Capital Adequacy and Asset Quality of Deposit-Taking Microfinance Banks in Kenya

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Abstract: The effect of capital adequacy on the asset quality of deposit-taking microfinance banks in Kenya is the central focus of this research. The study's central premise was based on the agency, moral hazard, and institutional theories. The study's target population was 14 deposit-taking microfinance banks in Kenya, with each bank's panel data collected from their audited reports for the years 2019 to 2023. Longitudinal design was the most ideal given the balanced panel data of the banks. Panel data regression was used to determine the causality between the predictor and response variables. The study findings reveal that capital adequacy positively influenced the asset quality of the DTM banks studied (B = 2.587). The association was also significant ($p = 0.002 < 0.05$). This implied that as MFBs accumulated more capital, the level or amount of NPLs decreased, thus leading to an improvement in their asset quality.

Key Words: Capital Adequacy, Asset Quality, microfinance banks.

1. INTRODUCTION

Given the importance of banks to the country's economy and the knowledge that credit risk presents a significant risk to banks, the asset quality becomes crucial as a key factor in banks' success. Banks may decide to raise lending rates to compensate for a decline in earnings if NPLs rise. This measure may improve lending conditions by lowering the NPL ratios, but it may have a negative effect on financially strapped sectors (Erdas & Ezanoglu, 2022). Therefore, understanding the determinants of asset quality can help detect a set of warning signs, facilitate prompt action, and reduce the chance and related cost of crises (Msomi, 2022). Ghosh (2015) opined that the rise in NPLs signifies significant hazards for the financial sector, pertaining to both liquidity and profitability.

Poor asset quality, as reflected by increasing NPLs, reduces banks' lending abilities and raises their opportunity cost of capital because these assets generate no returns and need capital provisioning, management, and funding (Roychowdhury, 2018). Rapid and excessive NPL accumulation can also result in a credit crunch, which can then escalate into a banking crisis. As a result, small-and medium-sized business financing, commerce, infrastructure, and household financing may all suffer significantly. Businesses with poor asset quality are mostly uncompetitive and register poor efficiency ratios (Ferreira, 2022).

As a result, it is critical to examine different factors, including those that are internal to banks, such as capital adequacy, as these might offer vital insights to regulatory agencies and the bank's management. The asset quality of DTM banks in Kenya was above 10% except in 2019. The NPLs ratio rose from 9.5% during years 2019 to 13.4% in 2020, 13.7% in 2021, and 14.5% in 2022 (Kenya Banking Association, 2023), a sign of deteriorating asset quality.

Studies such as Salas et al. (2024) explored the determinants of NPLs using global data from Europe, Asia, and Africa. The study was, however, not country-specific, hence making generalization difficult. Munyua (2022) investigated the determinants of financial performance. Asset quality is different from financial performance as it's a predictor of credit risk, whereas financial performance focuses on efficient asset utilization to generate business revenue. Rocha et al. (2019) analyzed macroeconomic factors and financial performance in Indonesia. The study, however, investigated MFIs, which are different from DTM banks, which are regulated by the CBK. Kuria et al. (2024) investigated AQ and financial stability of large banks, and Kimotho (2023) investigated asset quality and credit performance of MFBs. Both studies explored asset quality as a predictor variable and not a dependent variable. This current study aimed to fill these gaps by investigating bank-specific internal factors and the asset quality of deposit-taking microfinance banks in Kenya.

Asset quality remains a critical concern for deposit-taking microfinance banks (DTMFBs) in Kenya, as reflected by persistent levels of non-performing loans that threaten institutional sustainability, depositor confidence, and overall financial stability. Despite the sector's important role in promoting financial inclusion among low-income and underserved populations, many DTMFBs continue to experience loan portfolio deterioration arising from weak credit appraisal, inadequate risk management, and operational inefficiencies. Poor asset quality erodes capital buffers, exposes institutions to liquidity pressures, and increases regulatory risk.

While existing regulatory frameworks emphasize prudential management, evidence on how bank-specific internal factors, such as capital adequacy, influence asset quality among DTMFBs in Kenya remains limited and fragmented. Most prior studies have either focused on commercial banks or examined microfinance institutions without isolating deposit-taking entities, thereby limiting the applicability of findings to the DTMFB segment. Consequently, there is insufficient empirical clarity on the extent to which capital adequacy drives asset quality outcomes in the Kenyan microfinance banking sector. This gap constrains effective managerial decision-making and policy formulation, thus necessitating a systematic investigation of the relationship between capital adequacy and asset quality of deposit-taking microfinance banks in Kenya.

2. LITERATURE REVIEW

Ikpesu and Oke (2022) assessed how CAR and AQ affected Nigerian banking firms' performance. The authors collated panel data spanning 2010 to 2019. Their population consisted of 12 large banks that are listed. They adopted the SGMM model to process data extracted from audited reports. The study's conclusion showed that asset quality and capital sufficiency resulted in Nigerian banks performing well. Further, the results showed that higher bank performance and earnings are correlated with capital and good asset quality.

In Indonesia between 2015 and 2019, Setiawan and Muchtar (2021) investigated the elements influencing the capital adequacy ratio of Indonesian banks. Using a sample of 42 listed banks, the authors extracted information using a secondary collection technique from the banks' financial reports and later processed the data inferentially and using descriptive analysis. The outcome revealed that bank size, loan size, and size were significant factors influencing CAR. The findings linked banks with larger economies of scale to having significant CAR, and those with a lower loan ratio to also having a larger CAR ratio.

In Kenya, Njeri (2019) examined how CAR affected the AQ of SACCOs by targeting 35 SACCOs and extracting financial information from audited reports. The case study design was selected as appropriate, and the researcher descriptively and inferentially analyzes data using the SPSS software. Capital reserve influenced the asset quality of the SACCOs negatively. The research examined SACCOs whose capital and asset quality requirements differ from microfinance banks.

Nyaundi (2018) investigated whether a large CAR leads to better AQ management for 43 large banks in Kenya. Adopting a descriptive design, the researcher obtains data from the audited report for the period 2010 to 2014. Data analysis is achieved descriptively and inferentially using the SPSS software. The findings showed that a larger capital adequacy exposed the banks to a greater credit risk and thus could result in poor asset quality. The relationship was, however, not significant. He recommended that banks reexamine their credit monitoring practices, maintaining good asset quality levels.

3. RESEARCH METHODOLOGY

This research opted for a longitudinal research design because of the panel data that was collected. The population was the 14 deposit-taking microfinance banks. Appendix (IV) shows the list of the DTMs that this research selected. Instead of sampling, the study selected the entire target population. This is because there are only a small number of microfinance banks (fewer than 50), making it necessary to use the entire population to attain a higher accuracy. The duration of the study ranged from 2019 to 2023, and data were collected for this period.

Secondary data in this context is information on the financial position of DTMs publicly published by its management in audited reports. This secondary data, which was obtained from the DTMs' financial statement, is less expensive and simpler to access than primary data because it has already been published. It was also easier to confirm the reliability of the collected data.

Data was collected for the variables' gross loans, net non-performing loans, total deposits, total assets, total debt, total equity, and total capital. The researcher gathered separate yearly data on all the variables for all the DTMs in one Excel sheet. Thereafter, the researcher determined the different ratios for the study variables as per the conceptual framework.

Before the research instruments and methodology were used in the complete study. All variables in the data collection sheet were analyzed to guarantee information accuracy and clarity with respect to certain study objectives, using DTM banks for the pilot program.

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The results of the pilot study showed that the data were valid and reliable, meaning they could be utilized to examine the goals of the research.

Various diagnostic tests, such as the normality test, multicollinearity test, homoscedasticity test, autocorrelation test, stationarity test, and Hausman test, were conducted. The process of data analysis consisted of cleaning and preparing the data, analysis, report discussion, and interpretation. The researcher analyzed data using STATA statistical software version 16. The data was presented using tables through descriptive statistics and using means and standard deviation. The panel data regression model was used in the study-combining cross section data and time series, where the same unit cross-section is recorded at many times. Panel data was gathered over the time period (2019 to 2023) from each DTM bank. The model increased the degrees of freedom, removed the influence of the individual of the independent variables, thus making the estimates of model coefficients more realistic.

$Y_{it} = \beta_0 + \beta_1 X_{1it} + \varepsilon$

Where:

Y = Asset Quality measured as non-performing loans to gross loans; β_0 = Constant term; β = regression coefficient to be estimated; X_1 = Capital adequacy measured as total capital to risk-weighted assets; i = Microfinance banks (Cross - section dimension) ranging from 1 to 14; t = Time index: (Years (time - series dimension) ranging from 2019 to 2023 and ε = Error term

4. FINDINGS AND DISCUSSIONS

4.1 Descriptive Statistics

Table 4.1 below reports the mean, standard deviation, maximum, minimum, and observations of the data. Descriptive statistics are presented after preparing the data for analysis. A total of 69 observations were used in the analysis.

Table 4. 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CAR	69	0.140929	0.582112	-2.53192	2.1875
Asset Quality	69	0.27822	2.685214	-22	0.769231

In Table 4.1, asset quality depicts a mean of 0.278, with the min and max values ranging from -22 to 0.769. It falls within over 20% reported by the CBK (2023), pointing to poor asset quality. The SD of 2.685 is relatively higher than the mean, implying that the variation in asset quality between MFBs over time is rather high. The high variability indicates that asset quality differs markedly across banks and over time, justifying further econometric examination of internal determinants.

The CAR depicts a mean of 14.09%, ranging from -2.5319 to 2.1875, which is lower than the 19.05% capital adequacy strong performance rating, but within the 12.5% -15.0% fair performance ratings (CBK, 2023). The standard deviation of 0.582 is rather high compared to the mean, an indication of high volatility in CAR values between the MFBs over time. These widespread further signals uneven capital buffers across the sector, with implications for resilience to credit risk and asset quality deterioration.

4.2 Diagnostic Tests for Assumptions in the Regression Model

Regression modeling cannot be performed until a few key presumptions are met. Inaccurate statistical results may arise if the data does not support these assumptions. According to Osborne and Waters (2002), using data that deviates from these presumptions may result in type I or II errors and overestimate or underestimate the coefficient's significance.

4.2.1 Testing for Normality of Residuals

We adopted the Kolmogorov-Smirnov and Shapiro-Wilk tests in determining the data normality. A $p > 0.05$ would indicate data is normal and reject the null hypothesis, whereas a $p < 0.05$ would reveal abnormal data and not reject the null hypothesis. The results of the normalcy test are displayed in Table 4.2.

Table 4. 2: Kolmogorov-Smirnov and Shapiro-Wilk Tests

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Asset Quality	1.432	69	.244	1.431	69	.336
CAR	1.433	69	.396	1.892	69	.333

The study observes from Table 4.2 the p-values of the Kolmogorov-Smirnov test and the Shapiro-Wilk test for asset quality and capital adequacy exceed 5%, pointing to the data not violating the normality assumption. This reveals that, to a certain extent, the data collected had a normal distribution.

4.2.2 Testing for Heteroscedasticity

Homoscedasticity assumes that the errors in a linear regression model are spread uniformly across all the independent variables when applying the model to make inferences; if this is violated, heteroscedasticity exists. The coefficient estimators and predictors can withstand significant deviations from these assumptions; however, inference (such as confidence intervals) is not as resilient. The Breusch-Pagan test was applied in determining heteroscedasticity, with a chi-square exceeding 9.21 indicating its presence.

Table 4. 3: Heteroskedasticity Test

Breusch-Pagan Test	
Ho: Constant variance	
Variables: fitted values of Asset Quality	
chi2(1) =	1.46
Prob > chi2 =	0.2268

There was no indication of heteroscedasticity in the assembled data, according to the test results in Table 4.3. There is no heteroscedasticity problem according to the test results in Table 4.3, because capital adequacy produced a Chi-square value of 1.46, lower than 9.21, and the p-value exceeded 5%.

4.2.3 Testing for Multicollinearity

Regression coefficients are unstable, and conclusions drawn from the regression model may be inaccurate and misleading when the regressors are almost perfectly correlated. This phenomenon is referred to as multicollinearity, which is determined using the VIF test.

Table 4.4: VIF (tolerance) Test

Variable	VIF	Tolerance
Capital Adequacy	1.77	0.565
Mean VIF	1.77	

Table 4.4 outcome on multicollinearity shows that the VIF for capital adequacy (1.77) was less than 5, pointing to the absence of multicollinearity. In addition, the tolerance value for capital adequacy (0.565) is close to 1, an indication of no multicollinearity.

This study conducted multicollinearity diagnostics in examining the relationship between capital adequacy and asset quality among deposit-taking microfinance banks (DTMFBs) in Kenya, consistent with the prudential and supervisory framework established by the Central Bank of Kenya (CBK). Under the Microfinance Act (2006) and the Microfinance (Deposit-Taking Microfinance Institutions) Regulations, licensed DTMFBs are required to comply concurrently with regulatory standards governing capital adequacy and asset quality. These indicators are monitored collectively as measures of institutional soundness rather than in isolation.

CBK Prudential Guidelines relating to capital adequacy implicitly recognize the interdependence of internal bank indicators. Capital adequacy influences lending capacity and thus determines asset quality outcomes, commonly proxied by non-performing loans.

4.2.4 Testing for Autocorrelation

Autocorrelation results from a model's error term being correlated over several time periods. It can lead to inaccurate inferences and biased estimates between variables (Field, 2000). The error terms associated with any two observations should be mutually independent, according to the test's null hypothesis. Autocorrelation was evaluated using the Breusch-Godfrey Serial Correlation test.

Table 4. 5 Serial Correlation Test

lags(p)	chi2	df	Prob > chi2
2	3.752	2	0.9880

The study observes from Table 4.5 that the p-value > 0.001, indicating that serial correlation is not present since the value is insignificant.

4.2.5 Stationarity Test

Disregarding stationarity could result in erroneous regression if the study utilizes non-stationary variables. Inaccurate and erroneous findings are produced when non-stationary time series data is used in forecasting models, which hinders comprehension and forecasting. The Levin-Lin Chu unit-root test was used to test for stationarity in the data. Stationarity of the data is accepted if the null hypothesis is rejected. As shown in Table 4.6, panel data with unit roots were removed, and the data became stationary.

Table 4.6: Levin-Lin Chu unit-root test

Levin-Lin Chu unit-root test

Variable	Hypothesis	p-Value	Verdict
Asset Quality	Ho: Panels contain unit roots	0.0000	Reject
Capital Adequacy	Ho: Panels contain unit roots	0.0000	Reject

4.2.6 Hausman Specification Test

The study used the Hausman test in selecting the most ideal model. Using the Chi-square test statistic, the FE model would be adopted where probability < 0.05, but rejected for the RE model where p > 0.05.

Table 4. 7: Hausman Test Results

Hausman (1978) Specification test (model)	Chi-square value	P-value	Conclusion
Asset quality	1.79	0.7742	Random effect model

Table 4.7 reveals that, at a 5% level of significance, the Hausman specification test supports the random effect model for asset quality (chi-square = 1.79, $p > 0.05$). The panel regression results are all based on the random effect model.

4.3 Panel Regression Analysis

A panel regression data analysis was done to determine the causal association between the predictor variables and the explanatory variable- asset quality, and Tables 4.9, 4.10, and 4.11 reveal the outcomes.

Table 4.8: Model Summary

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.5018[a]	.2518	.2050	.66699
a. Predictors: (Constant), CAR				

As observed in Table 4.9, the R-squared is 0.2518, revealing that 25.18 % of deviations in asset quality occur due to capital adequacy. This implies that other variables that are not part of the study accounted for the remaining 74.82% in asset quality variations.

The study also observes from Table 4.10 an F value of 5.38 and $p < 0.05$, suggesting that the model was adequate (fit) for this study. Therefore, the study infers that there are significant variables in the study that influenced the asset quality of DTM banks.

Table 4.9: ANOVA with Asset Quality as Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.58188978	4	2.39547244	5.38	.0008[b]
	Residual	28.4724158	64	.444881498		
	Total	38.0543056	68			

Table 4.10: Random Effect Panel Regression Estimates

Asset Quality	**Coef.**	**Std. Err.**	**t**	**P>|t|**	**95% Confidence Interval**	
CAR	2.5871	0.7853	3.29	0.002	1.0109	4.1634
_cons	9.5338	21.5684	0.44	0.661	-33.7466	52.8141
sigma_u	9.8745					
sigma_e	8.1639					
Rho	0.5943					

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The coefficient results in Table 4.11 show that capital adequacy significantly predicted the asset quality of DTM banks in Kenya at a 5% significance level. Capital adequacy (p = .002, B = 2.587) influenced asset quality positively, with a significant relationship. The model with the coefficients embedded is as follows:

Asset Quality = 9.534 + 2.587 (CAR)

4.4 Hypotheses Testing

The null hypothesis, H_{01}, capital adequacy has no significant effect on the asset quality of deposit-taking microfinance banks in Kenya. Table 4.11 outcome reveals p-value of $0.002 < 0.05$, leading to the H_{01} being rejected.

CAR positively influenced the asset quality of the DTM banks studied (B = 2.587). The association was also significant ($p = 0.002 < 0.05$). This implied that as MFBs accumulated more capital, the level or amount of NPLs decreased, thus leading to an improvement in their asset quality. High bank CAR discourages banks from taking unnecessary risks and acting speculatively. Fewer guarantors of loans motivate banks to be hesitant in advancing credit for fear of losing their principal and interest amount.

The study findings concur with the Moral Hazard hypothesis, which argues that banks with inadequate capital but with higher NPLs are motivated to increase risk in their loan portfolio by advancing more loans to offset the NPLs' lost income. As a result, NPLs continue to rise, as a result of increased loan growth and, perhaps more significantly, the lowering of screening and monitoring requirements. The outcome could be deteriorating asset quality.

The findings also concur with Ikpesu and Oke (2022), who established that an increase in CAR contributed to better asset quality in Nigerian banks. However, our findings contradict Njeri (2019), who determined that CAR negatively affected the asset quality of SACCOs in Kenya. Similarly, our findings contradict Nyaundi (2018), who found that a larger capital adequacy exposed the banks to a greater credit risk and thus resulted in poor asset quality of banks in Kenya. The relationship was, however, not significant.

Capital adequacy and asset quality are core prudential indicators that reflect the solvency and credit risk profile of financial institutions, and their behavior over time and across institutions is best understood through systematic summarization of observable patterns, trends, and dispersion measures.

In the context of capital adequacy, descriptive statistics facilitate an assessment of the average capitalization levels, variability, and compliance tendencies of DTMFBs relative to regulatory thresholds. Given that microfinance banks often exhibit heterogeneity in size, risk exposure, and growth trajectories, descriptive measures such as means, minima, and standard deviations enable identification of capitalization asymmetries that may not be immediately evident from aggregate or model-based analysis. This preliminary examination is essential for contextualizing subsequent econometric results and for establishing whether observed capital ratios display sufficient variation to meaningfully explain asset quality outcomes.

Similarly, descriptive analysis of asset quality commonly proxied by non-performing loans or related credit risk indicators provides insight into the distribution and severity of credit risk within the sector. Asset quality indicators are typically skewed and sensitive to institutional, macroeconomic, and borrower-specific factors. Descriptive statistics, therefore, serve to highlight the prevalence of problem loans, the extent of dispersion across institutions, and temporal trends in credit performance, all of which are critical for interpreting the economic significance of regression estimates.

5. SUMMARY AND RECOMMENDATIONS

5.1 Summary of Findings

The researcher explored the asset quality of deposit-taking microfinance banks in Kenya, with the predictor variable of capital adequacy. The study opted for a longitudinal research design, given that secondary panel data from audited reports were collected for 14 microfinance banks from 2019 to 2023 and processed using STATA.

The study determined if capital adequacy had any influence that was significant on the asset quality of DTM banks. Correlation findings pointed to a direct and significant association between CAR and asset quality. Similarly, the random effect model results signified that increasing CAR leads to the asset quality of the DTM banks improving by 0.296. The association was also significant.

5.2 Recommendations of the Study

The study offers more proof of the positive correlation between CAR and asset quality and suggests that this relationship is the primary driver for regulatory goals for greater stability and higher coverage. Therefore, to guarantee that DTM banks have enough capital to cover both short- and long-term needs, regulatory bodies should tighten the capital requirements for these banks. Additionally, strengthening the regulatory framework would guarantee that these banks can successfully compete with other banks worldwide.

5.3 Suggested Areas for Future Research

Further research is recommended on internal bank-specific factors, such as management competency and cost-efficiency, industry factors such as competition and bank-risk taking, and inflation, GDP, and interest rates. These factors can affect the borrowers' ability to repay loans, thus influencing asset quality. Thus, future research should consider examining these additional factors. Also, an aggregated study of the various bank-specific factors and how they affect asset quality is recommended.

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