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Abstract
The purpose of the study was to determine the effect of interest rate risk on the financial performance of commercial banks in Kenya. The study adopted a positivist research philosophy. An explanatory research design was applied. Secondary data was collected from 38 commercial banks. Primary data was also collected using a structured questionnaire from a sample of 386 senior bank managers selected through stratified and simple random sampling methods. The findings of the study regarding interest rate risk showed moderate agreement among respondents (mean scores 3.48), with regression analysis indicating a significant negative association with financial performance of commercial banks (β=-0.297; $p<0.05$ for primary data; β=-0.326 $p<0.05$ for secondary data), leading to rejection of the null hypothesis. It was concluded that interest rate risk is significantly associated with the financial performance of commercial banks in Kenya. The results underscore the significance of robust interest rate risk management practices to enhance financial resilience and optimising performance in a dynamic economic environment. Commercial banks need to continuously monitor the interest-earnings ratio and diversification of their income sources to minimise exposure to interest rate risk in case of fluctuations and or market distortion. The financial performance was measured primarily using Return on Assets, which may not comprehensively capture the overall performance of commercial banks. Other indicators such as Return on Equity, Net Interest Margin, and earnings per share measures could provide additional insights into profitability and shareholder value. Similarly, interest rate risk was operationalised using interest income sensitivity/volatility, yet interest rate risk is multidimensional and may also be reflected through repricing gaps, duration gaps, maturity mismatches, and interest rate spreads.

Introduction
The banking industry continues to be vital to the Kenyan economy as it greatly contributes to the socioeconomic development by supporting the financial system of the nation. The banking sector contributes around 20-25% of the global economy (Ross, 2021). According to IbisWorld (2022), the global market size for commercial banks is USD 3 trillion. Thus, the financial performance of commercial banks remains a key concern to industry practitioners, regulators and researchers (Kharabsheh, 2026). Financial performance refers to the ability to leverage operational and investment choices and approaches to realise an organisation's economic stability. It is the degree to which a bank accomplishes its financial objectives through its financial goals and principles (Majok, 2015). Financial

performance of commercial banks is influenced by numerous factors key among them being interest rate risk.

Commercial banks generate most of their income through interest rates, making interest rate risk management pivotal in their profitability and sustainability (Fischer & Kampl, 2019). However, interest rate income is subject to adverse interest rate movements that influence banks' book positions. Ondari et al. (2024) define interest rate risk as the risk to a commercial bank's capital and earnings arising from adverse interest rate movements that affect its book positions. Commercial banks have assets and liabilities with differing maturities and interest rate risk features; they are regularly exposed to interest rate risk. Net interest income may rise as interest rate risk increases, since interest received on loans may exceed the interest paid on deposits (Bouis et al., 2025). Nonetheless, as interest rates drop, a bank's net interest income may decline because the interest it receives on loans falls faster than the interest it pays on deposits, reducing profitability. When interest rate risk increases, the value of a bank's fixed-rate assets may decline; when interest rate risk decreases, the value of a bank's fixed-rate obligations may increase, resulting in a decline in the bank's overall financial performance (Ondari et al., 2024).

Rahman et al. (2023) pointed out that a noteworthy contributing factor to the operationalisation of the banking system in an economy is the difference between lending and deposit interest rates, referred to as the interest rate spread (IRS). A high IRS poses a stark challenge to the development of financial intermediation, which is necessary for an industry to grow and mature. Several metrics have been established as indicators of interest rate risk, including the loan-to-total-assets ratio and the Net Interest Income ratio (interest income-to-total-assets ratio). Prabowo et al. (2018) used the loan-to-assets ratio (LAR) as an indicator of interest rate risk in their study of the effects of the equity-to-assets ratio (EAR), size, and LAR on bank performance in Indonesia. Dwitama and Hasanudin (2024) utilised LAR as a measure of interest rate risk in their study on the influence of loan growth, loan-to-assets, and size on return on assets through non-performing loans in banking companies in Indonesia.

Ebenezer et al. (2019) adopted the interest income-to-total assets ratio as an indicator of interest in their study of commercial banks in ASEAN-5 Countries. Chaudron (2018) applied interest to the total assets ratio in their study of a bank's interest rate risk and profitability in a prolonged low-interest-rate environment. Rokhmawati (2019) adopted the net interest income ratio as an indicator of interest rates in their study, "Interest Rate Risk of Banking Sector: The Effect of Maturity Gap on Net Interest Income in Indonesia." The sensitivity of interest income to the total assets ratio was adopted as an indicator of interest rate risk in the study. Interest income sensitivity, or volatility, measures the severity of fluctuations in net interest income (Hajilee & Nasser, 2017). The volatility of interest rate is operationalised as the standard deviation of interest income (Volker, 2016). Joslin and Konchitchki (2018) and Ludolph (2024) also used the standard deviation of interest income to measure interest rate risk.

Studies on interest rate risk and financial performance of commercial banks present mixed findings, with some scholars establishing a positive relationship while others report a negative or insignificant association. A number of studies indicate that interest rate risk significantly affects banks' financial performance. For instance, Kar and Swain (2014) found that the actual yield on loan portfolios is positively and significantly associated with the financial performance of microfinance institutions across 71 countries. Similarly, Hoffman et al. (2017) established that increases in interest rates improved the income and net worth of many banks in the Euro area, especially those financed through variable-rate assets. In Indonesia, Safitry et al. (2020) concluded that the interaction of interest rate risk with credit risk enhanced banks' Return on Assets (ROA), indicating a positive contribution to financial performance. Ahmed et al. (2018) also affirmed that bank profitability in Pakistan was highly

dependent on interest rate movements, while Rahman et al. (2023) reported that market interest rates and lending spreads were positively and significantly associated with the profitability of commercial banks in Bangladesh. In East Africa, Ally (2022) found that interest rates are significantly associated with the financial performance of commercial banks in Tanzania, while Kahihu et al. (2021) found that interest rate risk positively influences the financial performance of microfinance institutions in Kenya. Likewise, Kihuro (2023) concluded that interest rate spread is significantly associated with the financial performance of commercial banks in Kenya.

However, some studies disagree, reporting negative or insignificant association of interest rate risk and financial performance. Wani and Dar (2015) established that interest rate risk constrained the financial performance of insurance firms in India. Similarly, Aruwa and Musa (2014) concluded that interest rate risk is negatively associated with the profitability of deposit money banks in Nigeria. Owusu-Antwi et al. (2017) also found a negative relationship between interest rate spread and profitability among Ghanaian banks, while Mrindoko et al. (2020) reported that interest rates had an insignificant and negative relationship with ROA and Return on Equity (ROE) among Tanzanian commercial banks. In Kenya, Rono et al. (2021) observed that increases in interest rates did not translate into higher profitability among commercial banks in Bomet County, with profitability continuing to decline despite rising rates. Further contradiction was reported by Egbunike and Ekerekeoti (2018), who found that interest rate had no significant association with the financial performance of manufacturing firms in Nigeria. Similarly, Ndegwa et al. (2016) found that although higher interest rates improved liquidity among microfinance institutions in Kenya, they could discourage borrowing and reduce loan uptake. These contradictory findings indicate that the relationship between interest rate risk and financial performance is context-specific and may depend on factors such as economic environment, regulatory policies, type of financial institution, and the measures used to operationalise both interest rate risk and financial performance. The inconsistencies in empirical findings justify the need for further studies on interest rate risk and the financial performance of commercial banks.

Commercial Banks in Kenya

In Kenya, the banking sector remains a major contributor to the economy and a key pillar in the realisation of national development goals such as Vision 2030. Financial performance of commercial banks is commonly measured using indicators such as ROA, ROE, and Net Interest Margin (NIM), which reflect the efficiency with which banks utilise their assets, equity, and interest-earning investments to generate profits (Majok, 2015). However, the performance of commercial banks in Kenya has remained inconsistent over time. According to the Central Bank of Kenya (2021, 2022, 2023), the banking sector's average ROA fluctuated from 3.33% in 2017 to 3.5% in 2018, declined to 2.07% in 2020, improved to 3.7% in 2022, and later dropped to 2.7% in 2023. These fluctuations indicate instability in profitability and raise concerns about banks' ability to sustain operations, absorb economic shocks, and remain competitive in the financial sector.

Interest rate risk is one of the most significant market risks for commercial banks, as they derive a substantial proportion of their income from interest-bearing activities such as loans and advances. Interest rate risk refers to the potential for losses in a bank's earnings and capital arising from adverse movements in interest rates that affect assets and liabilities differently (Ondari et al., 2024). Commercial banks typically operate with mismatched maturities between deposits and loans, exposing them to fluctuations in lending and borrowing rates. When interest rates rise sharply, the cost of funds may increase faster than returns on assets, thereby reducing profitability. Conversely, when interest rates decline, returns on loans and investments may fall faster than the costs of deposits, thereby negatively affecting net interest income and overall financial performance. Fischer and Kampl (2019) argue that effective management of interest rate risk is therefore essential for maintaining

profitability and sustainability in the banking sector. In addition, Rahman et al. (2023) observed that the spread between lending and deposit rates is fundamental to the operationalisation and growth of the banking industry, since it directly influences banks' capacity to generate income through financial intermediation.

The importance of interest rate risk management is further reinforced by empirical studies showing that interest rate fluctuations are significantly associated with bank profitability, capital adequacy, liquidity, and lending activities. Ondari et al. (2024) noted that adverse interest rate movements may reduce the value of fixed-rate assets and increase the burden of fixed-rate liabilities, thereby weakening a bank's financial position. Similarly, Oluwayemisi and Fajuyagbe (2022) identified macroeconomic variables, such as interest rates, as major contributors to market risk that affect the survival and successful operation of commercial banks. Poor management of interest rate risk may therefore lead to reduced earnings, deterioration in asset quality, constrained lending, and reduced customer confidence. Despite its significance, existing studies on interest rate risk and financial performance have reported inconsistent findings. For instance, Kahihu et al. (2021) found a significant positive relationship between interest rate risk and financial performance among microfinance institutions, while Muriithi (2016) established a significant negative relationship between interest rate risk and financial performance of commercial banks in Kenya. These contradictory findings, coupled with differences in institutional contexts and methodologies, underscore the need for further investigation into how interest rate risk affects the financial performance of commercial banks. Against this backdrop, the study sought to determine the relationship between interest rate risk and the financial performance of commercial banks in Kenya.

Methodology

The study adopted a positivist approach anchored in the epistemological assumption that knowledge can and ought to be developed objectively, devoid of researchers' values influencing its development (Park et al., 2020). Based on a positivist approach, the study formulated the null hypothesis that interest rate risk is not statistically significantly associated with the financial performance of commercial banks in Kenya.

The study adopted the explanatory research design. The target population was 38 commercial banks for 10 years, from 2014 to 2023. Secondary data was collected from the Central Bank of Kenya's bank supervision department reports on interest rate income and the financial performance of commercial banks. Interest rate risk was operationalised as the volatility of interest income, measured by the standard deviation of interest income, while the financial performance of commercial banks was measured using ROA (return on assets). In addition, primary data were collected from senior bank managers with specific knowledge of operations and market risk management at their respective commercial banks. The number of senior management employees in commercial banks in Kenya stood at 11,469 as of December 2023 (Central Bank of Kenya, 2023). The Yamane (1967) formula was adopted in the study to establish a sample size of 386 senior management employees in commercial banks. Yamane's formula is suitable when the sample size is homogeneous and takes the form;

$$n = \frac{N}{(1+N(e)^2}$$

Where n is the sample size, N is the population of the study and e margin of error at (0.05)

n =11,469/ (1+11,469(0.05)^2

= 386 senior management employees in commercial banks

The sample of senior management employees at each bank was selected using stratified sampling, along with simple random sampling.

Stata version 14.0 and SPSS version 27.0 were used to analyse data. The primary data was obtained through structured questionnaires. The variables measured in the questionnaire included interest rate, risk, and financial performance of commercial banks. The questionnaire used a 1-5-point Likert scale and was pretested using the Cronbach's alpha coefficient (Cronbach, 1951) before being used to collect data. Inferential statistics included the Pearson correlation (r) to assess the nature and strength of the association between interest rate risk and the financial performance of commercial banks. The Hausman test was used to determine whether the most appropriate model to apply was Fixed Effects or Random Effects. If the Hausman Test p-value is greater than 0.05, then the random-effects model is chosen, and vice versa (Zulfikar & Stp, 2018). In addition, heteroscedasticity was tested to assess whether the error terms in a regression model have constant variance and to validate the model's statistical accuracy.

The study upheld high ethical standards to ensure that respondents, participating commercial banks, and researchers did not suffer any physical, psychological, emotional, or reputational harm during the research process. Before commencing the study, the researcher obtained approval from the Graduate School, ethical clearance from the Institutional Scientific Ethics Review Committee of the United States International University–Africa, and a research permit from the National Commission for Science, Technology and Innovation (NACOSTI). The researcher adhered to institutional ethical guidelines, NACOSTI regulations, and internationally accepted research ethics principles throughout the study period.

Participation in the study was entirely voluntary. Respondents were informed about the objectives, purpose, and significance of the research before participating. Informed consent was obtained from all participants prior to data collection, and respondents were free to withdraw from the study at any stage without penalty or negative consequences. The study also ensured that the findings were presented objectively and professionally, without biased or sensational language that could damage the reputation of participating institutions. Confidentiality, privacy, and data protection were strictly observed throughout the research process.

Results

Questionnaires were distributed to 386 employees working in the 38 commercial banks in Kenya. Out of these, 328 participants completed and returned the questionnaires, yielding a response rate of 84.5 per cent. The rate was considered satisfactory and, in tandem with the recommendations of Dalati and Gomez (2018), who averred that a response rate exceeding 50% is universally acceptable for ensuring that the sample adequately represents the target population. Prior to deploying the questionnaire for data collection, reliability was assessed to ensure the tool was consistent and reliable. The reliability test results are shown in Table 1.

Table 1: Reliability Test Results

Variable	Cronbach's Alpha	Verdict
Interest rate risks	.859	Reliable
Financial performance of commercial banks	.703	Reliable

The Cronbach alpha coefficient for the study variables was above the acceptability level of 0.7. This is within the acceptable cut-off of 0.7 and above, as proposed by Cronbach (1951). Thus, the tool was deemed reliable. In addition, factor analysis to assess the questionnaire's validity was conducted. Factor analysis was undertaken to evaluate the viability of the measures of interest rate risk. The results are shown in Table 2.

Table 2: Factor analysis results for the measures of interest rate risk

Constructs	Factor loadings
The bank has put necessary strategies to adequately mitigate risks associated with fluctuating interest rates	.830
The bank's management is fully aware and conversant of the potential effect of interest rate changes on its profitability	.618
The bank undertakes due asset and liability management practices to effectively address changes posed by interest rate volatility	.647
The bank has adequate resources and expertise to navigate an environment of fluctuating interest rates	.610
The bank has robust internal control and risk management processes that prevent significant losses due to interest rate volatility	.582
The bank has been experiencing rapid rise and fall of interest rates leading to low loan demand	.748

From the results presented above, all the measurement statements of interest rate risk returned factor loadings greater than 0.5. Thus, all the statements were retained for analysis. This is in tandem with Cheung et al. (2024), who established that factor loadings of 0.5 or higher are acceptable and retained for further analysis, though factor loadings of at least 0.7 are ideal. Similarly, the factor analysis results for financial performance are shown in Table 3.

Table 3: Factor analysis results for the measures of financial performance

Interest rate risk	Factor loadings
The bank has been recording high Earning Per Share	.639
The bank is efficient at using its assets to generate income	.635
The bank is efficient at generating profit from its shareholders' equity	.534
The bank is effective in managing its interest-bearing assets and liabilities (Net interest income)	.773
The bank is effective in managing operating costs to its total income with cost to income ratio of 55% and below	.730
The bank is able to meet its short-term obligations by maintaining liquidity ratio above 1	.897
The bank maintains a healthy proportion of a bank's capital relative to its risk-weighted assets of 8% and above	.629

Likewise, all the measurement statements for the financial performance of commercial banks attained factor loadings greater than 0.5. Thus, all the statements were retained for analysis. The tool observed a construct validity test.

Interest Rate Risk and Financial Performance of Commercial Banks in Kenya

Correlation analysis between interest rate risk and financial performance was conducted to demonstrate the nature and strength of the association between the two variables. Linear regression was undertaken to determine the nature and degree of the relationship between the study variables.

Descriptive Statistics for Interest Rate Risk

Participants were required to rate their level of agreement or disagreement on a given statement as measured by a Likert scale of 1-5, where 1 depicted strongly disagree, and 5 indicated strongly agree. The study employed mean (m) and standard deviation (std) to analyse the responses. The average values that ranged from 1.0-1.49 were interpreted as strongly disagree, 1.5-2.49 as disagree, 2.5-3.49 as not sure, 3.5-4.49 as agree and 4.5-5 as strongly agree. The study findings are presented in Table 4.

Table 4: Descriptive Statistics for Interest Rate Risk

Statement on Interest Rates	Mean	Standard Deviation
The bank has put necessary strategies to adequately mitigate risks associated with fluctuating interest rates	3.66	1.39
The bank's management is fully aware and conversant with the potential effect of interest rate changes on its profitability	3.58	1.42
The bank undertakes due asset and liability management practices to effectively address changes posed by interest rate volatility	3.38	1.46
The bank has adequate resources and expertise to navigate an environment of fluctuating interest rates	3.64	1.45
The bank has robust internal control and risk management processes that prevent significant losses due to interest rate volatility	3.57	1.40
The bank has been experiencing fluctuations in interest rates leading to low loan demand	2.98	1.38
Aggregate Mean and Standard deviation	3.47	1.42

The highest mean was 3.66 on the statement that the bank has put in place necessary strategies to adequately mitigate risks associated with fluctuating interest rates. This suggests that banks have effective mitigation strategies in place as perceived by respondents in senior management. Similarly, the perception that banks have adequate resources and expertise to navigate a complex environment characterised by fluctuating interest rates (mean=3.64) affirms the view that commercial banks are fairly prepared to deal with interest rate volatility. The view that banks' management is aware of the effects of interest rate changes on profitability (mean=3.58) and that it has robust internal controls and risk management processes (mean=3.57) further highlights a general agreement on banks' strategic awareness and operational preparedness. Nonetheless, the relatively high standard deviations of 1.39 to 1.46 indicate significant variation in opinions, suggesting differing experiences or levels of awareness among staff.

Conversely, the statement that the bank undertakes effective asset and liability management practices to address changes posed by interest rate volatility received a mean of 3.38, reflecting uncertainty among respondents. Notably, the lowest mean (2.98) was recorded for the statement that the bank has experienced rapid interest rate changes, leading to low demand. This shows neutrality or uncertainty due to varying customer demand experiences across branches or market segments. The descriptive results for secondary data are shown in Table 5.

Table 5: Descriptive Statistics Results

Variable	Mean	Std. Dev.	Min	Max
Financial Performance (ROA)	0.029	0.036	-0.088	0.358
Interest rate risk	0.019	0.062	-0.423	0.376

The descriptive statistics indicate that the average financial performance of the commercial banks, measured by ROA, was 0.029, implying that banks generated an average return of 2.9% from their total assets during the study period. The standard deviation of 0.036 suggests moderate variations in profitability across the banks, while the minimum and maximum values of -0.088 and 0.358, respectively, show that some banks experienced losses, whereas others achieved relatively high profitability. Interest rate risk had a mean of 0.019 and a standard deviation of 0.062, indicating notable fluctuations in interest rate exposures among banks. The minimum and maximum values of -0.423and 0.376, respectively, further reveal substantial disparities in the sensitivity of banks to interest rate movements.

Inferential Statistics for Interest Rate Risk and Financial Performance of Commercial Banks

Correlation Analysis between Interest Rate Risk and Financial Performance of Commercial Banks

Pearson correlation was used to measure the nature and strength of association between the study variables, that is, independent and dependent variables, in this case, interest rate risk and financial performance of commercial banks. Schober et al. (2018) noted that an r of 0.7 or above implies a very strong correlation; 0.5-0.69 implies a strong correlation; 0.39-0.49 implies a moderate correlation; 0.39 or less implies a weak correlation; 1 implies a perfect correlation; and 0 implies no correlation. The results in Table 3 demonstrate a strong, significant negative association between interest rate risk and the financial performance of commercial banks in Kenya ($r = -0.559$, $p < 0.05$).

Table 6: Correlation analysis between Interest Rate Risk and Financial Performance (primary Data)

		Financial performance commercial banks	of Interest rate risk
Financial performance of Commercial banks	Pearson Correlation	1	.-559**
	Sig. (2-tailed)		.000
	N	328	328
Interest rate risk	Pearson Correlation	-.559**	1
	Sig. (2-tailed)	.000	
	N	328	328

**. Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation of the secondary data results is presented in Table 7. The results demonstrated a significant, weak negative association between interest rate risk and the financial performance of commercial banks in Kenya ($r = -0.3437$, $p < 0.05$).

Table 7: Correlation between Interest Rate Risk and Financial Performance (Secondary Data)

	Financial Performance	Interest Rate Risk
Financial Performance	1.000	
Interest Rate Risk	-0.3437	1.000
	0.000	

Regression Analysis of Interest Rate Risk and Financial Performance of Commercial Banks in Kenya

The study used simple linear regression to this end and utilised the results of the regression analysis to test the study's null hypothesis. The regression model summary in Table 6 includes the correlation coefficient (r) and the coefficient of determination (R-squared), which depict the explanatory influence of interest rate risk on the financial performance of commercial banks in Kenya. The findings demonstrated a strong negative relationship between interest rate risk and financial performance ($R = -.559$). Additionally, the findings indicated that interest rate risk explains 31.2% of the variation in the financial performance of commercial banks in Kenya (R-squared = 0.312).

Table 8: Summary of the Model for Interest Rate Risk

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	-.559a	0.312	0.309	0.54419
a Predictors: (Constant), Interest Rate Risk				

The study conducted an ANOVA to assess the model's overall statistical significance. The results indicated that the model's F-value is statistically significant ($F=84.166$, $p<0.05$). These results indicated

that the model is good for the empirical data collected on interest rate risk and financial performance of commercial banks.

Table 9: ANOVA for Interest Rate Risk

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.264	1	14.264	84.166	.000b
	Residual	96.542	326	0.296		
	Total	110.806	327			

a Dependent Variable: Financial performance

The analysis further revealed that interest rate risk has a significant negative association with the financial performance of commercial banks in Kenya ($\beta = -0.297$, $t = -6.94$, $p < 0.05$). Consequently, the null hypothesis, which stated that interest rate risk does not significantly influence the financial performance of commercial banks in Kenya, was rejected.

Table 10: Regression Coefficient for Interest Rate Risk

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.637	0.152		17.313	0.000
	Interest Rate Risk	-0.297	0.043	-0.359	-6.94	0.000

Dependent Variable: Financial performance

Similarly, an analysis of secondary data on the relationship between interest rate risk and financial performance was conducted using a random-effects regression model. The first Hausman test was estimated to determine whether the random-effects or fixed-effects model is appropriate. The results are shown in Table 11.

Table 11: Hausman Test Results

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
Interest Rate Risk	-0.3265461	-0.32646	-0.0001	0.004056
	b = consistent under Ho and Ha; obtained from xtreg			
	B = inconsistent under Ha, efficient under Ho; obtained from xtreg			
	Test: Ho: difference in coefficients not systematic			
	chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)			
	= 0.000			
	Prob>chi2 = 0.9833			

The Hausman test results indicate that the random-effects model is appropriate for analysing the relationship between interest rate risk and financial performance. The test produced a chi-square statistic of 0.000 with a p-value of 0.9833, which is greater than the conventional significance level of

0.05. Therefore, the null hypothesis that the difference in coefficients between the fixed-effects and random-effects models is not systematic cannot be rejected. This implies that the random-effects estimator is consistent and efficient, making it preferable to the fixed-effects model.

In addition, heteroscedasticity was tested. The results are shown in Table 12.

Table 12: Heteroscedasticity Test Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of Financial Performance
chi2(1) = 2.36
Prob > chi2 = 0.894

The results indicate that the data did not exhibit heteroscedasticity. This is supported by a p=0.894>0.05. Finally, the study estimated the random-effects and fixed-effects models. The panel model was unbalanced since some banks underwent acquisitions and mergers or ceased operations during the study period, resulting in 321 observations. The results revealed a significant negative relationship between interest rate risk and financial performance. The coefficient of interest rate risk is -0.3264, with a standard error of 0.0496 and a t-value of -6.57, which is statistically significant at $p < 0.001$. This implies that a 1-unit increase in the interest rate is associated with a 0.3264-unit decrease in financial performance, holding other factors constant. The overall Wald test statistic is 43.17 with a p-value of 0.000, affirming that the model is statistically significant. The overall R-squared is 0.1181, meaning that approximately 11.81% of the variation in financial performance is explained by interest rate risk.

Table 13: Regression Results for Interest Rate Risk (RE)

Financial Performance	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Interest Rate Risk	-0.32646	0.0496893	-6.57	0.000	-0.42385	-0.22907
_cons	0.01878	0.2553443	0.74	0.821	1.08316	.8593608
R-sq:	within =	0.1216				
	between =	0.0086				
	overall =	0.1181				
Wald chi2(1) =	43.17					
Prob > chi2 =	0.000					

Furthermore, the study estimated a fixed-effects model. The results are shown in Table 14. Similarly, fixed-effects regression results indicate that interest rate risk is negatively and statistically significantly associated with financial performance. The model has an R-squared of 0.1216, indicating that approximately 12.16% of the variation in entities' financial performance over time is explained by interest rate risk. Additionally, the Wald chi-square statistic of 42.90 with a p-value of 0.000 indicates that the model is statistically significant and suitable for explaining variation in financial performance.

Table 14: Regression Results for Interest Rate Risk (FE)

Financial Performance	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Interest Rate Risk	-0.32655	0.04985	-6.55	0.000	-0.42385	-0.22907
_cons	0.02375	0.21495	0.11	0.789	0.01080	.34670
R-sq:	within =	0.1216				
	between =	0.0086				
	overall =	0.1181				
Wald chi2(1) =	42.90					
Prob > chi2 =	0.000					

Discussion

It was established that interest rate risk has a statistically significant negative association with the financial performance of commercial banks in Kenya. The findings imply that fluctuations in interest rates increase financial uncertainty for commercial banks, which is negatively associated with profitability. High interest rate risk may increase borrowing costs, reduce loan demand, increase default rates among borrowers, and consequently reduce banks' returns on assets. The results are consistent with the studies by Wani and Dar (2015), Aruwa and Musa (2014), Owusu-Antwi et al. (2017), Mrindoko et al. (2020), and Rono et al. (2021), which reported interest rate risk as negatively or insignificantly associated with the financial performance of commercial banks. The similarity in findings may be attributed to excessive fluctuations in interest rates, which can increase non-performing loans, reduce customer borrowing, and weaken banks' profitability.

However, the results also contradict several studies that established a positive relationship between interest rate risk and financial performance. For example, Kar and Swain (2014), Hoffman et al. (2017), Safitry et al. (2020), Ahmed et al. (2018), Rahman et al. (2023), Ally (2022), Kahihu et al. (2021), and Kihuro (2023) all concluded that interest rates or interest rate spreads positively and significantly enhanced the profitability and financial performance of financial institutions. The contradictory findings across studies suggest that the association between interest rate risk and financial performance is context-specific and may vary with economic conditions, regulatory frameworks, and the effectiveness of risk management strategies adopted by banks.

Conclusion

It was found that interest rate risk is a significant predictor of the financial performance of commercial banks in Kenya. Fluctuations in interest rates tend to distort bank earnings, loan portfolio quality and aggregate financial sustainability. When interest rates surge or fall unexpectedly, they can impact cost borrowing, lending rates, and value of interest sensitive assets and liabilities. Banks that fail to manage this nature of risk optimally are likely to experience reduced profitability or even losses. The results underscore the significance of robust interest rate risk management practices to enhance financial resilience and optimising performance in dynamic economic environment. Commercial banks need to continuously monitor the interest-earning ratio and the diversification of their income sources to minimise exposure to interest rate risk in the event of fluctuations and/or market distortions.

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