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Financial Risk, Income Diversification, Firm Characteristics and Performance of Commercial Banks in Kenya

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Abstract

The study investigated the influence of financial risks, income diversification, and firm characteristics on the financial performance of commercial banks in Kenya, motivated by the need to understand how these factors impact profitability and stability in an emerging market context. The general objective of the study was to assess the relationship among financial risks, diversification, firm characteristics, and financial performance. Specifically, the study sought to examine the effects of financial risks on performance, determine how income diversification mediate the relationship between financial risks and performance, assess the moderating role of firm characteristics (size, growth, and age), and evaluate the joint effect of these factors on profitability. The study utilized a population of 39 commercial banks in Kenya, gathering secondary data from financial reports over a seven-year period (2016–2022) to analyze key variables, including credit, liquidity, market, capital, and operational risks; income diversification; firm characteristics, and financial performance. Panel regression analysis, specifically fixed-effects modelling, was employed to test the hypotheses. Findings revealed that market, capital, and operational risks significantly negatively affected financial performance, while credit and liquidity risks showed no significant effect. Income diversification emerged as an effective mediating factor in mitigating the negative impacts of specific risks. Firm characteristics, particularly bank size and age, significantly moderated the relationship between certain financial risks and performance, suggesting that larger and more established banks exhibit greater resilience to financial risks. The study concluded that targeted management of specific financial risks, coupled with strategic income diversification and leveraging firm characteristics, is essential for enhancing bank performance. Recommendations include policy measures to strengthen regulatory guidelines on risk management, incentives for income diversification, and an integrated approach combining risk management, diversification, and firm characteristics to optimize performance. For further research, the study suggests exploring qualitative insights from bank managers, conducting comparative studies across countries, examining additional diversification strategies and firm attributes, extending the time frame, and employing advanced econometric methods to capture dynamic relationships. These findings extend the Modern Portfolio Theory by demonstrating that, in the context of Kenyan commercial banks, diversifying revenue streams across interest and non-interest income sources yields superior risk–return optimization compared to asset diversification alone. This implies that managers and regulators should prioritize income diversification strategies such as expanding fee-based services and investment income to enhance resilience and profitability under varying risk conditions.

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1. INTRODUCTION

1.1 Background of the Study

Financial risks are at the epicenter of modern management of business organizations (Truica & Trandafir, 2009). Banking institutions are vulnerable to different financial risks including liquidity, credit, forex, interest rate, and market risks that adversely affect their financial performance (Djan et al., 2015). Thus, to enhance financial performance, one of the most essential success indicators for any banking entity remains in its ability to effectively manage the inherent financial risks facing its business. Failure to manage effectively financial risks can lead to bank failure (Hunjra et al., 2020). Diversification is one of the strategies used by financial institutions to manage financial risks, and it is hypothesized that effective use of diversification strategy lowers financial risks and enhances financial performance (Amin et al., 2014). The effect of financial risks on financial performance is also expected to be influenced by firm characteristics such as age of the firm, ownership structure and size of the firm (Ye et al., 2020).

Financial risk indicates the uncertainty of future financial results that may affect the profitability and objectives of organizations (Rafique et al., 2020). Financial risks, if not managed, often lead to financial crises, leading to underperformance of banking entities, lowering of a country's economy, and thus depressing the standard of living of people (Zhao et al., 2021). The major financial risks comprise; credit risk, liquidity risk, capital risk, market risk, and operational risk (Haque & Wani, 2015; Amin et al., 2014). Credit risk is proxied by the percentage of defaulted loans to aggregate loans, and a higher percentage indicates a higher probability of default (AlKhouri & Aurori, 2019). Liquidity risk means that a bank is unable to reduce its liabilities and increase its assets and is measured using the liquidity coverage ratio (Haque & Wani, 2015). Market risk refers to uncertainty in a financial institution's portfolio earnings due to changes or fluctuations in market conditions related to factors such as exchange rates; interest rates is measured using value at risk (VAR). Capital risk denotes the possibility of a banking entity losing its capital, which is measured through the capital adequacy ratio (Duho et al., 2020). Operational risks denote the possibility of losses arising from bank systems, processes and individuals, and is assessed by the cost/revenue ratio (Ali & Oudat, 2020). The current study focused on these risks as they have been highlighted as the main financial risks facing financial firms (Rafique et al., 2020).

Corporate diversification is the act of operating in multiple unrelated or similar businesses, a growth approach adopted by many company executives globally (Ibekwe, 2017). Diversification minimizes unpredictable and predictable fluctuations, which ultimately lead to synchronization of financial entity's income flows (Siddique, Mehmood, Yasir, Ali, & Khan, 2017). Further, diversification leads to increased profitability, increased market share, reduced risk, extended business lifecycle, higher growth, and efficient use of financial and human resources (Yigit & Behram, 2013). Income diversification shows the expansion of an entity's income portfolio and is equivalent to the ratio of noninterest income to aggregate operating revenue, whereas noninterest income is a summation of income from investments, fee-based earnings, and other noninterest earnings. Operating income entails the sum of noninterest and net interest earnings (Majumder & Li, 2018).

Firm characteristics are the company's managerial and demographic attributes that form part of the entity's endogenous environment (Egbunike & Okerekeoti, 2018). The major bank characteristics include firm size, bank age and revenue growth (Kartiningasih & Daryanto, 2020). Firm size is a measure of whether a firm is classified as large or small and is measured using the logarithm of total assets (Al-Kayed & Aliani, 2020). Firm age an indicator of firm experience indicates a company's length of life since its inception and is usually measured using the number of years since incorporation (Kartiningasih & Daryanto, 2020). Revenue growth denotes the increase in sales or revenue over a specific period as is assessed using the total revenue growth ratio (Egbunike & Okerekeoti, 2018). The selection of bank size, firm age and firm growth as firm characteristics in the study might be driven by their perceived direct influence on a bank's risk-taking behavior and overall performance in the Kenyan context.

Performance denotes a set of non-financial and financial proxies that provide figures about the extent to which goals and outcomes have been achieved (Mirza & Javed, 2013). A firm's financial performance not only plays a key role in raising an entity's market value but also leads to overall industry growth, which eventually leads to financial performance (Kwaltommai et al., 2019). The key financial performance metrics entail the return on assets (ROA) ratio, return on equity (ROE), and the Tobin Q (Amin et al., 2014). Tobin's Q is a market-based performance indicator, and it is the summation of the book value debt and the market value of equity in proportion to the par value

of aggregate assets (Siddique et al., 2017). ROA shows the proportion of net earnings to assets while return ROE shows the proportion of net earnings to stockholders' funds (Hunjra et al., 2020). ROA specifies the capability of the entity executives to generate returns from the entity's assets and ROE shows the yield on equity owners (Adzobu et al., 2017). This study focused on ROA to measure financial performance since they can easily be obtained from published financial records hence reliable and verifiable. Further, ROA is widely accepted indicator in the financial industry, providing insights into a bank's ability to generate profit from its assets.

As of 31st December 2022, the industry consisted of the Kenyan Central Bank (CBK) as the regulator, 39 banking entities (38 banks and 1 mortgage financing institution). The Kenyan central bank (CBK) is the sector's supervisory body. In addition, the Companies Act, the CBK Act, the Banking Act, and various prudential measures circulated by the CBK also govern the industry (Aluoch et al., 2018). The sector has been identified as a key pillar in achieving Vision 2030 by increasing savings, promoting foreign direct investments, and protecting the economy from exogenous shocks (Muriithi, 2016). According to the CBK (2023), at least five previously well-performing banks, including Chase Bank, Imperial Bank, Dubai Bank, Spire Bank, and Charterhouse Bank, experienced severe losses or were placed under receivership between 2015 and 2022 due to inefficiencies, unstable credit lines, and inability to effectively hedge financial risks (Echwa & Atheru, 2020; CBK, 2023). Recognizing the high risks associated with banking operations, CBK published a risk management guide to guide all banking entities on the minimum preconditions for the framework and strategy (Mwangi & Muturi, 2016). However, although the guidelines have been met, some Kenyan banks are still vulnerable to systematic risks that have resulted in their inability to raise sufficient capital to meet obligations arising from legal guardianship (Musau et al., 2018).

1.2 Research Problem

Financial risk and its prudent management are significant for successful financial intermediation and banking sector performance. Efficient financial risks management is critical for monitoring in banks, control, and performance appraisal by regulators, stockholders, and shareholders (Eisenkopf, 2008). Various theories among them the modern portfolio theory, the capital assets pricing theory, and market power theory support that financial risks should be mitigated to enhance

firm performance. However, despite abundant theoretical literature on the significance of risk management, there is a large discussion in academic literature concerning the contribution of financial risk management to firm profitability (Truica & Trandafir, 2009). In addition, failure to manage risk at large companies has been making headlines around the world for many years, especially in the financial sector. As such, poor risk management practices and engagement in reckless risk-taking were blamed for the failure of large organizations among them Olympus, Enron, WorldCom, Satyam, Parmalat, and several others (OECD, 2014).

In Kenya, banks are key in transmitting the impulses of monetary policy to the economic system (Mudanya & Muturi, 2018). However, the Kenyan banking sector has been faced by the failure of some banks due to poor financial risks management and mismanagement (Mulwa & Kosgei, 2016). For quite sometimes, the majority of the Kenyan banks have been recording poor performance due to a high level of financial risks for instance, the ratio of gross NPLs increased from 12.03% in 2018 to 12.78% in 2019, and this increment negatively affected the profitability of these institutions (Siriba, 2020). As such, poor risks management has been reported as the key cause of the letdown and collapse of banks in Kenya (Musau et al., 2018).

Several studies have been carried out across the world on how firm performance is affected by various financial risks. For example, Hunjra et al. (2020) examined whether firm-specific risks affect bank performance and documented that credit, operational, and liquidity risks significantly affected bank performance, but the study was cross-country in nature and covered several countries in Asia. Fayman and He (2011) examined whether prepayment risk affected USA banks' performance and documented a positive and significant interrelationship though the study focused on prepayment risk. In Ghana, Zhongming et al. (2019) examined whether financial risks affected bank performance and revealed a unidirectional interrelationship between risks and bank performance, but the study used time series modeling. Olalekan, Olumide and Irom (2018) in Nigeria found an insignificant link between liquidity risk and profitability though the study focused on liquidity risk thus indicating that most of the available international studies focus on a single financial risk.

From the local perspective, Kioko et al (2019) assessed whether financial risk affects Kenyan listed banks' performance and documented a negative relationship between liquidity, market, credit, and operational risks and performance although the study focused on listed banks. Onsongo et al. (2020) also examined whether financial risk affects listed firms' performance liquidity and operational risks significantly affected performance, but the focus was listed commercial and services firms at the NSE. Further, Mwaurah et al. (2017) investigated financial risks and their effects on stock returns and found a significant interrelationship between stock returns and financial risks, but the study focused only on listed banks and stock returns as opposed to financial performance.

This study was motivated by the failure of five Kenyan banks between 2015 and 2022—namely Dubai Bank, Imperial Bank, Chase Bank, Charterhouse Bank, and Spire Bank—attributable to poor financial risk management, mismanagement, and governance weaknesses (CBK, 2023). These failures disrupted financial intermediation, eroded public confidence in the banking system, and highlighted persistent vulnerabilities in the sector's risk management practices. Although there are previous studies in this area, there exist conceptual, contextual, and methodological gaps that warrant further investigation. Conceptually, most prior studies have focused on the direct relationship between financial risks and bank performance without incorporating the potential mediating role of diversification strategies or the moderating role of firm characteristics, leaving the joint interaction of these variables underexplored. Contextually, much of the empirical work has concentrated on non-financial firms or banking sectors in other jurisdictions whose regulatory frameworks and market conditions differ significantly from Kenya's, limiting the applicability of their findings to the local context. Methodologically, earlier studies have reported inconsistent results found negative relationships, others positive, which can be linked to variations in variable measurement, model specification, and analytical approaches. These gaps, coupled with the real-world implications of bank failures in Kenya, underscore the need for an evidence-based analysis that integrates financial risks, diversification, and firm characteristics to explain performance outcomes. Accordingly, this study sought to answer the question: What relationship exists between financial risks, diversification, firm characteristics, and financial performance of commercial banks in Kenya?

2. METHODOLOGY

This study adopted a positivism philosophy. A positivism philosophy is appropriate for studies that deal with testable hypotheses arising from related theories, often explaining the nature of specific interrelationships, including variation in the response variable, or determining the difference between groups or the objectivity of several factors in a case (Sekaran & Bougie, 2013). This study adopted a descriptive correlational research design. This study design explains the data and characteristics of the phenomenon or population under investigation (Kothari, 2012). The population for this study comprised 39 commercial banks in Kenya as of December 31, 2022 (CBK, 2023). This study entirely used panel secondary data which was gathered from the annual accounting reports of the individual banks and the banking sector annual supervision reports by the Kenyan Central Bank (CBK). The data was collected from all the 39 commercial banks for 7 years from 2016 to 2022 through a data collection sheet. This study employed descriptive statistics and inferential statistics in data analysis using STATA statistical software version 15. Descriptive statistical tools entailed standard deviation, mean, maximum, and minimum values which were used to summarize data. Inferential statistical tools entailed the various panel regression equations which were used to assess the variables interrelationships. First, multiple linear regression was used to examine the direct effect of financial risk on financial performance. Second, the Baron and Kenny (1986) procedure was used to examine the intervening effect of firm characteristics on the relationship between financial risk and bank performance. Hierarchical regression was used to examine the moderating effect of firm characteristics on the relationship between financial risk and financial performance. Finally, multivariate regression analysis was used to test the joint effect of all the explanatory variables.

3. RESULTS

3.1 Descriptive Statistics

Table 1 provides a summary of descriptive statistics for the study variables, covering 273 observations derived from 39 commercial banks in Kenya that maintained complete data across a seven-year period (2016–2022).

Table 1: Summary of Descriptive Statistics

Stats	N	Min	Max	Mean	SD	CV	Se (Mean)
ROA	273	0.087561	20.52476	0.050736	1.52935	3.014297	0.092561
Credit risk	273	0.000803	4.037767	0.194625	0.287982	1.479676	0.01743
Liquidity risk	273	0.010366	0.410838	0.096118	0.054282	0.564747	0.003285
Market risk	273	0.539777	1.852932	1.304587	0.437365	0.335251	0.026471
Capital risk	273	-0.74455	0.945028	0.191703	0.138207	0.720945	0.008365
Operational risk	273	0.012075	22.03015	0.898128	2.381618	2.651758	0.144142
Income diversification	273	-169.718	1.428079	-0.01718	10.33147	-601.452	0.625289
Bank size	273	2610.309	971352.8	129888.9	184734.9	1.422254	11180.67
Bank growth	273	-98.5323	7009.029	54.69302	461.5662	8.439215	27.93526
Firm age	273	0	126	37.05861	28.3836	0.765911	1.717854

Return on Assets (ROA), a key indicator of financial performance, has a minimum of 0.0876 and a maximum of 20.5248, with a mean of 0.05074 and a SD of 1.5294. Credit Risk, measured by the non-performing loans to total loans ratio, shows a minimum of 0.0008 and a maximum of 4.0378, with a mean of 0.1946 and a SD of 0.2880. Liquidity Risk, with a minimum of 0.0104 and a maximum of 0.4108, has an average of 0.0961 and a SD of 0.0543. Market Risk shows a mean of 1.3046 with a SD of 0.4374, ranging from 0.5398 to 1.8529. Capital Risk demonstrates a minimum of -0.7446 and a maximum of 0.9450, with a mean of 0.1917 and a SD of 0.1382. With a coefficient of variation of 0.7209. Operational Risk has a broad range from 0.0121 to 22.0302, with a mean of 0.8981 and a SD of 2.3816, resulting in a high coefficient of variation of 2.6518. Income Diversification ranges widely from -169.7180 to 1.4281, with a mean of -0.0172 and a substantial SD of 10.3315, indicating a very high coefficient of variation (-601.452). Bank Size, measured in thousands, ranges from 2,610.309 to 971,352.8, with a mean of 129,888.9 and a SD of 184,734.9, giving a coefficient of variation of 1.4223. Bank Growth demonstrates a wide range from -98.5323 to 7009.029, with an average growth rate of 54.6930 and a high SD of 461.5662, resulting in a coefficient of variation of 8.4392. Firm Age spans from newly established banks to those with up to 126 years in operation, with an average of 37.0586 years and a SD of 28.3836 respectively.

3.2 Correlation Analysis

Table 2 presents the correlation analysis results, showing the relationships between financial performance (measured by ROA) and other variables in the study. Pearson correlation coefficients

are provided for each pair of variables, along with the significance levels (Sig. 2-tailed) to indicate the statistical significance of each correlation.

Table 2: Correlation Matrix

	ROA	Credit risk	Liquidity risk	Market risk	Capital risk	Operational risk	Income diversification	Bank size	Bank growth	Firm age
ROA	1									
Credit risk	-.168**									
Liquidity risk	-.019	-.048	1							
Market risk	-.047	-.126*	.093	1						
Capital risk	-.184**	-.215**	-.073	.123*	1					
Operational risk	-.578**	.070	.174**	.016	-.365**	1				
Income diversification	.128*	.125*	.088	.016	-.216**	.481**	1			
Bank size	.321**	-.232**	-.219**	-.103	-.095	-.063	-.219**	1		
Bank growth	.016	-.193**	.022	.166**	.045	.087	.073	-.004	1	
Firm age	.041	-.099	-.315**	-.088	-.007	-.397**	-.223**	.586**	-.141*	1

The correlation between financial performance (ROA) and credit risk is negative and significant, with a Pearson correlation of -0.168 ($p = 0.005$). For liquidity risk, the correlation with ROA is negative but not statistically significant (Pearson correlation = -0.019, $p = 0.756$). The correlation between market risk and ROA is also negative but not significant, with a Pearson correlation of -0.047 ($p = 0.441$). Capital risk shows a significant negative correlation with ROA, with a Pearson correlation of -0.184 ($p = 0.002$). Operational risk has a strong, significant negative correlation with ROA, with a Pearson correlation of -0.578 ($p = 0.000$). Income diversification is positively correlated with ROA, with a Pearson correlation of 0.128 ($p = 0.035$), indicating a significant but modest positive relationship. Bank size exhibits a significant positive correlation with ROA, with a Pearson correlation of 0.321 ($p = 0.000$), indicating that larger banks tend to perform better financially. Bank growth has a weak, non-significant positive correlation with ROA (Pearson correlation = 0.016, $p = 0.797$), indicating that changes in asset growth rates do not have a

substantial impact on financial performance within this sample. Finally, firm age shows a non-significant positive correlation with ROA, with a Pearson correlation of 0.041 ($p = 0.501$).

3.3 Regression Analysis

3.3.1 Financial Risk and Financial Performance

Table 3 presents the results of a fixed-effects regression model used to analyze this relationship, providing coefficients, standard errors, t-values, p-values, and confidence intervals for each type of financial risk. The model achieved an R-squared value of 0.1554 within groups, 0.3104 between groups, and 0.2651 overall, indicating that approximately 26.5% of the variation in financial performance can be explained by the financial risk factors considered in the model. The F-statistics ($F(5,229) = 8.43$) and the p-value ($\text{Prob} > F = 0.000$) confirm the model's statistical significance, suggesting that at least one of the financial risks significantly influences financial performance.

Table 3: Financial Risk and Financial Performance

Fixed effects (within) regression		Number of obs		=	273	
Group variable: BankID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.1554		Min		=	7	
between = 0.3104		Avg		=	7	
overall = 0.2651		Max		=	7	
		F (5,229)		=	8.43	
Corr (u_i, Xb) = 0.3460		Prob > F		=	0.00	
ROA	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
Credit risk	-0.00031	0.019558	-0.02	0.987	-0.03884	0.038229
Liquidity risk	-0.01493	0.032671	-0.46	0.648	-0.07931	0.049442
Market risk	-0.074917	0.033137	-2.26	0.025	0.009626	0.140209
Capital risk	-0.080386	0.02408	-3.34	0.001	0.03294	0.127833
Operational risk	-0.11524	0.026411	-4.36	0.000	-0.16728	-0.0632
cons	-1.3307	0.105515	-12.61	0.000	-1.53861	-1.1228

The regression testing results for the objective on financial risk and financial performance reveal mixed outcomes. The study found a non-significant relationship between credit risk and liquidity risk, respectively. However, the analysis revealed that market risk, capital risk, and operational risk show significant negative effects on financial performance. These results underscore the importance of managing specific financial risks, particularly market, capital, and operational risks, to enhance profitability in the Kenyan commercial banking sector.

3.3.2 Financial Risks, Income Diversification and Financial Performance

Table 4 assesses the relationship between financial risks and income diversification, treating income diversification as the dependent variable. The results show that only operational risk has a significant impact on income diversification, with a coefficient of -0.51493 and a p-value of 0.000. This suggests that higher operational risk reduces income diversification, potentially because operational inefficiencies may limit banks' ability to pursue diversified income sources. Other financial risks (credit, liquidity, market, and capital) do not significantly relate to income diversification, indicating that they do not strongly influence banks' income diversification strategies in this context. This finding is crucial as it highlights that only operational risk might play a role in mediating financial performance through income diversification.

Table 4: Financial Risk and Income Diversification

Fixed effects (within) regression		Number of obs		=	273	
Group variable: Bank ID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.5141		Min		=	7	
between = 0.1551		Avg		=	7	
overall = 0.2321		Max		=	7	
		F (5,229)		=	48.45	
Corr (u_i, Xb) = -0.7024		Prob > F		=	0.000	
Income diversification	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
Credit risk	-0.002547	0.025143	-0.1	0.919	-0.04699	0.052088
Liquidity risk	-0.06026	0.042002	-1.43	0.153	-0.14302	0.0225
Market risk	-0.012412	0.0426	-0.29	0.771	-0.07153	0.09635
Capital risk	-0.02609	0.030957	-0.84	0.4	-0.08709	0.034905
Operational risk	-0.514934	0.033954	-15.17	0.000	0.448032	0.581837
_cons	-0.02106	0.135649	-0.16	0.877	-0.28834	0.246221

Table 5 examines the direct effect of income diversification on ROA. The results show that income diversification alone does not have a statistically significant effect on financial performance (ROA), with a coefficient of 0.0079 and a p-value of 0.838. This suggests that, independently, income diversification does not significantly impact ROA. Therefore, while it may still play a mediating role, income diversification alone does not appear to enhance financial performance directly. This finding is essential for interpreting the mediation model, as it suggests that income

diversification's impact on ROA may depend on interactions with other financial risks rather than having an independent effect on performance.

Table 5: Income Diversification and Financial Performance

Fixed effects (within) regression		Number of obs		=	273	
Group variable: Bank ID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.0002		Min		=	7	
between = 0.0411		Avg		=	7	
overall = 0.0164		Max		=	7	
		F (1,233)		=	0.04	
Corr (u_i, Xb) = 0.1283		Prob > F		=	0.8379	
ROA	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
Income diversification	0.007917	0.03865	0.2	0.838	-0.06823	0.084065
_cons	-1.31967	0.017081	-77.26	0	-1.35332	-1.28601

In the final mediation step, Table 6 tests the joint effect of financial risks and income diversification on ROA. Here, market risk, capital risk, and operational risk continue to have significant negative effects on ROA, with operational risk showing the strongest negative impact. Interestingly, income diversification shows a significant positive effect on ROA in this combined model, with a coefficient of 0.2724 and a p-value of 0.000. This suggests that income diversification enhances financial performance when analyzed jointly with financial risks. The results indicate partial mediation, as income diversification affects ROA positively in the presence of financial risks, particularly operational risk. Thus, income diversification partially mediates the relationship between operational risk and financial performance.

Table 6: Financial Risks, Income Diversification and Financial Performance

Fixed effects (within) regression		Number of obs		=	273	
Group variable: Bank ID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.2590		Min		=	7	
between = 0.5287		Avg		=	7	
overall = 0.4848		Max		=	7	
		F (6,228)		=	13.28	
corr(u_i, Xb) = 0.4523		Prob > F		=	0.000	
LNROA	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Credit risk	-0.001	0.01836	-0.05	0.957	-0.03718	0.035176
Liquidity risk	-0.001483	0.030807	-0.05	0.962	-0.05922	0.062185
Market risk	-0.071536	0.031112	-2.3	0.022	0.010232	0.132839
Capital risk	-0.087494	0.02264	-3.86	0.000	0.042884	0.132103
Operational risk	-0.25551	0.035101	-7.28	0.000	-0.32468	-0.18635
Income diversification	0.272407	0.048252	5.65	0.000	0.177329	0.367484
_cons	-1.32497	0.099055	-13.38	0.000	-1.52015	-1.12979

3.3.3 Financial Risk, Firm Size and Financial Performance

Table 7 introduces interaction terms between firm size and each financial risk (e.g., CRSZ, LQSZ, MKTSZ, CPSZ, OPSZ) to assess if firm size moderates the risk-performance relationships. The interaction term for capital risk and firm size (CPSZ) is statistically significant with a negative coefficient (-0.10132, $p = 0.001$), indicating that firm size moderates the effect of capital risk on ROA. Specifically, as firm size increases, the negative impact of capital risk on ROA becomes less pronounced, suggesting that larger banks may be better equipped to manage capital adequacy challenges. Similarly, the interaction term for operational risk and firm size (OPSZ) is significant ($p = 0.05$), though weaker, indicating that firm size also mitigates the negative effect of operational risk on financial performance. This implies that larger banks, with more resources and operational systems, may better handle operational inefficiencies, reducing the adverse effects of operational risk on profitability.

Table 7: Interaction Term for Financial Risk and Firm Size

Fixed effects (within) regression			Number of obs		=	273
Group variable: Bank ID			Number of groups		=	39
R-sq:			Obs per group:			
within = 0.5037			Min		=	7
between = 0.2235			Avg		=	7
overall = 0.2395			Max		=	7
			F (11,223)		=	20.57
corr(u_i, Xb) = -0.3281			Prob > F		=	0.000
LNROA	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Credit risk	-0.09915	0.19573	-0.51	0.613	-0.48487	0.286567
Liquidity risk	-0.4565	0.337385	-1.35	0.177	-1.12137	0.208372
Market risk	-0.04853	0.334724	-0.14	0.885	-0.70815	0.6111
Capital risk	1.75693	0.508147	3.46	0.001	0.755546	2.758313
Operational risk	0.421265	0.288676	1.46	0.146	-0.14762	0.990147
Bank size	0.53656	0.073596	7.29	0.000	0.68159	0.39153
CR*SZ	0.004724	0.011627	0.41	0.685	-0.01819	0.027636
LQ*SZ	0.025952	0.019538	1.33	0.185	-0.01255	0.064455
MKT*SZ	-0.00167	0.018713	-0.09	0.929	-0.03855	0.035209
CP*SZ	-0.10132	0.030401	-3.33	0.001	-0.16123	-0.04141
OP*SZ	-0.03537	0.017909	-1.97	0.05	-0.07066	-7.4E-05
_cons	7.939205	1.255306	6.32	0.000	5.465425	10.41298

In contrast, the interaction terms for credit risk (CRSZ), liquidity risk (LQSZ), and market risk (MKT*SZ) are not statistically significant, suggesting that firm size does not significantly alter their impact on ROA. Therefore, the moderation effect of firm size appears to be specific to capital and operational risks, with no meaningful impact on the other types of risks. In summary, these results suggest partial moderation by firm size, specifically for capital and operational risks, leading to the rejection of hypotheses which posit no moderating effect of firm size on capital and operational risks. However, the other hypotheses are not rejected, indicating no moderating effect of firm size on credit, liquidity, and market risks. These findings underscore the role of firm size as a strategic asset that can help banks better manage specific types of financial risks, particularly capital and operational risks, enhancing financial performance.

3.3.4 Financial Risk, Firm Growth and Financial Performance

Table 8 includes interaction terms between each financial risk and firm growth (e.g., CRBG, LQBG, MKTBG, CPBG, OPBG) to test if firm growth moderates the impact of financial risks on ROA. In this model, only the interaction term for operational risk and firm growth (OPBG) approaches statistical significance ($p = 0.127$), suggesting a weak moderating effect. The negative coefficient for operational risk (-0.1919 , $p = 0.001$) remains significant, reinforcing that operational risk negatively impacts ROA regardless of growth rate. However, the non-significant interaction terms for other risks imply that firm growth does not significantly alter the effect of credit, liquidity, market, or capital risk on financial performance. These findings suggest that firm growth does not strongly moderate the relationship between financial risks and ROA, with only a slight indication of an interaction with operational risk.

Table 8: Interaction Term for Financial Risk and Firm Growth

Fixed effects (within) regression		Number of obs		=	273	
Group variable: Bank ID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.1730		Min		=	7	
between = 0.3578		Avg		=	7	
overall = 0.3077		Max		=	7	
		F (11,223)		=	4.24	
corr(u_i, Xb) = 0.3784		Prob > F		=	0	
LNROA	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
Credit risk	-0.020447	0.042428	-0.48	0.63	-0.06316	0.104058
Liquidity risk	-0.005129	0.054952	-0.09	0.926	-0.10316	0.113421
Market risk	-0.012813	0.069113	-0.19	0.853	-0.12339	0.149012
Capital risk	-0.071114	0.071812	-0.99	0.323	-0.0704	0.21263
Operational risk	-0.1919	0.056612	-3.39	0.001	-0.30346	-0.08033
Bank growth	0.00618	0.059881	0.1	0.918	0.12418	0.111826
CR*BG	-0.00413	0.010527	-0.39	0.695	-0.02488	0.016612
LQ*BG	-0.00841	0.015891	-0.53	0.597	-0.03973	0.022903
MKT*BG	0.028133	0.03079	0.91	0.362	-0.03254	0.088811
CP*BG	0.001801	0.021504	0.08	0.933	-0.04058	0.044177
OP*BG	0.02178	0.014222	1.53	0.127	-0.00625	0.049807
_cons	-1.33165	0.209945	-6.34	0.000	-1.74538	-0.91792

In summary, these results indicate minimal evidence for a moderating effect of firm growth on the relationship between financial risks and financial performance. Hypotheses H3f to H3j, which

posited no moderating effect of firm growth on various financial risks, are largely not rejected, as firm growth does not significantly alter the relationship between credit, liquidity, market, capital, or operational risk and ROA. Only a weak moderation effect is suggested for operational risk, but this remains statistically insignificant. These results imply that growth rate alone may not be a sufficient factor in managing the impact of financial risks on profitability, suggesting that other characteristics may be more relevant moderators in this context.

3.3.5 Financial Risk, Firm Age and Financial Performance

Table 9 introduces interaction terms between each financial risk and firm age (e.g., CRFA, LQFA, MKTFA, CPFA, OPFA) to examine whether firm age moderates the impact of financial risks on ROA.

Table 9: Interaction Term for Financial Risk and Firm Age

Fixed effects (within) regression		Number of obs		=	273	
Group variable: Bank ID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.3078		Min		=	7	
between = 0.0026		Avg		=	7	
overall = 0.0053		Max		=	7	
		F (11,223)		=	9.01	
Corr (u _i , X _b) = -0.6819		Prob > F		=	0.000	
ROA	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
Credit risk	-0.13571	0.046909	-2.89	0.004	-0.043269	0.228151
Liquidity risk	-0.41473	0.11155	-3.72	0.000	-0.63456	-0.1949
Market risk	-0.47916	0.208174	-2.3	0.022	-0.8894	-0.06892
Capital risk	-0.117078	0.125183	-0.94	0.351	-0.12961	0.36377
Operational risk	-0.068468	0.082609	-0.83	0.408	-0.09433	0.231261
Firm age	0.79157	0.23824	3.32	0.001	1.26106	0.32208
CR*FA	-0.043	0.01531	-2.81	0.005	-0.07317	-0.01283
LQ*FA	0.125201	0.034061	3.68	0.000	0.058078	0.192324
MKT*FA	0.11131	0.053635	2.08	0.039	0.005613	0.217006
CP*FA	-0.02153	0.044507	-0.48	0.629	-0.10924	0.066174
OP*FA	-0.06255	0.027214	-2.3	0.022	-0.11618	-0.00893
_cons	1.261433	0.786411	1.6	0.11	-0.28831	2.811181

The interaction term for credit risk and firm age (CRFA) is statistically significant with a negative coefficient (-0.043, p = 0.005), indicating that firm age moderates the effect of credit risk on

financial performance. Specifically, as banks age, the negative impact of credit risk on ROA intensifies. Similarly, the interaction terms for liquidity risk (LQFA, $p = 0.000$), market risk (MKTFA, $p = 0.039$), and operational risk (OPFA, $p = 0.022$) are also significant, suggesting that firm age moderates the effect of these risks. However, the moderation effects vary, with liquidity risk and market risk becoming less detrimental in older banks, possibly due to stronger resource bases and more established risk management practices.

In summary, the results indicate significant moderation effects of firm age on several financial risks, leading to the rejection of hypotheses that as firm age significantly moderates the relationships between credit, liquidity, market, and operational risks and financial performance. However, the interaction term for capital risk and firm age (CPFA) is not significant, indicating that firm age does not moderate the impact of capital risk on ROA. These findings highlight the role of firm age in shaping how banks respond to specific risks, suggesting that older banks may have enhanced resilience against certain types of risks due to experience and established practices.

3.3.5 Financial Risk, Diversification, Firm Characteristics and Financial Performance

Table 10 presents the results from the fixed-effects panel regression, providing coefficients, standard errors, t-values, p-values, and confidence intervals for each variable. The model achieves an R-squared value of 0.5097 within groups, indicating that approximately 50.97% of the variation in financial performance is explained by the combined factors of financial risks, income diversification, and firm characteristics. This high explanatory power, coupled with an F-statistic ($F(10,220) = 22.87$, $p = 0.000$), confirms the statistical significance of the model, validating its use in explaining the performance dynamics of commercial banks in Kenya. Among the financial risk factors, market risk, capital risk, and operational risk show significant negative relationships with financial performance. Market risk has a coefficient of -0.10348 ($p = 0.001$), indicating that greater exposure to market fluctuations negatively affects ROA. Capital risk also has a significant negative effect, with a coefficient of -0.05502 ($p = 0.003$), suggesting that banks facing higher capital adequacy pressures experience reduced profitability. Operational risk exhibits the strongest adverse effect, with a coefficient of -0.25831 ($p = 0.000$), implying that inefficiencies and operational issues substantially lower financial performance. These findings underscore the importance of managing market, capital, and operational risks in sustaining bank profitability.

Table 10: Joint Panel Regression Model

Fixed effects (within) regression		Number of obs		=	269	
Group variable: BankID		Number of groups		=	39	
R-sq:		Obs per group:				
within = 0.5097		Min		=	5	
between = 0.2163		Avg		=	6.9	
overall = 0.2454		Max		=	7	
		F (10,220)		=	22.87	
corr(u_i, Xb) = -0.4054		Prob > F		=	0.000	
LNROA	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Credit risk	-0.02352	0.017277	-1.36	0.175	-0.05757	0.010532
Liquidity risk	-0.008557	0.026717	-0.32	0.749	-0.0441	0.061212
Market risk	-0.10348	0.029725	-3.48	0.001	-0.16206	-0.0449
Capital risk	-0.055019	0.01819	-3.02	0.003	0.019171	0.090867
Operational risk	-0.25831	0.02778	-9.3	0.000	-0.31306	-0.20356
Income diversification	0.183713	0.043644	4.21	0.000	0.097699	0.269726
Bank size	0.35627	0.042399	8.4	0.000	0.43983	0.27271
Bank growth	0.00663	0.006884	0.96	0.336	0.0202	0.006933
Firm age	0.23472	0.089022	2.64	0.009	0.41017	0.05928
_cons	5.728996	0.725639	7.9	0.000	4.298903	7.159089

Income diversification shows a significant positive effect on ROA, with a coefficient of 0.18371 ($p = 0.000$). This indicates that diversifying income sources such as through non-interest income activities can enhance profitability, offering a counterbalance to the negative impact of certain financial risks. Firm characteristics also play a significant role in influencing financial performance. Bank size is positively related to ROA, with a coefficient of 0.35627 ($p = 0.000$), indicating that larger banks tend to perform better, likely due to economies of scale and resource advantages. Firm age also shows a significant positive impact on financial performance, with a coefficient of 0.23472 ($p = 0.009$), suggesting that older banks may benefit from established networks, reputation, and experience, contributing to better financial outcomes. Bank growth, however, does not significantly affect financial performance ($p = 0.336$), implying that growth rate alone is not a strong determinant of profitability.

The findings support a significant joint influence of financial risks, income diversification, and certain firm characteristics (particularly bank size and firm age) on the financial performance of

commercial banks in Kenya, leading to the rejection of the null hypothesis H04. These results highlight the importance of balancing risk management with diversification strategies and leveraging firm-specific advantages to enhance profitability in the banking sector. The study suggests that banks should prioritize managing specific risks, pursuing income diversification, and capitalizing on size and experience to sustain and improve financial performance.

4. DISCUSSION AND CONCLUSION

4.1 Summary of Findings

The findings for the first objective of this study align with several theoretical frameworks and empirical studies. This study found that market, capital, and operational risks have a significant and negative effect on the banks' financial performance, measured by Return on Assets (ROA), while credit and liquidity risks did not show a statistically significant impact. According to Modern Portfolio Theory (MPT) by Markowitz (1952), risk and return are inherently linked, suggesting that greater risk exposure should yield higher returns. However, in this study, the significant negative impact of market, capital, and operational risks implies that these risks might overwhelm potential returns, likely due to inefficiencies in risk management within the banking sector. This contrasts with MPT's premise, indicating that the high exposure to these risks does not necessarily result in higher profitability for Kenyan banks. Comparing these findings to Tafri et al. (2009), who analyzed Islamic and traditional banks in Malaysia, there are both similarities and differences. Tafri et al. found that credit risk significantly affected both types of banks, but liquidity risk had a negligible impact, which aligns with this study's results regarding liquidity risk. The study's results also show alignment with Amin et al. (2014), who found that credit and liquidity risks significantly impacted Tanzanian banks' financial performance, showing an inverse relationship between these risks and performance indicators such as ROE and ROA.

The findings of this study's second objective reveal that income diversification positively impacts bank profitability. These results align with the theoretical framework of Modern Portfolio Theory (MPT) by Markowitz (1952), which advocates for diversification to minimize risk without compromising returns. In line with this theory, the positive effect of income diversification suggests that banks can achieve a balance between risk and return by diversifying income sources. This approach allows banks to mitigate potential losses from high-risk financial exposures,

ultimately improving profitability. Comparing these findings with Mulwa and Kosgei (2016), who examined Kenyan banks, there are notable similarities and differences. Mulwa and Kosgei found that income diversification had an adverse effect on ROA, suggesting that diversification may dilute performance rather than enhance it. The study by Adzobu et al. (2017) on loan portfolio diversification in Ghana found an insignificant effect of diversification on profitability and risks. This study found that bank size and age significantly influenced the effect of certain financial risks on performance, with larger and older banks showing resilience to risks like credit and operational risks. This aligns with the Resource-Based View (RBV) theory, which suggests that firms with greater resources such as size and experience are better positioned to withstand and manage risks effectively. Larger banks may possess financial resources and established systems to mitigate the adverse impacts of risks on profitability, while older banks have the benefit of experience and established market presence, contributing to a more resilient risk management framework. In comparison, Dey, Hossain, and Rezaee (2018) examined firm characteristics in the context of financial risk disclosures and found that firm size and financial performance significantly influenced disclosure levels among manufacturing firms in Bangladesh. Their finding that larger firms tend to disclose more about financial risks supports this study's conclusion that size plays a critical role in managing and mitigating financial risks.

The findings revealed that, collectively, financial risks, income diversification, and firm characteristics significantly impact financial performance, with specific firm characteristics such as bank size and firm age enhancing resilience against risk. These results support the foundational principles of Modern Portfolio Theory (MPT) by Markowitz (1952), which promotes diversification to reduce risks without sacrificing returns. In this study, income diversification was found to enhance financial performance, suggesting that banks can improve profitability by expanding their revenue sources. The findings also align with the Resource-Based View (RBV), emphasizing that a firm's internal characteristics—such as size, age, and resource allocation—play a crucial role in mitigating the adverse effects of risks on performance. Comparing these findings to Hamdi, Hakimi, and Zaghdoudi (2017), who studied Tunisian banks, there are clear similarities in the positive effect of diversification on performance. Hamdi et al. documented that diversification, particularly into non-interest income, enhances bank performance indicators such as ROE and ROA.

4.2 Conclusions

This study concludes that financial risks, specifically market, capital, and operational risks, play a critical role in shaping the financial performance of commercial banks in Kenya. The significant negative impact of these risks on profitability indicates that banks must prioritize targeted risk management strategies to mitigate these specific financial risks effectively. The study further concludes that income diversification serves as a valuable strategy for commercial banks to enhance their resilience against certain financial risks. By diversifying income sources, banks can effectively mitigate the negative impacts of market, capital, and operational risks on financial performance. Additionally, firm characteristics specifically size and age are concluded to significantly moderate the effects of financial risks on bank performance. Larger banks demonstrated a greater ability to withstand capital and operational risks, while older banks showed resilience against liquidity and market risks, possibly due to their established practices, reputation, and resource advantages. Firm growth, however, did not have a moderating effect, indicating that growth rate alone does not meaningfully influence the relationship between financial risks and performance. Finally, this study concludes that an integrated approach combining effective management of financial risks, strategic income diversification, and capitalizing on firm-specific characteristics is essential for optimizing financial performance. The joint influence of these factors positively impacts profitability, demonstrating that commercial banks in Kenya can benefit from a balanced strategy that addresses both internal capabilities and external financial challenges.

This study, while providing valuable insights into the relationship between financial risks, diversification, and firm characteristics on bank performance, faced several limitations. First, the study relied exclusively on secondary data sourced from annual financial reports of commercial banks in Kenya. Although such data provides standardized and credible information, it lacks the granularity required to capture daily risk management practices and qualitative nuances within bank operations. Future studies could enhance the understanding of these dynamics by incorporating qualitative methods alongside quantitative data. Conducting interviews or case studies with bank managers and financial risk experts could provide a deeper, more nuanced view of how banks internally manage and perceive financial risks, especially in areas such as operational risk and income diversification. Such qualitative insights would complement the quantitative

findings and offer a richer perspective on the strategic choices and risk management practices in the banking industry.

Another limitation is the study's focus on a single geographical context Kenya which may affect the generalizability of the findings to other countries with different economic environments, regulatory structures, and risk profiles. Expanding the geographical scope of research would also be beneficial. Since this study focused solely on Kenyan banks, future research could apply similar methodologies across multiple countries or regions, allowing for cross-country comparisons and examining the influence of different regulatory environments and economic conditions. Comparative studies could shed light on how unique market factors or country-specific regulations impact risk management, diversification, and financial performance.

The study was further constrained by its time frame of seven years, which, while providing a solid dataset for trend and statistical analyses, might not fully capture long term impacts of global financial shifts, technological advances, and changes in risk regulations. Another potential area for further research is to extend the study's time frame to observe long-term trends and assess the impact of economic and regulatory changes on the relationship between financial risks, diversification, and firm characteristics. By analyzing data over a longer period, future studies could capture the effects of major economic events, technological advancements, or policy changes in the banking sector.

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