ASSET ALLOCATION AND PROFITABILITY OF FUND MANAGERS REGISTERED BY RETIREMENT BENEFITS AUTHORITY KENYA

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ABSTRACT

Over the past decade, fund managers registered with Kenya's Retirement Benefits Authority (RBA) have experienced declining and highly volatile profitability and returns on investment, raising concerns among financial practitioners and scholars. Persistent reductions in returns undermine investor confidence, erode value creation, and heighten systemic investment risk, underscoring the need to enhance profitability to ensure sustainable growth and stable investor returns. Despite professional expertise, Kenyan fund managers have struggled to optimize performance amid fluctuating market conditions. Since asset allocation decisions are widely recognized as critical determinants of profitability, this study examined the effect of asset allocation on the profitability of RBA-registered fund managers in Kenya. Specifically, the study assessed the influence of allocations to fixed income securities, equities, and real estate investments on profitability, while also evaluating the moderating role of market fluctuations. The analysis was grounded in established financial theories, including the Capital Asset Pricing Model (CAPM), the Fama–French Three-Factor Model, and the Arbitrage Pricing Theory (APT). A census of all 35 RBA-registered fund managers was undertaken, using secondary data drawn from audited financial statements covering the period 2015–2024. Panel regression analysis, Pearson correlation coefficients, and descriptive statistics were employed. Results revealed weak but positive correlations between asset allocation and profitability, with fixed income assets showing the strongest association. FGLS regression findings indicated that real estate investments had a strong and statistically significant positive effect on profitability, while fixed income securities exhibited a marginally significant positive influence. In contrast, equity investments had a significant negative effect on profitability. Furthermore, market volatility was found to positively moderate the relationship between asset allocation and profitability. The study concludes that increasing allocations to fixed income and real estate enhances profitability, whereas excessive exposure to equities diminishes financial performance.

Key words: Asset Allocation; Profitability; Fund Managers; Retirement Benefits Authority; Fixed Income Securities; Real Estate Investments; Market Volatility.

INTRODUCTION

Asset allocation is a central determinant of portfolio risk–return outcomes and fund managers' competitive performance and profitability. Extensive empirical evidence shows that diversification across multiple asset classes significantly reduces exposure to market and

economic volatility while enhancing risk-adjusted returns (Baele et al., 2018; Jang & Lee, 2020). As the global investable universe continues to expand, effective asset allocation has become increasingly critical for stabilizing portfolio performance and protecting against downside risk, particularly amid heightened complexity in fund administration in developing economies. Despite adverse global macroeconomic conditions, foreign direct investment inflows into Europe increased by 5% to approximately USD 800 billion in 2019, underscoring the importance of efficient asset allocation in sustaining profitability even during periods of uncertainty (UNCTAD, 2020; Baum, 2021).

Prior studies consistently identify asset allocation as the primary driver of portfolio performance, surpassing security selection and market timing, especially in developed markets (Brinson, Hood, & Beebower, 1986; CFA Institute, 2020; OECD, 2021). In Europe and North America, fund managers commonly apply strategic and tactical asset allocation frameworks informed by macroeconomic outlooks, regulatory dynamics, and risk forecasts. European fund managers, in particular, are increasingly adopting dynamic allocation approaches using scenario analysis, stress testing, and macroeconomic modeling to adjust portfolios in real time (ESMA, 2022). There is also a notable shift toward multi-asset and ESG-aligned portfolios, reflecting efforts to enhance risk-adjusted returns while meeting sustainability objectives (Morningstar, 2023). Collectively, these approaches strengthen fund manager profitability, improve portfolio resilience, and align investment practices with global investor expectations. International experience further demonstrates that diversification across uncorrelated asset classes, alongside innovative strategies such as factor investing and smart beta, enhances long-term profitability. Pension and mutual fund managers in countries such as the United Kingdom, Germany, and the Netherlands employ advanced portfolio optimization and liability-driven investment strategies to deliver stable returns while hedging inflation and interest-rate risks (BlackRock, 2022; OECD, 2021; PwC, 2020). Increasing reliance on technology, data analytics, and formal risk allocation frameworks has become a defining feature of leading global fund managers (CFA Institute, 2020), offering valuable lessons for economies in transition, including Kenya.

Regionally, investment trends in developing economies remain uneven. While Asia and Latin America recorded mixed inflow patterns, Africa experienced divergent outcomes, with North Africa attracting increased capital flows and sub-Saharan Africa facing notable declines (Institute of Developing Economies, 2020; UNCTAD, 2020). In Kenya, fund managers play a pivotal role in managing diversified portfolios comprising equities, fixed income securities, and real estate. However, recent underperformance of certain securities has raised concerns regarding the effectiveness of existing asset allocation practices (Ngugi & Njoroge, 2021). Given the strong linkage between asset allocation decisions and fund manager profitability (Bektić et al., 2019), there is a growing need for flexible, well-informed allocation strategies that align investor risk tolerance with return objectives. Examining equity, fixed income, and real estate allocations is therefore essential for understanding how Kenyan fund managers can enhance profitability and sustain long-term performance.

Asset allocation through fixed income, real estate, and equity investments plays a central role in shaping the profitability of fund managers, particularly in emerging markets such as Kenya. Fixed income securities are investment instruments that provide predictable coupon payments and return of principal at maturity and include government, corporate, municipal, and asset-backed securities (Tuckman & Serrat, 2022). Government bonds are generally considered low risk due to sovereign backing, while corporate and asset-backed securities offer higher yields with increased credit risk (Shahnia et al., 2020; Lin & Zhou, 2018). These instruments are widely used by fund managers to ensure income stability, manage risk, and diversify portfolios, making them a critical determinant of firm revenue and financial performance (Bektić et al., 2019). Empirical evidence highlights the importance of bond investments in reducing portfolio volatility and enhancing returns (Wang & Zhou, 2018; Chen & Xiong, 2019). In Kenya, fund managers have dynamically adjusted fixed income allocations over time, increasing exposure to government bonds between 2014 and 2019, reducing allocations during the COVID-19 period, and subsequently expanding holdings again in 2023–2024 due to attractive infrastructure bond yields (Cytonn Investments, 2019; RBA, 2022; BlackRock, 2024).

Real estate investments constitute another significant asset class, involving pooled capital used to acquire, develop, and manage property assets for income generation and capital appreciation (Baum, 2021). Fund managers benefit from economies of scale, stable rental income, and diversification benefits, although the sector is exposed to risks related to interest rates, economic cycles, and regulatory changes (Jolly & Singla, 2020; Chambers et al., 2021). Kenyan fund managers maintained cautious real estate allocations between 2014 and 2016, expanded investments during the 2017–2019 property boom, and reduced exposure during the pandemic before recovering in 2023–2024 amid post-pandemic economic stabilization (Balemi et al., 2021; KNBS, 2024).

Equity investments offer higher growth potential and are essential for long-term capital appreciation, though they are inherently more volatile (Amihud, 2020). Studies confirm a positive relationship between equity allocation and risk-adjusted returns, particularly when portfolios are well diversified (Braun et al., 2020; Fama & French, 2023). In Kenya, equity allocations increased steadily up to 2019, declined sharply during 2020–2022 due to heightened uncertainty, and showed modest recovery in 2023–2024 as investor confidence gradually returned (Cytonn Investments, 2019; Himanshu et al., 2021).

Market volatility moderates the relationship between asset allocation and profitability, influencing both the direction and magnitude of returns (Kamau, 2022; Wambua & Karoki, 2024). Kenya's experience of political events, pandemics, and social unrest underscores the need for adaptive and risk-adjusted investment strategies (KIPPRA, 2024; Lawi, 2024). Despite growth in assets under management, declining returns highlight inefficiencies in asset allocation and the urgent need for improved diversification and strategic realignment among Kenyan fund managers to restore profitability and investor confidence (Kamau & Otieno, 2023; Cytonn Investments, 2024).
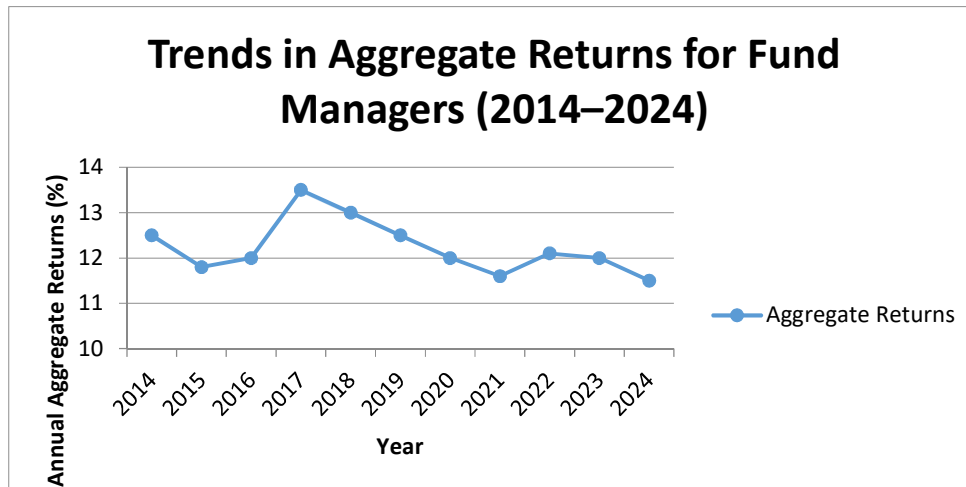
Figure 1 Aggregate Returns of Fund managers registered by RBA
Source: RBA, 2024

The Retirement Benefits Authority (RBA) is the principal regulatory body overseeing Kenya's retirement benefits industry, established under the Retirement Benefits Act to safeguard members' and beneficiaries' interests through prudent regulation and supervision (RBA, 2023). The Authority plays a critical role in promoting transparency, efficiency, and sound governance within the sector, thereby supporting national financial stability and workers' long-term economic security (Njiru & Kiarie, 2022). A core mandate of the RBA is the licensing and registration of fund managers entrusted with managing pension assets. These professional investment firms are required to meet stringent criteria relating to capital adequacy, technical competence, operational capacity, and risk management systems to ensure responsible stewardship of retirement savings (Kamau & Otieno, 2023; RBA, 2023).

Registered fund managers invest across diversified asset classes, including equities, fixed income securities, property, and alternative investments, to optimize risk-adjusted returns while protecting members' capital from market volatility (Kamau & Otieno, 2023). The RBA issues investment guidelines on asset allocation limits and enforces ongoing compliance through reporting, audits, and inspections, while also requiring disclosure of investment risks, fees, and performance to enhance informed decision-making by scheme members (Kariuki, 2022; Mwangi & Wambua, 2022).

As of 2025, 35 fund managers were registered with the RBA, reflecting the growing size and complexity of Kenya's retirement benefits sector (RBA, 2025). Despite sectoral growth, fund returns have shown volatility, declining from approximately 13.2% in 2017 to 11.5% in 2024, highlighting challenges linked to asset allocation strategies and macroeconomic conditions (RBA, 2024). Empirical evidence underscores that appropriate asset allocation aligned with market conditions significantly enhances fund performance and stability (Bodie, Kane, & Marcus, 2021; Fabozzi & Markowitz, 2017).

Research Problem

Fund managers play a critical role in Kenya's financial system by mobilizing long-term savings and channeling them into investments that support economic growth, capital market development, and infrastructure financing. According to the Retirement Benefits Authority (RBA, 2024), RBA-registered fund managers oversee pension assets exceeding KES 1.7 trillion, representing about 13% of Kenya's GDP. This underscores their importance in managing market liquidity, directing investment flows, and advancing financial inclusion within a transitioning formal economy (Mwangi & Wambua, 2023; Njiru & Kiarie, 2022).

Despite this significance, the profitability of Kenyan fund managers measured by aggregate investment returns has exhibited persistent volatility over the past decade. RBA data show that returns fluctuated from 12.5% in 2014, peaked at 13.2% in 2017, and declined to a decade-low of 11.5% in 2024, even during periods of relative macroeconomic stability (RBA, 2024). These oscillations raise concerns about the effectiveness and structural soundness of asset allocation strategies employed by fund managers, necessitating systematic investigation into how allocation decisions influence profitability.

Existing literature reveals notable conceptual, methodological, and contextual gaps. Many studies rely on simplified methods, isolated asset classes, or non-profitability measures, limiting their ability to capture the dynamic and integrated nature of institutional portfolios (Arora et al., 2019; Resnik et al., 2015). Others focus on banks, listed firms, or foreign contexts, reducing applicability to Kenya's pension fund industry (Odhiambo, 2015; Chen, 2023). Consequently, there is limited empirical evidence explaining how combined investments in fixed income, equities, and real estate jointly affect the profitability of RBA-regulated fund managers. This study addresses these gaps by adopting an integrated asset allocation framework grounded in Kenya's regulatory and market environment.

Research Objective

This study was guided by the following general objective to: to determine the effect of asset allocation on profitability of fund managers registered by Retirement Benefits Authority.
Specific Objectives were to;
   i.   To determine the effect of fixed income securities on profitability of fund managers registered by Retirement Benefits Authority, Kenya.
  ii.   To analyse the effect of equity investment on profitability of fund managers registered by Retirement Benefits Authority, Kenya.
 iii.   To determine the effect of real estate investment on profitability of fund managers registered by Retirement Benefits Authority, Kenya.
  iv.   To establish the moderating effect of market volatility on the relationship between asset allocation and profitability of fund managers registered by Retirement Benefits Authority, Kenya.

Significance of the Study

The study's findings are significant to investment firms, investors, regulators, policymakers, academics, and financial analysts. Fund managers can enhance portfolio selection strategies to improve profitability and sustain competitive advantage, consistent with modern portfolio

theory. Investors benefit through improved evaluation of fund managers' return generation and risk management capabilities, enabling informed capital allocation decisions. Regulators and policymakers may use the insights to design frameworks that promote market stability, investor protection, and integrity. Academically, the study enriches finance literature on portfolio selection and firm performance, while analysts and consultants can apply the findings to provide evidence-based advisory services.

LITERATURE REVIEW
The theoretical review

This section reviews the key financial theories that underpin the study and provide a conceptual basis for examining asset allocation and profitability. A theory is defined as a proposition developed to explain or predict observed phenomena (Saunders, Lewis, & Thornhill, 2012). The study is grounded in four core theories: Modern Portfolio Theory (MPT), the Capital Asset Pricing Model (CAPM), the Fama–French Three-Factor Model, and the Arbitrage Pricing Theory (APT). Together, these frameworks explain risk–return relationships, diversification, and asset pricing within investment portfolios.

Modern Portfolio Theory, introduced by Markowitz (1952, 1959), fundamentally transformed investment management by emphasizing diversification and the portfolio as the unit of analysis rather than individual assets. MPT posits that investors can achieve an optimal risk–return trade-off by combining assets whose returns are imperfectly correlated. The theory assumes rational, risk-averse investors, efficient markets, normally distributed returns, frictionless transactions, and a single investment horizon. While critics argue that these assumptions rarely hold in practice given behavioral biases, market inefficiencies, and fat-tailed return distributions MPT remains influential. Empirical evidence supports its relevance, particularly in emerging markets. Boyante (2022) found that diversified Kenyan fund managers achieved superior risk-adjusted returns, while Ilahi, Jamil, and Kazmi (2014) and Yat et al. (2017) demonstrated the benefits of MPT-based diversification in emerging economies. In this study, MPT provides a foundation for understanding how asset allocation among equities, fixed income, and real estate affects the profitability of RBA-registered fund managers.

Building on MPT, the Capital Asset Pricing Model was independently developed by Treynor (1961), Sharpe (1964), Lintner (1965), and Mossin (1966). CAPM explains expected returns as a function of systematic market risk, measured by beta, relative to a risk-free rate (Irfan & Lau, 2024). The model assumes efficient markets, homogeneous expectations, normal return distributions, and the absence of taxes and transaction costs (Shih, 2020; Takouachet, 2020). Although empirical studies present mixed evidence, CAPM remains widely used. While some researchers highlight its limitations and the emergence of multi-factor alternatives (Sagar, 2020; Agouram, 2020; Zhao, 2021), others reaffirm its applicability in different markets, including Nigeria (Ogiugo, 2020). For Kenyan fund managers, CAPM offers a systematic approach to estimating expected returns and aligning asset allocation decisions with market risk and profitability objectives (Sharpe, 1964; Ndumia, 2021; Boyante, 2022).

The Fama–French Three-Factor Model extended CAPM by incorporating size (SMB) and value (HML) factors alongside market risk (Fama & French, 1992). The model explains return differentials based on firm size and book-to-market ratios, addressing anomalies unexplained by CAPM (Ding, 2023; Haqqani, 2020). Empirical findings vary across markets: limited support has been observed in Egypt (Abd-Alla, 2020), while stronger evidence exists in emerging Asian and African markets, particularly when extended models are applied (Saleh, 2020; Juncheng, 2020; Taib, 2023). For Kenyan fund managers, the model is particularly useful in evaluating how real estate and equity investments interact with size and value risks, enhancing portfolio performance analysis (Jacobs, Müller, & Weber, 2014).

Finally, Arbitrage Pricing Theory, proposed by Ross (1976), offers a flexible multi-factor approach to asset pricing. APT asserts that asset returns are influenced by multiple macroeconomic factors, assuming no arbitrage opportunities, diversified portfolios, and efficient markets (Jalil & Ali, 2015; Elhusseiny, 2019). Empirical studies demonstrate its applicability across industries and markets, highlighting its strength in capturing macroeconomic influences on returns (Séverac, 2020; Bayraktar, 2022). In the Kenyan context, APT provides a robust framework for assessing how economic growth, interest rates, and market volatility affect asset allocation and profitability among RBA-licensed fund managers (Ross, 1976; Ndumia, 2021; Martins et al., 2019; Janani et al., 2022).

Empirical Literature Review

This empirical review synthesizes evidence-based studies examining the relationship between asset allocation particularly fixed income securities, equities, and real estate and profitability. Empirical inquiry relies on observed and analyzed data to draw objective conclusions (Mugenda & Mugenda, 2003), providing a foundation for understanding how different investment classes influence financial performance across contexts.

Studies on fixed income securities and profitability largely demonstrate a positive association between bond investments and financial performance. Nzau, Kung'u, and Onyuma (2019) found that secondary bond issuance explained a substantial proportion of variations in return on equity (ROE) among firms listed on the Nairobi Securities Exchange (NSE), indicating a strong profitability effect. Similarly, Makau and Ambrose (2018) established that bond allocation and yield to maturity significantly enhanced firm performance. However, both studies were limited by narrow scopes, focusing mainly on listed firms and fixed income assets in isolation. International studies, such as Arora et al. (2019) and Safford et al. (2015), emphasized the role of fixed income securities in liquidity provision, risk mitigation, and profitability, particularly during market stress. Nonetheless, their applicability to emerging markets like Kenya is constrained by differing regulatory and market structures. Cortés et al. (2013) further highlighted the theoretical benefits of optimized fixed income portfolios but lacked empirical validation. Collectively, these studies underscore the importance of fixed income securities while revealing gaps related to integrated asset allocation, emerging market contexts, and fund manager–level profitability.

Evidence on equity investment and profitability presents mixed but insightful findings. Muema, Kiptui and Ngeno (2021) showed that while equity investments did not significantly

affect return on assets among Kenyan collective investment schemes, they had a positive and significant impact on liquidity, highlighting the differentiated effects of asset classes. Qureshi and Hunjra (2012) examined investment decision-making behaviour and reported that equity fund managers are generally risk-averse and rely heavily on heuristics and financial tools, although the study did not directly link equity allocation to profitability. In contrast, Mutuku (2021) found that equity investment positively and significantly influenced profitability among firms listed at the Nairobi Securities Exchange, supporting the role of equity exposure in performance enhancement. Rotich (2016) similarly reported a positive relationship between equity allocation and profitability, although the study's reliance on a single market and omission of macroeconomic and regulatory variables limited generalisability. Consistent with the importance of revenue performance outcomes in institutional settings, Mutua and Gitagia (2025) further demonstrate that structured revenue enhancement strategies can strengthen own-source revenue growth, reinforcing the relevance of context-specific evidence when analysing investment-related profitability outcomes.

Research on real estate investment and profitability also yields divergent results. Mbogo (2016) and Resnik, Rasmussen, and Kissling (2015) documented positive relationships between real estate investment strategies and financial performance in Nairobi-based investment groups, suggesting that strategic real estate allocation can enhance returns. However, these studies were geographically limited and focused on specific investor categories. Chen (2023), using regional panel data from China, found that real estate investments reduced economic profitability by diverting resources from more productive sectors, highlighting potential crowding-out effects. Odhiambo (2015) reported an insignificant relationship between real estate diversification and bank performance in Kenya, attributing performance differences to structural and size-related factors. Jahromi and Jokar (2013) further demonstrated that stock market performance signals had little influence on real estate investment decisions, underscoring the role of market-specific dynamics.

In summary, the empirical literature confirms that asset allocation decisions materially influence profitability, though effects vary by asset class, market structure, and regulatory environment. Notably, gaps remain regarding integrated analyses of fixed income, equity, and real estate investments within emerging markets and among RBA-regulated fund managers in Kenya, justifying the need for the current study.

RESEARCH METHODOLOGY

Research philosophy refers to the underlying beliefs and assumptions guiding the growth of knowledge and shaping a researcher's approach to inquiry (Saunders et al., 2009). It influences the choice of methodology, research methods, and interpretation of findings. Among the main research philosophies are realism, interpretivism, pragmatism, and positivism. Realism posits that reality exists independently of human perception, although individual experiences and interpretations of reality also matter. Realism has two branches: direct realism, which assumes the world exists as perceived, and critical realism, which acknowledges that social and psychological factors influence perception (Obiero, 2019). Realism is often aligned with a scientific perspective but offers greater complexity than positivism in accounting for human experience.

In contrast, interpretivism emphasizes the role of subjective experiences and social interactions in shaping reality. It seeks to understand social phenomena within their specific contexts by examining the meanings individuals ascribe to actions (Ndumia & Jagongo, 2022). This study, however, adopted a positivist philosophy, which assumes that observable reality exists independently of the researcher, making it appropriate for investigating asset allocation and profitability among Kenyan fund managers registered with the Retirement Benefits Authority (RBA). Positivism allows for objective, quantifiable analysis free from value judgments, aligning well with research that seeks causal relationships between independent and dependent variables (Nwiado & Décor, 2013; Noriza, 2013; Nisra et al., 2018). This approach enabled the researcher to maintain neutrality, rely on empirical data, and employ quantitative procedures to test hypotheses and generate trustworthy results (Akinsola, 2012).

Research design provides a framework that guides data collection and analysis in addressing research questions (Maxwell, 2012; Cooper & Schindler, 2014). Designs may be exploratory or explanatory, where explanatory designs focus on testing causal relationships among variables (Nairobi Securities Exchange, 2018). This study adopted an explanatory design to examine the causal effects of asset allocation on the profitability of RBA-registered fund managers, consistent with performance-based finance studies using firm financial data over time (Njagi & Gitagia, 2024). The design was appropriate because the asset allocation variables were historical and immutable, enabling efficient analysis without manipulation (Baig, Usman, & Owais, 2014; Ali & Ibrahim, 2018).

The study utilized multiple panel regression models to quantify the effects of asset allocation on fund manager profitability. The general model related profitability (P_{it}Pit) to asset allocation (AL_{it}ALit), capturing fixed income securities (FI_{it}FIit), equity investments (EI_{it}EIit), and real estate investments (RI_{it}RIit) as independent variables (Taylor & Francis, n.d.; Number Analytics, n.d.). The model allowed for evaluation of coefficients to establish the strength and direction of the relationships:

$P_{it} = \beta_0 + \beta_1 FI_{it} + \beta_2 EI_{it} + \beta_3 RI_{it} + \epsilon_{it}$

Additionally, a moderation model tested whether market volatility (MV_{it}MVit) influenced the relationship between asset allocation and profitability. The analysis involved two steps: assessing market volatility as an explanatory variable and evaluating its interaction effect with asset allocation variables (Mwangi, Makau, & Kosimbei, 2014; Whisman & McClelland, 2005; Barnes & Burnie, 2014). Decision criteria for moderation were based on the significance of coefficients at a 5% level (Researcher, 2025).

The study measured profitability as the aggregate return on investment, while independent variables included the proportion of fixed income securities, equities, and real estate in fund portfolios. Market volatility served as a moderating variable, operationalized using a volatility index (Researcher, 2025). These measures ensured quantitative assessment of causal relationships over a ten-year period (2015–2024).

The population comprised 35 fund managers licensed by the RBA. A census approach was adopted by focusing on firms that operated throughout the study period to enhance comparability and support trend analysis (Hakim, 2012; Altan, Yusufazari, & Bedük, 2014). Secondary data were extracted from audited financial statements, covering ROI, ROA, and portfolio composition, using a standardized data collection guide to ensure consistency across firms. This approach aligns with evidence that regulated-sector studies require uniform panel measurement for reliable efficiency and performance analysis (Otondi & Gitagia, 2025). Authorization from Kenyatta University and NACOSTI was obtained to ensure ethical compliance.

Data were analyzed using Stata 15, employing descriptive and inferential statistics, including panel regression, correlation, and multivariate techniques (Mohamad & Saad, 2017). Descriptive statistics included means, standard deviations, and frequencies, while inferential analysis assessed causal relationships. Diagnostic tests addressed assumptions for regression analysis, including normality (graphical and Jarque-Bera tests; Milevsky & Young, 2007; Field, 2005), heteroskedasticity (Breusch-Pagan test; Garson, 2012; Dansey & Reidy, 2004), multicollinearity (VIF, condition index, tolerance; Martz, 2013; Ashraf et al., 2022), autocorrelation (Wald test; Sharifzadeh, 2010; Field, 2013), and stationarity (ADF and Levin-Lin-Chu tests; Ogada, 2021). Model specification tests, including Hausman tests, determined the appropriateness of fixed or random effects for panel data analysis (Lin et al., 2018; Lamichhane, 2021).

The study adhered to ethical principles by seeking prior authorization from NACOSTI and ensuring the protection of participants' rights and dignity (Resnik, Rasmussen & Kissling, 2015). Data were treated with confidentiality, and the analysis was conducted objectively without researcher interference.

RESEARCH RESULTS AND DISCUSSION
Descriptive Statistics
The descriptive statistics in Table 1 summarize key variables fixed income securities, equity investment, real estate investment, market volatility, and profitability over 350 firm-year observations from 2015 to 2024. On average, firms allocated most resources to fixed income securities (mean = 0.8325), followed by real estate (mean = 0.5935), with equity investments considerably lower (mean = 0.1042). Profitability averaged 0.5296, whereas market volatility exhibited the highest mean (1.7261), indicating significant external fluctuations. Median values reveal right-skewed distributions for equity and real estate investments, with most observations clustered at lower levels but few extreme highs. Dispersion measures highlight substantial variability in real estate (SD = 2.6243) and market volatility (SD = 4.0666), while fixed income securities and profitability are relatively stable. Skewness and kurtosis confirm non-normal distributions for equity, real estate, market volatility, and profitability, with heavy tails and leptokurtic behavior, whereas fixed income securities approximate normality, supporting their use in subsequent analyses.

Table 1: Descriptive Statistics

Statistic	Fixed Income Securities	Equity Investment	Real Estate Investment	Market Volatility	Profitability
Mean	0.8325	0.1042	0.5935	1.7261	0.5296
Median	0.7910	0.0012	0.0264	0.0687	0.4180
Maximum	4.9234	5.1578	30.9423	13.2512	4.9260
Minimum	-2.7152	-0.4085	-0.8377	-0.2714	-2.7045
Standard Deviation	1.2456	0.5456	2.6243	4.0666	1.0487
Skewness	-0.2421	6.9840	9.0341	2.4247	1.8843
Kurtosis	3.5621	54.9888	101.1291	7.0622	6.3159
Sum	291.38	36.47	207.91	604.13	185.35
Sum of Sq. Dev.	529.12	102.88	873.95	1441.47	384.32
Observations (n)	350	350	350	350	350

Source: Research Data, 2025

Diagnostic Tests

This section presents the results of key diagnostic tests applied to the study variables, including normality, heteroskedasticity, multicollinearity, autocorrelation, stationarity, and the evaluation of random versus fixed effects, ensuring the robustness and validity of panel regression analysis.

Normality Test

Normality was assessed using skewness, kurtosis, and the Jarque-Bera (JB) statistic. Fixed income securities approximated a normal distribution (skewness = -0.2421; kurtosis = 3.5621; JB p-value = 0.4146), indicating no significant departure from normality. In contrast, equity investment and real estate investment exhibited extreme positive skewness and high kurtosis (skewness = 6.9840 and 9.0341; kurtosis = 54.9888 and 101.1291), while market volatility and profitability were right-skewed with elevated kurtosis values. All four variables returned JB p-values of 0.0000, reflecting statistically significant deviations from normality. Such non-normality is typical in financial datasets due to heavy-tailed distributions and market shocks.

Table 2: Normality Test Results

Variable	Skewness	Kurtosis	Jarque-Bera (JB)	p-value
Fixed Income Securities	-0.2421	3.5621	1.7634	0.4146
Equity Investment	6.9840	54.9888	672.1124	0.0000
Real Estate Investment	9.0341	101.1291	1105.6642	0.0000
Market Volatility	2.4247	7.0622	82.1448	0.0000
Profitability	1.8843	6.3159	47.3523	0.0000

Source: Research Data, 2025

Heteroskedasticity and Cross-Sectional Dependence

The Breusch-Pagan LM test indicated significant heteroskedasticity (LM = 3969.0831, df = 780, $p < 0.001$), while Pesaran scaled LM, bias-corrected LM, and Pesaran CD tests confirmed cross-sectional dependence (all $p < 0.001$). These findings suggest error variances differ across observations, violating OLS assumptions and potentially biasing standard errors. To address these issues, the study employed feasible generalized least squares (FGLS) estimation and log-transformations for high-variance variables, ensuring consistent coefficient estimates and robust inference.

Table 3: Heteroskedasticity and Cross-Sectional Dependence Test Results

Test	Statistic	df	p-value
Breusch-PaganLM	3969.0831	780	0.0000
Pesaran Scale LM	80.7155		0.0000
Bias-Corrected Scaled LM	78.2155		0.0000
Pesaran CD	23.28865		0.0000

Source: Research Data, 2025

Multicollinearity

Multicollinearity was evaluated using Tolerance, Variance Inflation Factor (VIF), and Condition Index. Tolerance values ranged from 0.406 to 0.852, all above the 0.2 threshold, while VIF values ranged from 1.173 to 2.464, below the critical value of 5. Condition Index values were below 30, with the highest at 17.306. These results confirm no harmful multicollinearity among independent variables, allowing reliable regression estimation.

Table 4: Multicollinearity Test Results

Variable	Tolerance	VIF	Condition Index
Fixed Income Securities	0.779	1.284	10.213
Equity Investment	0.472	2.119	14.896
Real Estate Investment	0.406	2.464	17.306
Market Volatility	0.852	1.173	9.084

Source: Research Data, 2025

Autocorrelation

Autocorrelation, assessed using the Wald test, showed significant serial dependence (F-statistic = 16,287.31, Chi-square = 70,811.42, $p < 0.001$). Such violations of residual independence can distort standard errors and inference. The study employed FGLS to correct for autocorrelation and heteroskedasticity, enhancing the consistency and validity of parameter estimates in the panel context.

Table 5: Autocorrelation Test Results

Wald Test:

Equation: Untitled

Test Statistic	Value	df	p-value
F-statistic	16287.31	(4, 316)	0.0000
Chi-square	70811.42	4	0.0000

Source: Research Data, 2025

Stationarity

Stationarity was tested using the Augmented Dickey-Fuller (ADF) method. Fixed income securities, equity investment, profitability, and market volatility were stationary ($p < 0.05$), while real estate investment exhibited unit roots. Differencing transformed this variable to achieve stationarity, an essential step to avoid spurious regression and ensure reliable panel data estimates.

Table 6 Stationarity Test Results

Variable	ADF Statistics	Prob.*	1%	5%	10%
Fixed income securities	3.2821	0.0097	-2.5800	-1.9500	-1.6200
Equity investment	3.2427	0.0060	-2.5600	-1.9300	-1.6100
Real estate investment	1.1151	0.0156	-2.5900	-1.9600	-1.6300
Profitability	-10.8841	0.0000	-2.6000	-1.9800	-1.6400
Market volatility	-20.1517	0.0000	-2.6100	-1.9900	-1.6500

Source: Research Data, 2025

Fixed vs. Random Effects

The Hausman specification test was used to determine the appropriate panel estimation method. The test rejected the null hypothesis of random effects (Chi-square = 19.472, df = 3, $p < 0.001$), indicating that unobserved firm-specific effects correlate with explanatory variables. Consequently, a fixed effects model was preferred to control for time-invariant heterogeneity and obtain unbiased parameter estimates.

Table 7: Hausman Test Summary

Test Statistic (Chi-square)	df	p-value
19.472	*3*	*0.0000*

Source: Research Data, 2025

In summary, diagnostic tests revealed typical non-normality in financial variables, heteroskedasticity, cross-sectional dependence, autocorrelation, and mostly stationary variables, with real estate investment adjusted to achieve stationarity. Multicollinearity was not a concern, and fixed effects modeling was appropriate. FGLS estimation was applied throughout to ensure robust, efficient, and consistent regression results.

Correlation Analysis

The study employed correlation analysis to examine relationships among fixed income securities, equity investment, real estate investment, market volatility, and profitability. Fixed income securities exhibited weak positive correlations with equity (0.214), real estate (0.175), and market volatility (0.196), and a slightly stronger association with profitability (0.268), indicating a modest role in financial outcomes and risk management. Equity investments showed weak correlations with market volatility (0.149) and profitability (0.187), reflecting sensitivity to market conditions and limited impact on returns. Real estate investments demonstrated mild positive correlations with market volatility (0.183) and profitability (0.229), suggesting moderate contributions to income generation. Overall, profitability correlated weakly with all variables, underscoring its multifactorial determinants and the importance of diversified asset allocation for financial performance.

Table 8 Correlation Matrix

Variable	Fixed Income Securities	Equity Investment	Real Estate Investment	Market Volatility	Profitability
Fixed Income Securities	1.000	0.214	0.175	0.196	0.268
Equity Investment	0.214	1.000	0.221	0.149	0.187
Real Estate Investment	0.175	0.221	1.000	0.183	0.229
Market Volatility	0.196	0.149	0.183	1.000	0.211
Profitability	0.268	0.187	0.229	0.211	1.000

Source: Research Data, 2025

Regression analysis

Regression analysis was conducted to examine the relationship between asset allocation and the profitability of fund managers registered with the Retirement Benefits Authority. The model assessed the effects of fixed income securities, equity, and real estate investments, while considering market volatility. Model fitness results showed a strong correlation (R = 0.877) and a high explanatory power, with $R^2 = 0.769$ and adjusted $R^2 = 0.748$, indicating that over 74% of profitability variation is explained by the predictors. The low standard error (0.2471) confirmed prediction precision.

Table 9: Fitness of the Model

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.877[a]	0.769	0.748	0.2471

ANOVA results revealed the model's statistical significance (F = 227.572, p < 0.001), demonstrating that asset allocation decisions in these investment classes significantly influence fund managers' financial performance.

Table 10: ANOVA Results

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	55.574	4	13.893	227.572	0.000[b]
Residual	16.728	274	0.061		
Total	72.302	278			

Conclusions

The study examined the impact of asset allocation on the profitability of fund managers registered with Kenya's Retirement Benefits Authority. Findings indicate that fixed income securities and real estate investments positively influence profitability due to their stable and reliable returns, enhancing risk-return balance in portfolios. Conversely, equity investments negatively affect profitability, as market fluctuations make returns unpredictable, reducing overall financial performance. Additionally, market volatility was found to strengthen the relationship between asset allocation and profitability, highlighting the importance of strategic asset allocation in uncertain conditions. Overall, the results emphasize that carefully diversified portfolios, with a focus on stable asset classes and adaptive allocation strategies, can enhance fund managers' profitability, particularly during periods of market instability.

Recommendations

The study highlights critical insights on asset allocation and fund managers' profitability. Fixed income securities positively influence profitability; fund managers are encouraged to gradually increase allocations to these instruments while mitigating risk. Financial analysts should conduct thorough evaluations of fixed income options, and the Retirement Benefits Authority (RBA) could incentivize diversified, risk-balanced portfolios. Conversely, equity investments were found to reduce profitability, particularly in volatile markets. Fund managers should adopt flexible, trend-following strategies, and analysts should refine predictive models to optimize timing. Policymakers should ensure robust risk management frameworks for equity investments.

Real estate investments improved profitability, suggesting fund managers consider allocating more resources to stable, high-growth properties. Government policies should facilitate real estate investments through reduced administrative barriers, regulatory support, and tax incentives. Analysts should assist in assessing long-term value to align with profitability objectives. Market volatility was identified as a significant factor influencing asset allocation outcomes; fund managers should integrate volatility projections into broader strategies, supported by enhanced risk assessment models. Regulators might mandate stress testing to ensure resilience without compromising returns.

Future research should examine the performance of fixed income securities across varying market conditions, equity strategies that mitigate volatility risks, and specific real estate investment types and geographic diversification. Additionally, studies could explore volatility-

adjusted asset allocation models and longitudinal effects of allocation changes on fund manager profitability. Academic and industry collaborations are essential to generate actionable insights that strengthen resilience and enhance long-term financial performance in Kenya's evolving investment landscape.

REFERENCES

ACTSERV (2018). Pension Schemes Investment Performance Survey 2018. Actuarial Service E. A Limited, Nairobi.

ACTSERV (2020). Pension Schemes Investment Performance Survey 2020. Actuarial Service E. A Limited, Nairobi.

ACTSERV (2022). Pension Schemes Investment Performance Survey 2022. Actuarial Service E. A Limited, Nairobi.

Adebayo, A. (2016). The relationship between investment diversification and portfolio performance. Journal of African Finance and Economic Development, 18(2), 145–160.

Agouram, J., Anoualigh, J., & Lakhnati, G. (2020). Capital asset pricing model (CAPM) study in mean-gini model. *International Journal of Applied Economics, Finance and Accounting*, *6*(2), 57-63.

Akinsola, B. N. (2012). Comparative analysis of equity securities and commercial property investments and how they affect financial performance. *International Journal of Social, Management, Economics and Business Engineering*, 6(10), 414–422.

Ali, M., & Ibrahim, P. (2018). Market volatility and companies' performance: A cross-sectional analysis. *Advanced Science Letters*, 24(6), 4750–4755.

Allan Gray. (2019). Kenya pension funds too big on bonds, $39 billion firm says. *Bloomberg*.

Altan, M., Yusufazari, H., & Bedük, A. (2014, October). Performance analysis of banks in Turkey using CAMEL approach. In *Proceedings of International Academic Conferences* (Vol. 2, pp. 21–32). International Institute of Social and Economic Sciences.

Amihud, Y. (2020). Illiquidity and stock returns: A re-examination. Review of Financial Studies, 33(4), 1502–1537.

Arbale, H., & Mutisya, D. N. (2024). Book Review:" Research Methods for Business Students" by Mark NK Saunders, Philip Lewis, and Adrian Thornhill (Pearson Education, 2019). *African Quarterly Social Science Review*, *1*(2), 8-21.

Arora, A., Bansal, S., Kandpal, C., Aswani, R., & Dwivedi, Y. (2019). Measuring social media influencer index-insights from Facebook, Twitter and Instagram. *Journal of retailing and consumer services*, *49*, 86-101.

Ashraf, D., Rizwan, M. S., & Ahmad, G. (2022). Islamic equity investments and the COVID-19 pandemic. *Pacific-Basin Finance Journal*, 73, 101765.

Ayodele, A. E., Afolabi, B., & Olaoye, A. C. (2017). Impact of bond portfolio composition on the financial performance of mutual firms in Nigeria. *Asian Journal of Economics, Business and Accounting*, 2(4), 1–10.

Baig, M. A., Usman, A. M., & Owais, B. M. (2014). Assessment of the impact of investment in equity securities on the financial performance of investment banks in Pakistan. *The Lahore Journal of Business*, 2(2), 67–88.

Balemi, N., Füss, R., & Weigand, A. (2021). COVID-19's impact on real estate prices: Evidence from the Swiss market. Finance Research Letters, 38, 101–113.

Baltagi, B. H. (2021). Econometric analysis of panel data (6th ed.). Springer.

Barnes, T., & Burnie, D. (2014). Effects of bond portfolio composition and optimal risk-return relationship on the performance of diversified industries listed in the Canadian Stock Exchange. *Journal of Business Finance and Accounting*, 17(3), 20–30.

Baum, A. (2021). Tokenization The future of real estate investment? *The Journal of Portfolio Management*.

Beck, N., & Katz, J. N. (2020). Modeling dynamics in panel data: A practical guide for social scientists. Annual Review of Political Science, 23, 365–382.

Bektić, D., Wenzler, J. S., Wegener, M., Schiereck, D., & Spielmann, T. (2019). Extending Fama-French factors to corporate bond markets. *The Journal of Portfolio Management*, 45(3), 141–158.

BlackRock. (2024). Global investment outlook: Fixed income trends 2024.

Blumberg, B. F., Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods*. McGraw-Hill Education.

Bodie, K. Marcus.(2021). *Investment: Asset Classes and Financial Instruments*.

Bongoye, G. M. (2018). Effect of fixed income securities determinants on financial performance of non-financial firms listed at Nairobi Securities Exchange, Kenya (Doctoral dissertation).

Bougie, R., & Sekaran, U. (2016). Research methods for business: A skill-building approach (7th ed.). Wiley.

Boyante, R., Muturi, W., & Gekara, M. (2022). Moderating influence of portfolio rebalancing on the relationship between asset allocation and financial performance of pension funds in Kenya. *International Journal of Finance and Accounting*, 7(3), 56-67.

Braun, R., Jenkinson, T., & Schemmerl, C. (2020). Adverse selection and the performance of private equity co-investments. *Journal of Financial Economics*, 136(1), 44–62.

Brinson, G. P., Hood, L. R., & Beebower, G. L. (1986). Determinants of portfolio performance. Financial Analysts Journal, 42(4), 39–44. https://doi.org/10.2469/faj.v42.n4.39

CFA Institute. (2020). Global investment performance standards (GIPS®) for firms. https://www.cfainstitute.org

Chakravorty, G., Awasthi, A., & Singhal, M. (2019). Dynamic Risk-Aware Yield Search: A Useful Tool for Fixed Income Investors. Available at SSRN: https://doi.org/10.2139/ssrn.3326444.

Chambers, D., Spaenjers, C., & Steiner, E. (2021). The rate of return on real estate: Long-run micro-level evidence. *The Review of Financial Studies*, 34(8), 3572–3607.

Chan, K. (2019). Market microstructure and volatility forecasting. Journal of Empirical Finance, 51, 1–12.

Chen, Y., & Xiong, W. (2019). Behavioral finance and asset pricing: A new perspective. Finance Research Letters, 29, 213–220.

Chepkorir, J. (2019). Effect of return on investment on portfolio diversification among commercial sugarcane investors in Kenya (Doctoral dissertation, JKUAT-COHRED).

Cockx, L., De Weerdt, J., Duchoslav, J., Jamali, A., Nagoli, J., Pauw, K., & Thurlow, J. (2025). *Economic and welfare implications of the reduction of US foreign assistance in Malawi*. Intl Food Policy Res Inst.

Cytonn Investments. (2018). *Cytonn Annual Markets Review – 2018*.

Cytonn Investments. (2019). Kenyan pension funds asset allocation trends and regulatory changes.

Cytonn Investments. (2019). *Markets Outlook – Real Estate Sector*.

Dabara, I. D., Odewade, G. A., Ikpeme, A. A., & Olatunde, L. A. (2016). Financial performance evaluation of investment in real estate and selected financial assets in Nigeria between 2005 and 2014. *International Journal of Business and Management Studies*, 5(1), 197–210.

Dahabreh, I. J., & Hernán, M. A. (2019). Extending inferences from a randomized trial to a target population. *European Journal of Epidemiology*, 34(8), 719–722.

Dansey, D., & Reidy, J. (2004). Statistics for the health sciences: A non-mathematical introduction. Nelson Thornes.

Dansey, D., & Reidy, P. (2004). *Fundamentals of Investment Management: Strategies for Portfolio Diversification*. McGraw-Hill.

Dewenter, K. L., Han, X., & Malatesta, P. H. (2010). Firm values and sovereign wealth fund investments. *Journal of Financial Economics*, *98*(2), 256-278.

Dietrich, A., & Wanzenried, G. (2014). The determinants of commercial banking profitability in low-, middle-, and high-income countries. *The Quarterly Review of Economics and Finance*, 54(3), 337–354.

Dietrich, A., & Wanzenried, G. (2014). The determinants of commercial banking profitability in low-, middle-, and high-income countries. *The Quarterly Review of Economics and Finance*, *54*(3), 337-354.

Doornik, J. A., Bond, S., & Arellano, M. (2019). Panel data econometrics using OxMetrics. Timberlake Consultants Press.

Durall, R. (2022). Asset allocation: From Markowitz to deep reinforcement learning. arXiv preprint arXiv:2208.07158. https://doi.org/10.2139/ssrn.4148379

ESMA. (2022). Annual statistical report on EU securities markets. European Securities and Markets Authority. https://www.esma.europa.eu

Fabozzi, F. J. (2025). Interview with Gerald Garvey of Blackrock. *The Journal of Portfolio Management*, *51*(7), 14-19.

Fama, E. F., & French, K. R. (2023). Size, value, and profitability in international stock returns. Journal of Financial Economics, 148(1), 1–22.

Felsot, M. (2024, June 10). Understanding the real estate cycle. *JPMorgan Chase*.

Ferrando, A., Popov, A., & Udell, G. F. (2019). Do SMEs benefit from unconventional monetary policy and how? Microevidence from the Eurozone. *Journal of Money, Credit and Banking*, *51*(4), 895-928.

Field, A. (2013). Discovering statistics using IBM SPSS Statistics (4th ed.). SAGE Publications.

Fox, J. (2022). Regression diagnostics. SAGE Publications.

Gârleanu, N., & Pedersen, L. H. (2018). Efficiently inefficient markets for assets and

Gârleanu, N., & Pedersen, L. H. (2018). Efficiently inefficient markets for assets and asset management. The Journal of Finance, 73(4), 1663–1712. https://doi.org/10.1111/jofi.12605

Garson, G. D. (2012). Testing statistical assumptions. Statistical Associates Publishing.

Gathara, Z. M. (2019). *Financial structure and financial performance of selected firms listed at Nairobi Securities Exchange, Kenya* (Doctoral dissertation, Kenyatta University).

Gitau, A., & Mugo, R. (2021). The effect of macroeconomic factors on stock market returns in Kenya. International Journal of Economics and Finance, 13(2), 203–214.

Gomez, L. E., & Bernet, P. (2019). Diversity improves performance and outcomes. *Journal of the National Medical Association*, 111(4), 383–392.

Gujarati, D. N., & Porter, D. C. (2020). Basic econometrics (6th ed.). McGraw-Hill Education.

Gupta, R., & Sharma, A. (2021). Impact of monetary policy on stock returns: Evidence from India. Journal of Financial Economic Policy, 13(2), 256–271.

Guyo, D. Y., & Njoroge, J.(2023). *Project management practices and implementation of development projects in Kenya: A case study of Marsabit County. Reviewed Journal of Social Science & Humanities*, *4*(1), 704-718.

Hayashi, F. (2021). Econometrics (2nd ed.). Princeton University Press.

Himanshu, R., Mushir, N., & Suryavanshi, R. (2021). Impact of COVID-19 on portfolio allocation decisions of individual investors. *Journal of Public Affairs*, 21(4), e2649.

Hunjra, A. I., Rehman, K. U., & Ali Qureshi, S. (2012). Factors affecting investment decision making of equity fund managers. *Wulfenia Journal*, *19*(10).

Icharia, R. M. (2012). Determinants of the performance of pension funds in Kenya [Master's thesis, University of Nairobi].

Ilahi, I., Jamil, R. A., & Kazmi, S. (2014). Effects of portfolio share diversification on the financial performance of investment banks in Pakistan for the period 2009 to 2013. *Journal of Financial Information*, 4(1), 35–51.

Institute of Developing Economies. (2020). Emerging markets and development: Policy challenges. https://www.ide.go.jp

Iraya, C., & Wafula, A. (2018). The effect of asset allocation on the financial performance of pension funds in Kenya. Journal of Finance and Investment Analysis, 7(1), 45–59.

Irfan, M., & Lau, W. Y. (2024). Asset allocation and performance of Malaysian civil service pension fund. *Australasian Accounting, Business and Finance Journal*, 18(1), 86–107.

Irfan, M., & Lau, W. Y. (2024). Asset allocation and performance of Malaysian civil service pension fund. Australasian Accounting, Business and Finance Journal, 18(1).

Irfan, M., & Lau, W. Y. (2024). Asset allocation and performance of Malaysian civil service pension fund. *Australasian Accounting, Business and Finance Journal*, *18*(1).

Jacobs, H., Müller, S., & Weber, M. (2014). How should individual investors diversify? An empirical evaluation of alternative asset allocation policies. *Journal of Financial Markets*, 19, 62–85.

Jalil, R. A., & Ali, H. M. (2015). Performance determinants of Malaysian real estate investment trusts. *Jurnal Teknologi*, 73(5), 151–159. https://doi.org/10.31307/kjpp.2022.28.1.55

Jalil, R. A., & Ali, H. M. (2015). Performance determinants of Malaysian real estate investment trusts. *Jurnal Teknologi (Sciences & Engineering)*, *73*(5).

Janani Sri, S., Kayal, P., & Balasubramanian, G. (2022). Can equity be safe-haven for investment? *Journal of Emerging Market Finance*, 21(1), 32–63. https://doi.org/10.1177/09726527211068411

Jang, H., & Lee, Y. (2020). Asset allocation strategies and performance in emerging markets. Journal of Emerging Market Finance, 19(1), 3–25. https://doi.org/10.1177/0972652720906135

Jian[1], G., Khalid, A. A., Ali, A. B., & Abdalla, Y. A. The Shareholder Effect: A Deep Dive into China's High-Tech Equity Cost Determinants.

Jian[1], G., Khalid, A. A., Ali, A. B., & Abdalla, Y. A. The Shareholder Effect: A Deep Dive into China's High-Tech Equity Cost Determinants.

Jolly, R., & Singla, C. (2020). Foreign institutional investment and stock market volatility in India. Global Business Review, 21(5), 1200–1216.

Kabui, C. (2024). Kenyan Collective Investment Schemes Dataset.

Kalsi, K. (2013). *The relationship between foreign exchange trading and the financial performance of investment firms in Kenya* [Master's thesis, University of Nairobi]. University of Nairobi Repository. https://erepository.uonbi.ac.ke/handle/11295/59383

Kamau, A. (2023). Underwriting risk, firm size and financial performance of insurance firms in Kenya. *Eastern journal of economics and finance*.

Kariuki, J., & Muriithi, M. (2020). Asset allocation and financial performance of pension schemes in Kenya. African Journal of Business Management, 14(3), 75–84.

Kenya National Bureau of Statistics. (2024). Economic survey 2024. KNBS. https://www.knbs.or.ke/download/economic-survey-2024

Kimani, M., & Aduda, J. (2016). Relationship between asset allocation and financial performance of pension funds in Kenya. International Journal of Business and Management, 11(3), 191–204.

Krug, A. K. (2012). Investment company as instrument: the limitations of the corporate governance regulatory paradigm. *S. Cal. L. Rev.*, *86*, 263.

Lamichhane, K. (2021). Financial literacy and asset allocation decisions among retirees. International Journal of Economics and Financial Research, 7(3), 114–121.

Liang, Y., & McIntosh, J. (2019). Real estate investment trusts and market performance. Real Estate Economics, 47(1), 87–105.

Lin, M., Chen, Y., & Zhou, X. (2018). Portfolio diversification and investor behavior: Evidence from Chinese markets. Emerging Markets Finance and Trade, 54(6), 1234–1250.

Lin, W., & Zhou, Y. (2018). The impact of investment strategies on fund performance in emerging markets. Journal of Financial Research, 45(2), 134–150.

Madaan, G., & Singh, S. (2019). An analysis of behavioral biases in investment decision-making. *International Journal of Financial Research, 10*(4), 55–67. https://doi.org/10.5430/ijfr.v10n4p55

Markowitz, H. (1952). Portfolio selection. *The Journal of Finance, 7*(1), 77–91.

Martins, J., Costa, C., Oliveira, T., Gonçalves, R., & Branco, F. (2019). How smartphone advertising influences consumers' purchase intention. *Journal of business research*, *94*, 378-387.

Martz, E. (2013). Understanding and evaluating statistical inference with the general linear model. Springer.

Maxwell, J. A. (2012). *A realist approach for qualitative research*. Sage.

Mbogo, P. W. (2016). *Effect of real estate investment strategies on financial performance of investment groups in Kenya* (Doctoral dissertation, University of Nairobi).

Michaely, R., & Roberts, M. R. (2012). Corporate dividend policies: Lessons from private firms. *The Review of Financial Studies*, *25*(3), 711-746.

Milevsky, M. A., & Young, V. R. (2007). Annuitization and asset allocation. Journal of Economic Dynamics and Control, 31(9), 3138–3177.

Mohamad, N. E. A., & Saad, N. M. (2017). Risk-return trade-off and portfolio performance: Evidence from Malaysian unit trust funds. International Journal of Economics and Financial Issues, 7(4), 240–247.

Morningstar. (2023). Global fund performance report 2023. https://www.morningstar.com

Muema, L. M. (2022). *The Relationship Between Managerial Overconfidence and Financial Leverage Among State Corporations Listed at the Nairobi Securities Exchange, Kenya* (Doctoral dissertation, University of Nairobi).

Mugenda, O. M., & Mugenda, A. G. (2003). Research methods: Quantitative and qualitative approaches. ACTS Press.

Muhsin, H. H., Mandere, E. N., & Onyango, R. O. (2020). Effect of strategic planning practices on performance of state corporations in Kenya: A case of Agricultural Finance Corporation. *The Strategic Journal of Business & Change Management*, *7*(3), 789-808.

Musau, S., Muathe, S., & Mwangi, L. (2018). Financial inclusion, bank competitiveness and credit risk of commercial banks in Kenya. *International Journal of Financial Research*, *9*(1), 203-218.

Mutua, B. M., & Gitagia, F. K. (2025). Revenue enhancement strategies and growth of own source revenue in County Government of Machakos, Kenya. *International Academic Journal of Economics and Finance (IAJEF)| ISSN 2518-2366*, *5*(1), 280-295.

Mutuku, J. K. (2021). *Effect of leverage on financial performance of investment firms listed at the Nairobi Securities Exchange* (Unpublished master's thesis). University of Nairobi.

Mwangi, L. W., Makau, M. S., & Kosimbei, G. (2014). Relationship between capital structure and performance of non-financial companies listed in the Nairobi Securities Exchange, Kenya. *Global journal of contemporary research in Accounting, auditing and Business ethics*, *1*(2), 72-90.

Nairobi Securities Exchange. (2018). NSE annual report 2018. https://www.nse.co.ke

Nduati Kariuki, S. (2023). Board gender diversity, efficiency and risk-taking behavior: Empirical evidence from insurance firms in Kenya. *Cogent Business & Management*, *10*(2), 2226426.

Ndumia, M. I., & Jagongo, A. (2022). A critical review of literature on asset structure and profitability of firms listed under manufacturing and allied sector at the Nairobi securities exchange, Kenya. *International Journal of Management and Commerce Innovations*, *9*(2), 27-33.

Ngugi, R. W., & Njoroge, L. (2021). The impact of asset allocation on performance of pension funds in Kenya. African Journal of Economic Policy, 28(2), 55–74.

Njagi, P. N., & Gitagia, F. (2024). *Working Capital Management and Profitability of Tea Factories Managed By Ktda in Kirinyaga and Embu Counties, Kenya* (Doctoral dissertation, Doctoral dissertation, Kenyatta University).

Noriza, M. D., Kartono, K., & Sugianto, S. (2015). Kemampuan Pemecahan Masalah dan Disposisi Matematis Siswa Kelas X pada Pembelajaran Berbasis Masalah. *Unnes Journal of Mathematics Education Research*, *4*(2).

Nwiado, D., & Deekor, L. N. (2020). Medium Term Expenditure Framework (MTEF): A Panacea for Public Expenditure Management (PEM) In Nigeria?. *Business and Management Studies*, *6*(4), 1-13.

Nyamute, W., Lishenga, J., & Oloko, M. (2015). The relationship between investor behavior and portfolio performance at the Nairobi Securities Exchange.

Nyasha, S., & Odhiambo, N. M. (2014). The dynamics of stock market development in Kenya. *Journal of applied business research*, *30*(1), 73.

Nzau, M., Kung'u, J., & Onyuma, S., (2019) effect of bond issues on financial performance of firms listed at the Nairobi Securities Exchange. *(MBA - Laikipia University, Graduated)*.

O'Brien, R. M. (2021). A caution regarding rules of thumb for variance inflation factors. Quality & Quantity, 55(5), 1839–1847.

Obiero, K., Meulenbroek, P., Drexler, S., Dagne, A., Akoll, P., Odong, R., ... & Waidbacher, H. (2019). The contribution of fish to food and nutrition security in Eastern Africa: Emerging trends and future outlooks. *Sustainability*, *11*(6), 1636.

Odhiambo, N. M. (2015). Government expenditure and economic growth in South Africa: An empirical investigation. *Atlantic Economic Journal*, *43*(3), 393-406.

OECD. (2023). *Pension Markets in Focus 2023*. Organisation for Economic Co-operation and Development. Retrieved from https://www.oecd.org

Ogada, A. (2021). Asset allocation strategies and performance of pension schemes in Kenya. African Journal of Accounting, Auditing and Finance, 7(2), 167–182.

Ogbeide, S. O., Ogiugo, H. U., & Adesuyi, I. O. (2021). Corporate governance mechanisms and financial reporting quality of commercial banks in Nigeria. *Insights into regional development*, *3*(1), 136-146.

Otondi, F. M., & Gitagia, F. K. (2025). Financial innovations and cost efficiency of commercial banks in Kenya. *International Academic Journal of Economics and Finance (IAJEF)| ISSN 2518-2366*, *5*(1), 470-484.

Qureshi, M. A., & Hunjra, A. I. (2020). Investment decision making and behavioral factors: Evidence from Pakistan. International Journal of Economics and Financial Issues, 10(4), 89–97.

Rajyaguru, P. (2023). Strategic asset allocation in dynamic markets. International Journal of Financial Studies, 11(1), 12–29. https://doi.org/10.3390/ijfs11010012

Resnik, D. B., Rasmussen, L. M., & Kissling, G. E. (2015). An international study of research misconduct policies. *Accountability in research*, *22*(5), 249-266.

Retirement Benefits Authority. (2023). *Retirement Benefits Authority annual report and financial statements 2023*. https://www.rba.go.ke

Rohatgi, V. K., & Saleh, A. M. E. (2015). *An introduction to probability and statistics*. John Wiley & Sons.

Ross, S. A. (1978). The current status of the capital asset pricing model (CAPM). *The Journal of Finance*, *33*(3), 885-901.

Rotich, T. (2017). *The effect of board composition on quality of financial reporting among firms listed in Nairobi Securities Exchange* (Doctoral dissertation, University of Nairobi).

Safford, H. D., Miller, J. D., & Collins, B. M. (2015). Differences in land ownership, fire management objectives and source data matter: a reply to Hanson and Odion (2014). *International Journal of Wildland Fire*, *24*(2), 286-293.

Saunders, M. N., & Rojon, C. (2011). On the attributes of a critical literature review. *Coaching: An International Journal of Theory, Research and Practice*, *4*(2), 156-162.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. john wiley & sons.

Shahnia, C., Purnamasari, E. D., Hakim, L., & Endri, E. (2020). Determinant of profitability: Evidence from trading, service and investment companies in Indonesia. *Accounting*, *6*(5), 787-794

Sharifzadeh, M. (2010). Investment decision making and risk management in pension funds. Journal of Financial Services Marketing, 15(4), 322–336.

Sharpe, W. F. (1966). Mutual fund performance. *The Journal of Business, 39*(1), 119–138.

Smith, J. (2024). The future of global asset management. Harvard Business Review, 102(1), 56–67. Hakim, C. (2012). Research design: Strategies and choices in the design of social research. Routledge.

Smith, T., & Jones, R. (2021). Behavioral biases in investment decision making. Journal of Behavioral Finance, 22(1), 45–57.

Statistics, N. I. (2018). NISRA business plan.

Sutcliffe, C. (2021). A review of asset allocation strategies in pension funds. British Actuarial Journal, 26, e9. https://doi.org/10.1017/S135732172100005X

Tuckman, B., & Serrat, A. (2022). Fixed income securities: Tools for today's markets (4th ed.). Wiley.

UNCTAD. (2020). World investment report 2020: International production beyond the pandemic. United Nations Conference on Trade and Development. https://unctad.org

Vanwalleghem, D., & Mirowska, A. (2020). The investor that could and would: The effect of proactive personality on sustainable investment choice. *Journal of Behavioral and Experimental Finance*, *26*, 100313.

Véron, N., & Wolff, G. B. (2016). Capital Markets Union: a vision for the long term. *Journal of Financial Regulation*, *2*(1), 130-153.

Wachira, E. K. (2024). *Strategic Management Practices and Organizational Performance of Deposit Taking Savings and Credit Cooperative Societies in Nyeri County, Kenya* (Doctoral dissertation, Kenyatta University).

Wambua, j. M. (2024). *Prudential regulations and financial performance of deposit taking savings and credit cooperatives in nairobi city county, kenya* (doctoral dissertation, kenyatta university).

Wang, L., & Zhou, H. (2018). Risk assessment models for portfolio optimization. International Journal of Economics and Finance, 10(4), 89–101.

Whisman, M. A., & McClelland, G. H. (2005). Designing, testing, and interpreting interactions and moderator effects in family research. *Journal of family psychology*, *19*(1), 111.

White & Case LLP. (2022). Global mergers & acquisitions: 2022 annual report. https://www.whitecase.com/publications/insight/global-ma-report-2022

Wooldridge, J. M. (2019). *Introductory Econometrics: A Modern Approach* (7th ed.). Cengage Learning.

Zamara. (2022). *Retirement benefits industry report 2022*. Zamara Kenya. https://www.zamara.co.ke

Zhang, Y., Li, S., & Wang, P. (2020). Institutional ownership and firm value: Evidence from emerging markets. Journal of International Financial Markets, Institutions and Money, 65, 101–119.