



Determining the Effect of Prudential Regulations on Financial Performance of Commercial Banks in Kenya

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Commercial banks play a crucial role in the allocation and dissemination of a nation's economic resources. To maintain a sound banking sector, it is essential for these institutions to adhere to prudential regulations concerning liquidity, asset quality, and capital. The Kenyan banking sector has recently faced declining financial performance, prompting the need for further study on the impact of prudential regulations. This research aimed to determine the effect of these regulations on the financial performance of Kenyan commercial banks, focusing specifically on capital, credit, and liquidity regulations. The study examined all 41 Kenyan commercial banks from 2015 to 2021 to analyze the relationship between prudential regulations (capital, credit, and liquidity) and financial

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performance. This comprehensive coverage ensured accurate analysis, capturing the full scope of relevant data from all key players in the sector. The findings indicated that capital regulation had a positive but insignificant effect on financial performance, while credit regulation had a significant negative impact. Liquidity regulation showed an insignificant negative effect on financial performance. Moreover, interest rates were found to moderately affect the relationship between prudential regulations and financial performance, with an inverse and insignificant influence. The study recommends that commercial banks devise policies to enhance the effectiveness of capital regulations in improving financial performance.

Keywords: Financial performance; prudential regulations; capital regulation; credit regulation; interest rate.

1. INTRODUCTION

Commercial banks play a crucial role in the global economy by mobilizing and distributing scarce economic resources across various sectors [1,2]. They act as intermediaries, directing capital from surplus economic units to deficit units, ensuring the provision of capital for economic activities [3]. As a result, the soundness of the financial industry, dominated by commercial banks, is closely linked to the stability of national economies [4].

In Sub-Saharan Africa (SSA), commercial banks have consistently achieved high profitability, averaging a 2% return on assets [5]. This high profit margin is attributed to risky ventures and the significant gap between the demand and supply of financial services in the region, which has fewer banks relative to the demand for banking services [6].

Kenya's banking sector has undergone significant reforms in recent years, leading to structural changes that have attracted foreign banks to the country. These reforms, which include financial and regulatory adjustments, have enhanced the overall operational framework of the banking system (Gitonga, 2014). The regulatory framework in Kenya serves as a set of guidelines that banks must follow, with non-compliance resulting in penalties. Prudential regulations, implemented by the Central Bank of Kenya (CBK), ensure the stability of the banking sector and protect against systemic risks. Although Kenya is not a member of the Basel Committee, its prudential regulations are aligned with international standards and are periodically reviewed to address the dynamic business environment [7,8]. In conclusion, Kenya's banking sector operates under a robust regulatory framework designed to ensure financial stability and foster economic growth. The prudential regulations enforced by the CBK

are key to maintaining a sound banking system and safeguarding the interests of stakeholders.

Prudential regulations comprise a set of government instructions aimed at ensuring that the banking industry adheres strictly to established guidelines, boundaries, and requirements set by regulators. These regulations promote transparency and openness between consumers and banks, and between banks and other businesses [8,9]. The Central Bank's prudential regulations focus on three main areas: capital adequacy, credit risk, and liquidity.

Credit regulation refers to financial activities designed to maximize bank performance by reducing costs associated with cash flow volatility. Banks' risk behavior influences their risk management strategies, and robust frameworks can minimize risk exposure while enhancing performance. The Central Bank plays a role in assessing each bank's risk exposure and recommending effective procedures for identifying, measuring, monitoring, and controlling risks [10].

Capital regulation involves guidelines from the Central Bank concerning the capital levels banks must maintain relative to their risk exposure. Capital adequacy is vital for maintaining confidence in the banking sector, as it enables banks to absorb losses without facing costly liquidation [11]. It is often measured using the capital-to-deposit and capital-to-assets ratios, with the latter serving as a proxy for capital regulation. Adequate capital levels help banks manage risks associated with assets and deposits, such as deposit runs [10]. Liquidity regulation ensures that banks can meet short-term obligations by holding sufficient liquid assets. These assets should be convertible to cash without incurring significant losses, allowing banks to meet financial obligations promptly [12]. Liquidity requirements are designed to safeguard

the financial system by ensuring that banks maintain adequate levels of liquid assets to cover current and future needs [13]. In summary, prudential regulations enforced by the Central Bank of Kenya focus on ensuring that banks maintain adequate capital, manage credit risk effectively, and meet liquidity requirements to sustain a sound financial system.

Interest rates refer to the percentage that a lender charges a borrower for the use of an asset, typically expressed as the Annual Percentage Rate (APR) [14]. Interest rates can apply to various forms of borrowing, including loans for homes, vehicles, or other assets. The rate may be based on simple interest, which is typically applied to mortgages, or compound interest, where interest accumulates on the principal amount and previous interest. Essentially, the interest rate represents the cost of borrowing money [15]. The higher the interest rate, the more expensive it is for borrowers to access funds.

Interest rates play a critical role in numerous financial transactions, impacting individuals and businesses alike. Many people borrow money to acquire homes, start businesses, or fund projects, while businesses often take out loans to expand their operations or invest in long-term assets like buildings and machinery. Repayment terms vary, including installments, lump sums, or fixed schedules. From a lender's perspective, interest rates determine the return on lending, while for borrowers, they reflect the cost of debt. The rates are influenced by various factors, including economic conditions [14]. When inflation rises, banks often impose stricter lending requirements, limiting money supply and thus reducing risk for both lenders and borrowers. Higher risks for borrowers generally correspond to higher interest rates, ensuring lenders are compensated for the increased likelihood of default.

Financial performance refers to a business's ability to generate income by effectively using its assets and funds provided by shareholders. It is typically evaluated using profitability indicators, which form the basis for analyzing and interpreting financial data, offering insights into an organization's financial health. In banking, this evaluation is critical for comparing the performance of banks of different sizes and establishing benchmarks for the industry [16]. Common indicators of financial performance in banks include return on assets (ROA), return on

equity (ROE), and net interest margins (NIM). These metrics provide a comprehensive view of how efficiently a bank is using its resources to generate profits.

Return on equity (ROE) measures a bank's net income in relation to its average total equity, indicating how effectively the bank's managers are using shareholder funds to generate profits [17]. A higher ROE suggests that managers are efficiently utilizing these funds to achieve financial success. Banks with increasing ROE values are generally seen as performing well, with competent management.

Kenya's banking sector consists of the Central Bank of Kenya, which acts as the primary regulator, and 41 banking institutions, including one mortgage finance company and 40 commercial banks. In addition to these, there are eight representative offices of foreign banks, 13 licensed microfinance banks, 17 money remittance providers, three credit reference bureaus, and 77 foreign exchange bureaus. Of the 41 banks, 38 are privately owned, while three are publicly owned with the Government of Kenya holding a majority stake [18].

The Kenya Bankers Association (KBA) serves as the industry's umbrella body, representing and advocating for the interests of financial institutions. It also addresses issues affecting member institutions [8]. The banking sector is integral to the Central Bank's monetary policies, with a key role in providing credit to the public. The availability of loans and the terms of borrowing are significantly influenced by Central Bank regulations.

Prudential regulations are a crucial aspect of the banking industry, designed to protect consumers and investors while ensuring the systemic stability of the financial sector. In Kenya, commercial banks and other financial institutions are required to maintain adequate levels of liquidity, capital, and risk management to ensure their soundness. These regulations, established and enforced by the Central Bank of Kenya, aim to ensure the financial health of the country's banking institutions while fostering trust and stability within the economy. Kenya's banking industry consists of 41 institutions, including 40 commercial banks and 1 mortgage finance company, regulated by the Central Bank of Kenya (CBK). Other key players include microfinance banks, money remittance providers, credit reference bureaus, and foreign exchange bureaus. The Kenya Bankers Association (KBA)

advocates for these institutions, while CBK enforces regulations to maintain financial stability. Interest rates, influenced by CBK policies, affect lending practices and profitability. By moderating the relationship between credit provision and financial performance, interest rates highlight the impact of central banking policies on Kenya's financial outcomes.

1.1 Research Problem

The role of commercial banks is crucial to economic stability, and ensuring their soundness in terms of liquidity, asset quality, and capital is essential for their continued functionality [19]. A stable and healthy banking sector relies on effective prudential regulations, but Kenya's banking industry has experienced periods of poor financial performance. This is evidenced by the receivership and subsequent liquidation of Dubai Bank Ltd., as well as the placement of Chase Bank Ltd. and Imperial Bank Ltd. under receivership. These incidents highlighted the need for stronger regulations to safeguard the performance and resilience of banks in Kenya [1]. The failures were attributed to poor regulatory adherence, particularly in areas like liquidity transformation, capital adequacy, and provisions for non-performing loans [20].

The World Bank [21] revealed that the financial performance of Kenya's commercial banks has been deteriorating, as reflected in declining return on equity (ROE) figures. In 2012, the ROE was 21.99%, down from 23.10% in 2011, and continued to decline to 20.94% in 2013, 20.88% in 2014, and 17.39% in 2015 (World Bank, 2017). Additionally, Kenyan banks' net interest margin (NIM) decreased from 8.8% in 2016 to 7.5% in 2017. National Bank of Kenya, for example, recorded a loss of Sh.1.2 billion in 2015, compared to a profit of Sh.1.3 billion in 2014 [22]. CFC Stanbic Bank saw a reduction in profits from Ksh.5.478 billion in 2014 to Ksh.4.697 billion in 2015 (CFC annual report, 2015), while Barclays Bank of Kenya and Equity Bank of Kenya both experienced declines in profitability by 10% and 4%, respectively. Cooperative Bank of Kenya also reported a 10.4% reduction in earnings after tax in its 2017 half-year financial statements.

These indicators suggest that despite the Central Bank of Kenya's regulatory reviews aimed at addressing poor bank performance, many banks still face financial challenges. This raises the question of whether prudential regulations

effectively contribute to the financial performance of commercial banks in Kenya. Previous studies have explored the relationship between prudential regulations and bank performance. Kamande [23] found that capital levels had significant effects on financial performance and recommended processes to minimize insolvency risk. However, this study focused only on listed commercial banks in Kenya. Takon et al. [24] provided evidence that asset quality (credit risk) and profitability were significantly related, with capital ratio having a direct impact on profitability. Mutumira [25] found an insignificant relationship between asset quality and financial performance, though this study focused on the insurance sector, which is subject to different regulations.

Dembel [26] documented that credit risk and capital had a substantial effect on bank performance, but his research focused on Ethiopia, making it contextually different from Kenyan banking. The current study aimed to investigate the extent to which prudential regulations by the Central Bank of Kenya contribute to the financial performance of commercial banks. Additionally, it examined the moderating effect of interest rates on the relationship between prudential regulations and bank performance in Kenya.

1.2 Research Objective

This study was guided by the following general objective to determine the effect of prudential regulations on financial performance of commercial banks in Kenya. The specific objectives were to: To establish the effect of capital regulation on financial performance of commercial banks in Kenya, to analyze the effect of credit regulation on the financial performance of commercial banks in Kenya, to assess the effect of liquidity regulation on financial performance of commercial banks in Kenya and to investigate the moderating effect of interest rates on the relationship between prudential regulations and financial performance of commercial banks in Kenya.

1.3 Research Hypothesis (Es)

This study was guided by the following null and alternative hypothesis tested at 0.05 level of significance.

H₀₁: Capital regulation has no significant effect on financial performance of commercial banks in Kenya.

H_{A1}: Credit regulation, liquidity regulation, and interest rates have no significant effect on the financial performance of commercial banks in Kenya, with interest rates exerting no moderating effect on the relationship between prudential regulation and financial performance.

1.4 Justification of The Study

This survey's findings are relevant to several stakeholders, particularly managers of commercial banks in Kenya. It will provide documented recommendations on the relationship between prudential regulations and financial performance, aiming to enhance banking practices. Additionally, it will offer insights into how interest rates affect these relationships. Academicians and researchers will find the study valuable as a template and basis for further research within Kenya's banking sector.

2. LITERATURE REVIEW

This study reviews three key theoretical frameworks relevant to financial performance and regulation: Agency Theory, Capital Buffer Theory, and Liquidity Preference Theory.

Agency Theory, introduced by Jensen and Meckling [27], explores the dynamics between principals (owners) and agents (managers) in a firm. The theory emphasizes the contractual relationship wherein the principal hires the agent to act on their behalf. This relationship is guided by explicit or implicit contracts that dictate the responsibilities and expectations of both parties. The core of Agency Theory is the potential conflict of interest between principals and agents. Managers, who act as agents, are tasked with maximizing the wealth of the owners (principals). However, managers might prioritize their personal interests over the shareholders' interests, leading to agency problems. These problems manifest as agency costs, which are the costs associated with monitoring and ensuring that agents act in the best interests of principals. For example, managers might focus on their own remuneration and benefits rather than enhancing shareholder value, resulting in a misalignment of interests. To mitigate these issues, firms can implement various mechanisms, such as performance-based incentives for managers or threats of takeover. Understanding these dynamics is crucial for

evaluating financial performance and managing agency costs effectively.

Capital Buffer Theory, developed by Calem and Rob (1996), centers on the idea that banks maintain capital levels beyond regulatory requirements to manage risk and avoid the costs of regulatory breaches. The theory posits that banks are motivated to hold surplus capital—known as a capital buffer—to safeguard against financial shocks and ensure compliance with capital regulations. The concept of a capital buffer is integral to financial stability. It represents the excess capital held by banks over the minimum regulatory requirements, designed to absorb potential losses and prevent insolvency. This buffer helps banks navigate economic downturns and reduces the likelihood of regulatory sanctions or closure due to insufficient capital. Capital regulations aim to promote countercyclical buffers, which balance out the lending patterns of banks over economic cycles. Banks with lower capital buffers are incentivized to raise additional capital to achieve an optimal buffer level, enhancing their resilience against financial stress. Conversely, banks with higher capital buffers may strive to maintain their levels. The theory underscores the importance of capital adequacy in managing risk and sustaining financial stability.

Liquidity Preference Theory, proposed by Keynes [28], addresses the varying desires of institutions to hold liquid assets. According to this theory, liquidity preference reflects the preference for assets that can be quickly converted into cash. Cash is considered the most liquid asset, whereas other assets are less liquid and may require higher returns to compensate for their lack of liquidity.

In banking, liquidity preference influences lending and investment decisions. Banks are more likely to lend money or engage in risky investments when the expected rate of return justifies the potential risks. When returns are not attractive, banks may prefer to retain liquidity rather than investing in unviable projects. The theory links liquidity management with financial performance, suggesting that higher capital levels correlate with enhanced liquidity. This relationship helps banks maintain adequate liquidity, which is crucial for their operational stability and ability to meet financial obligations. Liquidity Preference Theory supports the connection between liquidity regulation, credit regulation, and overall financial

performance, making it relevant for analyzing how liquidity impacts banking institutions.

These theories provide a comprehensive understanding of various aspects of financial performance and regulation. Agency Theory highlights the conflicts between managers and owners and the costs of aligning interests. Capital Buffer Theory emphasizes the role of surplus capital in managing risk and ensuring compliance with regulatory standards. Liquidity Preference Theory explains how liquidity preferences influence financial decisions and performance. Together, these frameworks offer valuable insights into the mechanisms that affect financial stability and performance in banking and other financial institutions.

Molefe and Muzindutsi [9] conducted a study on capital management's impact on profitability in South African banks from 2004 to 2014. Their analysis of five banks revealed that capital adequacy significantly influenced financial soundness, recommending the establishment of robust capital management guidelines to enhance bank performance. While this research provides valuable insights into banking regulations and profitability, it is geographically limited to South Africa, necessitating similar studies in other contexts, such as Kenya.

A study by Mugo and Shiundu [29] encompassed all 42 Kenyan banks, both listed and non-listed. Kamande [23] investigated the influence of capital levels on the profitability of Kenyan banks from 2011 to 2015, using secondary panel data from 11 listed banks. The findings indicated that capital levels had a significant impact on financial performance, with Kamande recommending process improvements to mitigate insolvency risks. Unlike earlier studies, this research extended the analysis period to 2015-2020 and introduced interest rates as a moderating variable, covering all Kenyan commercial banks, not just the listed ones. Akims and Akims [5] examined the effects of prudential regulations on the profitability of Kenyan commercial banks from 2013 to 2017. Their panel regression analysis revealed that capital adequacy regulations positively influenced profitability. This study broadened the scope to include all Kenyan commercial banks, differing from previous research that focused solely on listed banks, and introduced a moderation analysis for interest rates, which had not been included in earlier studies.

Takon, Obim, and Atseye [24] examined the relationship between capital and profitability in Nigerian mega banks from 2007 to 2016. Their fixed-effects panel regression analysis indicated a significant positive relationship between capital ratios and profitability. This research, however, focused on Nigeria's top ten deposit money banks, whereas the present study centers on Kenyan commercial banks using a census approach.

Dembel [26] investigated the nexus between capital and financial performance in Ethiopian commercial banks from 2010 to 2018. Using ROA and random effects GLS methods, the study found that capital significantly influenced bank performance. This study's geographical focus on Ethiopia contrasts with the current research, which targets Kenyan banks and includes a moderation effect of interest rates.

Kiplagat and Kalui [8] evaluated prudential regulations' effects on the financial performance of Kenyan commercial banks, covering 36 out of 43 banks from 2013 to 2017. Their correlation research design and multiple regression analysis found no substantial impact of capital adequacy on financial performance. Unlike previous studies, this research utilized a census approach and provided updated evidence from 2015 to 2021, including the moderating effect of interest rates.

Gizaw, Kebede, and Selvaraj [30] explored the impact of credit risk on the profitability of Ethiopian commercial banks from 2003 to 2004. Their study, based on a sample of eight banks, revealed that effective credit risk management was linked to improved profitability. This research's focus on Ethiopian banks provides a comparative backdrop to studies conducted in Kenya. Kamande [23] examined the relationship between credit risk and financial performance in Kenyan commercial banks from 2011 to 2015. The study highlighted the significant impact of capital levels on financial performance and recommended measures to mitigate insolvency risks. This study's focus was limited to listed banks, and it did not consider interest rates' moderating effects, which are addressed in the current research. Takon et al. [24] investigated the effects of credit risk on the profitability of mega banks in Nigeria. Their panel regression analysis indicated a significant relationship between asset quality and profitability, recommending a robust customer deposit base for better financial outcomes. This study

contrasts with the current research by focusing on Nigerian mega banks rather than Kenyan commercial banks.

Mutumira [25] evaluated the nexus between credit risk and financial performance in Kenya's insurance sector from 2014 to 2018. Despite being part of the financial sector, insurance companies are regulated differently from commercial banks, which limits the direct applicability of this study's findings to the current research on Kenyan commercial banks. Dembel [26] analyzed credit risk's impact on Ethiopian banks' performance from 2010 to 2018. The study found a significant effect of credit risk on financial performance and explored interest rates' moderating effects, aligning with the current research's focus on Kenyan banks. Kiplagat and Kalui [8] investigated the relationship between credit risk management and financial performance in 36 out of 43 Kenyan commercial banks from 2013 to 2017. Their findings indicated a significant impact of credit risk management on performance, differing from previous studies by using a census approach and including interest rate moderation. Akims and Akims [5] examined prudential regulations' influence on Kenyan commercial banks' profitability from 2013 to 2017. Their study found that credit risk regulation had a significant negative impact on profitability, providing a contrast to previous research that focused solely on listed banks and used only ROA as a dependent variable.

Ibe [31] investigated liquidity management's impact on the profitability of Nigerian banks, finding that liquidity had a weak effect on profitability and highlighting poor liquidity management practices. This study's focus on Nigeria provides a comparative perspective to the current research on Kenyan banks. Faris [32] assessed liquidity control effectiveness in Jordan's Islamic banks, revealing ineffective liquidity management and its negative impact on performance. Although this study focused on Jordanian banks, it offers insights relevant to evaluating liquidity management in Kenyan banks.

Molefe and Muzindutsi [9] studied liquidity and capital management's effects on South African banks' profitability. Their research, covering five banks from 2004 to 2014, found a weak relationship between liquidity and profitability. The study recommended revising liquidity management guidelines, offering a contrast to

the current research on Kenyan banks. Akims and Akims [5] analyzed liquidity regulation's impact on the profitability of listed Kenyan commercial banks from 2013 to 2017. Their panel regression analysis found an insignificant negative effect of liquidity regulation on profitability. The study also considered both ROA and ROE as dependent variables, adding a new dimension to liquidity regulation research.

Kiplagat and Kalui [8] examined the link between liquidity management and profitability in Kenyan commercial banks, using a sample of 36 banks from 2013 to 2017. Their findings highlighted a substantial impact of liquidity management on profitability and provided updated evidence from 2015 to 2020, including the moderating effect of interest rates. Ahmed et al. [33] investigated the impact of interest rates on Pakistani banks' profitability from 2008 to 2014. Their study found that interest rates inversely affected profitability through deposits but positively influenced loans and advances. This research, conducted in Pakistan, offers comparative insights for the Kenyan context.

Osazevbaru [34] examined the effects of interest rate and exchange rate volatility on the performance of Nigerian SMEs from 1981 to 2018. The study found a positive correlation between interest rate volatility and SME performance, contrasting with the current research's focus on commercial banks in Kenya. Berko, Hammond, and Amisah [35] explored the effect of interest rate spread on economic growth in Ghana from 1975 to 2018. Their study revealed a positive but diminishing impact of interest rate spread on growth. Although this research is Ghana-specific, it provides relevant insights for understanding interest rate effects in Kenya. Lopez-Penabad et al. [36] analyzed the impact of negative interest rate policies on bank profitability and risk-taking across 2,596 banks in 29 European countries from 2011 to 2019. Their findings indicated that negative interest rates reduced net margins and asset returns, offering a contrast to the current study's focus on Kenyan commercial banks. This empirical review highlights the diverse findings and methodologies across studies on capital, credit, liquidity, and interest rate regulations, emphasizing the need for further research tailored to the Kenyan banking context [37-41].

3. METHODOLOGY

The research employed a causal design to explore the cause-and-effect relationships

between independent and dependent variables, suitable for examining the financial performance of Kenyan commercial banks in relation to prudential regulations (Mugenda & Mugenda, 2013).

The study targets all 41 commercial banks operating in Kenya from 2015 to 2021, providing a comprehensive analysis of how prudential regulations—specifically capital, credit, and liquidity—affect financial performance. This period was chosen to ensure the collection of current empirical data. Given the relatively small number of banks, a census approach was adopted, including all 41 banks, as advised by Mugenda and Mugenda (2013) for smaller populations. This methodology facilitated an in-depth examination of the relationship between regulatory frameworks and bank performance during the designated time frame.

3.1 Research Findings and Data Analysis

Data collection involved gathering information to inform conclusions and recommendations. Secondary data was prioritized for its objectivity compared to primary data. This data, covering the years 2015 to 2021, included prudential regulations (capital, credit, and liquidity), interest rates, and financial performance, and was obtained through a documented review guide.

The raw data was meticulously analyzed to explore the research variables in depth. This involved the use of descriptive, correlational, and panel regression methods. Descriptive analysis calculated mean scores and standard deviations to summarize key features of the data. Correlation analysis assessed the relationships between prudential regulations and financial performance prior to conducting regression analysis. The regression analysis, adhering to a 0.05 p-value threshold, evaluated the statistical significance of these relationships. Additionally, diagnostic tests were conducted to ensure accurate parameter evaluation, confirming the robustness of the findings.

3.2 Ethical Considerations

Research is guided by international ethical standards that play a crucial role in fulfilling research goals. An approval letter from the

Graduate School of Kenyatta University enabled the acquisition of a research permit from the National Commission for Science, Technology & Innovation Headquarters. This permit was vital for collaborating with relevant organizations and gathering the required data. Throughout the research process, strict adherence to ethical practices was upheld, ensuring that no unethical behavior occurred.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The exploratory analysis of financial performance among commercial banks in Kenya, as summarized in Table 1, reveals several key metrics. The average financial performance showed a mean of -0.1535 with a standard deviation of 0.1511, indicating notable variations from -0.4301 to 0.0619. This suggests a 0.1511% average fluctuation in financial performance across these banks. In terms of capital regulations, the mean was 0.1389 and the standard deviation was 0.0670, with minimum and maximum values of -0.2058 and 0.4854, respectively. This reflects a minor variation in the impact of capital regulations on financial performance. For credit regulation, the mean was 0.1286 with a standard deviation of 0.1175, and the values ranged from 0 to 0.6962, indicating slight year-to-year fluctuations in financial performance. Liquidity regulation displayed a mean of 0.1936 and a standard deviation of 0.1359, with values ranging from 0.0044 to 0.98. This implies minimal variation in liquidity among the banks. Finally, the interest rate showed a mean of 9.4286 and a standard deviation of 1.0516, with minimum and maximum values of 8.5 and 11.5, respectively. The relatively high average interest rate indicates a significant cost of borrowing in Kenya.

4.2 Diagnostic Tests

To ensure the validity of the regression model and avoid biased, inefficient, or inconsistent estimates, several diagnostic tests were conducted to verify the assumptions of linear regression. These tests include assessments for normality, multicollinearity, heteroscedasticity, and stationarity.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.
Financial Performance	287	-0.1535	0.1511

Capital Regulation	273	0.1389	0.0670
Credit Regulation	274	0.1286	0.1175

Source: Study Data (2023)

Normality assumes that residuals follow a normal or gamma-symmetric distribution, which is crucial for reliable test results. The Shapiro-Wilk test was utilized to evaluate this assumption, with a high p-value (greater than 0.05) indicating that the residuals are normally distributed. The results showed that p-values were below the significance level of 0.05, suggesting deviations from normality. However, given the sample size exceeded 30, the concern about normality was mitigated, aligning with the central limit theorem which suggests that larger sample sizes tend to approximate a normal distribution.

Multicollinearity was assessed using the Variance Inflation Factor (VIF). A VIF value less than 10 indicates weak multicollinearity, while values greater than 10 signify severe multicollinearity. The results revealed that all VIF values were below 10, indicating that multicollinearity was not a significant issue for the parameter estimates in this study.

The Breusch-Pagan test was employed to detect heteroscedasticity, which occurs when the error term exhibits varying variance. The test results, with a p-value of 0.0543, were not significant, suggesting that the null hypothesis of homoscedasticity (equal variance of error terms) could not be rejected. Thus, the data did not exhibit significant heteroscedasticity, and the efficiency of the coefficient estimates was considered reliable.

Stationarity of time series variables is crucial to avoid spurious results. The Fisher-type test was conducted to assess whether variables were stationary. The results showed that capital regulation and liquidity regulations were stationary at level, while financial performance, credit regulation, and interest rate required differencing to achieve stationarity at order 1 (1).

Once differenced, all variables were stationary, confirming that no unit roots were present and allowing for further analysis.

To select the most appropriate model, both the random effect and fixed effect models were compared using the Hausman Test. The test results supported the null hypothesis that the random effect model was preferred, with a p-value of 0.9956, exceeding the 0.05 significance threshold. Consequently, the random effect model was deemed the most suitable for the analysis, suggesting that the component error model should be used rather than the fixed effect model.

4.3 Regression Analysis

In the study, a reliable random effects model was employed to test research hypotheses concerning the impact of prudential regulations on the financial performance of Kenyan banks. The panel regression model was selected for its effectiveness in capturing the relationship between prudential regulations and bank performance. The results, as shown in Table 3, reveal a Wald Chi-Square statistic of 62.57 with a p-value of 0.0000, indicating that the model significantly fits the data and effectively analyzes the impact of prudential regulations on banks' financial performance in Kenya. The model's R² of 25.90% reflects the proportion of variation in financial performance attributable to prudential regulations. Without these regulations, the model predicts a constant decline in financial performance, represented by a value of -0.1494.

The study further indicates that capital regulation has a positive but statistically insignificant effect on financial performance, with a β -value of 0.0051 and a p-value of 0.412. This suggests a minimal impact, with a 1% increase in

Table 2. Shapiro-wilk test for normality

Variable	Obs	W	V	Z	Prob > Z
Financial Performance	287	0.9204	16.308	6.539	0.0010
Capital Regulation	273	0.8685	25.775	7.593	0.0000
Credit Regulation	274	0.8198	35.442	8.338	0.0000
Liquidity Regulation	273	0.8223	34.821	8.296	0.0000
Interest Rate	287	0.9570	8.808	5.096	0.0000

Source: Study Data (2023)

Table 3. Regression analysis

Financial Performance		Coef.	Std. Err.	z	P> z
Capital Regulation	0.00516	0.00629	0.82	0.412	
Credit Regulation	-0.02794	0.00447	-6.24	0.000	0.247
Liquidity Regulation	-0.00655	0.00366	-1.79	0.074	0.001
_cons	-0.14944	0.02397	-6.23	0.000	0.000
R2	0.2590				0.000

capital regulation resulting in a 0.0051% improvement in performance. In contrast, credit regulation has a significant negative impact, with a β -value of -0.0279 and a p-value of 0.000. This implies that a 1% increase in credit regulation would decrease financial performance by 0.0279%. Liquidity regulation also shows a negative effect, with a β -value of -0.0065 and a p-value of 0.074, suggesting that a 1% increase in liquidity regulation would lead to a 0.0065% decline in performance, though this effect is not statistically significant.

5. CONCLUSIONS

The study evaluated the effect of prudential regulations on the financial performance of commercial banks in Kenya. It found that capital regulation had an insignificant influence on the financial performance of these banks, suggesting that capital regulation does not improve financial outcomes. In contrast, credit regulation significantly impacted the performance of successful banks, emphasizing its critical role in enhancing financial results. Liquidity regulation, however, did not show a substantial effect on financial performance. The study also explored the moderating role of interest rates on the relationship between prudential regulation and bank performance, concluding that interest rates did not significantly moderate this relationship. Ultimately, the findings suggest that while credit regulation is pivotal to improving financial performance, capital and liquidity regulations, as well as interest rates, have a limited impact.

6. RECOMMENDATIONS

The survey reveals that capital regulation positively but insignificantly affects the financial performance of Kenya's commercial banks. To enhance this regulation's effectiveness, it is recommended that bank management develop additional policies that strengthen capital regulation's impact on financial performance.

Credit regulation, on the other hand, has a significant negative effect on bank performance.

It is advised that the monetary authority intensify credit regulation to mitigate the adverse effects of loan defaults on banks.

The study also found that liquidity regulation has an inverse but insignificant effect on financial performance. The survey recommends that the apex bank enforce stricter compliance with liquidity regulations to fortify banks, enabling them to handle short-term obligations and avoid failure under financial stress.

This study evaluates the impact of prudential regulations on the financial performance of Kenya's commercial banks, finding that capital and liquidity regulations do not significantly affect performance. Future research should extend the investigation over a longer period and utilize different methodologies to explore these effects further. Additionally, exploring the role of interest rates in moderating the relationship between prudential regulations and bank performance could provide further insights. Research in alternative contexts, such as the insurance industry, is also suggested.

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COMPETING INTERESTS

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