which refers to bank size (Durguti, 2020). Thus,

Table 1

Determinants	Variables	Measures	Notations
Dependent variable			
Profitability	Return on Asset	$ROA = \frac{Net\ Profit}{Total\ Assets}$	ROA
	Capital adequacy Ratio	$CAR = \frac{Equity}{Total\ Assets}$	CAD
Independent variable:	Bank Size	Log (Total Assets)	BS
Bank-specific factors	Deposit	$DEP = \frac{Deposit}{Total\ Assets}$	DEP
	Asset quality	$AQ = \frac{Loan}{Total\ Assets}$	AQ
Independent variable	Inflation	Annual Inflation rate	INF
Macroeconomic	Economic activity	Annual real GDP growth Rate	GDP
factors	Exchange rate	Average Exchange rate in a year	ER

Source Author 2024

3.3.2 Macroeconomic Factors

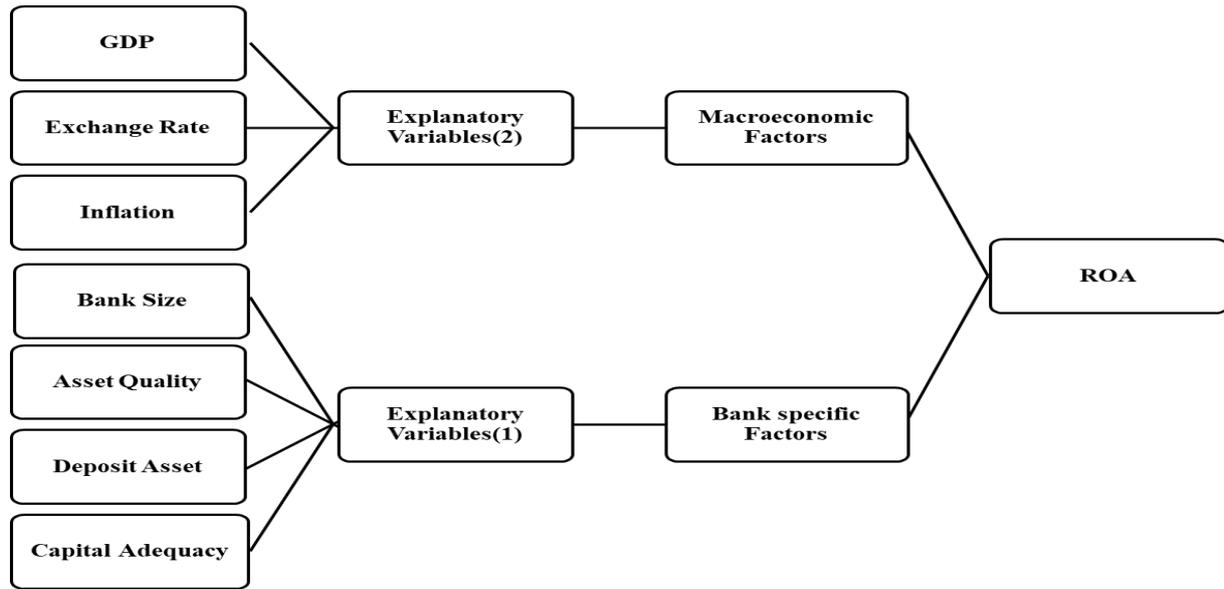
The macroeconomic variables that may impact banks' profitability are also considered in this research, including the gross domestic product, Inflation rate, and exchange rate. Macroeconomic indicator widely used to evaluate economic development is the gross domestic product. Abdilahi & Davis(2022) explains the correlation between GDP growth and bank profitability by arguing that an increase in GDP signals economic growth that results in greater aggregate demands and more investments. Wang et al. (2023) When there is an increase in investment, businesses can finance a portion of their investments with financial assistance from banks, thereby contributing to the banking industry's growth. According to the contradictory findings of empirical research, then the relationship between GDP and bank performance has been examined. For instance, the GDP and profitability of commercial banks were found to be significantly positively correlated (Sarkar & Rakshit, 2023).

A fiscal year's average exchange rate is used to calculate the exchange rate. This research utilizes the inclusion of the International Fisher Effect theory, which guarantees that the range of products and services purchased in a given country for one unit of currency is equivalent to those sold at equilibrium exchange rates. The theory captures the inflation across countries and explains the purchasing power of each currency (Salas-Ortiz & Gomez-Monge, 2015). This hypothesis states that relatively high foreign currency nominal interest rates tend to depreciate because of the expected inflation (Madura, 2022). In previous research, exchange rates have often been used to predict bank performance. Elisa & Guido(2016) discovered that the profitability of banks was strongly and significantly predicted by the foreign exchange rate., while (Almaqtari et al., 2018) found that bank performance and exchange rates had a negative statistically significant relationship.

The pattern of rising average prices for goods and services is expressed by inflation. According to (Singh & Sharma, 2016), it displays the buying power of a currency. Inflation has been frequently used in previous research on banks' profitability, with different levels of agreement reached. (Rekik & Kalai, 2018). Hammami & Smida (2022) established that there is a significant correlation between the profitability of commercial banks and Inflation.

The framework of the study.

Figure 1



Independent variables

Dependent variable

From the Figure 1 above it shows the flow of the variables that influencing the profitability of commercial banks in Kenya, where the profitability is measured using the ROA as the dependent variable and GDP, exchange Rate, Inflation, Bank size, Asset quality, Deposit asset and capital adequacy as independent variables to used to this research ,

3.4 Hypotheses

This research attempts to examine the following two hypotheses:

H₀: Bank-specific factors and macroeconomic factors have no significance in the profitability of commercial banks in Kenya.

H₁: Bank-specific factors and macroeconomic factors significantly affect the profitability of commercial banks in Kenya.

3.5 Model specification and econometric tools

Panel data regression analysis is used to assess the impact of macroeconomic variables and bank-specific factors on the profitability of banks.

This research used the following panel data model to examine the effects of various factors on bank profitability.

Regression

The panel data equation model for bank-related and macroeconomic factors

$$ROA = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \epsilon$$

Where,

X₁=Capital adequacy

X₂=Deposit

X₃=Asset quality

X₄=Exchange Rate

X₅=Bank Size

X₆=GDP

X₇=Inflation

β_i =Variables coefficients and ε= error term.

The pooled OLS, fixed effect, and random effect models employed to estimate the panel data regression model. Furthermore, Minimised collinearity across variables when bank-specific indicators are taken into account allows for a more flexible and effective examination of how macroeconomic variables impact the profitability of the banking industry (Ekinçi & Poyraz 2019).

The appropriate model will be determined by employing the Hausman test to determine the most likely model between random effect and the fixed models and detect the endogeneity with the explanatory variables. If the error terms of the panel data model and the independent variables do not correlate, the random effect model is the most suitable. The alternative hypothesis states that the fixed effects model should be used when there is a statistically significant relationship between the explanatory components and the error term in panel data. (Bell et al., 2019).

3.6 Cross-sectional dependence: The cross-sectional dependence test was employed in this study to evaluate the chance of a spillover impact (Li et al., 2022), and others all looked at how valuable the CD test was compared to other testing techniques. Furthermore, unit roots may influence panel data or time series. The stationarity of the variables was determined using the Fisher-ADF unit root test (Im et al., 2003).

3.7 Cointegration tests: The long-term relationship between the variables in this study was investigated using panel cointegration. Kao tests the alternative hypothesis with panel data that cointegration exists (Kao, 1999) when the scenario in which the cointegration vectors are homogeneous among the individuals, then the augmented Dickey-Fuller and Dickey-Fuller type tests are employed. These tests limit heterogeneity under alternative hypotheses and cannot be applied to a bivariate system where the cointegration relationship contains just one regressor.

3.8 Multicollinearity test

The regression analysis of panel data of commercial banks in Kenya was conducted after the robustness testing, and the possibility of multicollinearity was examined. The correlation between the independent variables was determined using the correlation matrix. When the correlation coefficient between two variables is closer to another one, then multicollinearity is observable. The variance inflation factor technique (VIF) is used in research to check the multicollinearity between independent variables and compare their values if they are less than 5. When the VIF value is more than number 5, then the variables are multicollinear; Therefore, the model should be removed that independent variable.

4. Data Analysis

4.1 Descriptive Analysis

Table 2 Descriptive Statistics

Variables	Obs	Mean	Median	Min	Max	Std.	Skew.	Kurt.
ROA	279	0.02	0.019	-.102	0.074	0.025	-0.817	5.332
AQ	279	0.573	0.614	.165	1.012	0.155	-0.68	2.953
CAD	279	0.219	0.194	.013	0.586	0.087	1.147	5.104
DEP	279	3.585	0.758	0.00	794.298	47.509	16.613	277
BS	279	4.758	4.734	3.677	5.987	0.572	0.214	1.943
GDP	279	0.046	0.05	-.003	0.076	0.02	-1.194	4.585
INF	279	0.063	0.063	0.047	0.08	0.011	0.1	1.88
ER	279	103.162	102	87.9	117.9	7.717	-.044	3.278

Source Stata results (2024)

The descriptive data for each variable influencing Kenyan commercial banks' profitability between 2014 and 2022 are shown in Table 2. The dependent variable ROA has a mean value of 0.02. In contrast, the independent variables are AQ, DEP, BS, CAD, GDP, INF, and ER, have mean values of 0.573, 3.585, 4.758, 0.219, 0.046, 0.063, and 103.162 with a standard deviation of 0.025, 0.155, 0.087, 47.509, 0.572, 0.02, 0.011, and 7.717 respectively.

4.2 Multicollinearity and correlation analysis

Benesty et al. (2009) state that the Pearson correlation coefficient indicates performance. The research used the correlation coefficient to determine the random relationship among a set of variables. Table 3 below shows.

Table 3 correlations

Variables	ROA	AQ	CAD	DEP	BS	GDP	INF	ER	VIF
ROA	1								
AQ	-0.119	1							1.508
CAD	0.173	-0.533	1						1.558
DEP	-0.004	-0.016	-0.008	1					1.023
BS	0.57	-0.086	-0.22	0.084	1				1.138
GDP	0.058	-0.01	0.003	0.009	-0.004	1			1.008
INFL	0.056	0.056	0.002	0.076	-0.021	0.077	1		1.036
EXH	-0.094	-0.083	-0.036	0.115	0.14	-0.026	0.128	1	1.06

Source Stata results (2024)

Table 3 excludes the possibility that the variables selected for the estimation don't have multicollinearity because the VIF less than 5.

The results show that the greatest VIF score is 1.558, indicating the absence of multicollinearity in the independent variables. Correlation results further confirm the absence of multicollinearity among the independent variables. The Independent variables and dependent variables have positive correlations with ROA, such as CAD BS, GDP, and INF, Whereas the negative correlations between ROA and DEP, ER, and AQ. Thus, the absence of multicollinearity in this study is indicated by the low correlation between the independent variables.

4.3 Model test results

Table 4 Summary of Model Results

Variable	Pooled		Fixed		Random	
	Coef.	P- Value	Coef.	p-value	Coef.	p-value
ROA						
AQ	-0.0205	0.0192**	-0.0206	0.1326	-0.0167	0.0213**
CAD	0.1101	0.0000***	0.0276	0.1868	0.0566	0.0021***
DEP	0.0000	0.3197	0.0000	0.5448	0.0000	0.4747
BS	0.0302	0.0000***	0.0221	0.0536*	0.0274	0.0000***
GDP	0.0635	0.2556	0.0644	0.1260	0.0633	0.1344
INF	0.1954	0.0633*	0.1793	0.0289**	0.1935	0.0158**
ER	-0.0006	0.0002***	-0.0005	0.0014**	-0.0006	0.0000***
Constant	-0.1178		-0.0648	0.2011	-0.0899	0.0002
R-squared	0.4716		0.3927		0.4452	
Adjusted R ²	0.4580		0.5222		0.5998	
Prob (F-statistic)	0.0000		0.0000		0.0000	
Hausman Test					0.176	

Source Author 2024

Note *, ** and *** mean significance at 10%, 5%, and 1% respectively .

Summaries of the model estimation results for the variables that possibly impacted bank profitability are displayed in Table 4. The model's adjusted R2 value, 0.5998, indicates that the factors selected can account for 59.98% of the ROA variable, while variables that were excluded from the estimation can be considered for the remaining 40.02%.

Hausman test findings show that the p-value for the models is 0.176, which is greater than the 0.05 significant reference value; thus, the random effect model is considered suitable for this research after the models' results are analyzed using the Hausman test.

4.4 Dependency test on residual cross-section

The first and most crucial diagnostic test that researchers should take into account when using panel data is cross-sectional dependency (Hoyos & Sarafidis, 2006).

Table 5 shows that, even at the 1% significance level, no cross-sectional dependency rejects the null hypothesis. This indicates that the residuals have cross-section dependence or correlation. Therefore, we proceeded with estimating techniques and testing,

considering cross-sectional dependency(Abou Elseoud et al., 2020)

Table 5 Cross-Sectional Dependency Results

Test	Statistic	d.f.	Prob.
Pesaran scaled LM	11.7738		0.0000***
Pesaran CD	14.65574		0.0000***
Breusch-Pagan LM	824.0553	465	0.0000***
Bias-corrected scaled LM	16.02		0.0000***

Source: Stata results (2024)

Note *, **, and *** indicates at 10%, 5%, and 1%, respectively, the level of significance

According to Baltagi et al. (2012), pasaran is employed in research as a measure of cross-sectional dependency. Panel unit root test employing ADF-Fisher Chi-square and PP-Fisher Chi-square for stationarity checking (Hassan et al., 2015)

4.5 Panel cointegration test

Only the cointegration of the variables allows for a long-term relationship between non-stationary variables (Bakucs & Ferto, 2011). Kao's (Baltagi et al., 2012) residual cointegration test is shown in Table 6.

Table 6 Results Summary of Cointegration.

	Statistic	p-value
ADF	-5.5784	0.0000***
Residual Variance	3.8503	0.0000***

Source Stata results (2024)

Table 6 indicates that all panels are cointegrated since the p-value is less than 0.05, rejecting the null hypothesis. Thus, it shows that the bank's profitability has been positively impacted in the long term by these factors. The findings are consistent with (Siddique et al., 2022).

4.6 Unit root test for panels

Table 7 Results of Stationarity Test

Variables	Test	Level difference		1st difference	
		Statistics	p-value	Statistic	p-value
ROA	ADF-Fisher Chi-Square	4.6193	0.0000***		
AQ		4.6653	0.0000***		
CAD		4.5413	0.0000***		
DEP		-0.9539	0.8299	9.6357	0.0000***
BS		2.245	0.0124**		
GDP		15.7703	0.0000***		
INF		-3.952	0.9995	7.8701	0.0000***
ER		-2.4311	0.9925	-3.5643	0.0000***

Source: Stata results (2024)

*, **, *** indicates at 10%, 5%, and 1%, respectively, the level of significance

ROA is stationary in the level difference for variables, as shown in Table 7. The independent variables AQ, CAD GDP, INF, and BS are stationary with respect to the level difference. Non-stationary levels of difference are limited to DEP and ER. Furthermore, in the first difference, it remains stationary. We validate that the model is statistically significant by hypothetically concluding that the panel for

the model is stationary, given the significant level difference of the dependent variable (ROA).

5. Findings and discussions

According to Table 3, the correlation analysis results show that the correlation between the independent variables is not perfect. Additionally, among the independent variables, the

VIF value is less than five. Consequently, collinearity does not affect the coefficient of variables.

The results shown in Table 4 indicate that all variables, except for DEP and GDP, affect the profitability of commercial banks significantly. The positive coefficient of the BS implies that for every percent increase in Bank size, profitability will increase by 0.0274%; this has been supported by the findings of (Abou Elseoud et al., 2020), who stated that the high bank size results in the banks to make more profits. However, some researcher's findings conflict with these results, as in the case of (Sarkar & Rakshit, 2023); research established that the bank size and exchange rate have a negative impact on the performance of commercial banks in Kenya, although the inflation rate has a positive impact. A positive regression coefficient of inflation indicates that a one percent increase in inflation leads to a 0.1935% increase in profitability. Additionally, ROA is negatively impacted by the exchange rate (coefficient of -0.0006), which means that for every unit increase in the exchange rate, the ROA will decrease by 0.0006%.

Further, ROA is significantly impacted by AQ because of its negative coefficient of AQ; an increase of one unit in AQ results in a 0.0167% decrease in ROA. The results are consistent with the conclusions (Sufian & Habibullah, 2009) that established banks become less profitable when their ER and AQ levels are higher. The results, however, conflict with those of (Ongore & Kusa, 2013), who maintained that Exchange rate and asset quality will impact banks' profitability greatly.

According to Table 7, the dependent variable (Return on Asset) and all the independent variables (CAD, BS, GDP, and AQ) are stationary at level differences except DEP, INF, and ER, which are non-stationary but are stationary in the first difference. The model can be considered statistically significant in the investigation since the ROA in the level difference is significant, suggesting that the panel is stationary.

Table 6 demonstrates that the Kao and Westerlund test significantly rejects the null hypothesis; this implies that bank-specific variables and macroeconomic variables have a long-term significant impact on the profitability of the banks and is supported by the findings of (Siddique et al., 2022).

6. Implications

The findings of this research indicate that Capital adequacy has a significant impact on the profitability of commercial banks in Kenya, and this is Comparable to the findings of (Olalere et al., 2017), which established that Capital adequacy significantly positively impacted company profitability. Nevertheless, the results are in contrast with those of (Al-Taani, 2013), who claimed that Capital adequacy did not affect bank profits.

However, (Salim & Yadav, 2012) indicated that the

profitability of banks is significantly impacted negatively by capital adequacy. Since the findings differ across the country, this implies that the findings of the regional study should be considered by bank management.

The research findings indicate that deposit has a negligible impact on bank profitability, and this is related to the results of (O'Connell, 2023), who also found the insignificant influence of deposit on bank profitability in the UK.

However, (Paolucci & Menicucci, 2016) reported that when firms with higher deposit levels are safe as they possess strong financial stability. In addition, increased deposit levels in financial institutions improve the credit services in term bank loans and improve the operations of the bank, thus resulting in financial performance. Therefore, the results vary from one country to another, which anticipates that the bank's management should depend on its internal research. Nonetheless, the results of this research demonstrate that exchange rate and asset quality significantly negatively affect bank profitability.

Kenyan commercial banks should put more emphasis on online banking than branch expansion and make full use of technology. This will guarantee that the quality of loans issued will be higher. Therefore, to reduce the amount of non-performing loans, lenders should properly evaluate the credit risk of the borrowers using modern credit risk management techniques. The results concur with the findings of (Sufian & Habibullah, 2009), who reported that banks are less profitable when their exchange rate and Asset quality are higher. Nevertheless, the results contradict the results of (Abel & Le Roux, 2016), who stated that exchange rate and Asset quality have a significant impact on the bank's profitability.

The inflation rate is among the macroeconomic variables that have been examined; thus, the results indicate that it significantly and positively affects the profitability of commercial banks in Kenya. These results are consistent with those of Jadah et al. (2020) and Hammami & Smida (2022). On the contrary, (Sarkar & Rakshit, 2023) revealed a significant negative effect; however (Ongore & Kusa, 2013) concluded that the profitability of commercial banks is insignificantly impacted by inflation. Therefore, the management of commercial banks should use more advanced technology to forecast future inflation rate trends. The research findings show that GDP growth has little effect on how well commercial banks operate. Therefore, commercial banks shouldn't take GDP growth into account when developing their investment plan. This concurs with the results of Sufian & Habibullah (2009). Whereas other research by Adewole et al. (2019) revealed a considerable positive influence, this finding contradicts that of other studies (Al-Homaidi et al., 2020); it found that GDP growth has a significant adverse effect on bank performance.

The research concludes by showing that exchange rates significantly negatively impact bank profitability. The results are integrated with the conclusion of (Almaqtari & Tabash, 2018), who stated a significant adverse effect. In contrast, (Elisa & Guido, 2016) showed that foreign currency rates considerably positively influence banks' profits. Therefore, Kenyan policymakers should be aware that a stronger foreign currency rate is related to an increase in the performance of firms. A favorable currency rate management strategy is important for the banking industry to grow and prosper.

7. Conclusions

The purpose of this research was to address the knowledge gap by comprehensively examining the variables that affect bank profitability. The research discussed and analyzed how both bank specific and macroeconomic factors impacted the profitability of banks. Despite the assumption that commercial banks will operate appropriately, the research showed that conditions were quite volatile. The study highlights the significance of strong, stable, and effective banks in promoting sustainable economic growth. Considering the currently highly competitive banking environment, such banks have an important competitive edge. This research examines the factors that affect the commercial banks profitability. The panel data regression statistical techniques were used to analyze data collected over 9 years from 31 commercial banks in Kenya. The study used the Stata version 17 software tool for the data analysis because Stata can handle large and complex datasets, especially panel data (Gjuzi, 2018). The research findings provided valuable information to commercial bank owners, policymakers, and bank managers.

The return on Assets measure was used to assess the profitability of 31 commercial banks in Kenya. The impact of macroeconomic and bank-specific factors on bank profitability has been examined from 2014 to 2022. All bank-specific factors, with the exception of deposits, were found to have significant effects on return on assets, according to the random effect model. The research found that the profitability of banks is statistically significantly affected by bank size, with a confidence level of 99% ($\alpha=0.01$). That is comparable to the results of (Al-Matari, 2021), who indicated that banks with greater bank size are more profitable. According to the current study model, Kenyan bank performance is impacted by Capital adequacy. That relates to the results of (Khan et al., 2020), who argue that Capital adequacy significantly affects a firm's profitability. The findings of this research contradict the results of (Salim & Yadav, 2012), which showed that Capital adequacy had a significant negative effect on bank profitability.

Furthermore, the research analysis shows that deposits have little effect on bank profitability. Similarly, findings were established in (O'Connell, 2023), which also found that deposits did not significantly affect UK bank profitability.

However, research results differ from those of Elisa & Guido (2016), who established that higher deposit levels could improve bank funding access and financial stability. Research shows a negative correlation between asset quality and the profitability of the bank at a 99% ($\alpha = 0.01$) confidence level. These results supported the findings of (Sufian & Habibullah, 2009), who indicated that the low profitability in banks results from higher asset quality of the banks. However, the findings of (Doğan & Yildiz, 2023) conflict with research findings, which indicate that asset quality is significantly affecting the bank's profitability.

The study reveals that INF significantly and positively impacts profitability among the macroeconomic variables at a 95% confidence level ($\alpha = 0.05$). The findings are integrated with the results (Jara-Bertin et al., 2014). Similarly, (Sufian & Habibullah, 2009) demonstrated that INF significantly and substantially affects bank performance. Ongore & Kusa (2013) showed that the profitability of commercial banks is insignificantly affected by inflation. Nonetheless, the research findings support previous studies' results that GDP has minimal impact on the commercial bank's performance (Sufian & Habibullah, 2009). Although the results of (Adewole et al., 2019) showed a considerable favourable influence, this outcome contradicts their findings. Also, the results (Almaqtari & Tabash 2018) demonstrated that GDP negatively significantly impacts the profitability of the banks.

Additionally, the research showed that fluctuation in exchange rates has a negative impact on the profitability of banks. The findings of Almaqtari et al. (2018) indicate that the exchange rate has negative effects on bank profitability. Conversely, (Rashid & Jabeen, 2016) established a positive correlation between foreign exchange rates and bank performance.

The research has contributed significantly to the study of the variables affecting Kenyan commercial banks' profitability through an analysis of macroeconomic and bank-specific factors over the short- and long-term periods.

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