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INVESTMENT DIVERSIFICATION AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA: CONTROLLING ROLE OF BANK SIZE

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ABSTRACT

This study examines the connection between diversification of investments and the financial outcomes of commercial banks in Kenya, moderated by Bank size. It addresses critical issues related to portfolio diversification roadmaps within the banking sector, mainly focusing on mitigating various classes of risk. The findings aim to provide insights into best practices for risk management and strategic investment, contributing to a more resilient banking industry in Kenya. The target population for this study includes the 38 commercial banking institutions that held official licenses from the Central Bank of Kenya as of December 2023. The paper employs an analysis of unbalanced secondary panel data, which comprises both time series and cross-sectional data. Data was sourced from the Kenya National Bureau of Statistics, the World Bank, the Central Bank of Kenya, and the published financial statements of all 38 licensed commercial banks in Kenya. The data covers the period from 2013 to 2023. Investment diversification has a significant positive impact on financial performance. The study suggests that an investment portfolio is a key factor in determining the financial performance of commercial banks in Kenya. The findings indicate that diversification of investment portfolios among Kenyan banks encompasses various asset classes, including placements, shares, and government securities, as well as alternative investments, with a notable preference for government securities. Kenyan banks should actively diversify their investment portfolios by including placements, government securities, and shares to enhance their financial performance. By emphasizing the importance of strategic investment choices, particularly in government securities and shares, banks can achieve significant improvements in their overall financial outcomes.

INTRODUCTION

According to a 2024 report by the Kenya Bankers Association, increased competition, regulatory shifts, and changing consumer preferences have significantly transformed Kenya's banking sector. In response, commercial banks must understand the role of investment diversification in enhancing financial performance and ensuring long-term stability (Wanjiru & Nzulwa, 2018). Given their role in economic development, Kenyan banks are under increasing pressure to refine their investment strategies, striking a balance between profitability and risk (Onyango & Kalunda, 2023).

Portfolio diversification, derived from Modern Portfolio Theory (MPT), is a core component of risk management. It involves spreading investments across various financial instruments to minimize unsystematic risk and reduce overall portfolio volatility (Markowitz, 1959). This strategic allocation ensures that the underperformance of one investment does not critically affect the entire portfolio (Michaud et al., 2020). The core principle of diversification is to combine assets with different risk-return profiles to stabilize performance. According to Bodie et al. (2019), adequate diversification mitigates idiosyncratic risk by reallocating capital among a broad range of asset classes. Banks can achieve this by taking long positions in well-performing assets while adopting short positions in negatively correlated investments. Although systematic risks cannot be eliminated, they can be minimized, for example, through volatility reduction —a concept consistent with the Efficient Market Hypothesis.

Markowitz's (1959) model emphasizes building efficient portfolios that reduce risk (standard deviation) for a given return level. This is vital in understanding how banks structure investments in the face of sector volatility. According to the Central Bank of Kenya (CBK, 2023), the sector now includes 41 commercial banks, one mortgage finance firm, 12 microfinance institutions, and other financial service providers. Notable events, such as the collapse of Chase Bank and Imperial Bank, underscore systemic vulnerabilities.

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In Kenya, financial performance is a key focus in policy and academic discourse, as it reflects institutional efficiency and broader economic health (Akwimbi et al., 2024). Metrics like Return on Assets (ROA), Return on Equity (ROE), Earnings Per Share (EPS), and asset turnover are commonly used, alongside qualitative assessments of strategic resource allocation (Serrano, 2021). Typical performance benchmarks include ROE of 15–30% and ROA above 1%. Prior studies by ElChaarani et al. (2022) further validate these measures.

The landscape of Mobile Financial Services (MFS) has undergone a significant transformation, substantially enhancing financial accessibility, as indicated by the increase in proximity to such services from 59% in 2013 to 77% in 2023 (Fin-Access, 2023). This expansion has altered investment dynamics, raising critical concerns around cybersecurity and prompting proactive measures from financial institutions such as Family Bank and Absa Bank (CBK, 2023). The regulatory framework shapes institutional performance; for instance, the KPMG Africa Banking Survey (2021) highlights the mandatory minimum core capital requirement of KES 1 billion, presenting challenges for smaller banking entities. This regulatory pressure has led to sector consolidation, exemplified by mergers such as I&M and Giro, as well as KCB's acquisition of a Rwandan bank (CBK, 2023). Equity Bank's expansion into markets such as the Democratic Republic of the Congo and South Sudan reflects a trend in regional diversification and adaptive restructuring, responding to evolving market demands and competitive pressures within the financial sector.

Complementing these trends, the Central Bank of Kenya (CBK) (2021) shows notable growth in banking assets, revenues, and deposits from 2002 to 2012. During this period, total assets surged from KES 456.7 billion to KES 2.35 trillion; deposits grew from KES 360.6 billion to KES 1.76 trillion; and bank accounts increased from 1.9 million to 17.6 million. Pretax profits increased by 18.4% in 2014, providing a solid foundation for evaluating portfolio performance.

By 2024, average ROA and ROE had improved to 3.7% and 26.5% respectively (Kenya Bankers Association, 2024). Nevertheless, performance pressures remain. Earnings Per Share (EPS) rose to 8.5% in FY 2023, up from 4.4% in FY 2022 and 2.8% in FY 2021, yet still below the five-year average of 13.9%. Key contributors to this stagnation include nonperforming loans, weak credit growth, and liquidity issues, necessitating a re-evaluation of investment portfolio composition.

The study aims to investigate the impact of investment portfolio diversification on the financial performance of commercial banks in Kenya. It focuses on analyzing the effects of placements, shares, government securities, and alternative investments on bank performance, and further investigates the moderating role of bank size in this relationship. Most research broadly endorses diversification without detailing which assets most influence performance, or accounting for shifts in digital finance, regulatory policies, or cross-border banking. By addressing this important issue, the study aimed to provide valuable insights that not only enriched academic discourse but also informed effective policy decisions. The study outcome empowers regulators and banking institutions to refine their portfolio strategies, ensuring they are aligned with performance objectives and compliance standards in an increasingly dynamic macroeconomic and technological environment. This research was crucial for fostering a resilient banking sector that can thrive in the face of change.

LITERATURE REVIEW

The relationship between investment diversification and the financial performance of Kenyan commercial banks can be effectively understood through the lens of financial intermediation and delegated monitoring, a theory introduced by Diamond (1984). This theory highlights how financial institutions reduce the costs of acquiring essential information, thus addressing incentive problems in financial markets. Banks can improve efficiency by either increasing the number of agents involved or expanding their range of financial activities. According to this theory, diversification can be achieved in two main ways: by increasing the number of participants in financial intermediation, or by broadening the activities undertaken by a single institution. Both methods help distribute risk and reduce supervision costs. Monitoring many financial projects centrally is significantly cheaper than doing so through multiple entities (Bongomin et al., 2021). This centralized oversight also reduces risk premiums for depositors and strengthens the ability to monitor systemic vulnerabilities.

Research findings underscore the importance of financial intermediation theory in shaping banking practices and fostering diversified financial portfolios. For instance, banks that implement effective lending practices are better equipped to withstand economic turbulence. Effective lending and diversified portfolios enable banks to withstand economic shocks better, enhance their resilience, and improve financial performance (Omete, 2023). As noted by Ongore and Kusa (2013), a robust and profitable banking system is crucial for Kenya's overall economic stability. They emphasize the need for innovative business models and diversification strategies to address market challenges effectively.

However, there are critiques of the theory that point out its limitations regarding the fundamental role of intermediaries in investment and resource allocation. For instance, Arrow and Debreu's general equilibrium model posits that in perfectly efficient markets, intermediaries may be redundant, raising questions about the theory's applicability, especially in developing economies (Adesina, 2021). Therefore, although the theory offers valuable insights into the benefits of diversification, it may not apply uniformly across all economic environments, particularly in developing economies. While the financial intermediation and delegated monitoring theory provides a valuable framework for understanding how diversification can enhance the financial performance of commercial banks in Kenya, it is essential to acknowledge its limitations in contexts characterized by ideal market conditions. Further research is necessary to examine the intersection of traditional banking approaches with modern financial innovations (Molnár, 2018).

This study is further anchored in Modern Portfolio Theory (MPT), developed by Markowitz in the 1950s. MPT aims to balance risk and return by spreading investments across various asset classes and segments that do not move in tandem, thereby minimizing the impact of new information on the portfolio's overall performance and promoting global diversification to enhance the risk-return tradeoff. The core tenet of MPT is that investors can reduce risk without necessarily sacrificing returns by selecting assets with low correlation. Assets that perform inversely when one rises as another falls are

beautiful for diversification purposes (Kazan & Uludag, 2014).

MPT is a foundational concept in financial management and portfolio construction. It utilizes mathematical models to formalize the benefits of holding a diversified portfolio, thereby reducing the overall risk compared to investing in a single asset. This strategy operates on the premise that unrelated assets move independently, thereby significantly reducing portfolio volatility. Mandelbrot and Hudson (2022) underscore the necessity of analyzing expected returns and variance when determining the most effective portfolio. This theory extends beyond securities to corporate diversification strategies, as seen in the works of Lubatkin and Chatterjee (1994), who found that unrelated business lines can reduce a firm's overall risk.

The impact of investment diversification on the financial results of commercial banks in Kenya has been explored in various recent research works. Ndungu and Muturi (2019) explored the relationship between income diversification and financial performance among commercial banks in Kenya, finding that diversification significantly enhances profitability. The study emphasized that banks should adopt diversified income streams to mitigate risks and improve overall financial performance (Ochenge, 2022). An international perspective is provided by Susanto et al. (2024), who studied Indonesian banks and found that diversifying revenue streams, including interest income and fees, improves both profitability and stability. Utilizing robust quantitative methods, the researchers meticulously analyze data from a range of banks, highlighting how various revenue streams, such as interest income, fees, and noninterest earnings, significantly influence profitability and stability metrics. Their compelling findings reveal that income diversification not only enhances bank profitability but also enables institutions to navigate risks more effectively, resulting in stronger financial outcomes. Furthermore, the research underscores that greater diversification contributes to improved bank stability, enabling financial institutions to shield themselves against fluctuations in any single revenue source. The authors strongly advocate that Indonesian banks embrace strategies to diversify their income sources, which is essential for bolstering overall performance and achieving resilience in an increasingly competitive financial landscape.

The study by Kondova and Bandyopadhyay (2019) examines the impact of nonbank lending on the efficiency of European banks, utilizing data envelopment analysis (DEA) to evaluate bank performance from 2014 to 2016. The findings reveal that nonbank lenders can influence traditional banking efficiency, prompting banks to diversify and innovate. The authors emphasize the importance of understanding this relationship for policymakers and investors alike, suggesting that regulatory frameworks should adapt to the evolving landscape where both Bank and nonbank lenders operate, thus highlighting the need for an integrated approach to risk management and competition in the financial sector. Harrison and Muiru (2021) also emphasized the importance of diversification and strategic financial management for boosting profitability. This is further reinforced by examining the effects of mortgage financing on financial performance, indicating that diversification through mortgage products can lead to increased income and stability for banks.

Kenga et al. (2024) looked at investment diversification in real estate for retirement schemes in Kenya and found a positive impact on returns. This study reinforces the notion that diversification across asset classes can enhance financial performance. In a broader context, the study assessed the impact of income diversification strategies on credit risk and market risk among microfinance institutions, concluding that diversification helps reduce credit risk and enhances sustainability. This finding is consistent with the notion that diversification is a crucial strategy for mitigating risk and enhancing financial performance.

Huynh (2024) cautioned that while diversification offers potential performance benefits, it may also introduce organizational complexity. Adequate diversification requires investment in both tangible and intangible resources. This is especially relevant in Kenya, where resource constraints can hinder the execution of diversification strategies.

Macroeconomic factors influence banking diversification. The study finds that inflation has a positive impact on diversification, while GDP has a negative impact. This suggests that banks must navigate economic conditions carefully when implementing diversification strategies. The implications for Kenyan banks are significant, as they must consider the broader economic environment when diversifying their portfolios to enhance financial performance. The study underscores the importance of understanding the external economic factors that can influence the success of diversification efforts.

The relationship between income diversification and financial performance among commercial banks in the COMESA region, with a focus on Kenya, was assessed by Ndungu and Muturi (2019). The findings indicate a positive correlation between income diversification and return on assets (ROA), suggesting that as banks diversify their income sources, their financial performance improves. This study reinforces the notion that diversification is a critical strategy for enhancing profitability in the Kenyan banking sector. Further research by Baraka and Mrindoko (2023) in Tanzania showed that asset diversification through loans, bank assurance, and government securities significantly improves profitability. This study highlights the importance of diversification strategies in enhancing financial performance within the Tanzanian banking sector, providing valuable insights for Kenyan banks considering similar strategies.

A substantial body of empirical research highlights the crucial role of revenue and corporate diversification in enhancing bank performance, with a more diversified income structure consistently associated with improved profitability and financial stability. In the context of South Asia, robust evidence that diversification enables banks to navigate financial risks more effectively. Similarly, recent studies from Kenya have shown that the positive effects of diversification are particularly pronounced among larger banking institutions, resulting in notable improvements in core financial indicators, such as return on equity (ROE) and return on assets (ROA). Nonetheless, the literature also cautions that excessive diversification may compromise operational efficiency. Taken together, these insights underscore the need for banks to tailor their diversification strategies according to institutional size, thereby achieving optimal financial outcomes and informing evidence-based policy development in the banking sector.

Focusing on the Kenyan banking landscape, analyzed the dynamics between competition, risk-taking behavior, and financial stability. Their results underscore the crucial role of financial stability in promoting economic growth and

advocate for regulatory measures that promote prudent risk management practices and income diversification. In examining external economic disruptions, Saif-Alyousfi (2022) studied the connection between the volatility of oil and gas prices and the performance of banks. Their results indicate that variations in commodity prices hurt banks, particularly those operating in economies heavily reliant on oil. The authors recommend diversifying income sources beyond traditional banking assets to help mitigate these risks.

Furthermore, Kenga et al. (2024) studied the effects of real estate investment diversification on the financial performance of retirement benefit schemes in Kenya. Their findings suggest that diversifying investments across different asset classes enhances financial outcomes, leading to recommendations for policies that promote broader investment strategies.

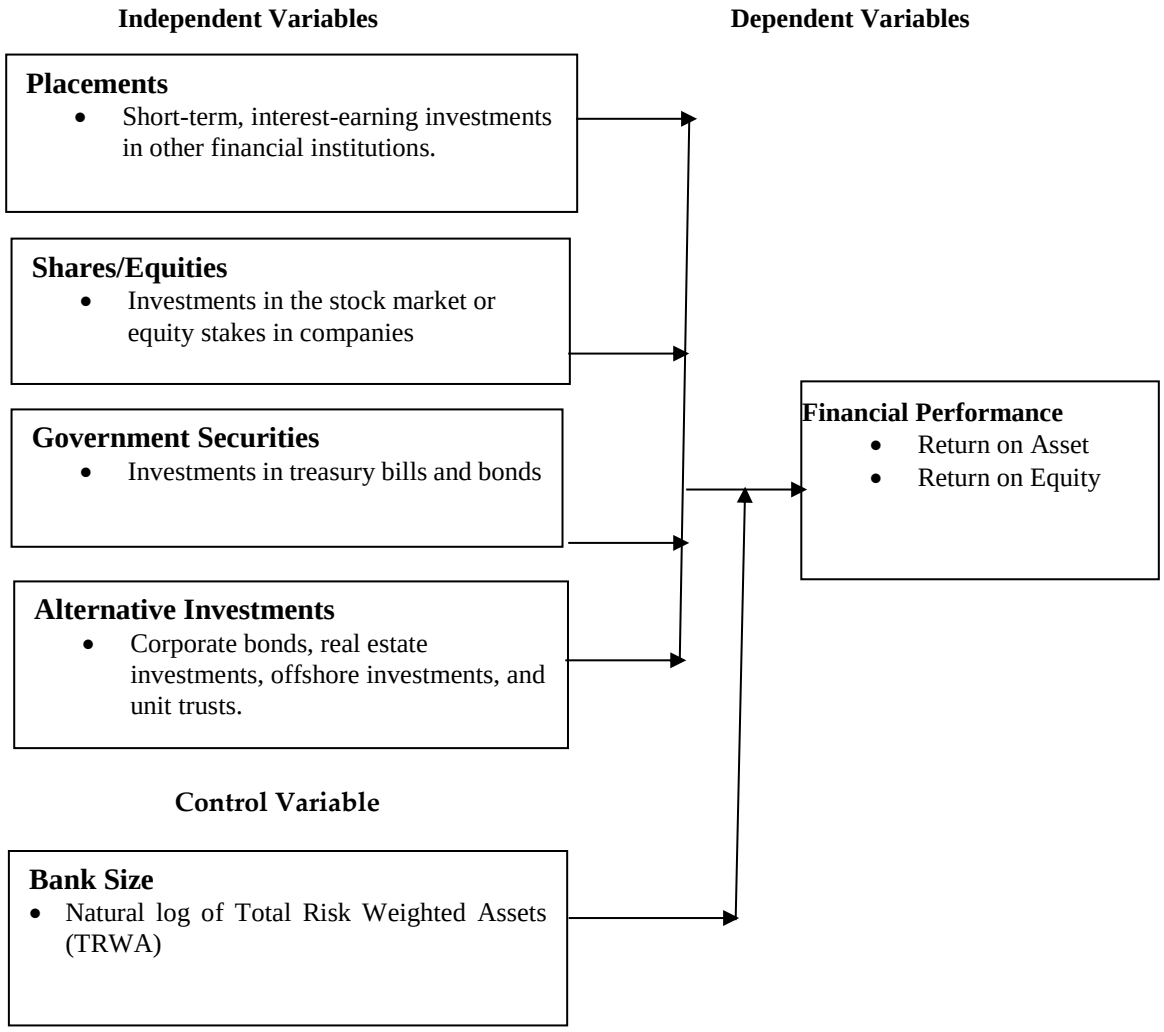
Bank size plays a pivotal role in the banking sector and has garnered significant attention in academic research. While some studies contend that larger banks are "too big to fail" (Sapci & Miles, 2019), others argue that smaller banks can be "too small to succeed," particularly in the case of Islamic banks (Naseri et al., 2020). Research by Abisola (2022) and Hermuningsih et al. (2023) reveals a compelling inverse relationship between bank size and performance, suggesting that as banks shrink, their performance tends to soar. Supporting this notion, Olivia et al. (2022) assert that smaller banks often outperform their larger counterparts financially, while Mkhaiber and Werner (2021) highlight the efficiency of medium-sized banks compared to larger ones. However, it is crucial to acknowledge contrary findings, such as those from Amene and Alemu (2019), who demonstrate that larger banks can achieve greater profits than smaller institutions in the Ethiopian banking sector. Simultaneously, Ruslan et al. (2019) provide evidence that larger banks benefit from increased profitability due to enhanced efficiency. A study further solidifies this concept, establishing a clear link between bank size and performance in China.

However, some research suggests that size may not be a decisive factor in influencing bank performance. Moreover, the intricate relationship between investment portfolio diversification and financial performance in banks, alongside the indirect effects of bank size, remains an area that warrants further exploration. This gap in the existing literature presents a valuable opportunity for further investigation, emphasizing the need for a deeper understanding of these critical dynamics within the banking industry. While existing studies confirm the general positive effects of diversification on financial performance, a clearer understanding of the specific types of diversification that most effectively enhance bank performance in Kenya remains lacking. This literature review identifies a significant research gap regarding the nuanced impacts of different diversification strategies and the role of macroeconomic and regulatory factors in shaping their effectiveness. Future research should focus on providing novel insights into these aspects, offering both academic contributions and practical recommendations for policymakers and banking institutions in Kenya. This study sought to address the following pertinent research hypotheses;

H1: Placements have no significant effect on the financial performance of commercial banks in Kenya.
H2: Equities portfolio has no significant effect on the financial performance of commercial banks in Kenya.
H3: Government securities have no significant effect on the financial performance of commercial banks in Kenya.
H4: Alternative Investments has no significant effect on the financial performance of commercial banks in Kenya.
H5: Bank size has no significant moderating effect on the relationship between investment diversification and the financial performance of commercial banks in Kenya.

Conceptual Framework

The conceptual framework for this study was formulated through a comprehensive review of both theoretical foundations and empirical research, enabling the establishment of well-defined connections between the variables under investigation. The independent variables, placements, equities (or stocks), government securities, and alternative investments are grounded in the principles of Modern Portfolio Theory (MPT). This theory offers critical insights into how investors construct portfolios to optimize returns while managing risk in securities markets. To account for differences in economies of scale among banks, the study introduced bank size as a control variable. The dependent variable, financial performance, is informed by financial intermediation and delegated monitoring theory, which emphasizes how diversification supports improved risk management and enhances a bank's overall resilience and performance. This framework sets a solid foundation for further exploration and analysis in the field.



MATERIALS AND METHODS

This investigation employs a robust positivist methodology and adopts a descriptive correlational design to examine the impact of investment diversification on the financial performance of commercial banks in Kenya. By employing a Time Series and Cross-Sectional (TSCS) design, we are well-equipped to conduct a comprehensive analysis using panel data, which enables richer insights. The analysis focuses on all 38 licensed commercial banks in Kenya as of 2024, with data primarily obtained from credible institutions such as the Central Bank of Kenya (CBK) (2021) and published financial reports. The period from January 2007 to December 2024, spanning 18 years, was covered using secondary data extracted from financial statements, industry reports, and publications. The data were organized in Microsoft Excel and analyzed using STATA version 13.0. The analytical process was structured to identify trends, evaluate relationships, and uncover insights into how different asset classes contribute to financial performance within Kenya's banking sector.

Mathematical Equations

The following mathematical equation was followed.

$ROE_{i,t} = f(PLA, GOV, SHA, ALT)$
$ROA_{i,t} = f(PLA, GOV, SHA, ALT)$

After performing linearization and parameterization, the long-term unbalanced panel data model was defined as follows:
$ROE_{i,t} = \beta_o + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 ALT_{i,t} + \alpha_i + \varepsilon_{it}$
$ROA_{i,t} = \beta_o + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 ALT_{i,t} + \alpha_i + \varepsilon_{it}$

The short-run model was:
$ROE_{i,t} = \beta_o + \lambda ROE_{i,t1} + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 ALT_{i,t} + \alpha_i + \varepsilon_{it}$
$ROA_{i,t} = \beta_o + \lambda ROE_{i,t1} + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 ALT_{i,t} + \alpha_i + \varepsilon_{it}$
Where PLA, GOV, SHA, and ALT represent placements, government securities, shares, and alternative investments, respectively, for Bank i at time t.

RESULTS

Descriptive Statistics

This section examines the impact of investment portfolio diversification on the financial performance of commercial banks in Kenya, analyzing various asset categories, including placements, government securities, shares, and alternative investments. According to the data summarized in Table 1, government securities represented the largest share of bank investments, with an average value of 8.73, followed closely by placements (8.58), alternative investments (8.45), and equities at 8.24. The most significant variability in banking investments was observed in equities, which exhibited a standard deviation of 4.97, followed closely by alternative investments with a standard deviation of 4.81. None of these investment categories appeared to follow a normal distribution among banks, as indicated by the Jarque-Bera coefficients, which resulted in p-values below 0.05.

The probability values for all components in the series were recorded at 0.000, suggesting that the model used in the study was a good fit. This suggests that each variable related to the measured investment avenues would have a significant influence on the financial performance of the Kenyan banking sector. Therefore, banks should focus on enhancing their commitment to portfolio diversification. This can be achieved by developing marketing strategies that promote this approach and establishing optimal asset combinations to create an effective portfolio. The kurtosis values, all greater than three, suggest that the data is leptokurtic, indicating heavier tails and more frequent extreme values. This aligns with earlier findings by Ochenge (2022), who emphasized the importance of asset quality in determining bank profitability in Kenya.

Table 1. Descriptive Statistics for Investment Portfolio Diversification

	Placement	Government securities	Shares	Alternative investment	Bank Size
Mean	8.58	8.73	8.24	8.45	9.86
Median	8.42	7.68	6.54	6.81	9.66
Maximum	27.32	19.96	27.60	25.32	14.86
Minimum	2.15	2.00	1.22	2.23	2.23
Std. Dev.	2.57	3.11	4.97	4.81	1.51
Skewness	2.10	1.74	1.12	1.11	0.30
Kurtosis	13.73	7.98	3.32	3.05	5.32
JarqueBera	3173.16	883.36	121.77	117.44	138.15
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
Sum	5543.446	5640.386	5325.105	5459.465	6367.926
Sum Sq. Dev.	4287.137	6260.828	15990.113	14959.809	1473.986
Observations	646	646	646	646	646

Panel Hausman Test for the Effect of Investment Portfolio Diversification on ROE

To determine the most appropriate model — fixed effects or random effects — for analyzing the impact of investment diversification on Return on Equity (ROE), the Hausman test was conducted. The null hypothesis of the test supports the random effects model, whereas the alternative hypothesis favors the fixed effects model. As shown in Table 2, the chi-square statistic was 5.0761, and the p-value was 0.2796, which exceeds the significance level of 0.05. This suggests that there is insufficient evidence to reject the null hypothesis. Therefore, the random effects model was considered more suitable for analyzing the impact of investment portfolio diversification on return on equity (ROE) in commercial banks in Kenya. This decision differs from some earlier studies, such as those by Ndungu and Muturi (2019), who used fixed effects in their analyses of financial performance among listed firms. The divergence in methodological choice may stem from differences in sector-specific data structures, sample characteristics, or temporal coverage.

Table 2. Panel Hausman Test for the Effect of Investment Portfolio Diversification on ROE

Test Summary		**ChiSq. Statistic**	**ChiSq. d.f.**	**Prob.**
Cross-section random		5.0761	4	0.2796
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
Placements	0.7161	0.8545	0.0044	0.0367
Shares/Equity	0.3378	0.3419	0.0065	0.9589
Government Securities	0.0207	0.1203	0.0108	0.3376
Alternative Investments	1.0004	0.8760	0.0152	0.3126

Panel Hausman Test for the Effect of Investment Portfolio Diversification on ROA

According to the findings in Table 3, the chi-square statistic was 4.9439, and the p-value stood at 0.2931, which exceeds the standard significance level of 0.05. This strong evidence suggests that we cannot reject the null hypothesis, thereby reinforcing the choice of the random effects model as the most effective framework for exploring the relationship between banking financial innovations and the financial deepening of listed banks in Kenya. These findings not only align with the research that similarly employed the random effects model, but they also echo the conclusions drawn by those who utilized the same approach to analyze how firm characteristics impact the efficiency of savings and credit cooperative societies in Kenya. Overall, the random effects framework was validated as the appropriate model for investigating how different investment categories affect the asset-based performance of commercial banks.

Table 3. Panel Hausman Test for the Effect of Investment Portfolio Diversification on ROA

Test Summary		ChiSq. Statistic	ChiSq. d.f.	Prob.
Cross-section random		4.9439	4	0.2931
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
Placements	1.2427	1.0280	0.0219	0.1472
Shares/Equity	0.6631	0.5904	0.0133	0.5283
Government Securities	0.5699	0.6050	0.0265	0.8291
Alternative Investments	0.1446	0.3068	0.0299	0.3483

Diagnostic Tests

To ensure the credibility and statistical integrity of the regression models used in this study, several diagnostic tests were conducted. This critical evaluation is essential, as any violations of the classical linear regression assumptions can significantly distort our estimates, leading to biased or inconsistent results. We focused on the key assumptions of linearity, independence of errors, homoscedasticity, and the normality of residuals, meticulously examining each to uncover any potential model misspecifications.

While some assumptions were found to be violated, the study applied corrective measures, including the use of robust standard errors and Generalized Least Squares (GLS) estimation, to safeguard the accuracy and validity of the model outputs. This commitment to rigorous analysis not only enhances the reliability of our findings but also reinforces the overall validity of the conclusions drawn from our research.

Multicollinearity Test for Investment Portfolio Diversification

To ensure the integrity of our regression analysis, the researcher conducted a thorough assessment of multicollinearity using the Variance Inflation Factor (VIF). This crucial step allowed us to pinpoint any independent variables that might be excessively correlated, potentially skewing coefficient estimates and undermining the model's explanatory power. The findings, detailed in Table 4, revealed VIF values ranging from 1.424 to 5.441, all of which are significantly below the widely accepted threshold of 10. Notably, Alternative Investments exhibited the highest VIF at 5.441, while Placements maintained the lowest at 1.424. These compelling results confirm that multicollinearity is not a concern in our analysis, enabling us to confidently incorporate the independent variables into the model without introducing any estimation bias. This strong foundation enhances our findings and bolsters the reliability of our conclusions.

Table 4. Multicollinearity Test

	Collinearity Statistics		
	Tolerance	**VIF**	**Remark**
Placements	0.358	2.796	No Multicollinearity
Shares/Equity	0.402	2.487	No Multicollinearity
Government Securities	0.224	4.458	No Multicollinearity
Other Investments	0.184	5.441	No Multicollinearity
Placements	0.702	1.424	No Multicollinearity
a Dependent Variable: Financial Performance			

Autocorrelation Test for Deposits Portfolio Diversification

Autocorrelation was effectively evaluated using the Panel Serial Correlation Test, with the results clearly outlined in Table 5. In the Return on Assets (ROA) model, which incorporated Placements (PLA), Shares/Equity (SHA), Government Securities (GOV), and Alternative Investments (ALT) as independent variables, the F-square statistic was determined to be 6.2539, with a p-value of 0.0000. Likewise, the Return on Equity (ROE) model, utilizing the same set of independent variables, yielded an F-square value of 5.3442, with a p-value of 0.0000. These highly significant results ($p < 0.05$) confirm the existence of autocorrelation in both models. To correct this issue, GLS estimation was applied, strengthening the reliability of the results.

Table 5. Autocorrelation test

Dependent	Independent	F square	P value
ROA	PLA, SHA, GOV, ALT	6.2539	0.0000
ROE	PLA, SHA, GOV, ALT	5.3442	0.0000

Panel Homoskedasticity Test for Investment Portfolio Diversification

The Breusch-Pagan test has been expertly employed to rigorously evaluate the presence of heteroscedasticity within study models, reinforcing the analytical framework. The null hypothesis suggests that error variances are constant, representing a state of homoscedasticity. Notably, our findings, presented in Table 6, reveal compelling evidence: The chi-square statistic for the Return on Assets (ROA) model incorporating crucial independent variables such as Placements (PLA), Shares/Equity (SHA), Government Securities (GOV), and Alternative Investments (ALT) was an astounding 850.31, with an associated p-value of 0.0000. Furthermore, the Return on Equity (ROE) model yielded an even more striking Chi-Square value of 2,800.47, also with a p-value of 0.0000. These remarkably significant results ($p < 0.05$) show strong evidence of heteroscedasticity, prompting the use of robust standard errors to mitigate this issue and ensure the accuracy of the regression coefficients.

Table 6. Heteroscedasticity

Dependent	Independent	Chi square	P value
ROA	PLA, SHA, GOV, ALT	850.31	0.0000
ROE	PLA, SHA, GOV, ALT	2,800.47	0.0000

Panel Serial Correlation Test for Investment Portfolio Diversification

The findings presented in Table 7 underscore the importance of our analysis, revealing compelling results from the Panel Serial Correlation Test. The statistically significant F-values for both the Return on Equity (ROE) model ($F = 5.658$, $p = 0.0133$) and the Return on Assets (ROA) model ($F = 6.152$, $p = 0.0047$) clearly indicate a notable trend, with p-values decisively below the 0.05 significance threshold. These results provide robust evidence to reject the null hypothesis of no serial correlation, confirming the existence of autocorrelation in the error terms. Given these revelations, it became evident that employing the fixed generalized least squares (GLS) model or a regression model with robust standard errors was essential for accurate analysis. Thus, the researcher strategically chose to utilize regression models with robust standard errors to thoroughly investigate the influence of investment portfolio diversification on the financial performance of commercial banks in Kenya. This approach not only enhances the credibility of the findings but also supports informed decision-making in the financial sector.

Table 7. Panel Serial Correlation Test

Dependent	Independent	F	P value
ROE	PLA, SHA, GOV, ALT	5.658	0.0133
ROA	PLA, SHA, GOV, ALT	6.152	0.0047

Correlation Analysis

As summarized in Table 8, the analysis revealed substantial and statistically significant positive correlations between all four investment types (placements, government securities, shares, and alternative investments) and Return on Equity (ROE). In particular, placements were found to have a significant positive effect on ROE ($rho = 0.560$, $p < 0.05$) and Return on Assets (ROA) ($rho = 0.501$, $p < 0.05$). Moreover, government securities displayed a significant positive relationship with both ROE ($rho = 0.597$, $p < 0.05$) and ROA ($rho = 0.552$, $p < 0.05$). Likewise, shares also had a significant and positive influence on ROE ($rho = 0.665$, $p < 0.05$) and ROA ($rho = 0.646$, $p < 0.05$). These results ($rho = 0.560, 0.597, 0.665, 0.667$ for ROE and $rho = 0.501, 0.552, 0.568, 0.646$ for ROA, with $p < 0.05$) found similar positive correlations between portfolio diversification and financial performance in Kenyan commercial banks. Similarly, a significant correlation was confirmed between investment portfolio diversification and banking performance within the Kenyan context. This was supported by the positive coefficients and p-values indicating significance at $p < 0.05$. There were no issues with collinearity, as none of the independent variables showed correlation coefficients above 0.8. The probability values across the analysis were all recorded as 0.000, confirming that the model provided a strong fit and that each investment type plays a statistically significant role in influencing the financial outcomes of the banking sector.

Table 8. Correlation Analysis of Investment Portfolio Diversification

		ROE	ROA	Placement	Government securities	Shares	Other Investment
ROE	Pearson Correlation	1					
ROA	Pearson Correlation	.787**	1				
	Sig. (2tailed)	0.000					
	N	646	646				
Placement	Pearson Correlation	.560**	.501**	1			
	Sig. (2tailed)	0.000	0.000				
	N	646	646	646			
Government securities	Pearson Correlation	.597**	.552**	.500**	1		
	Sig. (2tailed)	0.000	0.000	0.000			
	N	646	646	646	646		
Shares	Pearson Correlation	.665**	.568**	.509**	.646**	1	
	Sig. (2tailed)	0.000	0.000	0.000	0.000		
	N	646	646	646	646	646	
Other Investment	Pearson Correlation	.667**	.646**	.508**	.619**	.569**	1
	Sig. (2tailed)	0.000	0.000	0.000	0.000	0.000	
	N	646	646	646	646	646	646

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

Hypothesis Testing

The study aimed to test the null hypothesis that investment portfolio diversification has no significant impact on the financial performance of commercial banks in Kenya. The findings, however, provide strong evidence to reject the null hypothesis.

As shown in Table 9, the overall model assessing ROE was statistically significant, with an F-statistic of 34.1590 and a p-value of 0.0000. The coefficient of determination (R^2) stood at 0.7864, indicating that about 78.64% of the variation in ROE can be attributed to the combined influence of placements, government securities, shares, alternative investments, and bank size.

In detail, placements demonstrated a positive but statistically insignificant effect on ROE ($\beta = 0.7704$, $p = 0.1022$). This result implies that a unit increase in placements would yield an increase in ROE of 0.7704 units; however, this effect does not achieve statistical significance at the 5% level. Conversely, investments in government securities were found to have a significant positive effect on ROE ($\beta = 0.6392$, $p < 0.0001$), indicating that a one-unit increase in such investments would result in a 0.6392-unit increase in ROE, when controlling for other variables. These findings underscore the importance of strategic investment decisions for commercial banks, particularly in allocating resources towards government securities, as a means to enhance their financial performance.

Equity investments (shares) play a crucial role in enhancing return on equity (ROE), as indicated by a significant coefficient of $\beta = 0.5592$ ($p < 0.0002$). This suggests that a unit increase in equity holdings leads to a notable increase of 0.5592 units in ROE. Additionally, alternative investments contribute positively and significantly to ROE, with a coefficient of $\beta = 0.2936$ ($p < 0.0001$). This highlights the benefits of adopting diverse investment strategies to achieve improved financial performance. Furthermore, larger bank size has a positive effect on ROE ($\beta = 0.2936$, $p = 0.0023$), indicating that bigger banks are better positioned to achieve higher returns on equity. Collectively, these findings underscore the importance of portfolio diversification in enhancing bank profitability, offering valuable insights for financial institutions seeking to improve their performance.

ROE = 0.4247 + 0.7704 *Placement* + 0.6392 *Government Securities* + 0.5592 *Shares* + 0.2936 *Alternative Investment* + 0.2936**Bank Size*.

Table 9. Fixed Effects on the Effect of Investment Portfolio Diversification on ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	0.4247	0.0587	7.2351	0.7666
Placement	0.7704	0.1799	4.2824	0.1022
Government securities	0.6392	0.1402	4.5592	0.0000
Shares	0.5592	0.1562	3.5800	0.0002
Alternative investment	0.2936	0.0531	5.5292	0.0001
Bank_Size	0.2936	0.1955	1.5018	0.0023
R-squared	0.7864	Mean dependent var		16.3682
Adjusted R-squared	0.7382	S.D. dependent var		15.3555
S.E. of regression	7.8356	Akaike info criterion		6.6997
Sum squared residuals	28976.4570	Schwarz criterion		7.5142
Log likelihood	1858.4289	Hannan-Quinn criterion		7.3924
F-statistic	34.1590	Durbin-Watson stat		1.2465
Prob (Fstatistic)	0.0000			

The fixed effects regression model also examined how investment diversification impacts Return on Assets (ROA). The model demonstrated strong statistical validity, with an F-statistic of 36.2017 and a p-value of 0.0000, confirming that the relationship is statistically significant. Notably, the model's R-squared value of 0.7292 suggests that around 72.92% of the variation in ROA among commercial banks in Kenya can be attributed to factors such as investments in placements, government securities, shares, other investments, and bank size. This leaves 27.08% of the variance unaccounted for by other unmeasured factors, presenting an opportunity for further exploration.

While investments in placements appear to have a positive effect on ROA ($\beta = 0.0723$, $p = 0.0329$), this relationship is statistically significant, though relatively modest. This suggests that banks can benefit from carefully optimizing their allocation of funds to short-term placements. In contrast, investments in government securities show a substantial and statistically significant impact on ROA ($\beta = 0.1679$, $p = 0.0001$), emphasizing the potential for stable returns through government instruments.

Furthermore, equity investments demonstrated a positive and significant influence on ROA ($\beta = 0.0847$, $p = 0.0013$), indicating that channeling some resources into equity can contribute meaningfully to financial performance. Alternative investments also showed a significant positive effect ($\beta = 0.1062$, $p = 0.0003$), suggesting that diversifying into less traditional areas can substantially enhance ROA.

Additionally, bank size emerged as a significant factor affecting ROA ($\beta = 0.1986$, $p < 0.0001$). This finding highlights the advantages that come with scale, such as operational efficiency and resource leverage, which tend to benefit larger institutions. Overall, these insights provide practical guidance for bank management to refine their investment strategies and enhance performance.

ROA = 1.8742 + 0.0723×*Placement* + 0.1679×*Government Securities* + 0.0847×*Shares* + 0.1062×*Other Investment* + 0.1986×*Bank Size*.

Table 10. Fixed Effects on the Effect of Investment Portfolio Diversification on ROA

Variable	Coefficient	Robust Std. Error	tStatistic	Prob.
C	1.8742	0.3615	5.18	0.0000
Placement	0.0723	0.0338	2.14	0.0329
Government securities	0.1679	0.0412	4.08	0.0001
Shares	0.0847	0.0261	3.24	0.0013
Alternative_investment	0.1062	0.0289	3.68	0.0003
Bank_Size	0.1986	0.0455	4.36	0.0000
Rsquared	0.7292	Mean dependent var		2.0040
Adjusted R-squared	0.7074	S.D. dependent var		3.5163
S.E. of regression	1.8239	Akaike info criterion		4.0875
Sum squared residuals	2151.2743	Schwarz criterion		4.4126
Log likelihood	-1259.2384	Hannan-Quinn criterion		4.2221
Fstatistic	36.2017	DurbinWatson stat		1.9886
Prob(Fstatistic)	0.0000			

To analyze the short-term impact of investment portfolio diversification on bank performance, the study applied a dynamic panel model. The results, presented in Table 11, highlight a noteworthy short-term impact of investment portfolio diversification on the banks' financial performance (Wald Chi-square = 142.56, $p < 0.05$). Notably, the analysis shows a positive and significant relationship between the lagged return on equity (ROE) and investments in placements and government securities, indicating their contribution to enhancing current ROE. However, it is worth noting that investments in shares did not yield a significant effect on ROE. These insights can help guide banks in optimizing their investment strategies for better financial outcomes.

ROE = 1.8834 + 0.2784*ROEt1 + 0.4794*Placement + 0.4528 * Government Securities + 0.1982 * Shares + 0.5004*Other Investment + 1.044107* Bank Size

Table 11. Dynamic Panel Model on the Effect of Investment Portfolio Diversification on ROE

Arellano-Bond dynamic panel data estimation			**Number of obs**		=	**646**
Group variable: id			Number of groups		=	38
Time variable: year						
			Obs per group		min =	9
					avg =	14.717949
					max =	16
Number of instruments =	123		Wald chi2 (5)		=	142.56
			Prob > chi2		=	0.0000
One step results						
roe	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roe						
L1.	.2784004	.0587291	4.74	0.000	.1632935	.3935074
Placement	.4793593	.1822704	2.62	0.009	.1212669	.8374518
government_securities	.4527582	.1721922	2.63	0.009	.1152676	.7902488
Shares	.1981910	.1160096	1.71	0.088	.0291837	.4255657
Alternative_investment	.5004262	.1287249	3.89	0.000	.2481299	.7527224
Bank_Size	1.044107	0.1525106	6.85	0.000	0.7436769	1.344537
_cons	1.8833850	1.8415650	1.02	0.306	5.4927860	1.7260170

The Sargan test was employed to evaluate the potential for underestimation within the model. The null hypothesis (H0) asserted that the model satisfied all necessary conditions, whereas the alternative hypothesis indicated otherwise. The findings presented in Table 12 demonstrate that the model is well-specified, as indicated by a p-value of less than 0.05. This suggests that the model's integrity is strong and that it effectively captures the underlying relationships in the data.

Table 12. Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	170.0850
Prob > chi2	=	0.0000

Table 13 highlights the significant short-term impact of investment portfolio diversification on the financial performance of commercial banks in Kenya, with a Wald chi-square value of 188.94 and a p-value of less than 0.05. Notably, the lagged return had a positive influence on Return on Assets (ROA), alongside investments in placements and government securities, demonstrating their importance in enhancing financial outcomes. While investments in shares showed a positive effect on ROA, this was not statistically significant.

The findings reveal that a one-unit change in previous performance results in a substantial 0.5278-unit increase in the current performance of banks, indicating a strong relationship between past and current results that is significant at a p-value below the critical threshold of 0.05. Among the various investment types, placements in other banks and the Central

Bank emerged as the most impactful, with a coefficient of 0.1046 on ROA. This was closely followed by government securities at 0.0954, alternative investments at 0.0763, and investments in shares at 0.0402, suggesting a clear hierarchy of effectiveness in enhancing financial performance.

ROA = 1.7241 + 0.5278**ROAt1* + 0.1046**Placement* + 0.0954 * *Government Securities*+ 0.0402 * *Shares*+ 0.0763**Other Investment* + 1.8517643* *Bank Size.*

Table 13. Dynamic Panel Model on the Effect of Investment Portfolio Diversification on ROA

Arellano-Bond dynamic panel-data estimation				**Number of obs**	=	**646**
Group variable: id				Number of groups	=	38
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments =	123			Wald chi2(5)	=	188.94
				Prob > chi2	=	0.0000
One step results						
Roa	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
Roa						
L1.	.5278145	.0487104	10.84	0.000	.4323438	.6232852
Placement	.1045666	.0456092	2.29	0.022	.0151743	.1939590
government_securities	.0954332	.0424118	2.25	0.024	.0123076	.1785589
Shares	.0401628	.0288852	1.39	0.164	.0164511	.0967767
Alternative_investment	.0763961	.0320501	2.38	0.017	.0135790	.1392132
Bank_Size	1.8517643	0.0915827	20.22	0.000	1.6722635	2.0312651
_cons	1.7240550	.4350755	3.96	0.000	2.5767880	.8713231

The Sargan test was employed to evaluate the potential for underestimation in the model. The null hypothesis (H0) proposed that the underlying conditions for the model were met, whereas the alternative suggested they were not. The results shown in Table 6 confirmed that the model was appropriately specified, with a p-value of less than 0.05. This positive outcome from the diagnostic tests of the system GMM not only reinforces the validity of the model but also strengthens the conclusions derived from the system GMM estimations. Overall, these findings contribute to a more robust understanding of the model's effectiveness.

Table 14. Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	248.6839
Prob > chi2	=	0.0000

DISCUSSIONS

In both dynamic panel models using Return on Equity (ROE) and Return on Assets (ROA) as primary indicators of bank performance, the number of instruments applied (123) was notably low in relation to the total observations (646). This suggests that instrument proliferation was not a significant issue, thereby reinforcing the validity of our results. Additionally, the Sargan test was statistically significant, confirming that the instruments used were both valid and exogenous, which significantly strengthens the credibility of our model. These outcomes not only support the analytical structure adopted but also affirm the insights obtained through the system Generalized Method of Moments (GMM) estimation. To further refine our analysis, we included a time variable to account for the influence of economic cycles. The study utilized data from 38 banks, with group sizes ranging from nine to sixteen, and an average of 14.72, which adds to the robustness and significance of the findings regarding bank performance. These conclusions are consistent with those of Luu et al. (2020), who investigated the relationship between income diversification and commercial bank performance. They observed that the impact of diversification varies depending on the type of Bank, indicating that institutions focusing on traditional banking may show different performance trends compared to those engaged in investment banking. The primary benefit of diversification lies in its potential to stabilize performance during economic fluctuations. Further supporting this perspective, Saif-Alyousfi et al. (2021) examined the determinants of bank profitability across 47 Asian countries and found that financial turmoil has an adverse effect on bank profitability. They noted the importance of maintaining diversified income streams to mitigate such adverse effects, indicating that a bank's ability to diversify can enhance financial stability during periods of economic uncertainty. In alignment with this, Saif-Alyousfi et al. (2021) examined how oil and gas price shocks affect bank performance, concluding that banks with diversified portfolios are generally better equipped to handle the risks associated with fluctuating commodity prices. This underscores the importance of adequate diversification in building resilience in a competitive banking sector.

Furthermore, studied the relationship between competition and risk-taking behavior in Kenyan banks, concluding that while competition improves stability, excessive risk-taking may lead to negative financial consequences. Their work supports the idea that strategic diversification helps enhance financial performance by balancing risk exposure.These findings also align with research by Kenga et al. (2024), which revealed that investment diversification in real estate

contributes positively to financial performance, reinforcing the notion that strategic asset allocation across various classes, such as government securities and real estate, effectively enhances banking performance by reducing risk exposure. In summary, strategic diversification is beneficial for improving commercial bank performance, provided it is supported by effective planning, resource allocation, and sound management practices to avoid diminishing returns (Tariq et al., 2021; Kenga et al., 2024).

CONCLUSIONS

This study provides robust empirical evidence that placements, equity portfolios, government securities, and alternative investments each exert a statistically significant and positive influence on the financial performance of commercial banks in Kenya. The findings highlight the crucial role of investment portfolio diversification in enhancing both profitability and stability within the banking sector. Moreover, the moderating effect of bank size is pronounced, as larger institutions realize greater financial gains from diversification strategies compared to their smaller counterparts, highlighting the importance of scale in optimizing investment outcomes. These insights make a substantial contribution to the literature on financial performance determinants and provide actionable implications for bank management and policymakers. The Banks in Kenya are strongly encouraged to diversify their investment portfolios, and for good reason. This strategy not only boosts financial performance but also mitigates the risks associated with asset concentration. By investing in a variety of assets such as placements, government securities, alternative investments, and shares, banks can achieve better returns while maintaining financial stability. Investment diversification plays a crucial role in risk management, enabling banks to safeguard themselves against market volatility and sector-specific downturns. For example, while government securities (e.g., Treasury bills and bonds) offer lower risk due to government backing, shares provide higher potential returns, albeit with greater risk. Their reliable returns drive the growing preference among Kenyan banks for government securities. As low-risk investments, they help banks maintain liquidity and stability in their portfolios. The government's ability to repay through taxation or further borrowing reduces default risk, making these securities especially appealing during uncertain economic conditions. In summary, diversifying investments is not just a safeguard; it is a strategic imperative for banks aiming to thrive in a dynamic economic landscape. However, overreliance on government securities can restrict profitability. Although stable, these instruments may not deliver the high returns necessary for maximum performance compared to equities. Stocks, particularly from fast-growing sectors, offer attractive returns for banks willing to embrace some risk. To enhance their investment effectiveness, banks in Kenya are encouraged to develop a well-rounded investment strategy that balances the security of government bonds with the potential for greater returns from shares and other investments. This balanced approach can lead to improved performance metrics, such as Return on Assets (ROA) and Return on Equity (ROE), which are vital indicators of a bank's financial health and operational efficiency. Successful diversification requires thorough market research and performance forecasting. Understanding trends such as interest rates, inflation, and market demand enables informed investment choices. Creating specialized teams to manage specific asset classes can also help banks capitalize on diverse opportunities more effectively. The study finds that multidimensional portfolio diversification significantly improves the financial performance of commercial banks, with larger banks experiencing greater benefits. Empirical evidence from Kenyan banks highlights practical implications for optimizing investment strategies and regulatory frameworks, especially in emerging markets. In summary, while the current tendency among Kenyan banks to prioritize government securities provides a solid foundation of stability, expanding into other investment avenues, such as shares and placements, can significantly improve financial results. By adopting a constructive and balanced diversification strategy, banks can better position themselves for sustained growth and enhanced profitability in a dynamic financial environment.

In conclusion, the diversified investment portfolios of Kenyan banks, which include placements, shares, government securities, and other ventures, reflect a strategic move aimed at enhancing financial performance. Government securities have played a central role due to their stability and favorable risk-return balance. However, this strong preference has created a somewhat skewed portfolio, with a limited allocation to other profitable investments, such as shares and placements. While government securities provide guaranteed returns, expanding into higher-yield investments is crucial for sustainable profitability. While this approach may involve increased risk, it also brings opportunities for better overall returns, which are essential for long-term financial health. Broadening investment options allows banks to build resilience and pursue better profitability outcomes. Furthermore, as banks expand into various investment portfolios, they should consider increasing their operational scale to absorb better the shocks associated with diverse investment opportunities. A greater asset base enhances a bank's capacity to manage risks associated with volatile markets, increasing its competitive advantage in a dynamic financial landscape. The study also highlights the value of integrating traditional banking with alternative investment avenues, such as securities trading, bancassurance, and securitization. These strategies reduce risk exposure and lead to steadier income streams. Ultimately, a comprehensive diversification plan can help Kenyan banks improve financial performance while adapting to economic challenges. It prepares them to seize new opportunities and promote sustained growth and innovation in the sector. The research further highlights a strong relationship between the financial performance of Kenyan commercial banks and their size. Therefore, banks must implement strategic initiatives such as acquisitions, mergers, or the infusion of additional equity. These measures are essential for strengthening their asset base and enhancing their capital position, ultimately leading to improved financial outcomes.

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