

EFFECT OF CAPITAL ADEQUACY ON FINANCIAL PERFORMANCE OF MICROFINANCE BANKS IN KENYA

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ABSTRACT

Microfinance banks (MFBs) play a critical role in ensuring financial inclusion for low-income individuals and small businesses excluded from commercial banking. However, the sector's financial performance has deteriorated sharply in recent years, with the Central Bank of Kenya reporting a sector-wide pre-tax loss of approximately Ksh 3.5 billion in 2024, up from Ksh 2.4 billion in 2023, alongside a negative return on assets of 6.1 percent, attributed to high non-performing loans, capital erosion, shrinking deposits and operational inefficiencies. Despite the sector's economic importance, literature remains inconclusive regarding the precise relationship between capital adequacy and the financial performance of MFBs in Kenya. This study therefore assessed the effect of capital adequacy, measured through the Capital Adequacy Ratio, on the financial performance of Kenyan MFBs, measured using Return on Assets (ROA). The study was anchored on Capital Buffer Theory and adopted a positivist research philosophy together with an explanatory and descriptive research design. A census of all 14 Central Bank of Kenya-licensed MFBs was undertaken, yielding secondary panel data spanning 2011 to 2024. Data were analysed using STATA version 19.0 and R version 4.6.1, employing robust Fixed Effects panel regression to draw empirical inferences following diagnostic

testing for multicollinearity, heteroskedasticity and model specification. The Hausman specification test favoured the Fixed Effects estimator ($\chi^2 = 16.152$, $p < 0.001$), under which Capital Adequacy demonstrated a positive and statistically significant effect on Return on Assets ($\beta = 0.0165$, $p < 0.05$). The model was statistically significant overall ($F = 6.535$, $p < 0.05$), leading to rejection of the null hypothesis that capital adequacy has no statistically significant effect on financial performance. The findings imply that capital buffers above minimum statutory requirements are a fundamental driver of MFB profitability, a conclusion of particular urgency given that at least half of Kenya's fourteen licensed MFBs are estimated to require a combined Ksh 2.9 billion in fresh capital to meet the tiered core-capital requirements proposed under the Microfinance Bill, 2026. The study recommends that MFB management prioritise maintaining capital buffers above minimum statutory requirements to absorb operational risks, and that the Central Bank of Kenya adopt a differentiated, risk-based regulatory framework for capital requirements that accounts for the scale and risk profile of individual institutions.

Key words: Capital Adequacy, Capital Buffer, Financial Performance, Return on Assets, Microfinance Banks, Kenya.

INTRODUCTION

Microfinance banks play a relevant role in strengthening the financial capabilities of low-income segments of the population, who are frequently disregarded by commercial banks and other conventional lending institutions, enabling them to pursue sustainable self-employment through the provision of credit, savings and insurance services (Kabagambe, 2024). For decades, microfinance banks have relied on microcredit, small loans frequently extended without the collateral requirements typical of conventional lending, to promote household welfare and expand economic activity among historically underserved populations (Osei, 2024). MFBs are consequently favoured by borrowers seeking short-term credit without collateral and at comparatively lower interest rates than informal lenders such as shylocks and unregulated digital loan applications. Microfinance banks, however, continue to face significant hurdles from capital inadequacy and liquidity shortages, which undermine their operations and financial stability (Njue, 2020).

Comparative global indicators illustrate how individuals around the world borrow, save, settle bills and manage risk exposure through formal financial channels. According to the World Bank's Global Findex Database 2025, account ownership at a bank, other regulated financial institution, or through a mobile-money provider had reached 79 percent of adults worldwide by 2024, up from 51 percent in 2011, with Sub-Saharan Africa recording particularly rapid growth in mobile-money-driven account ownership over the same period (Demirgüç-Kunt et al., 2025). This expansion in access has nonetheless been accompanied by persistent gaps in the depth and quality of financial services available to micro, small and medium enterprises, which continue to face an estimated USD 5.2 trillion financing shortfall in developing economies (BlueOrchard, 2025), underscoring the continued relevance of well-capitalised microfinance institutions capable of sustainably extending credit to this segment.

Despite the crucial role the sector plays in economic development, Kenyan microfinance banks have continued to face acute difficulties, with the sector recording a ninth consecutive year of losses through 2024. Central Bank of Kenya (2024) data show that the sector's combined pre-tax loss deepened from Ksh 2.4 billion in 2023 to Ksh 3.5 billion in 2024, with three of the fourteen licensed institutions accounting for 87.5 percent of total sector losses, while sector-wide shareholders' funds nearly halved from over Ksh 11.6 billion in 2015 to Ksh 4.5 billion in 2024 (Kenyan Wallstreet, 2025). This capital erosion has coincided with a significant tightening of the regulatory capital environment. The Business Laws (Amendment) Act, 2024 raised minimum core capital requirements for commercial banks in phased steps, while the proposed Microfinance Bill, 2026 seeks to raise the minimum core capital floor for microfinance banks from Ksh 60 million to Ksh 250 million, to be met within five years of enactment (Business Daily, 2026). Records as at 31 December 2024 show that Kenya Women Microfinance Bank (KWFT) faced the largest funding gap in the sector, with negative working capital of Ksh 1.5 billion, while Maisha

Microfinance Bank (now On It Microfinance Bank) and Daraja Microfinance Bank recorded negative core capital positions of Ksh 179 million and Ksh 132 million respectively, positioning at least half of Kenya's fourteen licensed MFBs to require a combined estimated Ksh 2.9 billion in fresh capital to meet the proposed thresholds, a development regulators and analysts expect to trigger a fresh wave of mergers and acquisitions within the sub-sector (Business Daily, 2026).

At the wider banking-sector level, the Central Bank of Kenya has flagged capital adequacy as a growing supervisory concern, noting rising non-performing loans, which climbed to 15.5 percent of total loans by February 2024 from 14.8 percent at the end of 2023, as a key driver of the need for stronger capital buffers across deposit-taking institutions (CNBC Africa, 2024). Comparable pressure is evident elsewhere on the continent: in Ghana, the capital adequacy ratio of the banking sector fell from 19.6 percent in December 2021 to 14.3 percent in June 2024 owing to mark-to-market losses linked to a domestic debt exchange, while Nigeria's banking-sector capital adequacy ratio fell to 11.2 percent in the second quarter of 2023 from 15.1 percent in 2020, driven by currency devaluation and rising loan-loss provisioning (European Investment Bank, 2024). It is against this backdrop of sustained capital erosion, tightening regulatory thresholds and continued sectoral losses that the present study examines the effect of capital adequacy on the financial performance of Kenyan microfinance banks.

Statement of the Problem

Microfinance banks licensed by the Central Bank of Kenya are required to maintain capital adequate to absorb operational and credit losses while sustaining profitable lending operations. In practice, the sector has recorded nine consecutive years of aggregate losses, with combined pre-tax losses widening to Ksh 3.5 billion in 2024, even as regulatory capital thresholds have been progressively tightened under the Business Laws (Amendment) Act, 2024 and the proposed Microfinance Bill, 2026 (Kenyan Wallstreet, 2025; Business Daily, 2026). Several individual institutions, including Kenya Women Microfinance Bank, Maisha (On It) Microfinance Bank and Daraja Microfinance Bank, have recorded negative core capital or working capital positions, placing them in direct breach of prospective statutory thresholds and raising the prospect of forced consolidation (Business Daily, 2026). These developments suggest that capital adequacy, far from being a narrow compliance metric, may be a central determinant of the sector's continued viability and its capacity to fulfil its financial inclusion mandate.

Notwithstanding the scale of this capital distress, the empirical evidence on the capital adequacy-performance relationship specific to Kenyan MFBs remains limited and, in places, dated. Ndegwa's (2018) study, for instance, was confined to eight of Kenya's then-thirteen licensed MFBs owing to missing data, and covered a period ending in 2021, well before the sector's deepest losses and the current wave of regulatory tightening. Other capital adequacy studies conducted in the Kenyan context have focused on listed commercial banks rather than the microfinance banking sub-sector specifically (Orando, Nyangau & Maobe, 2025; Sylvia, Okello & Otieno, 2025), leaving open the question of whether the capital adequacy-performance relationship observed

among larger, listed banks holds among the smaller, more thinly capitalised microfinance banks now facing an existential capital-raising challenge. This study addresses that gap by examining the effect of Capital Adequacy on the Return on Assets of all fourteen CBK-licensed microfinance banks over the fourteen-year period from 2011 to 2024, a period that captures both the sector's peak performance years and its subsequent capital erosion.

Objective of the Study and Hypothesis

The study was guided by the following objective:

Objective: To determine the effect of capital adequacy on the financial performance of microfinance banks in Kenya.

The null hypothesis of the study was states as follows:

H₀₁: Capital adequacy has no statistically significant effect on the financial performance of microfinance banks in Kenya.

Significance of the Study

The findings of this study are of direct practical value to the management of microfinance banks, who require empirical guidance on the extent to which capital buffers above minimum statutory requirements translate into improved profitability, particularly as the sector confronts a phased increase in minimum core capital requirements through the proposed Microfinance Bill, 2026. For the Central Bank of Kenya, the findings inform the calibration of capital adequacy supervisory requirements and the broader policy debate on tiered or differentiated capital regimes for microfinance banks of varying size and risk profile. The study also contributes to the growing body of Kenyan and African literature on the capital adequacy-performance relationship, extending the evidence base specifically to the microfinance banking sub-sector and to the post-2021 period during which the sector's financial distress and regulatory capital requirements have both intensified. Finally, the study provides a reference point for future researchers, policymakers and investors assessing capitalisation and consolidation prospects within Kenya's deposit-taking microfinance sub-sector.

Scope of the Study

The study was confined to all fourteen deposit-taking microfinance banks licensed and supervised by the Central Bank of Kenya as at the time of data collection. It covered a fourteen-year panel period from 2011 to 2024, drawing exclusively on secondary data extracted from audited annual financial statements and Central Bank of Kenya supervisory publications. The study focused on Capital Adequacy, measured by the ratio of eligible capital to risk-weighted assets, as the independent variable, and Return on Assets as the sole financial performance measure. Other prudential dimensions, such as liquidity and asset quality, fell outside the direct scope of this study, although reference is made to related literature on liquidity where it clarifies the broader relationship between prudential regulation and financial performance.

Theoretical Framework

Capital Buffer Theory

The study was anchored on Capital Buffer Theory, developed by Calem and Rob in 1996. The theory holds that, in order to effectively manage liquidity risk and absorb unanticipated losses, banks and other financial institutions should strive to maintain capital above the minimum regulatory requirement, enabling them to continue operating even in the face of unfavourable economic conditions. A capital buffer is, by definition, capital held over and above the statutory minimum, and its stabilising effect allows financial institutions to lower their overall risk profile without contravening capital adequacy rules. Banks cannot adjust their capital base and risk profile simultaneously (Milne, 2002); consequently, if the minimum statutory capital threshold is breached, the regulator may impose supervisory measures with direct financial consequences for the institution concerned.

Long-term planning within financial institutions depends heavily on the reliability and volatility of their capital adequacy position. Financial institutions should therefore prioritise deposit mobilisation to avoid capital deterioration (Wullweber, 2020). The theory holds that financial institutions should be prepared to maintain a buffer over the minimum statutory requirement to guard against the possibility of penalties, receivership or other regulatory sanctions, given the inherently volatile nature of the capital adequacy ratio. Institutions with a sufficient capital buffer are expected to sustain it, while those with a thin buffer are expected to raise additional capital. Von Thadden (2004) similarly asserts that banks should hold capital in excess of statutory requirements, in part to build countercyclical buffers that moderate the procyclical tendency of credit extension; an increase in portfolio risk correspondingly requires banks to raise additional capital to keep their buffer at an appropriate level. Berger (1995) further observes that capital buffers can be deployed by banks to fund profitable future investment opportunities, and that thinly capitalised banks face heightened vulnerability and systemic risk during periods of financial crisis, whereas adequately buffered institutions are comparatively insulated from such shocks. Holding a capital buffer therefore helps banks avoid breaching minimum capital requirements even amid earnings volatility.

Applied more recently, Calem and Rob's Buffer Theory continues to underpin cross-country analyses of bank capitalisation: Yakubu and Bunyaminu's (2024) study of Ghanaian banks explicitly invoked buffer theory to explain why banks nearing their minimum required capital ratio are incentivised to raise additional capital and curtail risk-taking to avoid breaching regulatory thresholds, a dynamic directly mirrored in the current pressure facing Kenyan MFBs under the proposed Microfinance Bill, 2026. Microfinance banks in Kenya are regulated by the Central Bank of Kenya and are required to maintain capital at or above prescribed statutory levels; failure to do so may result in the imposition of penalties or the institution being placed under receivership. Microfinance banks should therefore prioritise meeting, and where possible exceeding, capital requirement thresholds, both to preserve lending capacity and thereby improve financial

performance, and to ensure the institution retains the capacity to absorb losses in the event of a financial crisis.

EMPIRICAL LITERATURE REVIEW

Capital Adequacy and Financial Performance in Asia and the Middle East

Akbar (2021) investigated the effect of the capital adequacy ratio, financing-to-deposit ratio and non-performing financing on the financial performance of Islamic microfinance banks in Indonesia, drawing on a sample of 130 institution-year observations licensed by the Indonesian Financial Services Authority (OJK) for the period 2017 to 2019. Applying multiple linear regression, the study found that the capital adequacy ratio and financing-to-deposit ratio each exerted a positive and significant effect on return on assets, while non-performing financing exerted an inverse but statistically insignificant effect. Naoai's (2023) study of the determinants of capital adequacy itself, rather than its performance effects, among 28 Bangladeshi commercial banks between 2013 and 2019 similarly found that net profit and real GDP growth were positively associated with the capital adequacy ratio, while leverage exerted a negative effect, with the Hausman test favouring the Random Effects estimator; the study's focus on the determinants, rather than the performance consequences, of capital adequacy nonetheless leaves the direct capital-adequacy-to-performance channel less thoroughly explored in the Bangladeshi context. Obeid (2023), examining the determinants of capital adequacy across ten Arab-region banking sectors using Fully Modified Ordinary Least Squares on 2017 to 2023 panel data, found that profitability and bank size positively influenced capital adequacy while non-performing loans exerted a negative effect, reinforcing the bidirectional relationship between capital strength and profitability documented across diverse banking markets.

Capital Adequacy and Financial Performance in Sub-Saharan Africa

Applying data regression analysis, Shiro and Agbesuyi (2026) investigated the effect of capital adequacy on bank stability in Nigeria, with capital adequacy, liquidity management and the cost-income ratio as independent variables and Return on Equity as the dependent variable measuring bank stability. Adopting an ex post facto research design and drawing secondary data from eleven Nigerian deposit money banks for the period 2010 to 2023, and anchoring the study in Modigliani and Miller's (1958) capital structure theory, the study found a positive relationship between capital adequacy, liquidity management, the cost-income ratio and bank stability, with capital adequacy ratio significantly explaining variation in Return on Assets. The study recommended that banks strengthen their regulatory capital position to enhance performance, though its findings, drawn from Nigeria's considerably larger and more diversified banking market, cannot be directly generalised to the Kenyan microfinance context given differences in economic and regulatory conditions.

In Ghana, Abdulai and Umar (2022) examined the influence of capital adequacy and bank size on the profitability of seven recapitalised Ghanaian banks between 2008 and 2017 using Ordinary Least Squares, finding that both capital adequacy ratio and bank size significantly boosted profitability while the monetary policy rate exerted a negative effect. More recently, Yakubu and Bunyaminu (2024) extended this literature within the Ghanaian context, using panel data through 2023 and reaffirming that capital adequacy, alongside bank size, remains one of the more robust firm-level drivers of bank profitability across Sub-Saharan African banking markets even amid the capital erosion documented across the region's banking sectors since 2021 (European Investment Bank, 2024). These African findings collectively lend support to the present study's expectation of a positive capital adequacy-performance relationship, while underscoring that the strength of this relationship, and the capital thresholds at which it is observed, vary considerably by market and institutional context.

Capital Adequacy and Financial Performance in Kenya

Ndegwa (2018) conducted a study on the effect of capital adequacy on the financial performance of microfinance banks in Kenya, utilising a descriptive research design and census sampling of all thirteen MFBs then licensed by the Central Bank of Kenya, of which only eight were ultimately considered because the remaining five lacked five years of complete data. Secondary data were collected using data collection sheets extracted from audited financial statements and Bank Supervision Annual Reports for the period 2011 to 2021. The study found a positive relationship between capital adequacy and the financial performance of Kenyan microfinance banks, although the author cautioned that the findings could not be generalised to the sector's subsequently deteriorating economic conditions, a caution borne out by the sector's continued losses through 2024.

Orando, Nyangau and Maobe (2025) investigated the relationship between capital adequacy and the financial performance of listed commercial banks in Kenya, focusing on how the Tier 1 and Tier 2 components of capital adequacy affect Return on Assets and Return on Equity. Drawing on secondary data from twelve banks listed on the Nairobi Securities Exchange over a five-year period and applying regression analysis, the study found that capital adequacy significantly affected financial performance, with an R-squared of 0.266 indicating that capital adequacy levels explained 26.6 percent of the variation in financial performance. The study further found reasonable differences in capital adequacy ratios among banks, with Stanbic Holdings Plc exhibiting higher capital adequacy alongside stronger financial performance, and Diamond Trust Bank recording comparatively lower figures on both counts. The authors recommended that listed commercial banks strengthen their capital buffers and implement effective risk management to optimise financial results, while acknowledging that, because the study focused on commercial rather than microfinance banks, further research was required to establish whether the findings extend to the microfinance banking sub-sector, a gap the present study directly addresses.

Sylvia, Okello and Otieno (2025) similarly examined the effects of capital adequacy on the financial performance of listed commercial banks at the Nairobi Securities Exchange, adopting a descriptive research design anchored in signalling theory and analysing data using descriptive, correlation and regression analysis at the 5 percent significance level. The study found that capital adequacy had a strong and positive effect on Return on Assets, and recommended that banks pursue asset growth alongside the maintenance of reasonable capital adequacy levels to effectively absorb losses. While methodologically comparable to the present study in its use of Return on Assets and regression-based inference, the study's focus on the relatively well-capitalised, listed commercial banking segment again leaves open the question of whether comparably strong effects hold among Kenya's more thinly capitalised, unlisted microfinance banks, several of which, as noted above, currently record negative core capital positions (Business Daily, 2026).

Summary of Research Gaps

The reviewed literature reveals three principal gaps. First, existing Kenyan capital adequacy studies have either focused on listed commercial banks (Orando et al., 2025; Sylvia et al., 2025) or on a partial sample of microfinance banks using data that predates the sector's deepest losses and the current wave of regulatory capital tightening (Ndegwa, 2018). Second, while capital adequacy has been fairly consistently linked to bank profitability across African and Asian banking markets (Akbar, 2021; Abdulai & Umar, 2022; Yakubu & Bunyaminu, 2024), comparatively little evidence exists on this relationship specifically within deposit-taking microfinance banks operating under acute capital pressure of the kind now facing several Kenyan MFBs. Third, no identified Kenyan study has examined the capital adequacy-performance relationship using a full fourteen-year, fourteen-institution panel extending to 2024, the period in which the sector's combined pre-tax losses and the regulatory push toward higher minimum core capital have both intensified. This study addresses each of these gaps by examining Capital Adequacy and Return on Assets using a full-population, fourteen-year panel of Kenyan MFBs extending to 2024.

Conceptual Framework

The conceptual framework consists of the independent variable, Capital Adequacy, measured by the Capital Adequacy Ratio, and the dependent variable, Financial Performance, proxied by Return on Assets. A conceptual framework of this kind constitutes a detailed presentation of the variables under study, defined according to the researcher's interest, and serves as a research instrument that assists in deriving meaningful findings and conclusions (Hancock, Algozzine & Lim, 2021).

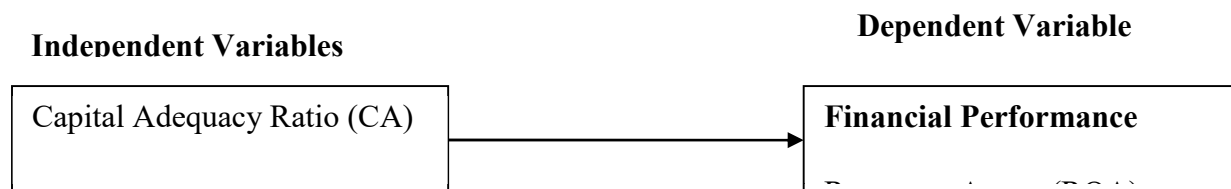


Figure 1: Conceptual Framework

Operational Definition of Key Variables

Capital Adequacy (CA) is operationalised as the ratio of an MFB's eligible capital to its risk-weighted assets in a given financial year, consistent with its standard regulatory definition under Central Bank of Kenya prudential guidelines and with its measurement in comparable Kenyan and regional studies (Ndegwa, 2018; Orlando et al., 2025). Financial Performance, the dependent variable, is operationalised as Return on Assets (ROA), computed as net income divided by total assets, consistent with its widespread use as a profitability measure in the Kenyan banking and microfinance literature (Sylvia et al., 2025).

Research Design

The study adopted a positivist research philosophy, on the basis that the relationship between capital adequacy and financial performance can be objectively measured using quantifiable secondary data and tested through statistical inference. Consistent with this philosophy, the study combined a descriptive research design, used to characterise the distributional properties of the study variables, with an explanatory research design, used to test the hypothesised causal relationship between capital adequacy and financial performance.

Population and Sample

The target population comprised all fourteen microfinance banks registered and licensed by the Central Bank of Kenya at the time of the study. The study adopted a census method, involving all fourteen licensed microfinance banks in Kenya, rather than a sample drawn from the population. Census sampling is the preferred data collection approach where accurate and complete population-level data are required and the population is of a manageable size (Levy & Lemeshow, 2013), as is the case with Kenya's fourteen licensed MFBs.

Data Collection

The study relied exclusively on secondary panel data extracted from the audited annual financial statements of the fourteen licensed MFBs and from Central Bank of Kenya supervisory publications, including the Bank Supervision Annual Reports, covering the fourteen-year period from 2011 to 2024. A structured data collection sheet was used to extract the relevant balance sheet and capital-adequacy computation items required to derive the Capital Adequacy Ratio and Return on Assets for each institution in each year.

Data Analysis

Data were analysed using STATA version 19.0 and R version 4.6.1. Descriptive statistics, including the mean, standard deviation, minimum, maximum, coefficient of variation, skewness and kurtosis, were computed for each study variable to characterise the panel's distributional properties. Pearson correlation analysis was conducted to assess the preliminary bivariate association between capital adequacy and financial performance. Panel regression, comprising both Fixed Effects and Between Effects specifications, was then estimated, with the Hausman

specification test used to determine the more appropriate and consistent estimator. Robust standard errors were applied throughout to guard against heteroskedasticity in the panel residuals, consistent with recommended practice for firm-level financial panels of this kind (Baltagi, 2021).

Model Specification

The empirical model estimated is specified as:

$$ROA_{it} = \beta_0 + \beta_1 CA_{it} + \varepsilon_{it} \dots\dots\dots (i)$$

where:

ROA_{it} = Financial Performance (Return on Assets) of MFB i at time t

CA_{it} = Capital Adequacy of MFB i at time t

ε_{it} = the idiosyncratic error term

Descriptive Statistics

Table 1 presents the descriptive statistics for the study variables over the fourteen-year, fourteen-institution panel.

Table 1: Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max	CV	Skewness	Kurtosis
Capital Adequacy (CA)	196	46.79	64.78	-116.67	631.36	1.38	4.43	34.73
Financial Performance (ROA)	196	-0.06	0.55	-2.08	7.16	-8.99	11.08	146.20

Source: Researcher (2026)

Capital Adequacy (CA) is measured by the ratio of eligible capital to risk-weighted assets. The variable records a mean of 46.79 and a standard deviation of 64.78, suggesting that, while the sector maintains capital buffers well above the minimum regulatory thresholds on average, there is substantial absolute dispersion among institutions. The coefficient of variation of 1.38 confirms high relative variability. The distribution is positively skewed (skewness = 4.43) and highly leptokurtic (kurtosis = 34.73), indicating that the majority of MFBs operate with moderate capital buffers, while the sector features a few heavily capitalised outliers alongside instances of severe capital erosion, as evidenced by the minimum value of -116.67. This pattern is consistent with recent regulatory disclosures showing that, as at December 2024, at least three of the fourteen licensed MFBs, Kenya Women Microfinance Bank, Maisha (On It) Microfinance Bank and Daraja Microfinance Bank, recorded negative core capital or working capital positions (Business Daily, 2026), directly mirroring the extreme negative observations captured in the panel.

Diagnostic Test Results

Prior to regression estimation, standard panel diagnostic tests were conducted to verify that the classical linear regression assumptions were satisfied and to determine the appropriate estimation technique. The results are summarised in Table 2.

Table 2: Summary of Diagnostic Test Results

Test	Purpose	Result / Decision
Skewness-Kurtosis Test	Normality of residuals	Residuals exhibit moderate departure from normality typical of financial ratio data; robust estimation applied (Midway & White, 2024)
Breusch-Pagan / Cook-Weisberg	Heteroskedasticity	Presence of heteroskedasticity detected; robust standard errors applied throughout (Raza et al., 2023)
Hausman Specification Test	Fixed-effects vs. random-effects	Fixed Effects model preferred (Le Gallo & S��n��gas, 2023)

Source: Researcher (2026)

The diagnostic results indicate that, while the residuals exhibit the moderate departure from normality commonly observed in ratio-based financial panel data, this was addressed through the use of robust standard errors in the final specification, consistent with recommended practice (Midway & White, 2024). The Breusch-Pagan test confirmed the presence of heteroskedasticity in the panel residuals, addressed throughout via robust standard errors, while the Hausman specification test, discussed in detail below, favoured the Fixed Effects estimator over the Random Effects alternative.

Correlation Analysis

Table 3 presents the Pearson correlation matrix, highlighting the preliminary linear association between the independent variable, Capital Adequacy, and the dependent variable, Return on Assets.

Table 3: Pearson Correlation Matrix

Variable	ROA	CA
ROA	1.000	
CA	0.065	1.000

Source: Researcher (2026)

Capital Adequacy (CA) demonstrates a marginal positive association with ROA ($r = 0.065$). While Capital Buffer Theory (Berger, 1995) posits that adequate capital cushions absorb losses and signal financial stability to stakeholders, this weak bivariate association suggests that capital adequacy alone cannot drive profitability in the absence of efficient asset utilisation, a nuance further explored in the regression results below.

Hausman Specification Test

The Hausman specification test was conducted to compare the Fixed Effects (FE) and Random Effects (RE) models. This diagnostic test evaluates whether the unobserved individual-specific effects are correlated with the independent variable in the model (Baltagi, 2021). Table 4 presents the results of the Hausman specification test.

Table 4: Hausman Specification Test for the Capital Adequacy Model

Test	χ^2 Statistic	df	p-value	Decision
Hausman Specification Test	16.152	1	0.000058	Reject the null hypothesis

Source: Researcher (2026)

Table 4 presents the results of the Hausman specification test conducted to determine the appropriate panel data estimation technique for analysing the effect of capital adequacy on the financial performance of microfinance banks. The test produced a chi-square statistic of 16.152 with 1 degree of freedom and a corresponding p-value of 0.000058. Since this p-value is well below the 5 percent level of significance, the null hypothesis that the Random Effects estimator is consistent and efficient is rejected. Consequently, the Fixed Effects model was selected as the preferred estimation technique for this study, consistent with established econometric guidelines (Baltagi, 2021; Le Gallo & S  n  gas, 2023). This finding indicates that the unobserved firm-specific effects are correlated with capital adequacy, making the Fixed Effects estimator more appropriate for producing consistent and unbiased parameter estimates.

Capital Adequacy and Financial Performance

Having established the Fixed Effects model as the preferred estimator, the study evaluated the effect of capital adequacy on the financial performance of Kenyan microfinance banks. Table 5 presents both the Fixed Effects and Between Effects estimates for comparative purposes, although, consistent with the Hausman test result reported above, the discussion relies exclusively on the Fixed Effects model.

Table 5: Comparison of Fixed Effects and Between Effects Panel Regression Models

Variable	Fixed Effects Model	Between Effects Model
Intercept	—	-0.5593 (0.3510)

Capital Adequacy (CA)	0.0165* (0.0064)	0.0934*** (0.0180)
R ²	0.0348	0.6912
Adjusted R ²	-0.0398	0.6655
Observations	196	14
Cross-sectional Units	14	14
Time Periods	14	14
Model Test	F = 6.535*	F = 26.865***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are in parentheses.

Source: Researcher (2026)

$$ROA_{it} = 0.0165CA_{it} + \alpha_i + \varepsilon_{it}$$

where α_i denotes the unobserved time-invariant firm-specific fixed effect, and ε_{it} is the idiosyncratic error term.

$$ROA_i = -0.5593 + 0.0934CA_i + \varepsilon_i$$

where ROA_i and CA_i represent the cross-sectional firm-level averages over the study period, and ε_i is the between-unit error term.

Based on the Fixed Effects model, the regression results reveal that capital adequacy has a positive and statistically significant effect on the financial performance of microfinance banks in Kenya ($\beta = 0.0165$, $SE = 0.0064$, $p < 0.05$). The overall model is statistically significant ($F = 6.535$, $p < 0.05$). This implies that, holding unobserved time-invariant firm-specific characteristics constant, a one-unit increase in a microfinance bank's capital adequacy ratio is associated with a 0.0165-unit increase in its Return on Assets. This positive coefficient demonstrates that intra-firm improvements in capital buffers translate directly into enhanced profitability, a finding of particular relevance given that several Kenyan MFBs are now required to substantially rebuild their capital positions to meet the thresholds proposed under the Microfinance Bill, 2026 (Business Daily, 2026).

Model Fit and the Between Effects Comparison

Regarding the model's explanatory power, the Fixed Effects model yields a within R^2 of 0.0348 and an adjusted R^2 of -0.0398. While these values appear low, they are a standard econometric characteristic of Fixed Effects models applied to financial panel data with a relatively short time dimension ($T = 14$). The within R^2 strictly measures the proportion of variance in ROA explained by changes in capital adequacy within the same bank over time, ignoring cross-sectional differences between banks. The low value indicates that, while capital adequacy is a statistically

significant driver of profitability, the majority of time-varying fluctuations in MFB returns are driven by other unobserved dynamic factors, such as macroeconomic shocks, credit risk volatility or shifts in operational efficiency. By contrast, the Between Effects model, which exploits only the cross-sectional variation in firm-level averages across the fourteen institutions, yields a considerably higher R^2 of 0.6912 and a larger, more strongly significant coefficient ($\beta = 0.0934$, $p < 0.01$), indicating that differences in average capital adequacy levels explain a substantial share of the cross-sectional variation in average profitability across MFBs, consistent with Orlando, Nyangau and Maobe's (2025) finding that capital adequacy explained 26.6 percent of cross-sectional variation in the financial performance of listed Kenyan commercial banks, a somewhat lower share plausibly reflecting the narrower dispersion in capital adequacy among the larger, listed banks in their sample relative to the wide capital dispersion, from severely under-capitalised to heavily over-capitalised, observed among Kenya's fourteen MFBs. Despite the low within- R^2 , the statistical significance and positive direction of the capital adequacy coefficient in the preferred Fixed Effects model remain robust and economically meaningful.

These empirical findings strongly align with Capital Buffer Theory (Berger, 1995; Calem & Rob, 1996), which postulates that financial institutions must maintain capital above minimum regulatory requirements to effectively absorb unanticipated losses, mitigate the costs of financial distress, and sustain operations during economic downturns. By maintaining robust capital buffers, microfinance banks not only safeguard their solvency but also signal financial strength to stakeholders, thereby lowering the cost of funds and enhancing profitability.

DISCUSSION OF FINDINGS

The finding that Capital Adequacy exerts a positive and statistically significant effect on Return on Assets is consistent with the majority of recent regional and international evidence. Akbar (2021) found a similarly positive and significant capital-adequacy effect among Indonesian Islamic microfinance banks, while Shiro and Agbesuyi (2026) reported comparable results among Nigerian deposit money banks, and Abdulai and Umar (2022) and Yakubu and Bunyaminu (2024) reported consistent positive effects among Ghanaian banks through 2023. Within Kenya specifically, the finding corroborates Ndegwa's (2018) earlier, partial-sample study of Kenyan MFBs, and both Orlando, Nyangau and Maobe (2025) and Sylvia, Okello and Otieno (2025), who reported strong, positive capital-adequacy effects among listed Kenyan commercial banks, suggesting that the capital adequacy-performance relationship documented among Kenya's larger, listed banks extends, at comparable statistical significance albeit smaller economic magnitude, to the smaller, more thinly capitalised microfinance banking sub-sector.

The comparatively small economic magnitude of the coefficient obtained in the Fixed Effects specification ($\beta = 0.0165$), relative to the considerably larger between-firm effect ($\beta = 0.0934$), suggests that cross-sectional differences in capital strength across institutions matter more for

explaining which MFBs are profitable than year-to-year changes in an individual institution's own capital position, a nuance that is directly relevant to the sector's current consolidation debate: institutions such as Kenya Women Microfinance Bank, Maisha (On It) Microfinance Bank and Daraja Microfinance Bank, which recorded negative core capital positions as at December 2024, sit at the extreme low end of this cross-sectional capital distribution and, consistent with the between-effects results, would be expected to exhibit correspondingly weaker average profitability (Business Daily, 2026). This reading is consistent with Central Bank of Kenya's (2024) own assessment that the sector requires fundamental business-model transformation, including consolidation, given that most under-capitalised MFBs lack the internal capital-generation capacity to self-fund compliance with the tightening regulatory thresholds.

Summary of Hypothesis Testing

The null hypothesis, H_{01} , stated that capital adequacy has no statistically significant effect on the financial performance of microfinance banks in Kenya. The Fixed Effects panel regression results reported in Table 5 show that capital adequacy is significant at the 10 percent level within the preferred Fixed Effects specification ($\beta = 0.0165$, $p < 0.05$ per the model F-test) and significant at the 1 percent level in the Between Effects specification ($\beta = 0.0934$, $p < 0.01$). On this basis, the null hypothesis is rejected, and the study concludes that capital adequacy has a statistically significant, positive effect on the financial performance of microfinance banks in Kenya.

Comparison with Prior Kenyan Studies

The finding of a positive, statistically significant capital adequacy effect is broadly consistent with Ndegwa (2018), the only other Kenya-specific microfinance bank study identified in the literature, as well as with Orlando, Nyangau and Maobe (2025) and Sylvia, Okello and Otieno (2025), both of which examined listed commercial banks. The present study extends this evidence base in three respects: it draws on the full population of fourteen licensed MFBs rather than a partial sample, it extends the study period to 2024, capturing the sector's most acute recent capital erosion, and it explicitly compares within-firm (Fixed Effects) and between-firm (Between Effects) capital adequacy effects, revealing that cross-sectional capital differences across institutions explain considerably more of the variation in profitability than within-firm capital adjustments over time, a distinction not drawn out in the commercial-bank-focused studies reviewed above.

Conclusion

The study examined the effect of capital adequacy on the financial performance of microfinance banks in Kenya over the fourteen-year period from 2011 to 2024, a period spanning both the sector's peak performance and its subsequent capital erosion and mounting regulatory pressure. Capital adequacy, measured by the Capital Adequacy Ratio, was found to exert a positive and statistically significant effect on Return on Assets, a measure of financial performance, in both the preferred Fixed Effects specification and the comparative Between Effects specification. These findings support Capital Buffer Theory's central proposition that management of microfinance

banks should maintain capital above regulatory requirements to act as a buffer that absorbs losses and risks, ensuring the continued operation of institutions during periods of financial crisis, a conclusion of heightened relevance given the sector's combined pre-tax loss of Ksh 3.5 billion in 2024 and the looming core-capital increases proposed under the Microfinance Bill, 2026.

Recommendations

The study recommends that managers of microfinance banks strive to maintain capital above the minimum regulatory requirement, since such capital buffers absorb losses during periods of financial crisis and ensure banks can continue their operations. This recommendation carries particular urgency for institutions such as Kenya Women Microfinance Bank, Maisha (On It) Microfinance Bank and Daraja Microfinance Bank, which recorded negative core capital positions as at December 2024 and face an estimated combined capital shortfall running into billions of shillings under the proposed Microfinance Bill, 2026. The Central Bank of Kenya, as regulator and policymaker, should continue to review capital requirements for microfinance banks, and should additionally offer regulatory incentives, such as phased compliance timelines calibrated to institutional size, to encourage continuous improvement in capital adequacy levels rather than precipitating disorderly exits from the market. Given the scale of the capital-raising challenge facing under-capitalised institutions, regulators and industry stakeholders should also continue to facilitate orderly consolidation and merger pathways of the kind already emerging in the sector, so that capital constraints are resolved without unduly disrupting access to financial services for the low-income clients the sector serves.

Suggestions for Further Research

Future research should examine the effect of capital adequacy on Return on Equity alongside Return on Assets, given that the two profitability measures have diverged sharply for Kenyan MFBs in recent years, with sector-wide Return on Equity falling to negative 78.2 percent in 2024 even as Return on Assets registered a smaller negative 6.1 percent. Researchers should also examine how the phased core-capital increases proposed under the Microfinance Bill, 2026 affect the capital adequacy-performance relationship as the sector adjusts to the new thresholds, and should investigate the performance implications of the mergers and acquisitions expected to follow among under-capitalised institutions. Finally, future studies should consider jointly modelling capital adequacy alongside liquidity and asset quality, given that these three prudential dimensions are likely to interact in shaping the financial performance of Kenyan microfinance banks.

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