International Journal of Business Management and Processes
http://journals.essrak.org/index.php/Business
International Journal of Business Management and Processes (IJBMP)
Vol 6. Issue No.2. May, 2024. PP 87-104. ISSN 2616-3209

CAPITAL ADEQUACY AND FINANCIAL PERFORMANCE OF DEPOSIT TAKING MICRO FINANCE BANKS IN KENYA

[1]Stephen Mulianga Sungwacha, [2]Gregory Namusonge Simiyu and [2]Elizabeth Makokha Nambuswa
[1]School of Business and Economics, Kibabii University, Kenya
[2]College of Entrepreneurship and Human Resource Development, Jomo Kenyatta university of Agriculture and Technology, Kenya
Corresponding Authors Email: ssungwacha@kibu.ac.ke

Abstract

Maintaining sufficient capital is a vital aspect in the functioning of financial institutions, ensuring that they possess an adequate financial buffer to absorb potential losses. Adequate capital becomes critical for a robust financial system as it fosters stability and safeguards the interests of stakeholders at the same time ensuring a resilient financial system. The purpose of the study was to determine how capital adequacy directly impacts the ability of deposit-taking microfinance banks to generate profits and sustain operations. This ensures that these banks can absorb shocks without becoming insolvent, given that they serve vulnerable populations and small businesses, which exposes them to profitability challenges. The study investigated the effect of capital adequacy on the financial performance of deposit-taking microfinance banks in Kenya for the 2018 – 2022 financial period utilizing secondary data from all 13 registered deposit-taking microfinance banks. It adapted the explanatory correlational research design and relied on secondary data generated from the Central Bank of Kenya and individual websites of the 13 deposit taking micro finance banks. Returns on Assets and Returns on Equity were regressed on capital adequacy predictors using Generalized Methods Method approach and the panel data analysis revealed positive betas for all predictors at a 0.05 significance level. The study concluded that capital adequacy has a significant effect on micro finance banks in Kenya and recommended that microfinance banks should maintain a minimum risk-based capital adequacy ratio of 12.5% to 15%, depending on the risk levels in their loan portfolios. Additionally, these firms must publicly disclose both qualitative and quantitative information about their risk exposures, including their risk management strategies; disclose stress testing results to potentially assist stakeholders understand the nature and magnitude of the risk exposures. By providing comparative data from previous years, they will assist financial statement users a perspective on trends in underlying exposures.

Keywords: *CAMEL ratings model, capital adequacy, financial performance, Returns on Assets and Returns on Equity*

Introduction

Capital is indispensable for a bank due to its pivotal roles including absorption of losses and enabling a bank to sustain its operations during challenging financial periods (Didier, 2021).Moreover, it instills confidence in the public, assuring them that the institution will persist in offering financial services even in the face of losses, thereby fostering trust in the banking system and alleviating concerns about liquidity. Major banks aspire to maintain favourable ratings, prompting them to retain substantial excess capital reserves determined by market conditions (Velliscig et al., 2023). When, coupled with minimum capital ratio standards, capital acts as a deterrent to unwarranted expansion of a bank's assets, mandating that asset growth is matched with a proportional increase in capital. This measure helps minimize the risk of moral hazard and advocates for the adoption of secure and prudent banking practices.According to (Velliscig et al., 2023) a bank's reputation will suffer if the bank finds it difficult to meet the authorities' capital requirements, e.g. in connection with large losses on a loan exposure.

The primary objective of the minimum capital requirements mandated by regulatory authorities is to avert the potential spread of financial troubles within a bank, which could pose a threat to overall financial stability. The ultimate consequence could be a breakdown in the efficient

provision of credit to businesses and households by banks. Minimum capital requirements are instituted to prevent the value of assets in a failing bank from falling below the value of depositors' claims (Choudhry, 2022).The overarching goal is to ensure that, in the event of a reconstruction or winding-up process, the bank can be managed in a relatively orderly manner, allowing for the settlement of exposures without counter parties incurring significant losses. The establishment of capital requirements aims to strike a balance between maintaining confidence in banks and preserving their essential function as capital providers (Siddika, 2020). The international standard of a minimum capital requirement of 8 percent of risk-weighted assets reflects a global consensus that seeks to harmonize these dual objectives.

The capital structure of a bank is impacted by its size, with larger banks typically maintaining smaller excess capital reserves compared to their smaller counterparts (Xiaoqing Fu, Shelagh Heffernan, 2009). The conventional rationale often cited is the "too-big-to-fail" argument, suggesting an implicit government guarantee due to the potentially severe societal consequences of large banks failing. However, there is a lack of empirical evidence supporting this hypothesis. Another explanation found in the literature proposes that excess capital reserves serve as an alternative to advanced risk management. For smaller banks, it is more cost-effective to hold relatively larger excess capital reserves than to invest in and maintain sophisticated risk management systems.As such compulsory periodic performance evaluations becomes crucial in banks' operations to allow them to monitor their financial and operational performance over time. By analyzing key performance indicators such as loan portfolio quality, profitability, efficiency ratios, and asset/liability management, Deposit-taking micro finance banks can assess their overall health and identify areas of strength and weakness and focus on three areas which include: maintaining sound macroeconomic fundamentals prerequisite for economic and financial resilience; encouraging a deepening and broadening financial systems to boost both financial efficiency and resilience; and greater regional cooperation efforts are needed to reinforce regional financial safety nets for financial resilience (Park, et al.2021) . Evaluation of the financial health of a bank through the CAMELS model considers the bank's significant financial, operational and management status in order to establish the risk profile and the level of performance. The CAMELS rating model looks at six key aspects of a bank; capital adequacy, management efficiency, asset quality, earnings ability, liquidity and sensitivity to risk to establish its financial soundness.

Central Bank of Kenya reports have continuously painted a grim picture of the Micro Finance Banking sub-sector in Kenya noting that the sector remains weak and vulnerable to even the most mild shock given its low level of key indicators.This was evidenced by the sector's total assets which declined on average by 2.393 percent between 2016 and 2022 owing to 3.1 percent decline in advances and loans. The depressed and declining quantity in loans and advances is attributed to the slow absorption of credit by borrowers due to high interest rate particularly in the 2022/2023 financial period as authorities adapted strict monetary and financial sector policies to address inflation. According to (Kenya Financial Stability Report of , 2023) borrowers' fears about losses on interest rate–sensitive assets led to the banking sell-off, especially for banks with concentrated deposit bases and large mark-to-market losses .Overall asset quality declined during the period before and during the banking sector instability from 2015 to 2022, and also during the implementation of the interest rate capping law, there was a significant surge in non-performing loans and a slow expansion in gross loans (Central Bank of Kenya Annual Report, 2020) .The non-performing loans experienced the highest increase compared to the growth in new lending since 2013. On average, between December 2015 and June 2022, gross non-performing loans rose by 193.2 percent, which was more than twice the 97 percent growth rate observed in gross loans over the 8-year period (Central Bank of Kenya Annual Report, 2020). The notable spike in defaults in the first half of 2023 is likely attributed

to the escalation of interest rates, a response to monetary policy tightening aimed at curbing inflationary pressures.Coupled with shrinking total deposits 7.8 percent to Ksh. 46.5 billion in December 2022,there was a corresponding negative impact on their funding base.

While Kenya relies on the micro finance sector to drive its objective of financial inclusion, according to (Central Bank of Kenya Annual Report, 2020) declining performance portents negatively on the overall economy particularly the informal sector and the rural populace that form the bulk of its clientele. The (Central Bank of Kenya Annual Report, 2020) notes that MFBs continue to operate with inadequate capitalization and face financial losses, affecting their ability to fulfil their role in credit inter-mediation. While the primary objective of Microfinance Institutions is to alleviate poverty they can achieve this goal by enabling access to credit, encouraging savings, and providing insurance, thereby contributing to economic stability and enhancing livelihoods. Studies indicate that effectively operating MFIs have a beneficial influence on income levels, education, and overall welfare (Chikwira et al, 2022).
Our examination of the influence of capital adequacy on deposit-taking microfinance banks in Kenya was motivated by several reasons including understanding the financial stability of these institutions in order to offer insights into their ability to withstand potential economic shocks. It has been observed that a robust capital adequacy is indicative of a bank's resilience, serving as a protective buffer against unforeseen losses (Adrian et al, 2023). By looking at the capital adequacy theories, we appreciate various risks that face micro finance banks and how these banks should manage these risks associated with their operations. The extent to which these micro finance banks in Kenya comply with regulatory standards is another focal point, given that central banks and financial regulators often establish capital adequacy requirements to ensure the stability of financial institutions. Assessing compliance with these regulations is crucial for safeguarding the interests of depositors, as a higher level of capital adequacy enhances the capacity of microfinance banks to protect deposits. The lending capacity of deposit-taking microfinance banks is also influenced by their capital adequacy. Insights into these aspects will shed light on how well micro finance banks can transform themselves into sustainable intermediaries to extend credit to support economic activities, a pivotal role in fostering financial inclusion and economic development in developing economies. Adequate capital signals responsible governance and risk mitigation and in the process it assures clients, investors, and stakeholders that the micro finance bank is well-prepared to fulfil its obligations.

Objective

To establish the effect of capital adequacy on financial performance of deposit taking micro finance banks in Kenya.

Hypothesis

H_0: Capital adequacy has no significant effect on the financial performance of deposit taking micro finance banks in Kenya.

Methodology

The research utilized a descriptive correlational research design, which involves collecting and analyzing data from specific study units at a particular moment to evaluate the relationships between variables (Park,2021)).Quantitative data for the study was extracted from annual reports of Deposit-Taking Microfinance Banks in Kenya, sourced from the Central Bank of Kenya and the Kenya Bureau of Statistics. The objective was to gain insights into the capital adequacy levels, Return on Equity, and Return on Assets of micro finance banks in Kenya for the 2018 to 2022 period. Given the cross-sectional nature of the study, various capital adequacy and financial performance ratios across the thirteen banks were examined concurrently.

Trochim et al. Ji. (2017) argue that descriptive correlational research is essentially an investigation aimed at portraying or characterizing the attributes of a specific population. Additionally, a descriptive correlational design involves the analysis of data to explore relationships among different variables, focusing on understanding "what" is happening rather than delving into the "why" behind the phenomena being studied. Consequently, findings from descriptive research often serve as a foundation for formulating hypotheses that can be further tested using more rigorous research designs. Various researchers have employed this research design, including (Tremer, 2023; Nissinen, 2024; Picazo et al, 2022 etc). Gichira,(2015 used this research design to examine the financial characteristics and stock returns of non-financial companies listed on East African securities exchanges. Additionally, (Adzobu et al., 2017) used this design to test whether diversification of credit portfolios across economic sectors leads to improved profitability and reduced credit risks for Ghanaian banks that have been characterized by high non-performing loans. On the other hand, (Fredrick et al., 2018) focused on assessing the impact of credit risk management on banking performance in Kenya.

The explanatory correlational design has received a wide acclaim for its capacity to thoroughly investigate a research topic, especially when dealing with new issues that have limited or no prior research (Sakyi et al., 2020). It serves as the groundwork for more conclusive research, influencing initial research design, sampling, and data collection. This design extends beyond exploratory and descriptive research, aiming to identify causes and reasons for a phenomenon while providing evidence to support or refute explanations (Malhotra, 2007). The selection of this design was driven by the aforementioned advantages which complement its inherent ability to integrate both quantitative and qualitative results. This integration is valuable for the current study because it assisted in explaining the established relationship between the hypothesized explanatory variable (Capital Adequacy) and the dependent variables (Return on Assets and Return on Equity) of deposit taking micro finance banks in Kenya.

Model specification

The study incorporated the model specification approach outlined by (Abbas et al., 2022) which involved defining and outlining the structure and features of suitable statistical models capable of capturing and quantifying relationships between the variables under scrutiny. The objective was to construct a formalized model that could represent these relationships in a quantitative fashion, offering a well-defined and structured framework for statistical analysis and hypothesis testing.

The study employed two distinct models: both the long-run and short-run models panel data analysis. In the long-run model, it was assumed that the current period's performance is not influenced by the financial performance in the preceding period. As cited in (de Salles, 2013) the estimation should not include lagged and persisting dependent explanatory variables. The short-run model also assumes that there was an incomplete adjustment process affecting financial performance. To illustrate, in the short run, deposit – taking micro finance banks could use their financial performance from the previous period to partially explain their current period's performance, indicating partial adjustment in the panel model. To explore these dynamics the study employed the following models that were aligned with the research hypothesis.

Hypothesis H_0

$ROE_{it} = f (RES; RER; RWACR)$
……3.1a

$ROA_{it}= f (RES; RER; RWACR)$
.……3.1b

After linearization and parametric adjustment, the variables were transformed using natural logarithms, leading to the formulation of the long-run model as follows:

$ROE_{it} = \beta o + \beta_1 RES_{it} + \beta_2 RER_{it} + \beta_3 RWACR_{it} + \alpha_i$……3.1c

$ROA_{it} = \beta o + \beta_1 RES_{it} + \beta_2 RER_{it} + \beta_3 RWACR_{i,t} + \alpha_i$……..3.1d

Where:

RER = Retained Earnings Ratio

RWACR = Risk Weighted Assets Ratio for the bank i at time t.

Therefore, the specified long run model was:

$ROE_{it} = \beta_0 + \Psi ROE_{it-1} + \beta_1 RES_{it} + \beta_2 RER_{it} + \beta_3 RWACR_{it} + \alpha_i$……3.1e

$ROA_{it} = \beta_0 + \Psi ROA_{it-1} + \beta_1 RES_{it} + \beta_2 RER_{it} + \beta_3 RWACR_{it} + \alpha_i$……3.1f

Ψ = the estimated coefficient of the financial performance predictors in the long run.

Variation in time estimate- dynamic panel modeling

Dynamic panel models, also known as lagged regression models, incorporate time lags in their analysis to account for the possibility of autocorrelation within individual panels or across all panels (Lillo & Torrecillas, 2018). According to (Bangura et al,. 2022) dynamic panel analysis becomes necessary due to the presence of autocorrelation, as indicated by lagged residuals in auto-regression. In the examination of data related to Deposit-Taking Microfinance Banks, the study anticipated multicollinearity among variables, particularly in the context of dynamic panel data models with correlated lagged predictor variables. To effectively address this issue and accommodate the dynamic nature of the data, the research employed Generalized Method of Moments techniques. Lillo & Torrecillas, (2018) recommend Generalized Moments Method as a robust statistical approach for estimating parameters in dynamic panel data models. The technique was well-suited for the current study, given the relatively small number of time periods (2018 – 2022) - five years-compared to the number of cross-sectional units. Ajao et al., (2023) note that the Generalized Method Moment approach ensures more reliable and unbiased parameter estimates while addressing issues arising from multicollinearity and autocorrelation. Through Generalized Method Moments operations, we generated both the long-term (static) and short-term (dynamic) panel models as presented in equations 3.1a up to 3.1f.

Study population

Our panel data set constituted all the entire licensed Deposit-Taking Microfinance Banks operating in Kenya as of December 2022. Statistics from the (Central Bank of Kenya 2022), showed that there were a total of fourteen micro finance banks officially registered by the end of that financial year. We used a census survey to evaluate 13 deposit-taking micro finance banks after excluding one microfinance bank from the analysis due to its lack of relevant financial statements, primarily because it was registered relatively late. Therefore, data was extracted from the annual reports of these banks, the Kenya Bureau of Statistics and their individual websites. As (Boyd, et al, 2022)suggest, a census survey is most desirable when the target population is small. Utilizing the entire population of the study enhances the validity of the collected data by potentially including supplementary information that complements the research study (Morgan, 2022).The decision to focus the research on the microfinance sector was driven by the sector's pivotal role in catalyzing economic growth through its intermediary functions. This role entails facilitating the flow of funds between low-income customers in need of funds and micro finance banks that provide them, thereby fostering financial inclusivity and accessibility of funds for a broader range of stakeholders in the economy (Alhammadi, 2023).

Results and Discussion

Diagnostic tests

Diagnostic tests were carried out to identify potential issues with residuals and model specification. To ensure the estimated coefficients were correct and reflected accurate representations of true parameters, it was crucial that the assumptions of linear regressions outlined in the Gauss-Markov theorem were satisfied, with a particular focus on the characteristics of the regression residuals (Reddy, 2023).

Panel unit roots test for stationarity

The study diagnosed the presence of stationarity or not in the residuals by use of panel unit roots test to determine the order in which variables became integrated. It was vital to ascertain whether the variables exhibited stationarity or non-stationarity across all levels within the panel. The regression equation employed for this purpose took the form of a linear structure, as illustrated below:

$$\Delta y_{(it)} = \alpha + \beta y_{(t-1)} + \gamma \Delta y_{(t-1)} + \delta * \Delta y_{(t-2)} + \ldots + \varepsilon_{(t).}$$

Where:

$\Delta y_{(I-t)}$ =differenced values of the time series,

α, β, γ, δ., denote parameters to be estimated;

t = 1……5 years,

i = 13 deposit micro finance banks

y = both Return on Assets and Return on Equity.

In line with Granger et al. (1974), if $\rho = 1$, it implies that the current observation Y_{it} is influenced by its lag value Y_{it-1}, indicating non-stationarity in the data. Conversely, if $\rho < 1$, it suggests that the current observation Y_{it} is not influenced by its lag value Y_{it-1}, indicating stationarity in the variable. The fundamental assumption of the test was that the time series

contained a unit root, indicative of non-stationarity, specifically a stochastic trend (Ryan et al, 2023). According to the results presented in Table 1, all unit root tests, yielded p-values < 0.05 at the 0.05 significance level implying that the findings did not support the hypothesis of non-stationarity in capital adequacy variables. Consequently, the regression analysis was conducted without incorporating the lagged time series values of the capital adequacy estimators.

Table 2: Panel Unit Roots Test for Capital Adequacy

Variable	Method	Statistic	p-value
Reserves	Levin, Lin & Chu t*	-14.4812	.0000
	ADF - Fisher Chi-square	144.2310	.0000
	PP - Fisher Chi-square	248.3030	.0000
Retained Earnings Ratio	Levin, Lin & Chu t*	-8.7658	.0000
	ADF - Fisher Chi-square	17.4340	.0011
	PP - Fisher Chi-square	222.4830	.0000
Total Capital to TRWAR	Levin, Lin & Chu t*	-11.6149	.0000

Panel multicollinearity test for capital adequacy

The multicollinearity test conducted on the capital adequacy variables aimed to assess whether reserves, retained earnings, and Total Risk Weighted Assets Ratio exhibited significant correlations among themselves. The goal was to determine whether these correlations might potentially undermine the accuracy and reliability of regression results, thereby making it more challenging to understand the individual effects of each variable when they would simultaneously be included in the model to predict Return on Assets and Return on Equity. The findings in Table 3 indicates that the Variance Inflation Factor values ranged between 1.599 and 2.660 thereby implying a moderate level of inflation in the variances of the variables. The average Variance Inflation Factor, calculated at 2.158, is below the threshold of 10. The results therefore confirm that these variables could be jointly used in one model to predict Return on Assets and Return on Equity outcomes.

Table 3: Panel Multicollinearity test

Dependent Variable		Collinearity Statistics	
		Tolerance	**VIF**
ROE	Reserves	0.625	1.599
	Retained Earnings Ratio	0.412	2.427
	Capital to TRWAR	0.569	1.757
ROA	Reserves	0.464	2.155
	Retained Earnings Ratio	0.424	2.358
	Capital to TRWAR	0.378	2.660

Panel heteroscedasticity test

The results presented in Table 4 from the study indicated a significant finding (p-value=0.000<0.05), providing evidence to reject H_0. It was inferred that the data set lacked uniformity in variance across the error terms. Consequently, a fixed generalized least squares model with robust standard errors was the most suitable for regression. In light of these results, the researchers opted for the Generalized Method Moments regression model (with robust standard errors) to analyse the effect of capital adequacy on deposit-taking micro finance banks' performance in Kenya. Heteroscedasticity is deemed to exist when p > chi2 is below the 5 percent significance level; otherwise, homoscedasticity is assumed.

Table 4: Panel Heteroscedasticity Test

Dependent Variable	Chi Square	P value
ROE	6012.14	.000
ROA	4970.55	.000

Panel Housman test for capital adequacy

In Table 5, the p-values were 0.000 and 0.0001, (p<0.05) significance level. The Chi-Square values for Return on Assets and Return on Equity were 76.9870 and 18.2314, respectively, above the critical threshold of point 9.49 with 4 degrees of freedom. This statistical evidence led the study to accept the alternative hypothesis, indicating that the Fixed Effects Model was the most suitable model for analyzing the panel data. Consequently, the study applied Fixed Effects Model regression analyses to investigate how capital adequacy affects financial performance of deposit – taking micro finance banks in Kenya.

Table 5: Panel Housman Test

Dependent	**Test Summary**		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
ROA			76.9870	4	.0000
	Variable	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
	Reserves	.47123	.237891	.000069	.0789
	Retained Earnings Ratio	.17623	.512378	.004431	.0000
	CTTRWAR	.51321	.712345	.001355	.0000
ROE	**Test Summary**		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
			18.2314	4	.0001
	Variable	Fixed	Random	Var(Diff.)	Prob.
	Reserves	.054151	.042444	.000089	.3563
	Retained Earnings Ratio	.035123	.056262	.000014	.0897
	CTTRWAR	.11234	.134761	.000890	.0000

Correlation analysis of capital adequacy

Table 6 reveals positive correlations between all capital adequacy composite parameters and Return on Assets and Return on Equity, as indicated by the following R-values: 0.697, 0.608, and 0.473 for reserves, retained earnings ratio, and total risk weighted assets ratio, respectively, at the 0.05 level of significance. Additionally, there is a positive correlation ($r = 0.768$) between Return on Assets and Return on Equity. These findings suggest the absence of autocollinearity among the capital adequacy variables. However, a notable strong relationship exists between Return on Assets and Return on Equity, posing a challenge. This issue was effectively addressed by conducting separate regressions for the two dependent variables in distinct models.

Table 6: Correlation Analysis

		ROA	ROE	Reserves	Retained Earnings Ratio	CTRWAR
ROA	Pearson Correlation	1				
ROE	Pearson Correlation	.768**	1			
	Sig. (2-tailed)	.000				
	N	65	65			
Reserves	Pearson Correlation	.697**	.495**	1		
	Sig. (2-tailed)	.000	.000			
	N	65	65	65		
Retained Earnings Ratio	Pearson Correlation	.608**	.579**	.673**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	65	65	65	65	
CTRWAR	Pearson Correlation	.473**	.566**	.477**	.528**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	65	65	65	65	65

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

Testing the hypothesis

The primary objective was to assess how capital adequacy influences the financial performance of Deposit-Taking Microfinance Banks in Kenya. The study conducted panel fixed effect regression analysis, with the financial performance being regressed on capital adequacy variable, and the results are summarized in Table 7.The following can be deduced from the analysis: reserves had a moderate effect on the financial performance, Return on Assets, of micro finance banks in Kenya (beta = 0.3823; F = 39.263, p-value < 0.05) implying that an increase in reserves by one unit contributes to a marginal rise in the Return on Assets of Deposit-Taking Microfinance Banks by approximately 38.23 percent holding retained earnings and Capital to Total Risk Weighted Assets Ratio constant. Likewise, the beta coefficient for the retained earnings ratio was 0.3961, indicating a modest effect on Return on Assets. This means that a one percent improvement in retained earnings would lead to an approximate 39.61 percent increase in Return on Assets, given that reserves and Capital to Total Risk Weighted Assets Ratio remain constant.

Notably, Capital to Total Risk Weighted Assets Ratio exhibited the most substantial effect on ROA, with a beta coefficient of 0.6315. This signifies that a one percent increase in the total risk-weighted asset ratio of micro finance banks would enhance their financial performance by roughly 63.15 percent, with reserves and retained earnings held constant. This underscores the long-term significance of Capital to Total Risk Weighted Assets Ratio for deposit – taking micro finance banks in Kenya. The coefficient of determination (R^2) was calculated as 0.6655, indicating that the three variables—reserves, retained earnings ratio, and Capital to Total Risk Weighted Assets Ratio —accounted for approximately 66.55 percent of the variations observed in Return on Assets. The remaining 33.45 percent of the changes were attributed to factors that were not included in the model.

The model:

ROA=0.1689 + 0.3823*RES + 0.3961*RER+ 0.6315*CTTRWA…… ……4.1

Table 4.28: Panel Fixed Effects on Effect of Capital Adequacy on ROA

Variable	Coefficient	Std. Error	t	Prob.
C	.1688935	.027900	3.29	.000
Reserves	.3823	.076600	5.1223	.0000
Retained Earnings Ratio	.3961	.090200	3.2960	.0010
CTTRWAR	.6315	.135300	4.6659	.0000
R-squared	.6655			
Adjusted R-squared	.6469			
F-statistic	39.263			
Prob(F-statistic)	.0000			

As shown in Table 7, the analysis revealed that reserves had a moderate effect on the financial performance, Return on Equity of deposit-taking micro finance banks in Kenya (beta = 0.4613; F = 40.229, p-value < 0.05). This implies that an increase in reserves by one unit contributes to a marginal rise in the Return on Equity of these banks by approximately 46.13 percent, other variables including retained earnings and Capital to Total Risk Weighted Assets Ratio, held constant. Likewise, the beta coefficient for the retained earnings ratio was 0.4211, indicating a modest effect on ROE. In practical terms, this means that a one percent improvement in retained earnings would lead to an approximate 42.11 percent increase in Return on Equity, given that reserves and Capital to Total Risk Weighted Assets Ratio remain constant.

However, Capital to Total Risk Weighted Assets Ratio exhibited a higher effect on ROE, with a beta coefficient of 45.65. This signifies that a one percent increase in the total risk-weighted asset ratio of micro finance banks would enhance their financial performance by roughly 45.65 percent, with reserves and retained earnings held constant. This underscores the long-term

significance of Capital to Total Risk Weighted Assets Ratio for deposit-taking micro finance banks in Kenya. The coefficient of determination - R-squared was calculated as 0.7015, indicating that the three variables accounted for approximately 66.55 percent of the variations observed in Return on Equity. The remaining 29.85 percent of the changes were attributed to factors that were not included in the model.

ROE=-1.0865 + .4613*Res + .4211*RE+ .4565*CTTRWAR…….4.2

Table 7: Fixed Effects on Effect of Capital Adequacy on ROE

Variable	**Coefficient**	**Std. Error**	**t**	**Prob.**
C	-1.0865	.037500	4.31	.0000
Reserves	.4613	.075600	3.7223	.0000
Retained Earnings Ratio	.4211	.090200	3.3950	.0010
CTTRWAR	.4565	.012690	4.5659	.0000
R-squared	0.7015			
Adjusted R-squared	0.6916			
F-statistic	40.729			
Prob(F-statistic)	.0000			

Dynamic panel model on effect of capital adequacy on ROA

As depicted in Table 8, a significant effect of capital adequacy on Return on Assets was observed, supported by a significant Wald Chi-square value of 145.28 and a p-value < 0.05. Additionally, lagged value of reserves, retained earnings ratio, and Capital to Total Risk Weighted Assets Ratio posited a positive and significant effect on Return on Assets, as evidenced by coefficients of 0.048998, 0.032122, and 0.112759, all of which had p-values less than 0.05. In contrast, the effect of retained earnings on ROA was positive but not statistically significant, with a coefficient of 0.03122 and a p > 0.05 = 0.053. The following dynamic panel regression model was fitted from the analysis.

ROA = -1.3152 + 0.2438*ROAt-1 + 0.0489*CA + 0.0312*RER +
0.1128*CTTRWAR……4.3

Table 8: Dynamic Panel Model on Effect of Capital Adequacy on ROA

roa	Coef.	Std. Err.	P>| z |	[95% Conf.	Interval]
L1.	.243865	.1012849	0.000	.3512234	.585431
Reserves	.048998	.0231209	0.002	.0231431	.1054114
Retained Earnings Ratio	.032122	.0286233	0.053	-.005312	.0876211
CTTRWAR	.112759	.0124566	0.002	.0326231	.2132313
_cons	-1.31524	.3578932	0.000	-2.451233	-.6713211

Wald chi= 145.28 $p< 0.05$

Dynamic panel model on effect of capital adequacy on ROE

In Table 9, we observed a significant impact of capital adequacy on Return on Equity. This was supported by a substantial Wald Chi-square value of 128.45 and a p-value less than 0.05. Furthermore, the lagged values of reserves, the retained earnings ratio, and Capital to Total Risk Weighted Assets Ratio all demonstrated a positive and statistically significant influence on ROE. This was evident from the coefficients of 0.046718, 0.019651, and 0.141328, all of which had p-values below 0.05. On the other hand, the effect of retained earnings on ROE was positive but did not reach statistical significance, with a coefficient of 0.019651 and a p-value greater than 0.05, specifically 0.068. From this analysis, we derived the following dynamic panel regression model.

ROE = -1.66725 + 0.243865*ROE +
0.46718*RES+0.019651*RER+0.141300*TRWAR…...4.5

Table 9: Dynamic Panel Model on Effect of Capital Adequacy on ROE

roe	Coef.	Std. Err.	P>| z |	[95% Conf.	Interval]
L1.	.243865	.1012865	0.000	.345234	.575431
Reserves	.046718	.0233309	0.002	.033131	.1114114
Retained Earnings Ratio	.019651	.0214233	0.068	-.004312	.0766211
CTTRWAR	.141300	.0132566	0.002	.032631	.1132313
_cons	-1.66725	.3745712	0.000	-2.451233	-.5513211

Wald chi= 128.45 $p< 0.05$

Studies that have been conducted on the impact of capital adequacy on financial performance include a study conducted by (Sebayang, 2020), that centred on the correlation between the Capital Adequacy Ratio and Return on Equity among foreign private banks subject to government regulation in Indonesia. The research aimed to achieve two key objectives: firstly, to evaluate how Capital Adequacy Ratio influences Return on Equity, and secondly, to explore the impact of Non-Performing Loans on Return on Equity. Employing multiple regression

analysis on a sample of 20 banks, the study found a positive correlation, suggesting that an increase in Capital Adequacy Ratio had the potential to enhance the Return on Equity for these foreign private banks in Indonesia. A similar study by (Barus et al., 2017) analysed the effect of capital adequacy on the financial performance of savings and credit societies in kenya and concluded that the financial performance of savings and credit societies in Kenya is influenced by capital adequacy. This assertion was supported by the regression analysis results, which not only demonstrated a positive impact but also quantified the extent to which capital adequacy affects the financial performance of these societies.

We also observed that the findings corroborate the perspective advocated by (Wondimu, 2022) who suggests that an augmentation in the capital adequacy of micro finance banks can lead to an improvement in their financial performance, and vice versa. This viewpoint is further supported by (Central Bank of Kenya, 2022) which attributes the financial performance of micro finance banks to the substantial capital funds these institutions mobilize from their clients. Based on the findings and the corroborating evidence, conclude that capital adequacy has a significant effect on the financial performance of Deposit-Taking Microfinance Banks in Kenya contrary to the null hypothesis. The inclusion of capital adequacy in this study was motivated by its significant role in ensuring banks' financial stability. This perspective is reinforced by the (World Bank, 2019), which contends that higher bank capital plays a pivotal role in maintaining financial stability. It achieves this by serving as a buffer to absorb losses during turbulent and risky periods for a bank. Additionally, increased capital enhances a bank's capacity for effective screening and monitoring, and it acts as a deterrent against excessive risk-taking (Bank, 2019) but notes that heightened shareholder equity in a bank augments the interests of its shareholders.

These results are consistent with the correlation results whose Pearson's product moment correlation coefficient was 0.6123 with Return on Assets and 0.6612 with Return on Equity. The high correlation magnitude implies that there exists a strong positive correlation between capital adequacy and financial performance of micro finance banks. Since the coefficients were significant, it was concluded that capital adequacy has a positive significant effect on financial performance of deposit-Taking MFBs in Kenya. Significantly, when considering other CAMEL rating variables, the impact of capital adequacy becomes more pronounced, aligning with the Central Bank of Kenya's Prudential Guideline on Capital Adequacy (CBK/ PG/04), which mandates banks to meet specified capital adequacy ratios. This regulatory mandate compels banks to maintain an adequate level of capital in their reserves, serving two primary purposes. Firstly, it ensures compliance with regulatory standards, and secondly, it acts as a buffer against potential market risks that may expose the bank to market contagion. The current minimum regulatory capital adequacy ratio for Total Capital to Total Risk Weighted Assets is 14.5 percent averaging to about 10 percent above the Central Bank of Kenya's threshold for all micro finance banks. The analysis by on the financial performance of the African banks using the CAMEL composite rating revealed that the banks are rated as strong and satisfactory when rated in terms of capital adequacy ratio and earnings ability (Desta, 2016).

The theoretical anchorage of buffer theories focuses on the importance of financial institutions in maintaining a sufficient quantity of capital meant to cushion them against market uncertainties. The buffer theory (Calem & Rob, 1996), proposes that banking institutions should hold an adequate quantity of capital above their established core capital to reduce chances of failing to meet the legal capital requirements established by the regulatory authorities. The capital base should be adequate to meet both the firm's operational costs and be enough for lending out to customers. Capital adequacy requirements are therefore an important tool for monitoring banks. Consequently, the use of CAMELS ratings parameters

when evaluating a bank's profitability aims at ensuring that they adhere to the prescribed regulatory authorities' guidelines. When properly implemented, capital requirements incentivize banks to improve their risk management Hendrawan et al,2023). Moreover, capital can substitute for supervision and oversight in reducing bank risk. Empirical evidence shows that in countries where supervision and regulation are costlier, the role of capital in systemic stability is stronger and promotes financial performance of banking institutions (Minh Sang, 2021;Anginer et al., 2018).Maintaining adequate capital buffers is a crucial aspect of banking regulation and risk management. These buffers help banks absorb unexpected losses that may arise from economic downturns, financial market turmoil, or unexpected events. The idea behind capital buffers is to ensure that banks have a sufficient financial cushion to continue operating and honoring their obligations even during times of financial stress.

Banks are typically required to maintain minimum levels of capital adequacy based on regulatory frameworks, such as the Basel Accords. The Basel Accords are international banking standards that provide guidelines for banking supervision, including capital requirements. The most notable of these accords are Basel I, Basel II, and Basel III. Basel III, which was introduced in response to the global financial crisis of 2008, introduced more stringent capital requirements and emphasized the need for banks to maintain different types of capital buffers. These buffers include the: i) Common Equity Tier 1 capital buffer constituting the highest quality capital, primarily consisting of common equity, that banks are required to hold above the minimum regulatory capital requirement. It acts as a first line of defense against losses. ii) Counter cyclical Capital Buffer which is designed to be increased in times of excessive credit growth and decreased in economic downturns. It aims to ensure that banks build up additional capital during periods of economic expansion. iii) Capital Conservation buffer that ensures that banks maintain an extra cushion of capital to absorb losses without falling below minimum capital requirements. It is designed to prevent banks from distributing dividends or conducting share buybacks if their capital falls below the conservation buffer level. Finally, the systemic Risk Buffer required to be held by banks in some countries as an additional buffer if they are deemed systemically important to the overall financial system. This buffer aims to address the potential impact of a failure of a major financial institution on the stability of the entire system. Overall, the concept of holding adequate capital buffers is fundamental to the stability of the banking sector and the broader economy. It is a means of reducing the risk of financial crises and ensuring that banks can weather economic shocks without collapsing.

Conclusion and Recommendations

Results showed that capital adequacy had a positive influence on the financial performance of deposit taking micro finance banks in Kenya. Therefore, increase in the level and quantity of capital enhances risk management, constrains bank leverage, improves bank liquidity and limits cyclic changes in risk and minimizes the tendency of returns to fluctuate around low levels in a turbulent economic cycle. In addition to the core capital requirement, deposit – taking micro finance banks are required to maintain a minimum risk-based Capital Adequacy Ratio of 12.5% to 15%, depending on the level of risk in their loan portfolios. They should also publicly disclose qualitative and quantitative information about their risk exposures, including strategies for managing their risk and should present sufficient qualitative (e.g., management strategies) and quantitative information (stress testing) to enable users to understand the nature and magnitude of these risk exposures. Lastly, they should provide comparative information of

previous years' data to give the financial statement users a perspective on trends in the underlying exposures.

References

Abbas, D. S., Ismail, T., Taqi, M., & Yazid, H. (2022). The Implementation of a Management Auditon HR Recruitment to Assess the Effectiveness of Employee Performance. *JRAK*, *14*(2), 243–251.

Didier, T., Huneeus, F., Larrain, M., & Schmukler, S. L. (2021). Financing firms in hibernation during the COVID-19 pandemic. *Journal of Financial Stability*, *53*, 100837.

Picazo-Sánchez, L., Domínguez-Martín, R., & García-Marín, D. (2022). Health Promotion on Instagram: Descriptive–Correlational Study and Predictive Factors of Influencers' Content. *International Journal of Environmental Research and Public Health*, *19*(23), 15817.

Tremer, C. (2023). *Exploring website accessibility of US-based retailers: a quantitative descriptive-correlational study* (Doctoral dissertation, Northcentral University).

Nissinen, S., Pesonen, S., Toivio, P., & Sormunen, E. (2024). Exploring the use, usefulness and ease of use of digital occupational health services: A descriptive correlational study of customer experiences. *Digital Health*, *10*, 20552076241242668.

Aziznejadroshan, P., Goliroshan, S., Qalehsari, M. Q., Hosseini, S. J., Geraili, Z., & Zavardehi, F. S. (2022). An Analysis of the Relationship between Resilience and Clinical Competence in Nurses: A Descriptive-Correlational Study. *Christian Journal for Global Health*, *9*(1), 44-53.

Ryan, O., Haslbeck, J., & Waldorp, L. (2023). Non-stationarity in time-series analysis: Modeling stochastic and deterministic trends.

Choudhry, M. (2022). *The principles of banking*. John Wiley & Sons.

Park, C. Y., & Rajan, R. S. (2021). Regional Financial Cooperation in ASEAN+ 3: Taking Stock and Moving Forward. *REDEFINING STRATEGIC ROUTES TO FINANCIAL RESILIENCE IN ASEAN+ 3*, 361.

Bangura, M., Ngombu, A., Pessima, S., & Kargbo, I. (2021). Bank lending channel of monetary policy: Dynamic panel data evidence from Sierra Leone. *Modern Economy*, *12*(5), 1035-1058.

Morgan, H. (2022). Conducting a qualitative document analysis. *The Qualitative Report*, *27*(1), 64-77.

Park, J. Y., & Hong, O. (2021). Factors affecting adjustment of first-year nursing students to college life: A descriptive correlational study. *Nurse Education Today*, *102*, 104911

Adzobu, L. D., Agbloyor, E. K., & Aboagye, A. (2017). The effect of loan portfolio diversification on banks' risks and return: Evidence from an emerging market. *Managerial Finance*, *43*(11), 1274–1291. https://doi.org/10.1108/MF-10-2016-0292

Safa, A., Valiee, S., Fazel Darbandi, A., & Aghajani, M. (2020). Risky behaviors and sensation-seeking in adolescence: a descriptive correlational study. *Comprehensive child and adolescent nursing*, *43*(4), 260-273.

Boyd, D., & Sarathy, J. (2022). Differential perspectives: Epistemic disconnects surrounding the US Census Bureau's use of differential privacy. *Harvard Data Science Review (Forthcoming)*.

Ajao, K., Adenomon, M. O., & Adehi, M. U. (2023). Comparing some panel data estimators in the presence of autocorrelation. *Science World Journal*, *18*(3), 398–403.

Alhammadi, S. (2023). Expanding financial inclusion in Indonesia through Takaful: Opportunities, challenges and sustainability. *Journal of Financial Reporting and Accounting*.

Anginer, D., Demirguc-Kunt, A., Huizinga, H., & Ma, K. (2018). Corporate governance of banks and financial stability. *Journal of Financial Economics*, *130*(2), 327–346. https://doi.org/10.1016/j.jfineco.2018.06.011

Bank, W. (2019). *Global financial development report 2019/2020: Bank regulation and supervision a decade after the global financial crisis*. The World Bank.

Barus, J. J., Muturi, W., Kibati, P., & Koima, J. (2017). Effect of capital adequacy on the financial performance of savings and credit societies in Kenya. *American Journal of Finance*, *1*(4), 1–12.

Bouwman. (2013). *Liquidity: How Banks Create It and How It Should Be Regulated*.

Calem, P. S., & Rob, R. (1996). *The impact of capital-based regulation on bank risk-taking: A dynamic model* (Finance and Economics Discussion Series 96–12). Board of Governors of the Federal Reserve System (U.S.). https://EconPapers.repec.org/RePEc:fip:fedgfe:96-12

Crestwell. (2003). *An Expanded Typology for Classifying Mixed Methods Research Into Designs*.

Desta, T. S. (2016). Financial performance of "The best African banks": A comparative analysis through CAMEL rating. *Journal of Accounting and Management*, *6*(1), 1–20.

Fredrick, O., Jeremiah, O., & Onsomu, Z. (2018). The Relationship between Liquidity Risk and Failure of Commercial Banks in Kenya. *Universal Journal of Accounting and Finance*, *6*(1), 7–13. https://doi.org/10.13189/ujaf.2018.060102

Gichira. (2015). *Capital Structure Determinants among Companies Quoted in Securities Exchange in East Africa*.

Hansen, M. H., Hurwitz, W. N., & Pritzker, L. (1953). The accuracy of census results. *American Sociological Review*, *18*(4), 416–423.

Reddy, T. A., & Henze, G. P. (2023). Parametric and non-parametric regression methods. In *Applied Data Analysis and Modeling for Energy Engineers and Scientists* (pp. 355-407). Cham: Springer International Publishing.

Larocca, R. (2005). Reconciling conflicting Gauss-Markov conditions in the classical linear regression model. *Political Analysis*, *13*(2), 188–207.

Lillo, R. L., & Torrecillas, C. (2018). Estimating dynamic Panel data. A practical approach to perform long panels. *Revista Colombiana de Estadística*, *41*(1), 31–52.

Malhotra, N. K. (2007). Review of Marketing Research. In N. K. Malhotra (Ed.), *Review of Marketing Research* (Vol. 3, pp. v–v). Emerald Group Publishing Limited. https://doi.org/10.1108/S1548-6435(2007)0000003004

Minh Sang, N. (2021). Capital adequacy ratio and a bank's financial stability in Vietnam. *Banks and Bank Systems*, *16*(4), 61–71. https://doi.org/10.21511/bbs.16(4).2021.06

Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, *34*(5 Pt 2), 1189.

Sakyi, K. A., Musona, D., & Mweshi, G. (2020). Research Methods and Methodology. *Advances in Social Sciences Research Journal*, *7*(3), 296–302. https://doi.org/10.14738/assrj.73.7993

Sardo, F., & Serrasqueiro, Z. (2017). A European empirical study of the relationship between firms' intellectual capital, financial performance and market value. *Journal of Intellectual Capital*, *18*(4), 771–788.

Sebayang, P. (2020). The impact of the capital adequacy ratio, non-performing loan against to return on equity (Case study private bank in Indonesia). *SHS Web of Conferences*, *76*, 01035.

Velliscig, G., Floreani, J., & Polato, M. (2023). Capital and asset quality implications for bank resilience and performance in the light of NPLs' regulation: A focus on the Texas ratio. *Journal of Banking Regulation*, *24*(1), 66–88. https://doi.org/10.1057/s41261-021-00184-y

Wall, L. D., & Peterson, P. P. (1996). *Banks' Responses to Binding Regulatory Capital Requirements*.

Wondimu, A. (2022). *Determinants of Financial Sustainability of Microfinance Institutions in Ethiopia*. St. Mary's University.

Xiaoqing (Maggie) Fu, Shelagh Heffernan. (n.d.).

Hendrawan, M. H., Defung, F., & Wardhani, W. (2023). Un/desired impact of capital buffers: Evidence from Indonesian bank profitability and risk-taking. *Cogent Economics & Finance*, *11*(2), 2245217.