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Influence of Credit Risk on Intermediation Efficiency of Commercial Banks in Kenya

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Abstract

The banking sector in Kenya demonstrates a low intermediation efficiency of 67.5%, which limits its capacity to effectively perform its essential function in fostering economic growth. This study aimed to explore the effect of credit risk on the intermediation efficiency of commercial banks in Kenya. The study was anchored on agency theory and employed an explanatory sequential design, incorporating both secondary and primary data across two distinct phases. The focus of this study encompassed 39 commercial banks that were operational in Kenya throughout the period spanning from 2014 to 2023. A two-phase examination was implemented. Initially, efficiency scores were derived through the application of the Data Envelopment Analysis (DEA) methodology, with the calculated efficiency scores subsequently serving as dependent variables within the efficiency equation. Subsequently, a Tobit regression analysis model was employed to examine the relationship between the computed DEA efficiency scores and credit risk. The research additionally collected qualitative data through interviews, which were subsequently analyzed using thematic summary analysis. The research revealed that credit risk has a significant and negative influence on intermediation efficiency in commercial banks in Kenya (β = -0.2113, z = -3.01, p = 0.003). This study contributes new country specific evidence by quantifying how credit risk shapes intermediation efficiency, addressing a significant gap in the literature on African emerging markets. The findings underscore the criticality of robust credit risk management not only for bank stability but for the overall efficiency of the financial intermediation process in developing economies.

Key Words: Credit risk, Commercial banks in Kenya, Financial intermediaries, Intermediation efficiency.

Introduction

Financial institutions are essential for fostering economic growth and development on worldwide, regional, and national scales (Istaiteyeh, Milhem, & Elsayed, 2024). This role primarily arises from their duty in capitalizing savings, from which surplus funds are allocated

to finance productive investments. They facilitate the transfer of capital from surplus units to deficit units within the economy as financial intermediaries (Werner, 2015). Commercial banks function as financial intermediaries by receiving deposits, safeguarding assets, and providing loans (Ulvi, 2023). In their intermediary role, commercial banks mitigate risk, facilitate economies of scale, and promote economies of scope. Commercial banks provide people with surplus cash the opportunity to mitigate risk by lending to several borrowers rather than a single one (Ullah, Majeed, & Popp, 2023). Furthermore, commercial banks capitalize on economies of scale by consolidating deposits from several consumers and extending loans to diverse borrowers. Furthermore, commercial banks possess the capacity to customize loan packages to accommodate the requirements of both small and large borrowers when extending credit (Chowdhury, Uddin, Ahmmed, Hassan, & Kabir, 2023).

Financial intermediation has been around since the advent of money, when wealthy people recognized the need for a safe storage for their assets. Ancient empires need an effective financial system to facilitate trade, distribute riches, and collect taxes. Historical records from the ancient civilizations of Rome, Greece, Egypt, and Babylon reveal that temples often functioned as the financial centers of their societies, offering loans with the safekeeping of deposits (Rathore, 2021). Silva (2018) asserts that intermediation efficiency is vital as it directs saved resources to productive applications at low expense, hence reducing credit spreads and promoting capital creation. Effective resource allocation by banks mitigates systemic risk via portfolio diversification, robust liquidity, and depositor confidence, so aiding the economy in circumventing disturbances like to those seen during the crises of 1929 and 2007 (Cetorelli, Mandel, & Mollineaux, 2012). This research use Data Envelopment Analysis (DEA) to evaluate intermediation efficiency by examining the effectiveness of a bank in converting its resource mix into loans and investments. Arora (2014) links the disparities in bank efficiency to two primary variables: external macroeconomic dynamics affecting all banks and internal bank-specific factors. Internal factors include elements of the organization that are mostly governed by management at the company level. These internal elements, often known as micro or firm-specific features, stem from the firm's financial statements (Athanasoglou et al., 2008). Prominent factors include bank size, credit risk, bank capitalization, bank profitability, bank liquidity, and bank ownership. Among the various internal factors that drive intermediation efficiency, credit risk is paramount, as it directly impacts the quality of a bank's primary assets and its cost structure.

Credit risk is a bank specific factor which has been largely researched and its effect on various variables such as performance, efficiency and competitive advantage investigated. On the effect of credit risk on bank efficiency, Siddique, Khan, and Khan (2022) established that non-performing loans (NPLs) which is a measure of credit risk, have a negative relationship with cost-efficiency ratio (CER). Similarly, Batir et al. (2017) determined that loan quality which is applied as the proxy for credit risk have a significantly negative relationship with efficiency of conventional banks. The implication is that problematic loans lower the efficiency of conventional banks. Besides, Salim, Arjomandi, and Dakpo (2017) determined that while the banks' efficiency has improved over time, credit risk had a negative influence on their efficiency. Thus, banks are required to improve on their credit granting and monitoring mechanisms so as assess their credit risk more closely in order to improve on efficiency. However, Girdadone et al. (2007) observed that a significantly positive relationship was noted between nonperforming loans and efficiency for Islamic banks, meaning that problem loans will likely increase the efficiency of this bank group. This study contributes to the literature by providing robust, methodologically advanced evidence from a key East African economy, using a unique mixed-methods approach that combines a decade-long panel data analysis with qualitative insights from banking professionals.

Statement of the Problem

Kenya's banking sector faces a significant challenge with its intermediation efficiency, which stands at a low 67.5%, hindering its role in fostering economic growth (Osoro & Kiplangat, 2020). In practice, banks in Kenya lack actionable guidance on how to lift the low intermediation efficiency while managing credit risk and costs. External macroeconomic factors and internal bank-specific characteristics contribute to this inefficiency (Camanho et al., 2024), making it essential to understand how these factors impact banking efficiency. Policymakers in Kenya specific tools and targets to track efficiency drivers and design incentives that reflect macro shocks and bank differences. Theoretically, links between macro factors, bank capabilities, risk taking, and intermediation efficiency are weak and under specified. Despite the importance of this issue, existing research has overlooked developing countries like Kenya and excluded critical variables such as credit risk, which this study aims to address. Previous studies, including those in Ethiopia (Abdulahi et al., 2023) and Nigeria (Yahaya & Awen, 2020), have either failed to account for unique contextual factors or employed inappropriate methodologies. For instance, regression models were used instead of more suitable approaches like Data Envelopment Analysis (DEA) or Tobit panel regression, which this study applies to a dataset of 39 banks over a decade (2014–2023). In terms of context, evidence from Ethiopia and Nigeria does not transfer well to Kenya's digital and regulatory setting, so a decade long panel of 39 Kenyan banks with both primary and secondary data is needed to produce locally relevant insights. Additionally, while much research has relied solely on secondary data, this study incorporates both primary and secondary data, offering a more comprehensive view of the factors affecting efficiency in Kenya's commercial banks. By filling these gaps, this research provides valuable insights into how credit risk influence intermediation efficiency, offering critical implications for bank management, regulators, and policymakers.

Purpose of the Study

The purpose of this study was to examine the effect of credit risk on the intermediation efficiency of commercial banks in Kenya.

Literature Review

This section provides the theoretical, empirical, and conceptual framework that guided the study.

Theoretical Literature

The seminal work of Jensen and Meckling (1976) gave grounding literature on the agency theory. The theory is concerned with the relationship between the principals (shareholders) and the agents (the managers) of the company. The relationship is one of a contractual arrangement where the principal engages the agent to perform some service to increase performance and maximize the value of the firm Jensen and Meckling (1976). In this contract the principal expects the agent will act in their best interests but due to opportunistic behavior, the agent may not necessarily act in the best interest of the principal (Padilla, 2002). This gives rise to asymmetric information and uncertainty between the two parties leading to a problem of moral hazard. The owners are then left to consider investing in monitoring the actions of the executive management leading to agency costs or motivating the agent behavior in their own interests by creating additional incentives such as a compatible reward structure and remuneration package (Jensen & Meckling, 1976). The above principal-agent problem reduces firm's profit and contribute to inefficiency in the firms' operations. The agency theory links credit risk with efficiency in commercial banks. Agency problems can lead to poor lending decisions (increasing NPLs) and necessitate higher monitoring costs (increasing inputs like wages), thereby reducing the ratio of outputs (loans) to inputs, which is precisely what intermediation efficiency measures. Considering the agency relationship between shareholders and management, shareholders can adopt and implement credit granting polices through the board

of directors (Ouenniche & Carrales, 2018). These credit granting polices could affect the credit risk of the firm and thus influencing the efficiency and value of the commercial bank. H_1: Consistent with agency theory, credit risk (NPL ratio) has a significant negative effect on the intermediation efficiency of commercial banks.

Empirical Literature

Intermediation efficiency in the banking sector is crucial as it optimizes the allocation of financial resources, enhances liquidity management, and fosters economic growth. Chowdhury et al. (2023) examined the impact of credit risk on the efficiency of Islamic banks in Bangladesh, using data from 2007 to 2018. Their two-stage evaluation employed Data Envelopment Analysis (DEA) in the first phase and regression models in the second. The results indicated that Islamic banks operated at 86% efficiency, with 68% of them exhibiting constant returns to scale. The study found a significant inverse relationship between credit risk and bank efficiency, where lower credit risk corresponded to higher efficiency. Similarly, Siddique et al. (2022) investigated the link between credit risk management and the financial performance of South Asian commercial banks. Their study, using data from 19 banks in Pakistan and India from 2009 to 2018, found a significant negative relationship between non-performing loans (NPLs) and financial performance, with cost-efficiency ratio (CER) as one of the key metrics.

In Turkey, Batir et al. (2017) applied DEA and Tobit regression to evaluate the technical, allocative, and cost efficiency of conventional and participation banks. Their findings showed that conventional banks generally exhibited higher efficiency than participation banks. The study also revealed a negative relationship between credit risk (represented by loan quality) and efficiency for conventional banks, implying that problematic loans reduce their efficiency. Conversely, a positive relationship was found for participation banks, where NPLs seemed to enhance their efficiency. Furthermore, Salim, Arjomandi, and Dakpo (2017) used an innovative DEA by-production model to assess the efficiency of Iranian banks from 1998 to 2012, finding that credit risk negatively affected bank efficiency, despite overall improvements in efficiency over time.

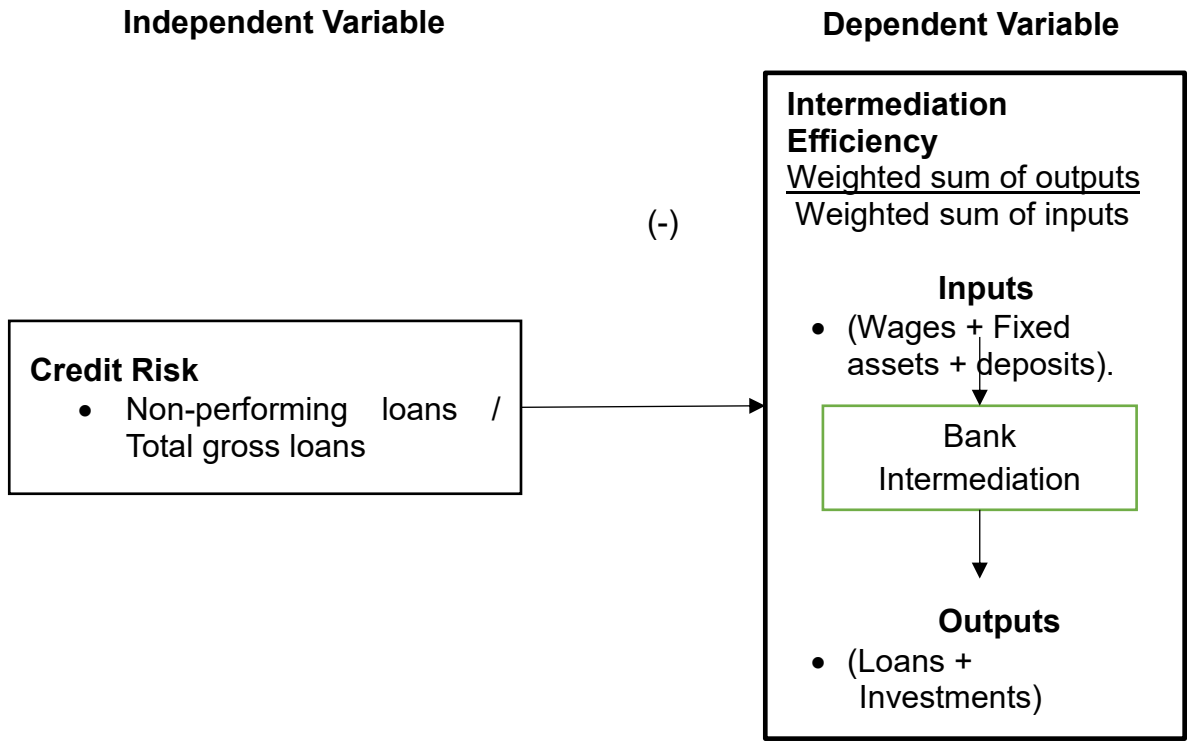
Lema (2017) studied the technical efficiency determinants of commercial banks in Ethiopia from 2011 to 2014. Using DEA on various input and output variables, followed by Tobit regression, the study found a negative but insignificant effect of credit risk on efficiency, where the ratio of loans to total assets served as the proxy for credit risk. Manlagnit (2015) also explored the effect of credit risk on bank efficiency in the Philippines from 2001 to 2011, applying stochastic frontier analysis. The study revealed a significant negative correlation between credit risk and cost efficiency, aligning with the findings of Girdadone et al. (2007), who observed a positive relationship between inefficiencies and non-performing loans in Italian banks during 1993–1996.

Conceptual Framework

The research was underpinned by a conceptual framework, shown in Figure 1, which depicts the predicted influence of credit risk on intermediation efficiency.

Figure 1

Conceptual Framework



Credit risk was measured using the credit risk ratio which is he ratio of non-performing loans to total loans. intermediation efficiency was measured using DEA as a ratio of the weighted sum of outputs to the weighted sum of inputs. The inputs used were wages, fixed assets and deposits, while the outputs were loans and investments.

Method

This research used a positivist philosophy to collect data on credit risk and assess its influence on intermediation efficiency of commercial banks in Kenya. This study used an explanatory sequential research design, which according to Creswell and Creswell (2022), is a mixed methods research design that follows a two-phase approach. The design began with the collection and analysis of quantitative data, followed by the collection and analysis of qualitative data (Kothari & Garg, 2019). The qualitative data was gathered after design of an instrument that was informed by the findings of the quantitative analysis (Schindler, 2022). This study applied this design by first gathering secondary data from the 34 commercial banks in Kenya for ten years from 2014 to 2023 and analyzing it to get quantitative findings. Thereafter, the study then used interviews to gather qualitative data based on the findings from the secondary quantitative data analysis. The interviews were conducted with 26 finance managers of the commercial banks.

A two-stage analysis was then adopted where in the first stage; efficiency scores were generated using the DEA methodology. The estimated efficiency scores were used as dependent variables in the efficiency equation. The frontier efficiency analysis in R (FEAR)

program was utilized to computed efficiency scores using DEA. In the second stage, Tobit panel regression analysis was used to regress DEA efficiency scores against bank capitalization. The study conducted diagnostic tests to evaluate the six essential assumptions; linear relationship between outcome and predictor variables, no multicollinearity, stationarity, no autocorrelation, normality of regression residuals, and homoscedasticity. This study used Nvivo software and applied the six steps to analyze the qualitative data and derive themes. The steps include familiarizing with the data, generating initial codes, searching for themes, reviewing themes, defining themes, and generating the report (Creswell & Creswell, 2022), The results from the analysis were used to explain the findings from the quantitative secondary data analysis.

Results

General Information

The study gathered secondary data for bank capitalization and financial performance from 39 commercial banks in Kenya for a period of 10 years (2014 – 2023). Of the 39 commercial banks that were considered in the study, 34 satisfied the inclusion criteria as they were operational for 10 years and this resulted in 340 observations.

Descriptive Analysis of Credit Risk and Intermediation Efficiency

The research measured credit risk as the ratio of NPLs to total loans of the commercial banks. Descriptive statistics for credit risk analysed from the panel data are shown in Table 1. The descriptive statistics for credit risk of the 34 commercial banks from 2014 to 2023 include the mean, standard deviation, minimum, and maximum values.

Table 1

Descriptive Statistics for Credit Risk

Variable		Mean	Std. Dev.	Min	Max	Obs.
Credit Risk	Overall	12.65	4.172	0.45	24.1	N = 340
	Between		3.295	0.74	13.2	n = 34
	Within		2.824	5.62	15.6	T = 10

The panel data descriptive analysis presented in Table 1 indicates that the credit risk among commercial banks in Kenya had an average level of 12.65% over the 10-year period. The overall standard deviation of 4.172 suggests a high degree of variability in the credit risk levels among the commercial banks. The minimum value of 0.45 and the maximum value of 24.1% indicate a significant disparity in credit risk among banks, with some having very low credit risk while others have very high levels of credit risk. Additionally, the variation observed "between" banks indicates a standard deviation of 3.295, with credit risk values spanning from 0.74% to 13.2%. Conversely, the "within" variation, which reflects temporal changes within each bank, exhibits a standard deviation of 2.824, indicating a slightly lower variability, and presents a more constrained credit risk range from 5.62% to 15.6%. This suggests that although banks experience variations in credit risk over time, these changes are not as significant as the disparities noted among different commercial banks.

The study used Frontier Efficiency Analysis with R (FEAR) package to perform non-parametric efficiency analysis utilizing data envelopment analysis (DEA). The FEAR package was instrumental in evaluating intermediation efficiency by analysing inputs (wages, fixed assets and deposits) and outputs (loans and investments). Table 2 includes descriptive information for intermediation efficiency across the 34 commercial banks over the period 2014 – 2023, including the means, standard deviations, minimums, and maximums.

Table 2
Descriptive Statistics for Intermediation Efficiency

Variable		Mean	Std. Dev.	Min	Max	Obs.
Intermediation Efficiency	Overall	0.771	0.238	0.531	0.951	N = 340
	Between		0.229	0.574	0.893	n = 34
	Within		0.192	0.622	0.835	T = 10

The descriptive statistics for intermediation efficiency among commercial banks in Kenya, as shown in the panel data descriptive analysis in Table 2, reveal a moderate efficiency level of 0.771 or 77.1% across the 10-year period. This is lower than the 95.4% reported in Ethiopia (Abdulahi et al., 2023). The overall standard deviation of 0.238 indicates moderate variability in efficiency levels across the observed banks. The minimum and maximum values of 0.531 and 0.951 respectively suggest that while some banks operate with notably lower efficiency, others approach near-optimal intermediation. The dataset includes 340 observations, covering 34 commercial banks over a 10-year period, offering a robust basis for analysing trends and performance in the sector.

Further, the "between" variation, which reflects differences across banks, shows a standard deviation of 0.229, with intermediation efficiency ranging from 0.574 to 0.893. This points to notable efficiency disparities between different banks. On the other hand, the "within" variation, capturing changes over time within each bank, has a slightly lower standard deviation of 0.192 and a narrower efficiency range from 0.622 to 0.835. This indicates that while banks do experience changes in efficiency over time, these shifts are less pronounced than the differences observed between institutions. Overall, the statistics suggest that structural and institutional factors may play a larger role than temporal ones in shaping intermediation efficiency.

Tobit Fixed Effects Model

The study's objective was to assess the effect of credit risk on intermediation efficiency of commercial banks in Kenya. The research fitted a Tobit regression model which was used to accomplish the research objective and also to test the study hypothesis which was;
H_0: Credit risk has no statistically significant effect on intermediation efficiency of commercial banks in Kenya.

The control variables used in the model included Bank Size (log of total assets), profitability (ROE), Capitalization (Capital adequacy ratio), bank ownership (Domestic [DO] or Foreign [FO]), and bank liquidity (Liquid Assets/Total Assets). The study findings of the fitted Tobit fixed effects model are provided in Table 3.

Table 3

Tobit Fixed Effects Model of Credit Risk on Intermediation Efficiency

Tobit fixed-effects regression					Number of obs =	306
					Uncensored =	306
Limits	Lower = 0				Left-censored =	0
	Upper = 1				Right-censored =	0
					Wald chi2(1) =	52.61
Log likelihood = -218.9036					Prob > chi2 =	0.0000
EFF	Coef.	Std. Err.	z	P > | z |	[95% conf. interval]	
Bank Size	.2503	.1136	2.20	0.028	.1705	.4917
Bank Liquidity	-.1318	.0775	-1.70	0.089	-.1936	.0590
Credit Risk	-.2115	.0901	-2.35	0.019	-.3083	-0516
Bank Capitalization	.3236	.1528	2.12	0.034	.1068	.5317
Bank Profitability	.3253	.1108	2.94	0.003	.0974	.5072
FO (1/0)	.1396	.0691	2.02	0.043	.0493	.2305
_Cons	.2719	.2116	1.28	0.201	-.0539	.5503
var (e.EFF)	2.2419	.2692			2.082854	2.51261

The resultant equation from the Tobit regression model is;

$EFF_{it} = 0.2503\ Size_{it} - 0.2115\ Credit\ Risk_{it} + 0.3236\ Capitalization_{it} + 0.3253\ Profitability_{it} + 0.1396\ FO_{it} + \varepsilon_{it}$

Where:

EFF = Intermediation efficiency
FO = Foreign banks.
i = Bank
t = Year
ε = error term

The Tobit fixed effects regression results presented in Table 3 assess the effect of credit risk, quantified by the ratio of non-performing loans to total loans, on intermediation efficiency within Kenyan commercial banks. The statistical strength of the model is evidenced by the Wald chi-square statistic of 52.61, with a p-value less than 0.001, indicating that the model significantly explains variations in intermediation efficiency. The constant term in the model is not statistically significant (Coef. = 0.2719, p = 0.201), meaning it has no reliable standalone impact on intermediation efficiency when credit risk and other control variables are held at zero. The log likelihood value of -218.9036 provides a benchmark for comparing the fit of this model against other competing models.

The regression revealed a statistically significant negative coefficient for credit risk (Coef. = -0.2115, p = 0.019), suggesting that as credit risk increases, intermediation efficiency decreases. This result highlights the adverse impact that rising levels of non-performing loans may have on a bank's ability to efficiently channel funds from savers to borrowers. These finding led to the rejection of the hypothesis and acceptance of alternative hypothesis that credit risk has a statistically significant effect on intermediation efficiency of commercial banks in Kenya. The findings further showed that larger banks exhibit higher efficiency [Bank Size: β = 0.2503, z = 2.20, p = 0.028], while more liquid balance sheets are associated with slightly lower efficiency,

consistent with precautionary or idle liquidity though this was not significant [Bank Liquidity: $\beta = -0.1318$, $z = -1.70$, $p = 0.089$]. Stronger capitalization and profitability improve intermediation efficiency [Capitalization: $\beta = 0.3236$, $z = 2.12$, $p = 0.034$; Profitability: $\beta = 0.3253$, $z = 2.94$, $p = 0.003$].

Findings from the interviews showed consensus on the effect of credit risk, measured by the ratio of NPLs to total loans, on a bank's intermediation efficiency as significant and generally expected to be negative. Study participants agreed that when credit risk is high, indicated by a rising proportion of NPLs, it implies that a greater share of the bank's loan portfolio is not generating income. This deterioration in asset quality reduces the bank's capacity to earn interest income, thereby undermining its efficiency in financial intermediation. The interview findings also established that high levels of NPLs compel banks to allocate more capital to loan loss provisions, which further constrains their ability to extend new credit. Additionally, study participants were of the view that elevated credit risk often leads to stricter lending standards, which may limit access to credit for productive sectors of the economy, further diminishing the bank's intermediation role. Moreover, interview findings showed that a high NPL ratio can damage the bank's reputation and creditworthiness, increase funding costs, and reduce investor and depositor confidence.

Table 4
Summary of Qualitative Themes

Theme	Representative Quote	Connection to Quantitative Finding
Impact on Interest Income	"When credit risk is high… a greater share of the bank's loan portfolio is not generating income."	Supports negative coefficient by lowering interest income, reducing intermediation efficiency.
Asset Quality Deterioration	"This deterioration in asset quality reduces the bank's capacity to earn interest income, thereby undermining its efficiency in financial intermediation."	Supports negative coefficient by directly weakening efficiency via poorer asset performance.
Provisioning Crowds Out Lending	"High levels of NPLs compel banks to allocate more capital to loan loss provisions, which further constrains their ability to extend new credit."	Supports negative coefficient by shrinking new lending, depressing intermediation activity.
Tighter Lending Standards	"Elevated credit risk often leads to stricter lending standards, which may limit access to credit for productive sectors of the economy."	Supports negative coefficient through reduced credit supply to the real economy.
Reputation and Creditworthiness	"A high NPL ratio can damage the bank's reputation and creditworthiness."	Supports negative coefficient by worsening market perception, tightening constraints on intermediation.

Discussion

The study sought to determine the influence of credit risk on intermediation efficiency of commercial banks in Kenya. The Tobit fixed effects regression results showed that there is a statistically significant negative relationship between credit risk and banks' ability to efficiently allocate financial resources. The significant negative relationship strongly supports the agency

theory perspective. It suggests that the agency costs associated with poor credit risk management, including the costs of monitoring problematic loans, writing them off, and the capital allocated to provisions, directly erode the efficiency of the intermediation process. These finding aligns with existing literature that emphasizes the detrimental effects of credit risk on banking operations. As noted by Cibulskiene and Rumbauskaite (2012), credit risk, arising from borrowers' failure to meet obligations, is one of the most critical threats in the banking sector. Berger and De Young (1997) associate poor cost efficiency with ineffective management practices, suggesting that banks with poor credit assessment, collateral evaluation, and borrower monitoring are more prone to inefficiency. Further, the findings support Arora (2014), who explained that banks incur additional costs managing nonperforming loans, further reducing efficiency. Moreover, Ahmad and Bashir's (2013) 'skimping' hypothesis illustrates how banks that cut costs on loan underwriting and monitoring may appear efficient in the short term but ultimately suffer from increased loan defaults and declining efficiency over time.

The research findings which established a significant negative effect of credit risk on banks' intermediation efficiency align closely with the broader literature on the relationship between credit risk and bank performance. For instance, Siddique et al. (2022) found that both non-performing loans (NPLs) and the capital adequacy ratio (CAR), two key indicators of credit risk, were negatively related to the cost-efficiency ratio (CER) in South Asian commercial banks. This suggests that higher credit risk tends to undermine bank efficiency, consistent with the current study's results. Similarly, Batir et al. (2017) reported a significantly negative relationship between loan quality (another proxy for credit risk) and the efficiency of conventional banks in Turkey, indicating that problematic loans diminish operational efficiency. Salim, Arjomandi, and Dakpo (2017) also supported this view, using a DEA by-production model to show that non-performing loans negatively impact the efficiency of Iranian banks. Collectively, these studies reinforce the notion that credit risk is a critical determinant of banking efficiency, and the negative correlation observed in the current analysis is both theoretically and empirically grounded in prior research. However, Girdadone et al. (2007) offered a contrasting perspective by noting a positive relationship between non-performing loans and efficiency in Islamic banks, possibly reflecting structural or strategic differences in how these institutions manage risk. The divergent finding for Islamic banks may be explained by their profit-and-loss sharing model, which could align the incentives of the bank (agent) and the investor (principal) more closely, mitigating the agency costs typically associated with NPLs.

Limitations

This study has several limitations. First, the Tobit fixed-effects model may face endogeneity, since efficiency can affect credit risk and vice versa, and some macro and regulatory factors may be omitted, which can bias the estimates. Further, the balanced panel excludes banks affected by mergers, failures, or recent entry, so the results may not generalize to all Kenyan banks. Moreover, the qualitative interviews may have selection and recall bias. Finally, credit risk is measured only by the NPL ratio, which does not capture collateral quality, provisioning, or the timing of defaults, and the findings apply to Kenya in 2014–2023 and may not be generalizable to other periods or settings.

Conclusion & Recommendations

The research concludes that credit risk has a significant and negative impact on the intermediation efficiency of commercial banks in Kenya. Increased NPLs lead to lower income, greater loan loss provisioning, constrained lending capacity, and stricter credit standards, all of which undermine the banks' core intermediation function. The study recommends to bank managers to prioritize strengthening credit risk management frameworks.

This includes implementing rigorous credit appraisal processes, continuous monitoring of loan portfolios, and early warning systems to detect potential defaults. Second, given that NPLs were identified as a major contributor to reduced efficiency, banks should adopt proactive loan restructuring and recovery strategies to minimize NPLs. The study also recommends to the CBK to enforce stricter prudential regulations and provide guidance on optimal loan provisioning practices. Further, there should be a concerted effort to adopt advanced credit risk modeling tools, including the use of artificial intelligence (AI) and data analytics, to enable early warning systems that flag potential default risks. This study contributes theoretically by successfully applying agency theory to the problem of intermediation efficiency, and methodologically by demonstrating the value of a mixed-methods, DEA-Tobit approach in banking research. Future studies could incorporate a broader set of control variables, explore non-linear relationships, or apply this framework to compare efficiency across different types of financial institutions in Africa.

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