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Asset Quality and Its Effect on Operational Efficiency of Commercial Banks in Kenya

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Abstract:
In the dynamic landscape of banking, the quality of assets held by financial institutions plays a pivotal role in determining their operational efficiency and overall stability. Deterioration in asset quality not only poses immediate challenges to a bank's financial performance but also reverberates through the broader financial system. Utilizing secondary data from 2008 to 2022, a period marked by notable financial reforms and challenges, this research examines the relationship between asset quality and operational efficiency in Kenya's banking sector. The study employed a two-step approach analysis. First, Stochastic Frontier Analysis was utilized to determine operational efficiency scores for each cross-section. Second, the panel Generalized Method of Moments (GMM) was applied to regress efficiency scores on independent variables. The findings indicated a significant positive association between asset quality and operational efficiency in Kenya's banking sector, with significance levels observed at 1%, 5%, and 10%, a unit improvement in asset quality corresponds to a 1.2% increase in operational efficiency. These results highlighted the symbiotic relationship between asset quality and operational efficiency in Kenya's banking landscape. In light of these findings, policymakers are urged to adopt a multifaceted policy framework aimed at nurturing and strengthening the interplay between asset quality and operational efficiency within Kenya's banking sector.

Keywords: *Operation efficiency, asset quality, stochastic frontier analysis*

1. Introduction

The concept of asset quality involves the evaluation of assets in a bank that are used in credit risk and generally linked to general operation. Asset quality is an important factor for bank management, and it includes bank asset evaluation to facilitate the level of measurement and size of credit risk that is associated with bank operation (Ongore, 2013). It directly relates to the banks' balance sheet on the left-hand side and is focused on loan quality, which provides bank earnings quality. The most vital asset that requires a determination on the level of asset quality is loans that can be non-performing assets when borrowers default on the repayment requirement.

Banking theories have not been clear on whether asset quality has an influence on the operational efficiency of banks (Allen & Santomero, 1997) Jensen and Meckling (1976). Theories emphasize the importance of prudent lending practices in enhancing asset quality (Ariff & Shawtari, 2019), while research indicates the likelihood of those assets generating income and the risk of default or non-performance (Kadioglu & Ocal, 2017). Research on operational efficiency and asset quality is accelerating Lawal, Oluoch and Muturi (2018), Justin et al. (2006), Cheruiyot (2015), Papanikolaou (2009) and Kalluru and Bhat (2009) have investigated the relationship between asset quality and operational efficiency of banks.

A decline in asset quality negatively impacts a bank's operational and financial performance, as well as the overall stability of the financial system. Ignoring loan quality, as seen during the Asian Financial Crisis, can have widespread repercussions. In Kenya, despite efforts by the Central Bank to maintain a robust banking environment, issues like bank bailouts persist, undermining investor and depositor confidence (Abor et al., 2020; Mugo, 2018). This situation calls for research into the relationship between bank asset quality and performance in Kenya, acknowledging the essential role banks play in financial intermediation and development. This study aims to explore the relationship between asset quality and the operational efficiency of commercial banks in Kenya. It will specifically examine how factors such as non-performing loans (NPLs), loan loss provisions, and risk management practices affect the overall asset quality of banks in the Kenyan financial market. By understanding these dynamics, policymakers, regulators, and stakeholders can better

evaluate the stability and sustainability of the banking sector, identify potential risks, and develop strategies to improve asset quality management practices.

2. Literature Review

Asset quality and operational efficiency are two crucial factors that determine the stability, profitability, and sustainability of banks. Asset quality refers to the health and performance of a bank's loan portfolio and other assets. It indicates the likelihood of those assets generating income and the risk of default or non-performance (Kadioglu & Ocal, 2017). Key indicators of asset quality include non-performing Loans (NPLs), which are loans that are in default or close to default. High levels of NPLs indicate poor asset quality. Loan Loss Provision - The amount set aside by the bank to cover potential losses from bad loans. High asset quality is essential for banks to maintain investor confidence, attract deposits, and borrow funds at favorable rates. Poor asset quality can lead to financial instability and even bankruptcy.

Various researchers have investigated the relationship between asset quality and operational efficiency. Michael (2006) explored how non-performing assets affect the operational efficiency of Central Co-operative banks in India. They found that non-performing assets have a significant impact on operational efficiency, which in turn affects the liquidity, profitability, and solvency ratios of co-operative banks.

Cheruiyot (2015) researched the effects of asset quality on banks' profitability in Kenya using audited financial reports from all 43 banks. The researcher discovered that there is a strong positive correlation between asset quality and the profitability of banks in Kenya. This is because when the non-performing asset to net asset ratio is lower, it means that the association between asset quality and bank profitability is positive and significant. In a similar study, Dimitris et al. (2023) indicated that there exists a positive correlation between bank profitability and operational efficiency. This indicates that big banks have larger operational efficiency compared to less profitable banks. There is no strong evidence that links large banks that are profitable to operational efficiency as compared to small profit-making banks (Hanwek et al., 1983). Delis and Papanikolaou (2009) and Kalluru and Bhat (2009) researched determinants of bank efficiency and discovered that there is a positive cordial relationship between banks' efficiency and level of profitability.

From a managerial accounting perspective, there exists a discernible and positive relationship between the quality of assets held by a bank and its operational performance. This association stems from the imperative that banks facing a shortfall in asset quality are compelled to navigate increased losses arising from non-performing loans and must allocate additional resources towards the management and recovery of such assets (Abata, 2014). As banks designate loans for collection, they inevitably incur supplementary operational expenses attributed primarily to non-value-added activities involved in overseeing the collection process. These activities encompass a spectrum of tasks, including but not limited to the routine monitoring of debtors' financial positions, the valuation and protection of collateral assets, the restructuring of amortization schedules, the negotiation of contractual terms, and the computation of withholding liabilities (Khalid, 2012).

The costs incurred extend beyond purely financial considerations and encapsulate broader strategic imperatives. These encompass the necessity of fostering and preserving trust among stakeholders, including both management and the public, ensuring the ongoing safety and integrity of the institution, mitigating the risk of adverse ratings due to external contingencies, addressing potential deposit withdrawals resulting from diminished depositor confidence, continually monitoring the quality of loan portfolios, and proactively addressing issues that may arise from neglecting other operational dimensions once concerns related to asset quality have captured the attention of senior management (Khalid, 2012).

Achou and Tenguh (2008) highlighted a negative correlation between non-performing loans (NPL) and banks' profitability. They emphasized the critical importance of banks implementing prudent credit risk management to protect their assets and safeguard the interests of investors. Likewise, Aboagye and Otieku (2010) argued that for banks to sustain their operations, they must generate sufficient income from lending and fiduciary services to offset operational and financing expenses and reinvest retained earnings to support future endeavors. This approach, they suggested, not only ensures survival but also fosters growth and profitability for banks.

According to Alhassan, Coleman and Andoh (2014), non-performing loans, market structure, loan growth, inflation, bank market structure, real exchange rate and GDP growth are significant factors that determine the asset quality of Ghanaian banks. These findings are particularly important for bank managers and regulators in emerging economies. Swamy (2021) researched asset quality determinants and profitability using a panel data model from 1997 to 2009. Priority sector credit was found insignificant in affecting non-performing assets. Bad debts are found to be more industry-dependence on performance measures than most different sectors of the economy. Public sector banks indicated that they could better contain bad debts and performance, while private sector banks indicated they are quite established in bad debt containment since they had better risk management processes, which definitely allowed them to end quite well while having lower levels of non-performing assets.

Kariuki, Muturi and Ngugi (2017) researched asset quality and intermediation efficiency using credit co-operative societies and deposit-taking saving banks in Kenya. DEA was used while generating efficiency scores in the first stage. To minimize heavy reliance on the efficiency scores, corrected efficiency scores that were biased were generated and regressed against asset quality. Firm size, diversification and profitability were included as control measures. The findings indicated a strong positive relationship between asset quality and intermediation efficiency.

2.1. Research Hypotheses

The research was guided by the following null hypotheses:

- H01: There is no significant relationship between asset quality and operational efficiency of commercial banks in Kenya.

- H02: Market structure does not moderate the relationship between asset quality and operational efficiency of commercial banks in Kenya.

2.2. Conceptual Framework

The research was guided by the following conceptual framework.

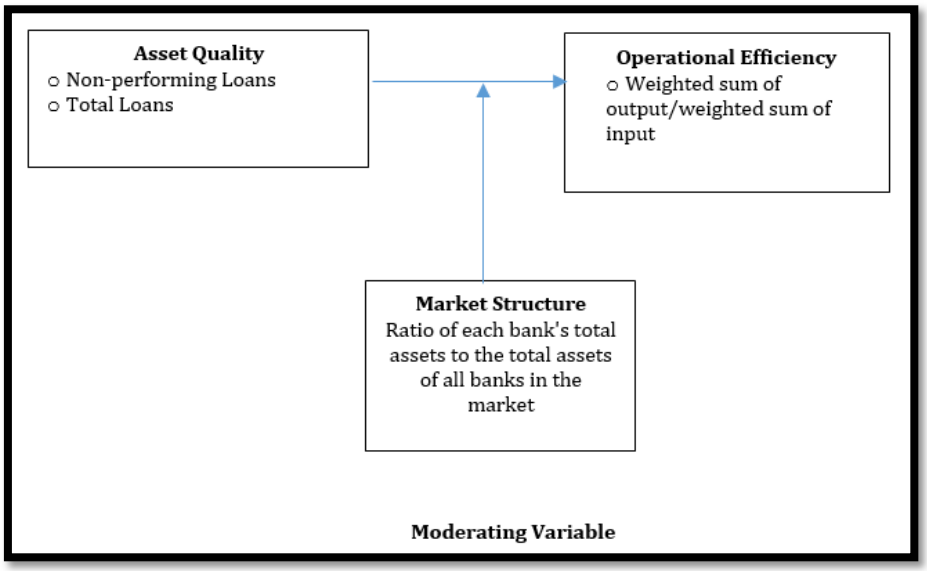

Figure 1: Conceptual Framework
Source: Author, 2024

3. Research Methodology

The research was guided by the positivist philosophy using the scientific methodology approach to gather and analyze data to establish a relationship between asset quality and operational efficiency of commercial banks in Kenya. The quantitative research design was used. The study compiled secondary data covering a period of 14 years, from 2008 to 2022, obtained from authenticated audited financial records obtained from the Central Bank of Kenya and the official websites of the respective banks.

3.1. Operational Efficiency Measure

Stochastic Frontier Analysis (SFA) was used to evaluate the operational efficiency of banks in Kenya. The stochastic production function within the translog cost function, following Coelli's (2005) framework, was employed. This approach, widely used in constructing production functions, allows for the analysis of production, cost, and efficiency across different sectors (Martin & Dorta, 2007).

3.2. Model Specification and Estimation Technique of Asset Quality

Given the potential relationship between the independent variable, the following model was specified:

$Operational\ Efficiency = \alpha_0 + Asset\ Quality_{it} + \varepsilon_{it}$……..1

The Dynamic Panel Model (DPMs) was used for analysis.

3.3. Testing for Moderation Effect of Market Structure

To assess the moderation effect of market structure on the relationship between the operational efficiency of banks and asset quality, the analysis used the hierarchical regression analysis, where three regression analysis models tested for moderation. The use of hierarchical regression analysis in this study indicates a sophisticated approach to understanding the interplay between market structure, asset quality, and operational efficiency within the banking sector. Hierarchical regression allows researchers to examine the incremental contribution of different variables while controlling for the effects of others, which is particularly useful when investigating complex relationships like those in banking.

The following models were used to test for the moderation effect of market structure.

$Y = \alpha_0 + \varepsilon\beta_3 X_1 X_3 + \varepsilon\beta_i X_i + \varepsilon$……(i)

$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_3 + \varepsilon$…… (ii)

$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_3 + \beta_3 X_1 X_3 + \varepsilon$……(iii)

In testing for the moderation effect of market structure, the interaction term ($\beta_3 X_1 X_3$) was included in the models. The interaction terms of this study were the product market structure and asset quality. Moderation occurs when the link between an independent and dependent variable shifts in magnitude or sign when a moderator is introduced, as described by Preacher et al. (2007) and Baron and Kenny (1986). We employed a hierarchical multiple regression strategy to test the moderation effect of market structure. The first model (i) examined how changes in asset quality affected operational efficiency. The second model (ii) was to test the hypothesis that the independent variables (asset quality) and the moderator (market structure) influence the dependent variable (operational efficiency). The third model (iii) required the

incorporation of an interaction term, which is the multiplication product of asset quality and market structure. Using this step, moderation is presumed to be taking place when the introduction of the interaction term in the model alters the overall effect of the model (R2), and the predictor variables, the moderator, and the interaction between the two are all statistically significant.

4. Findings and Discussions

4.1. Descriptive Statistics

Variable	Mean	SD	Min	Max	Skewness	Kurtosis
Total Cost	4.12e+06	6.50e+06	0.0000	4.17e+07	2.8274	11.9786
Total Loans	2.94e+07	4.95e+07	0.0000	3.73e+08	3.1555	15.4550
Earning Assets	1.55e+07	2.29e+07	0.0000	1.35e+08	2.3981	8.9840
Labor	0.0410	0.0394	0.0000	0.6756	8.9566	130.5773
Capital	0.1370	0.1298	-0.4254	1.1218	2.5612	18.6752
Deposits	0.2640	0.3314	0.0000	6.4895	12.3456	222.7268

Table 1: Summary Statistics for Operational Efficiency
Source: Author, 2024

The results displayed in table 1 demonstrate that the average values of both the input and output variables exhibit a balanced distribution. The mean values of the input variables, namely total loans, earnings from assets, and total costs, were approximately Ksh 29.4 million, Ksh 15.5 million, and Ksh 4.12 million, respectively. Correspondingly, these inputs exhibited standard deviations of approximately Ksh 49.5 million, Ksh 22.9 million, and Ksh 6.5 million, respectively. The standard deviation of input variables indicates the variability or spread of the input variables around the mean. A higher standard deviation indicates greater variability in the data. On the other hand, the input variables, total costs, total loans, and earnings from assets, had skewness of 2.82, 3.15 and 2.39, respectively, and Kurtosis of 11.97, 15.45 and 8.98, respectively.

4.2. Operational Efficiency by Year

The summary statistics of operational efficiency by year are presented in table 2.

Year	Mean	SD	Min	Max	Skewness	Kurtosis
2008	0.7578	0.1263	0.1961	0.8945	-2.9774	13.5947
2009	0.7605	0.0723	0.5705	0.9068	-0.2948	3.4168
2010	0.7843	0.0824	0.4850	0.9052	-1.5619	6.7790
2011	0.7969	0.0594	0.6231	0.9210	-0.8374	4.7352
2012	0.8114	0.0616	0.5944	0.9089	-1.2740	5.9688
2013	0.8268	0.0528	0.6402	0.9158	-1.3658	5.7577
2014	0.8205	0.0526	0.6760	0.9522	-0.8667	4.8199
2015	0.8108	0.0642	0.6399	0.9720	-0.1833	4.3506
2016	0.7872	0.1495	0.0351	0.9041	-3.9560	19.0920
2017	0.8094	0.1707	0.0505	0.9197	-3.3128	13.4737
2018	0.8325	0.0398	0.6397	0.8942	-3.1371	15.5698
2019	0.8286	0.0385	0.6561	0.8994	-2.3394	11.6586
2020	0.8167	0.1597	0.0784	0.9372	-3.8279	16.7701
2021	0.8457	0.0380	0.7408	0.9338	-0.6116	4.1498
2022	0.8337	0.0809	0.3989	0.8900	-4.7545	26.1325
Total	0.8092	0.0965	0.0351	0.9720	-4.3511	29.6293

Table 2: Summary Statistics of Operational Efficiency by Year
Source: Author, 2024

The statistical data in table 2 regarding the operational efficiency scores indicates an increase in efficiency across all banks. In particular, the scores displayed a consistent rise, ascending from 75.7 percent in 2008 to 80.9 percent in 2022. The increase from 75.7 percent to 80.9 percent suggests that banks have become more effective in managing their operations and resources over the years. This could be attributed to various factors such as advancements in technology, streamlining of processes, better risk management practices, or improvements in organizational structure. Additionally, a consistent upward trend in efficiency scores indicates that banks are adapting to changes in the financial landscape and optimizing their operations to remain competitive. This trend could also reflect regulatory changes or industry-wide initiatives aimed at enhancing efficiency and transparency.

4.3. Dependent, Independent and Moderating Variables

Variable	Mean	SD	Min	Max	Skewness	Kurtosis
Operation Efficiency	0.8092	0.0965	0.0351	0.9720	-4.3511	29.6293
Market Structure	0.8626	1.0660	0.0000	23.3410	16.9429	349.609
Asset Quality	0.0831	0.5311	0.0000	12.1161	21.0951	471.416

Table 3: Summary Statistics of Dependent, Independent and Moderating Variables
Source: Author, 2024

According to the descriptive statistics in table 3, the average Asset Quality of banks was 0.0831, with a standard deviation of 0.5311. Additionally, the skewness and kurtosis were calculated to be 21.1 and 471.42, respectively. The highest observed value for Asset Quality among the banks was 12.1161, while the lowest was 0.0000. These descriptive statistics provide valuable insights into the distribution and variability of banks' asset quality.

Notably, asset quality had skewness values of 21.1. A positive skewness value indicates that the distribution of data is skewed to the right, meaning there may be a few extremely high values that are pulling the distribution in that direction. Asset quality had a kurtosis value of 471.4. A high positive kurtosis value like 471.4 indicates that the distribution has heavy tails and is more peaked than a normal distribution.

4.4. Diagnostic Tests

Diagnostic tests were conducted before the Panel GMM Model estimation.

Variable	Obs	W	V	z	Prob>z
Operational Efficiency	546	0.62711	135.800	11.852	0.00000
Asset Quality	564	0.07559	346.659	14.134	0.00000
Market Structure	571	0.70042	113.602	11.444	0.00000

Table 4: Shapiro - Wilk Test for Normality
Source: Author, 2024

Table 4 represents the Shapiro-Wilk test statistic (W) calculated based on the covariance matrix of the sample data. The p-value for all the variables was less than 1%, 5%, and 10% significance level. Hence, we rejected the null hypotheses, suggesting that the data deviates significantly from a normal distribution. The LLC Unit root test was used to establish stationarity among the variables, indicating that the variables had both non-stationarity and stationarity traits. The variables that were non-stationary were differenced once, and they became stationary. The Variance Inflation Factor (VIF) of 1.04 suggests that there is no evidence of multicollinearity among the independent variables in the regression model.

4.5. Model Estimation Results on the Effect of Asset Quality on Operational Efficiency of Banks

	Panel GMM
	Operational efficiency
Asset Quality	0.0122***
	(0.0047)
Constant	0.8101***
	(0.0090)
Observations	544
Number of Group	40

Table 5: Effect of Asset Quality on Operational Efficiency
*Standard Errors in Parentheses *** p<0.01, ** p<0.05, * p<0.1*
Source: Author, 2024

The results derived from table 4 from the panel generalized method of moments (GMM) analysis demonstrate a statistical unit improvement in asset quality corresponding to a 1.2 per cent increase in operational efficiency. In line with the research conducted by Piskorski, Seru and Witkin (2015), there exists a notable relationship between banks' reputations for maintaining high asset quality and their associated funding costs. The study suggests that banks with a well-established reputation for managing their assets prudently are perceived by investors as being less susceptible to risk.

4.6. Hypothesis Testing

- H01: There is no significant relationship between asset quality and operational efficiency in banking institutions in Kenya.

The results obtained from the panel GMM models reveal a positive relationship between asset quality and operational efficiency, with statistical significance detected at the 1%, 5%, and 10% thresholds.

4.7. Moderation Effect of Market Structure on Relationship between Capital Adequacy and Operational Efficiency

	Model One	**Model Two**	**Model Three**
	Operational Efficiency	Operational Efficiency	Operational Efficiency
Asset Quality	0.0277	0.0140	0.0575
	(0.0196)	(0.0150)	(0.0548)
Market Structure		0.7525***	0.7929***
		(0.2245)	(0.2299)
Interaction Term			-0.4520
			(0.5473)
Constant	0.7355***	0.7529***	0.7497***
	(0.0102)	(0.0099)	(0.0106)
Observations	599	571	571
R-squared	0.0033	0.0216	0.0228

Table 6: The Moderating Effect of Market Structure on the Relationship between Asset Quality and Operational Efficiency
*Note: Interaction Term = (Asset Quality * Market Structure)*
*Standard Errors in Parentheses *** p<0.01, ** p<0.05, * p<0.1*
Source: Author, 2024

The results delineated in table 6 pertain to Model 2, which incorporates market structure alongside an interaction term to scrutinize the moderating influence of market dynamics. The findings indicate that the regression coefficient associated with the interactive term, along with asset quality, lacks statistical significance. Furthermore, the inclusion of the moderating variable in Model 2 did not yield a change in direction. These outcomes unequivocally suggest that market structure does not exert a moderating impact on the relationship between asset quality and the operational efficiency of banks in Kenya.

The absence of no moderation effect implies the following regarding the banks in Kenya. First, if there is no moderation effect of market structure on the relationship between asset quality and operational efficiency, it suggests that regardless of whether the market is highly competitive or less competitive, banks with better asset quality still tend to be more operationally efficient.

4.8. Hypothesis Testing

- H02: Market structure does not moderate the relationship between asset quality and operational efficiency of commercial banks in Kenya.

The results obtained from the panel GMM models reveal a positive relationship between market structure and the association between asset quality and operational efficiency, with statistical significance detected at the 1%, 5%, and 10% thresholds.

5. Conclusion and Recommendation

The null hypothesis examined the relationship between asset quality and operational efficiency. The researcher conducted an empirical investigation to examine the hypothesis that there exists no significant effect of asset quality on operating efficiency. The findings from the panel GMM analysis revealed a significant positive link between asset quality and operational efficiency in Kenya's banking sector, with significance levels at 1%, 5%, and 10%. A unit improvement in asset quality corresponds to a 1.2% boost in operational efficiency.

The research findings highlighting a significant positive correlation between asset quality and operational efficiency within Kenya's banking sector, along with their substantiation, resonate with previous scholarly works such as those authored by Ali, Shuib, & Nor (2021), Bruno et al. (2015), Ahamed (2017), Piskorski, Seru, and Witkin (2015), and Duffie (2018). These studies underscore the critical importance of maintaining high asset quality as a fundamental driver for banks to achieve operational efficiency, profitability, and sustainable growth. Through adept management of credit risk and the cultivation of a robust asset portfolio, financial institutions stand to realize a multitude of beneficial outcomes that significantly enhance their overall operational efficiency and long-term viability.

In light of these findings, policymakers are poised to enact a multifaceted policy framework aimed at nurturing and amplifying the symbiotic relationship between asset quality and operational efficiency within Kenya's banking landscape. This framework encompasses initiatives to incentivize continuous monitoring and improvement of asset quality, fortification of credit risk management practices, promotion of investments in technology and talent, robust regulatory oversight, bolstering of investor confidence through enhanced transparency, and provision of support for

capacity-building initiatives. By embracing these strategic policy interventions, Kenya's banking sector is poised to not only solidify its asset quality standards and operational efficiency but also foster a more resilient and prosperous financial ecosystem capable of weathering future challenges and seizing emerging opportunities on the horizon.

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