

An econometric assessment of the institutional and systemic drivers of pension fund financial performance in an emerging Sub-Saharan economy, Kenya

Abstract

This research examines institutional and systemic drivers of pension fund financial performance in Kenya from 2012 to 2022. Based on Agency, Stakeholder, Modern Portfolio, and Arbitrage Pricing theories, the research used a mixed-methods design integrating primary survey data with secondary macroeconomic metrics. Linear regression and structural equation modeling indicate that governance mechanisms enhance financial returns, while strategic asset allocation partially mediates this relationship. Additionally, macroeconomic conditions significantly moderate final portfolio outcomes. These findings advance emerging market pension literature and provide actionable insights for fund managers, policymakers, and regulators aiming to optimize fund performance and long-term sustainability.

Keywords: corporate governance, financial performance, macroeconomic factors, investment strategy, strategic asset allocation, pension funds

Date of Submission: 12-10-2026

Date of Acceptance: 25-10-2026

I. Introduction

Pension funds constitute a critical pillar of Kenya's economy, accounting for approximately 13 percent of the country's Gross Domestic Product. Their performance has gained attention because of its impact on retirement income security and long-term financial stability. Despite recent regulatory reforms aimed at enhancing transparency and accountability, many pension schemes continue to underperform, posing significant risks to retirees' financial security. Corporate governance is an important way to reduce conflicts of interest and improve organizational performance. However, empirical evidence on its effect on pension fund performance remains mixed and context-dependent. Additionally, strategic asset allocation and economic conditions play a significant role in investment performance. This study therefore examined both the independent and combined effects of these factors on pension fund performance in Kenya, aiming to provide a clear framework for understanding their overall influence.

1.1 Corporate Governance

Corporate governance (CG) serves as a foundational pillar for organizational accountability, transparency, and stakeholder equity (Castrillón, 2021). In pension fund administration, governance structures delineate decision-making frameworks, fiduciary competencies, and oversight mechanisms necessary to protect beneficiary interests and sustain long-term retirement asset viability (Carmichael & Palacios, 2003). Historically, systemic governance failures such as those observed during the Asian financial crisis and the Enron collapse, demonstrate how weak oversight directly translates into catastrophic investment losses borne by beneficiaries. Although empirical evidence confirms that effective CG optimization correlates with superior fund performance and enhanced organizational outcomes (Ambachtsheer, 2001; Chen et al., 1986; Dallas, 2002; Iglesias & Palacios, 2000; Useem & Mitchell, 2000), persistent underperformance of fund indicate that governance structure is not the sole determinant of institutional performance.

1.2 Strategic asset allocation

Strategic asset allocation (SAA) functions as the primary mechanism for aligning investment portfolios with long-term objectives, risk tolerances, liquidity constraints, and prevailing market dynamics (Bilaus, 2010; Business Dictionary, 2018). Formulating a rigorous Investment Policy Statement (IPS) improves portfolio longevity and sustainability while driving investment performance (Tonks, 2006). To mitigate pervasive systemic threats, including inflation, market volatility, and agency conflicts (Obermann, 2005), global standard-setting bodies advocate for diversification, active-passive management blends, and international portfolio allocation (Urwin, 2010). However, the specific empirical relationship between these SAA practices and fund performance within emerging context, remains insufficiently examined.

1.3 Macroeconomic Factors

Macroeconomic factors, including GDP growth, inflation, interest rates, and exchange rates, fundamentally shape the financial structure of institutional portfolio management (Brinson et al., 2009; Sharan, 2009). Portfolio managers make asset allocation decisions based on these economic indicators to optimize risk-adjusted returns (Khaparde, 2014). Thus, increased macroeconomic volatility disrupts allocative efficiency and distorts investment behavior, destabilizing long-term financial planning and capital structures (Kahraman, 2011; Liu & Pang, 2009).

1.4 Pension Schemes in Kenya

Pension schemes are long-term social protection arrangements designed to provide income security during retirement, disability, or death through the accumulation and investment of contributions to generate future benefits (Business Dictionary, 2019). As major institutional investors, they play a vital role in supporting sustainable economic development by mobilizing long-term savings and channel capital into productive economic activities (Davis, 1995).

Pension schemes are classified as Defined Benefit (DB) or Defined Contribution (DC) plans, and may be structured as public, private, occupational, or personal arrangements. This study focuses on occupational pension schemes, which are employer-sponsored, trust-based arrangements that provide retirement benefits through either DB, DC, or provident fund structures (Bodie et al., 1988). Due to the inherent separation of ownership and control between beneficiaries and fund managers, the schemes are exposed to investment, funding, longevity, and agency risks. The retirement benefits industry in Kenya, which is regulated by the Retirement Benefits Authority, had amassed assets worth over KS. 1.58 trillion by 2022. Despite considerable regulatory reforms and growth in the pension industry, performance has been inconsistent and limited data exists concerning the main factors determining their performance.

1.5 Research Problem

Pension funds are important institutional investors because they mobilize long-term savings, provide retirement income, and contribute to capital-market development. Their ability to fulfil these functions depends not only on the availability of financial resources but also on the quality of governance, investment decision-making, and risk management. Agency Theory suggests that pension arrangements are particularly vulnerable to principal-agent problems because beneficiaries delegate investment and oversight responsibilities to trustees, fund managers, and other service providers who may possess greater information and different incentives. Weak monitoring, information asymmetry, and inadequate accountability can therefore affect the quality of investment decisions and, ultimately, fund performance. At the same time, Stakeholder Theory emphasizes the importance of relationships among trustees, beneficiaries, sponsors, regulators, and other stakeholders in sustaining effective governance and institutional accountability. These theoretical perspectives indicate that governance may influence pension-fund performance through both oversight mechanisms and the quality of investment decisions.

In Kenya, the importance of these issues has increased alongside the growth of occupational pension assets and the expanding role of pension funds in domestic financial markets. Although the Retirement Benefits Authority (RBA) provides a regulatory framework for the sector, pension schemes operate within a financial environment characterized by market concentration, liquidity constraints, regulatory investment limits, and periodic macroeconomic volatility. These conditions create challenges for strategic asset allocation (SAA), diversification, and risk management. Consequently, compliance with formal governance requirements does not necessarily imply that governance mechanisms operate with equal effectiveness in shaping investment decisions or financial performance. Understanding this distinction is particularly important in an emerging-market pension system where institutional and market conditions differ from those prevailing in the advanced economies that dominate much of the existing literature.

A further problem concerns limitations in the empirical literature. Existing studies have frequently examined corporate governance, investment strategy, and pension-fund performance as separate or loosely connected determinants. This approach provides limited insight into whether investment strategy constitutes a pathway through which governance is associated with performance. Similarly, relatively little attention has been given to whether macroeconomic conditions alter the relationship between governance and pension-fund performance. Modern Portfolio Theory provides a basis for understanding how governance may affect asset allocation, diversification, and risk–return trade-offs, while Arbitrage Pricing Theory highlights the relevance of systematic factors such as inflation, interest rates, exchange-rate movements, and broader market conditions. However, these perspectives have rarely been integrated within a single empirical framework for occupational pension funds in an emerging-market setting.

The resulting evidence gap limits understanding of how governance, SAA, and macroeconomic conditions jointly relate to pension-fund performance in Kenya. There is therefore a need for an integrated empirical investigation that examines governance as a multidimensional construct, evaluates SAA as a potential mediating

pathway, and assesses macroeconomic conditions as contextual factors that may moderate governance–performance relationships. Addressing this gap can provide evidence relevant to pension trustees, fund managers, regulators, and other institutional stakeholders concerned with improving long-term retirement-fund performance and resilience.

1.6 Research Objectives

The main objective of this study is to evaluate the relationship between the financial performance of occupational pension funds and the factors of corporate governance, strategic asset allocation, and macroeconomic conditions in Kenya from 2012-2022. Specifically, the study seeks to:

1. Examine the effect of CG on the market value of occupational pension funds.
2. Determine the moderating role of IS in the relationship between CG and the financial position of occupational pension funds.
3. Assess the influence of selected macroeconomic variables on the relationship between CG and the financial position of occupational pension funds.
4. Evaluate the combined effect of CG, IS, and macroeconomic factors on the financial position of occupational pension funds.

II. Theoretical Foundation of the Study

2.1 Agency Theory

Agency Theory of Jensen and Meckling (1976), conceptualizes organizations as contractual relationships between principals (owners or beneficiaries) and agents (managers or trustees), whose interests may diverge because of information asymmetry, limited rationality and risk appetite. A discrepancy between principals' and agents' interests results in agency conflicts and costs that may impair organizational performance. Thus, Agency theory states that governance practices diminish these conflicts. In concurrence, Eisenhardt (1989) argues for the use of good contracts to contain asymmetric information while, Jensen and Meckling (1976), as well as Maher and Andersson (2000) avow that enhanced governance structures improve organizational value through reduced agency costs.

Critics highlight substantial limitations within the Agency theory, specifically its narrowed focus on shareholder wealth maximization and its restricted external validity across varied institutional settings where governance effectiveness remains highly dependent upon localized legal traditions, capital market maturity, and cultural norms (Aguilera et al., 2008; Donaldson & Davis, 1991). Financial scholars nevertheless maintain that the theory retains great analytical value when applied to retirement institutions. Effective governance structures are thus essential for safeguarding beneficiary interests, mitigating information asymmetry, enforcing institutional accountability, and optimizing long-term portfolio performance of pension funds (Fan, 2004)

2.2 Stakeholder Theory

Stakeholder Theory, advanced by Freeman (1984), extends CG principles beyond shareholder wealth maximization by incorporating the interests of all parties affected by organizational activities. Its proponents argue that sustainable success depends on managing diverse stakeholder interests, with performance evaluated through value creation for multiple constituencies not simply for shareholders alone (Mayer, 1997). Besides, Donaldson and Preston (1995) argue that stakeholder expectations significantly influence organizational outcomes, making their engagement instrumental for long-term success. Pension funds are composed of numerous stakeholders including contributors, beneficiaries, trustees, fund managers, and regulatory bodies, all of whom have a vested interest in maintaining accountability, establishing legitimacy, and ensuring long-term viability. Critics of Stakeholder theory argue that the resulting uncertainty in managerial accountability causes managers to make suboptimal decisions due to the potential for conflict between competing interests (Friedman, 2007; Heath & Norman, 2004). Supporters advocate its benefits through promotion of greater organisational efficiency (Blair, 1995; Williamson, 1985). The theory thus, provides an useful framework for explaining effect of CG on pension fund performance.

2.3 Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT), developed by Markowitz (1952), provides an analytical foundation for strategic asset allocation based on investment risk and reward profiles. By focusing on the interrelationship between risk and return, MPT helps investors create an efficient portfolio through diversification of assets with imperfectly correlated returns, thereby maximizing expected returns for a given level of risk or minimizing risk for a given return.

MPT has important implications for pension funds, which must balance long-term return objectives with capital preservation to meet future obligations (Fabozzi, Brachwitz, 2011).. Diversification across asset classes helps manage both systematic (undiversifiable) risk and unsystematic risks (diversifiable), leading to improved

pension portfolio performance (Sharpe, 1964; Lintner, 1965). In this study, MPT links to Agency theory to explain how CG structures influence investment policies. Effective governance supports prudent asset allocation aligned with beneficiaries' risk–return preferences. Conversely, ineffective CG will result in pension funds having inadequate diversification, excessive concentration in a single investment or asset class, and poor financial performance. Thus, MPT adds value to the application of Agency theory as it provides a means of linking effective governance to investment decision-making in pension funds.

2.4 Arbitrage Pricing Theory (APT)

As outlined by Ross (1976), the Arbitrage Pricing Theory (APT) reveals that the expected returns of stocks are influenced by several different factors rather than a single market factor. The theory provides a multifactor framework in which asset prices reflect sensitivities to macroeconomic variables including GDP growth, inflation, and interest rates (Chen et al., 1986). APT suggests that while diversification can reduce their own risk (idiosyncratic risk), systematic risk arising from economy-wide shocks remains unavoidable, making macroeconomic conditions critical determinants of an investor's portfolio performance.

While theorists have criticized the APT for not providing specific guidelines on what factors to include when developing a model, and challenges related to model specification in addition to whether empirical evidence supports the model's claims (Huberman, 2005; Roll, 1977), APT continues to be a valuable conceptual framework for helping to explain return patterns. In this study, APT will serve as the theoretical basis for examining the relationship between corporate governance, strategic asset allocation, and the effect of macroeconomic conditions on the financial performance of pension funds in Kenya.

III. Empirical Literature Review

3.1 Corporate Governance and Pension Performance

Most empirical literature on CG and organizational performance has been carried out in the United States and other OECD economies where the existence of effective shareholder protection, legal system and board independence tends to be associated with a better valuation and performance of companies (Gompers et al., 2003; LaPorta et al., 2002; Lombardo & Pagano, 1999). Effective governance has also shown to influence better decision-making processes within pension funds which result in a superior investment performance through oversight, transparency and accountability (Besley & Prat, 2005; Mitchell & Yang, 2005; Zahra & Pearce, 1989). However, the governance–performance relationship remains inconclusive, with mixed findings due to varying methodological, contextual, and measurement differences (Renders et al., 2010).

Variations in the effects of board size, composition, and meeting frequency further contribute to the different results (Coles et al., 2008; Larcker et al., 2007). Although Kenyan studies report positive governance–performance associations (Njuguna, 2011; Lishenga, 2012; Mutegi, 2014), there is lack of studies investigating how the joined effect of governance, strategy allocation of assets and macro-economic environment impacts performance of pension funds.

3.2 Corporate Governance, Strategic asset allocation and Pension Performance

Empirical evidence shows that corporate governance (CG) significantly influences investment decision-making and pension fund performance. However, these studies vary across institutional setting. Khanna and Zyla (2012) found that in emerging markets, strong governance structures are associated with higher firm valuations and enhanced investor trust. Conversely, Useem and Mitchell (2000) found no evidence of a direct relationship between governance and performance. However, they did demonstrate that governance affects strategic asset allocation, which in turn affects positively the performance of pension funds.

Similarly, Camenisch and Eberhardt (2017) found a positive relationship between the quality of governance and asset allocation decisions among Swiss pension schemes. Additionally, Ambachtsheer et al. (1998) showed that effective governance facilitates the identification of profitable investments. Trustee board characteristics and regulatory frameworks also influence investment performance (Davis & Hu, 2008; Ippolito & Turner, 1987; Jackowicz & Kowalewski, 2012). However, there is limited empirical evidence regarding the combined effects of governance, strategic asset allocation, and fund performance, mainly in developing countries such as Kenya.

3.3 Corporate Governance, Macroeconomic factors and Pension Performance

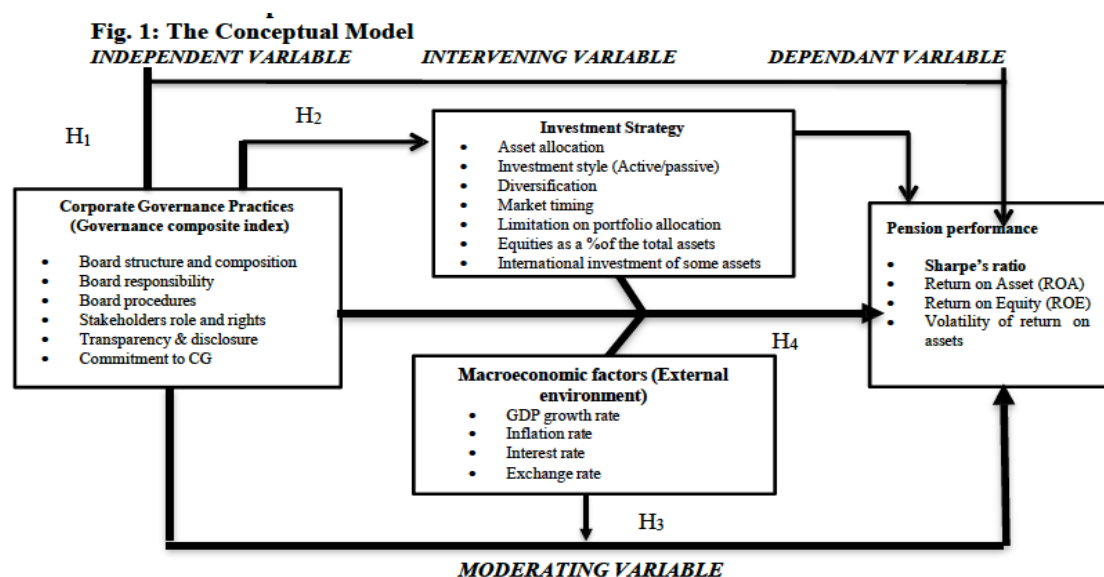
Empirical investigations of pension fund return variability have largely relied on indirect proof, as most studies focus on financial securities rather than directly researching pension funds. However, in both developed and emerging economies, evidence of research demonstrates that macroeconomic factors have a very strong impact on the performance of assets and the entire stock market. Researchers have identified gross national product, industrial production, and interest rates as key determinants of stock market returns (Black et al., 1997; Chen, 1991; Humpe & Macmillan, 2009; Kwon & Shin, 1999; Mukherjee & Yu, 1997).

Evidence in south Asia reveals that the impact of interest rate, the real exchange rate, the rate of inflation and the level of real output on the returns on stock differ across country due to differences in macro-economic transmission channels. The later creates further variances between the same macroeconomic variables with respect to their impact on stock market returns (Muhammad & Rasheed, 2002; Singh, 2010). In Kenya, studies by Ochieng and Oriwo (2012), Olweny and Omondi (2011), besides Wanjiku (2014) showed that macroeconomic indicators significantly influence both stock market and pension fund performance. However, within the current body of literature, researchers often do not link the study of macroeconomic conditions, corporate governance, and strategic asset allocation into an integrated conceptual framework. Thus, this is a major area for future research in regards to pension funds.

3.4 Empirical Evidence on the Joint Effect of CG, Strategic asset allocation and Macroeconomic Factors on Pension Performance

Research on the combined effects of corporate governance (CG), strategic asset allocation (IS), and macroeconomic factors on pension fund performance remains limited both across developed and developing countries. Existing studies frequently yield mixed and inconclusive results because these determinants are often examined independently, overlooking their potential interdependence and interaction effects. Such fragmented approaches may poorly explain the complex mechanisms through which these factors jointly influence pension fund outcomes. To address this gap, the present study adopts a multifactor analytical framework integrating CG, IS, and macroeconomic factors to explain the financial performance of occupational pension funds in Kenya.

3.5 The Conceptual Framework



Source. Author, 2025.

3.6 Hypotheses

The proposed study tested the below hypotheses in Kenya:

1. H₁: The structural strength of CG exerts a significant positive effect on the financial performance of occupational pension funds.
2. H₂: IS has significant intervening influence on the link between structural strength of CG financial position of occupational pension funds.
3. H₃: Macroeconomic shocks have significant moderating effect on the link between CG and pension-fund financial performance of occupational pension funds.
4. H₄: The joint effect of CG, IS and macroeconomic variables does significantly explain the variance in the financial position of occupational pension funds.

IV. Research Methodology

4.1 Research Design

The study adopted a mixed-methods research design integrating qualitative and quantitative approaches to examine determinants of pension fund performance in Kenya. The qualitative component employed interviews, structured questionnaires, and document reviews to assess and develop corporate governance (CG) and strategic

asset allocation indices. Quantitative analysis examined relationships among CG-Index, IS-index, macroeconomic variables, and pension fund performance indicators using descriptive, correlational, survey, and longitudinal techniques.

4.2 Population of the Study

The study used Cochran's (1963) formula with a 95% confidence level and 5% margin of error to randomly sample from a population of 1,306 RBA-registered pension funds as of 31 December 2022. The resulting sample comprised 73 schemes, consisting of 41 individual and 32 umbrella plans.

4.3 Data Integration and Construction of the Analytical Dataset

Primary and secondary data were integrated at the pension-scheme level using a unique scheme identifier to ensure consistent linkage across data sources. Primary data were used principally to measure scheme-level corporate governance characteristics and construct the Kenya Pension Fund Governance Index (KPGI), as well as measure the adoption of investment strategies and construct the ISI, while secondary data provided annual observations of financial performance and macroeconomic conditions for the period 2012–2022. This integration enabled institutional characteristics measured through field-based evidence to be linked systematically with longitudinal financial and economic observations.

The resulting analytical dataset combines relatively stable scheme-level institutional characteristics with time-varying financial and macroeconomic conditions. This distinction is methodologically important. The KPGI and ISI were measured during the fieldwork period and therefore represents a scheme-level institutional characteristic that were not repeatedly observed for each year of the study period. Financial-performance and macroeconomic variables, in contrast, vary over time and were observed annually. The empirical structure consequently treats governance quality as well as investment strategy as a relatively time-invariant scheme characteristics while allowing financial performance and macroeconomic conditions to vary across the 2012–2022 observation period.

The integration of these two forms of information constitutes an important methodological feature of the study. It enables the empirical analysis to assess whether differences in governance quality and adoption of effective investment strategies across pension schemes are systematically associated with differences in financial performance, while simultaneously accounting for changes in the broader economic and capital-market environment. The resulting structure is particularly appropriate for examining whether macroeconomic conditions condition the relationship between institutional governance characteristics, and financial outcomes, as well as whether strategic investment decisions provide an intervening mechanism in that relationship. The approach also enhances the analytical transferability of the study. Although the empirical sample is drawn exclusively from Kenya and therefore does not support statistical generalisation to pension funds globally, the underlying analytical framework is applicable to other emerging and frontier-market pension systems where institutional governance, investment constraints, financial-market development, and macroeconomic volatility jointly influence long-term investment outcomes. Thus, the Kenyan evidence provides context-specific empirical estimates while the integrated measurement and analytical approach offers a framework that can be adapted and tested in other institutional investment settings.

4.4 Data Collection

The study used both primary and secondary data comprising cross-sectional and time-series observations for the period 2012–2022, a phase characterized by significant pension sector reforms. Secondary data on pension fund assets, investment returns, Treasury bill rates, bond yields, stock market indices, inflation, GDP growth, and exchange rates were obtained from pension fund records, annual reports, the Central Bank of Kenya (CBK), Kenya National Bureau of Statistics (KNBS), and the Capital Markets Authority (CMA).

Primary data were collected through structured questionnaires administered to key pension stakeholders, including trustees, fund managers, administrators, custodians, and actuaries. These data were then used to construct the CG Index, a proxy for the effectiveness of governance mechanisms and IS Index, a composite measure that captures the extent and effectiveness of pension fund investment decisions applied in the empirical analysis.

4.5 Data Analysis

Data analysis was undertaken in sequential stages corresponding to the study's conceptual framework and research objectives. First, descriptive statistics were used to characterise the distribution and variability of pension-fund performance, corporate governance measures, strategic asset allocation variables, and macroeconomic conditions. Means, standard deviations, minimum and maximum values, frequency distributions, and coefficients of variation were examined to establish the characteristics of the analytical sample and identify patterns of dispersion and potential anomalies in the data.

Second, bivariate and multivariate analyses were conducted to examine the relationships among corporate governance, strategic asset allocation, macroeconomic conditions, and pension-fund performance. Pearson correlation analysis was used to assess the direction and strength of pairwise associations among the principal variables. Analysis of variance (ANOVA) was used where appropriate to assess differences in performance across relevant groups, while multiple regression procedures were employed to examine the joint relationship between the explanatory variables and pension-fund performance. The empirical model estimated in the study is specified as follows:

$$\text{Pension fund Financial Performance} = \alpha + \beta_1 \text{CG} + \beta_2 \text{IS} + \beta_3 \text{Macro} + \varepsilon$$

Where CG = Corporate Governance; IS = Investment Strategy; Macro = Macroeconomic Factors; and ε = Error term. In this specification, β_1 , β_2 , and β_3 represent the estimated coefficients capturing the individual effects of CG, IS, and macroeconomic factors on pension financial performance, respectively. These analyses provided the preliminary empirical basis for testing the study's hypotheses and specifying the subsequent longitudinal models. The principal empirical models were then estimated using the scheme-year longitudinal dataset.

A methodological consideration arose because the Kenya Pension Fund Governance Index (KPGI) and the investment strategy index (ISI) were measured at the scheme level during the fieldwork period and were therefore treated as time-invariant in the analytical dataset. A conventional fixed-effects model would absorb such a time-invariant variable and consequently prevent estimation of its coefficient. The study therefore employed a correlated random-effects (CRE) specification based on the Mundlak (1978) approach. Unlike the conventional random-effects model, the Mundlak approach permits correlation between observed explanatory variables and unobserved scheme-specific effects by incorporating scheme-level means of the time-varying covariates. The general CRE specification was expressed as:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \delta Z_i + \varphi_i + \varepsilon_{it}$$

where (Y_{it}) represents financial performance of scheme (i) in year (t); (X_{it}) denotes time-varying explanatory variables; (Z_i = KPGI/ISI) represents the scheme-specific means of the time-invariant included under the Mundlak transformation; where applicable; φ_i is the unobserved individual effects; and (ε_{it}) represents the idiosyncratic error term. Mundlak's framework models the unobserved heterogeneity φ_i as a linear function of the group means $\varphi_i = X_i\pi + v_i$. The CRE approach is particularly appropriate because it reconciles two requirements of the empirical analysis: controlling for unobserved scheme-level heterogeneity while retaining the ability to estimate the association between governance quality and financial performance when governance is not repeatedly measured over time. This is relevant to pension-fund research because governance structures are generally relatively persistent, whereas investment performance and macroeconomic conditions can change substantially from year to year.

To examine the conditions under which the governance–performance relationship varies and the mechanisms through which the variables are related, the analysis sequentially estimated moderation and mediation models. The moderation analysis assessed whether macroeconomic conditions, including fluctuations in key economic and capital-market indicators, altered the strength of the association between governance quality and pension-fund financial performance. The mediation analysis, in turn, examined whether strategic asset allocation and investment decisions provided an intervening pathway linking governance quality with fund performance. Taken together, these models enabled the study to move beyond the estimation of direct associations by assessing both the conditional nature of the governance–performance relationship and the extent to which investment strategy may serve as a transmission mechanism between governance characteristics and pension-fund outcomes.

For the mediation analysis, strategic asset allocation was operationalised using the Investment Strategy Index (ISI), capturing the scheme's asset-allocation practices and investment risk posture. The analysis examined whether CG was associated with the ISI and whether the ISI was subsequently associated with financial performance. Moderation analysis assessed whether macroeconomic conditions altered the magnitude or direction of the CG–performance relationship. Interaction terms between governance measures and selected macroeconomic variables were introduced into nested regression specifications. The statistical significance and direction of these interaction terms were examined to determine whether the governance–performance association varied across economic and capital-market conditions. Changes in (R^2) across nested models were also evaluated to assess the incremental explanatory contribution of macroeconomic variables and their interactions.

Because governance and investment-strategy measures were relatively persistent and were not repeatedly observed at the scheme level, correlated random-effects (CRE) estimation based on the Mundlak (1978) specification was employed. This approach accommodates correlation between observed covariates and unobserved scheme-specific heterogeneity while retaining coefficients for variables that are effectively time-invariant. Cluster-robust standard errors at the pension-scheme level were used to account for heteroskedasticity and within-scheme dependence over time. Accordingly, estimated coefficients are interpreted as conditional associations and empirical pathways rather than experimental causal effects.

V. Findings

5.1. Path Analysis/Stepwise Regression Analysis

5.1.1. Step 1: Testing the effect of CG indicators on the combined ROI of pension funds.

Table 1. Model Summary of effect of CG on the combined ROI of pension funds in Kenya (Model Summary (Y= $\alpha_0 + \beta_1 X_1 + \epsilon$))

Model	R	R-squared	Adjusted R-squared	Std. Error of the Estimate	Change Statistics					
					R square change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.602a	.362	.271	43.63799	.362	3.977	7	49	.002	1.993

a. Predictors: (Constant), Stakeholders' interests in board decisions, Board structure and composition, Commitment to Corporate Governance, Shareholders' Rights, Role of stakeholders, Disclosure and transparency, Board Responsibilities..

b. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025).

Consistent with the mediation procedure of Baron and Kenny (1986), the first step was to establish whether CG significantly predicts pension fund ROI in the absence of the mediating variable, the IS-Index. The results presented in Table 1 indicate moderate explanatory power, with an R^2 of 0.362 and an adjusted R^2 of 0.271, suggesting that CG dimensions jointly account for 36.2% of the variation in ROI. According to Srinivasan's (2020) criteria, this represents moderate explanatory strength. The findings therefore confirm a statistically significant direct effect of CG on ROI, satisfying the first condition for mediation. Nonetheless, the substantial unexplained variance (63.8%) indicates that additional institutional, strategic, and macroeconomic factors may also influence pension fund performance.

Table 2. ANOVA of the relationship between CG and the combined ROI of pension funds

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	53017.341	7	7573.906	3.977	0.002
Residual	93309.450	49	1904.274		
Total	146326.791	56			

a. Dependent Variable: Combined ROI of pension funds.

b. Predictors: (Constant), Stakeholders' interests in board decisions, Board structure and composition, Commitment to Corporate governance, Shareholders' Rights, Role of stakeholders, Disclosure and transparency, Board responsibilities

Source: Author's primary analysis (2025)

The ANOVA results indicate that the overall regression model is statistically significant, $F(7, 49) = 3.977$, $p < .05$, showing that CG indicators jointly explain a significant proportion of the variation in the combined ROI of pension funds. This finding confirms the existence of a significant baseline relationship between CG and financial performance. Consistent with the mediation framework proposed by Baron and Kenny (1986), the result satisfies the first condition for mediation by establishing a significant direct effect of the independent variable prior to the inclusion of the mediating variable (IS-Index). Nevertheless, the findings suggest that other institutional, strategic, and macroeconomic factors may also contribute to pension fund performance beyond the variables included in the model.

Table 3. Coefficient of the relationship between corporate governance and the combined ROI of pension funds

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	Correlations		Collinearity Statistics		
	B	Std. Error	Beta	t		Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-35.689	22.902		-1.558	.126					
1 Board structure and composition	53.518	69.951	.256	.765	.448	.366	.109	.087	.116	8.621
Board responsibilities	-66.058	54.893	-.326	-1.203	.235	.245	-.169	-.137	.178	5.631

Shareholder's Rights	-15.084	25.867	-.075	-.583	.562	-.170	-.083	-.067	.792	1.263
Disclosure and transparency	46.419	43.249	.230	1.073	.288	.302	.152	.122	.283	3.538
Commitment to Corporate governance	-9.610	15.185	-.074	-.633	.530	-.133	-.090	-.072	.959	1.043
Role of stakeholders	95.770	32.643	.421	2.934	.005	.539	.387	.335	.632	1.582
Stakeholders' interests in board decisions	25.162	20.104	.147	1.252	.217	.200	.176	.143	.945	1.058

Source: Author's primary analysis (2025).

The coefficient estimates presented in Table 3 reveal that the Role of Stakeholders (RS) is the only CG dimension exerting a statistically significant effect on the combined ROI of pension funds ($t = 2.934$, $p < .005$). The positive coefficient suggests that greater stakeholder participation enhances financial performance, supporting Stakeholder Theory advanced by Freeman (1984), which argues that organizational outcomes improve when stakeholder interests are effectively integrated into decision-making processes. Although the remaining CG variables exhibited either positive or negative coefficients, none were statistically significant ($p > .05$). Nevertheless, the overall model remained significant, $F(7, 49) = 3.977$, $p < .05$, indicating that CG indicators collectively explain variations in ROI and provide a suitable basis for subsequent mediation analysis. Given that RS was the only significant predictor, a parsimonious model of pension fund performance can be expressed as a function of stakeholder participation, while the full regression specification incorporates all CG dimensions to capture their collective influence on ROI.

5.1.2. Step 2: Testing the relationship between CG indicators and strategic asset allocation

Table 4. Model summary ($Me = a_0 + \beta_1 X_1 + \varepsilon$)

Model	R	R-squared	Adjusted R-squared	Std. Error of the Estimate	R-squared change	Change Statistics				Durbin-Watson
						F-Change	df ₁	df ₂	Sig. F-Change	
1	.955a	.911	.899	5.57871	.911	71.819	7	49	<.001	1.441

a. Predictors: (Constant), Stakeholders' interests in board decisions, Board structure and composition, Commitment to Corporate governance, Shareholders' Rights, Role of stakeholders, Disclosure and transparency, Board Responsibilities.

b. Dependent Variable: IS Index.

Source: Author's primary analysis (2025).

The results presented in Table 4 indicate that the regression model possesses substantial explanatory power, with an R^2 of 0.911 and an adjusted R^2 of 0.899. These values imply that approximately 91.1% of the variation in the Investment Strategy (IS) Index is jointly explained by the CG indicators included in the model. Consistent with the mediation procedure proposed by Baron and Kenny (1986), this finding satisfies the second condition for mediation by demonstrating that the independent variable significantly predicts the mediator. The high explanatory power of the model suggests that governance mechanisms, including board structure, disclosure and transparency practices, and stakeholder participation, play a critical role in shaping strategic asset allocation decisions within pension funds. Consequently, the results provide strong empirical justification for proceeding to the third stage of the mediation analysis, where the IS Index is incorporated into the regression model to assess its influence on return on investment (ROI) and determine whether the mediation effect is partial or full.

Table 5. ANOVA of the relationship between CG indicators and the IS index

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	13.921	7	.560	71.819	<.001b
1 Residual	.382	49	.008		
Total	4.304	56			

a. Dependent Variable: IS Index

b. Predictors: (Constant), Stakeholders' interests in board decisions, Board structure and composition, Commitment to Corporate governance, Shareholders' Rights, Role of stakeholders, Disclosure and transparency, Board Responsibilities.

Source: Author's primary analysis (2025).

The results in the ANOVA Table 5 show that the overall model is statistically significant $F(7, 49) = 71.819$, $p < .001$), meaning the combination of governance predictors effectively predicts the mediator (IS Index).

Table 6. Coefficients of IS index and CG indicators model

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t		Zero-order	Partial	Part	Tolerance	VIF
(Constant)	-.181	.046		3.906	<.001					
Board structure and composition	.712	.142	.629	5.032	<.001	.944	.584	.214	.116	8.621
Board responsibilities	.200	.111	.182	1.802	.078	.884	.249	.077	.178	5.631
Shareholders' rights	.032	.052	.029	.614	.542	.082	.087	.026	.792	1.263
Disclosure and transparency	.121	.088	.111	1.382	.173	.810	.194	.059	.283	3.538
Commitment to corporate governance	-.034	.031	-.047	1.092	.280	-.007	-.154	-.046	.959	1.043
Role of stakeholders	.142	.066	.115	2.143	.037	.559	.293	.091	.632	1.582
Stakeholder interests in board decisions	-.017	.041	-.018	-.410	.683	-.014	-.059	-.017	.945	1.058

Source. Author's primary analysis (2025).

The results presented in Table 6 reveal that only two corporate governance (CG) indicators exerted statistically significant influences on the Investment Strategy (IS) Index. Board Structure and Composition (BS&C) demonstrated a strong positive effect ($t = 5.032$, $p < .001$), indicating that effective board structures are instrumental in guiding strategic asset allocation decisions. Similarly, the Role of Stakeholders (RS) exhibited a positive and significant relationship with the IS Index ($t = 2.143$, $p < .05$), suggesting that active stakeholder involvement contributes to the development of sound investment strategies. In contrast, the remaining CG dimensions did not demonstrate statistically significant effects on the IS Index. Accordingly, only BS&C and RS satisfied the second mediation condition outlined by Baron and Kenny (1986), thereby providing empirical justification for advancing to the third stage of the mediation analysis.

IS Index = -0.181 + 0.712(BS&C) + 0.200(BR) + 0.032(SR) + 0.121(D&T) - 0.034(CCG) + 0.142(RS) - 0.017(SIBD)

5.1.3. Step three: Testing the relationship between combined ROI of pension funds and strategic asset allocation (IS Index)

Table 7. Model summary ($Y = a_0 + \beta_2 Me + \epsilon$)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change	Durbin-Watson
						F Change	df1	df2		
1	.429a	.184	.169	46.59898	.184	12.386	1	55	<.001	2.160

a. Predictors: (Constant), IS Index.

b. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025).

In the third stage of the mediation analysis, combined ROI of pension funds was regressed on the mediating variable, the Investment Strategy (IS) Index, to assess the explanatory contribution of the IS Index to the dependent variable. The results in Table 7 show that the model yielded an R^2 of 0.184 and an adjusted R^2 of 0.169, indicating weak explanatory power based on Srinivasan's (2020) criteria. This suggests that the IS Index accounts for 18.4% of the variation in pension fund ROI, implying a modest influence of strategic asset allocation

on financial performance. Despite its limited explanatory strength, the model provides a basis for determining whether the mediation effect is partial or full in the subsequent analytical step.

Table 8. ANOVA of the relationship between combined ROI of pension funds and IS Index

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	26,896.217	1	26,896.217	12.386	<.001 ^b
Residual	119,430.574	55	2171.465		
Total	146,326.791	56			

a. Dependent Variable: Combined ROI of pension funds.

b. Predictors: (Constant), IS Index.

Source: Author's primary analysis (2025).

The overall significance of the regression model was assessed using the F-statistic, which yielded a value of 12.386 with degrees of freedom (df = 1, 55) and a p-value < .001. This indicates that the model is statistically significant and, therefore, reliably predicts the combined ROI of pension funds, thereby satisfying the first condition required for testing mediation.

Table 9. Coefficients of Combined ROI of pension funds and IS Index: Predictor Impact

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.	Correlations	
		B	Std. Error	Beta	t		Zero-order	Partial Part
1	(Constant)	-7.084	12.842		-.553	.583		
	IS Index	79.179	22.455	.429	3.526	<.001	.429	.429 .429

a. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025).

The regression coefficient results presented in Table 9 indicate that the IS-Index exerts a statistically significant effect on the combined ROI of pension funds ($t = 3.526$, $p < .001$), confirming that the mediator significantly predicts the dependent variable. The estimated regression equation is: **Combined ROI of pension funds = -7.084 + 79.179 IS-Index.**

The results provide evidence consistent with a partial mediating pathway involving strategic asset allocation, although the evidence should not be interpreted as definitive causal mediation. The IS Index was positively associated with combined ROI when considered alone ($B = 79.179$, $t = 3.526$, $p < .001$); however, its coefficient became statistically nonsignificant at the 5% level after the governance variables were included simultaneously ($B = 128.119$, $t = 1.860$, $p = .069$). This results suggests evidence of an empirical pathway rather than conclusive proof of mediation. A formal indirect-effect test, such as bootstrap confidence intervals for the indirect effect, would provide stronger evidence.

Consistent with Baron and Kenny's (1986) mediation framework, the first three conditions for mediation were satisfied, as CG indicators significantly influenced ROI in Step 1, significantly predicted the IS-Index in Step 2, and the IS-Index significantly predicted ROI in Step 3. Accordingly, the analysis proceeds to the final stage to determine whether the mediation effect is partial or full in explaining the relationship between CG and pension fund performance.

5.1.4. Step four of testing the relationship between Combined ROI of pension funds, CG indicators and IS Index

Table 10. Model summary ($Y = a_0 + \beta_2 Me + \beta_1 X_1 + \epsilon$)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R square change	Change Statistics			
						F Change	df1	df2	Sig. F change
1	.637a	.405	.306	42.582	.405	4.087	8	48	$p < 0.001$

a. Predictors: (Constant), IS INDEX, Commitment to Corporate governance, Stakeholders' interests in board decisions, Shareholders' Rights, Role of stakeholders, Disclosure and transparency, Board Responsibilities, Board Structure and Composition.

b. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025).

The results of Step Four of the mediation analysis indicate that the integrated governance–investment model explained 40.5% of the variation in ROI ($R^2 = .405$, adjusted $R^2 = .306$) and was statistically significant,

$F(8, 48) = 4.087, p < .001$). This reflects a moderate explanatory power according to Srinivasan's (2020) criteria. The inclusion of the IS-Index in the regression model confirms its mediating role, indicating that part of the influence of CG on pension fund performance is transmitted through strategic asset allocation decisions.

Table 11: ANOVA of the relationship between Combined ROI of pension funds, CG indicators, and strategic asset allocation (IS-Index)

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	59,291.006	8	7,411.376	4.087	<.001b
1	Residual	87,035.785	48	1,813.246		
	Total	146,326.791	56			

a. Predictors: (Constant), IS INDEX, Commitment to Corporate governance, Stakeholders' interests in board decisions, Shareholders' Rights, Role of stakeholders, Disclosure and transparency, Board Responsibilities, Board Structure and Composition.

b. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025).

The ANOVA results (Table 11) show that the overall regression model is statistically significant, meaning the predictors collectively have a significant impact on the dependent variable. Consequently, it significantly predicts the combined ROI of pension funds.

Table 12. Coefficients of Combined ROI of pension funds, CG indicators and strategic asset allocation (IS Index), the Predictor Impact

Model	Unstandardized Coefficients		Standardized Coefficients			Correlations		
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
1 (Constant)	-12.490	25.593		-.488	.628			
Board structure and composition	-37.750	84.064	-.181	-.449	.655	.366	-.065	-.050
Board Responsibilities	-91.704	55.311	-.452	-1.658	.104	.245	-.233	-.185
Shareholder's Rights	-19.205	25.338	-.095	-.758	.452	-.170	-.109	-.084
Disclosure and transparency	30.918	43.017	.153	.719	.476	.302	.103	.080
Commitment to Corporate governance	-5.311	14.996	-.041	-.354	.725	-.133	-.051	-.039
Role of stakeholders	77.630	33.312	.341	2.330	.024	.539	.319	.259
Stakeholders interests in board decisions	27.301	19.652	.159	1.389	.171	.200	.197	.155
IS Index	128.119	68.878	.695	1.860	.069	.429	.259	.207

a. Dependent Variable: Combined ROI of pension funds.

b. Independent variables: CG dimensions and IS Index

Source: Author's primary analysis (2025)

Table 12 presents the regression coefficients for individual predictors of Combined ROI. Role of Stakeholders remained significant ($B = 77.630, \beta = .341, t = 2.330, p = .024$), whereas the IS Index was positive but not statistically significant at the 5% level ($B = 128.119, \beta = .695, t = 1.860, p = .069$). The role of stakeholders therefore strongly drives positive outcomes or performance in this model. While IS Index narrowly misses the strict 5% significance threshold, its high standardized coefficient ($\beta = 0.695$) suggests it is a powerful real-world contributor to the model's outcome. The results are therefore consistent with, but do not definitively establish, a partial mediation pathway. The evidence is therefore consistent with a partial mediating pathway

For Disclosure and Transparency ($B = 30.918, p = 0.476$), and Stakeholders' Interests in Board Decisions ($B = 27.301, p = 0.171$), both point toward a positive relationship but, their high p-values indicate that one cannot statistically confirm their independent influence within this specific sample. The negative and statistically non-significant predictors of Board Structure and Composition ($B = -37.750, p = 0.655$), Board Responsibilities ($B = -91.704, t = -1.658, p = 0.104$), Shareholder's Rights ($B = -19.205, p = 0.452$), and Commitment to Corporate Governance ($B = -5.311, p = 0.725$) show negative coefficients, meaning higher levels are associated with a decrease in the dependent variable. However, because none of their p-values cross the significance threshold, these negative relationships could simply be due to random variation in the data.

The predictor model accounting for significance levels is specified below:

$$\text{Combined ROI of pension funds} = -12.490 - 37.750 \text{ BS\&C} - 91.704 \text{ BR} - 19.205 \text{ SR} + 30.918 \text{ D\&T} - 5.311 \text{ CCG} + 77.630 \text{ RS} + 27.301 \text{ SIBD} + 128.119 \text{ ISI}$$

5.2. The Stepwise Analysis of the Moderating Effect of Macroeconomic Variables on the Relationship between CG Indicators and the Combined ROI of Pension Funds

Table 13. Model summary of the effect of inclusion of interaction terms of macroeconomic variables on the relationship between CG indicators and the combined ROI of pension funds

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change	Durbin-Watson
						F Change	df1	df2		
.539a	.290	.277	.277	43.45326	.290	22.496	1	55	<.001	
.603b	.363	.340	.340	41.53071	.073	6.210	1	54	.016	
.662c	.438	.407	.407	39.37951	.075	7.061	1	53	.010	
.713d	.509	.471	.471	37.18350	.070	7.445	1	52	.009	1.964

a. Predictors: (Constant), Role of stakeholders (RS).

b. Predictors: (Constant), RS, NSE 20 Share Index.

c. Predictors: (Constant), RS, NSE 20 Share Index, Inflation (%).

d. Predictors: (Constant), RS, NSE 20 Share Index, Inflation (%), GDP Growth Rate (%).

e. Dependent Variable: the combined ROI of pension funds.

Source. Author's primary analysis (2025).

The results presented in Table 13 show that the inclusion of interaction terms significantly enhanced the explanatory power of the regression models. The R² change values indicate that the interaction effects contributed an additional 7.3% of explained variance in Model 2, 7.5% in Model 3, and 7.0% in Model 4. These improvements are attributable to the moderating influences of the NSE 20 Share Index, inflation rate, and GDP growth rate, respectively. The corresponding Sig. F Change values were all statistically significant ($p < .05$), confirming meaningful improvements in model fit. These results demonstrate incremental explanatory associations between the macroeconomic variables and pension-fund ROI. They do not, by themselves, establish moderation because the reported models do not include CG $\times$ macroeconomic interaction terms. This however, serves as a proxy for moderation. This implies that the effectiveness of governance mechanisms varies with changes in market conditions, inflationary pressures, and economic growth dynamics.

Table 14. ANOVA of the moderating effect of macroeconomic variables on the relationship between CG indicators and the combined ROI of pension funds

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42,476.570	1	42,476.570	22.496	<.001b
	Residual	103,850.221	55	1,888.186		
	Total	146,326.791	56			
2	Regression	53,187.612	2	26,593.806	15.418	<.001c
	Residual	93,139.180	54	1,724.800		
	Total	146,326.791	56			
3	Regression	64,137.277	3	21,379.092	13.786	<.001d
	Residual	82,189.514	53	1,550.746		
	Total	146,326.791	56			
4	Regression	74,430.932	4	18,607.733	13.458	<.001e
	Residual	71,895.860	52	1,382.613		
	Total	146,326.791	56			

a. Dependent Variable: the combined ROI of pension funds.

b. Predictors: (Constant), Role of stakeholders (RS)

c. Predictors: (Constant), RS, NSE 20 Share Index.

d. Predictors: (Constant), RS, NSE 20 Share Index, Inflation (%).

e. Predictors: (Constant), RS, NSE 20 Share Index, Inflation (%), GDP Growth Rate (%).

Source: Author's primary analysis (2025).

ANOVA results presented in Table 14 indicate that all four regression models are statistically significant at $\alpha = .01$ ($p < .001$), confirming their suitability for predicting the combined ROI of pension funds. Specifically, Model 1 was significant, $F(1, 55) = 22.496$, $p < .001$; Model 2, $F(2, 54) = 15.418$, $p < .001$; Model 3, $F(3, 53) = 13.786$, $p < .001$; and Model 4, $F(4, 52) = 13.458$, $p < .001$. These findings demonstrate that the inclusion of additional predictors progressively improves the explanatory power of the regression models for explaining pension fund performance. Collectively, the results confirm that the incorporation of macroeconomic variables significantly enhances the predictive capacity of the governance–performance models.

6. Regression Analysis of the Moderating Effect of Macroeconomic Variables on the Relationship Between CG Indicators and the Combined ROI of Pension Funds

Table 15: Model summary of the moderating effect of macroeconomic variables on the relationship between CG indicators and the combined ROI of pension funds

Model	R	R-squared	Adjusted R-squared	Standard Error of the Estimate	R-squared Change	Change Statistics				Significance F	Durbin-Watson
						F Change	df1	df2			
1	.885a	.784	.705	27.77042	.784	9.916	15	41		<.001	1.457

Notes: a. Predictors: (Constant), Unemployment rate, Shareholders' Rights, Board structure and composition, Commitment to corporate governance, Stakeholders' interests in board decisions, GDP Growth Rate (%), Role of stakeholders, balance of payments, Inflation (%), Exchange rate (KS/US\$), Disclosure and transparency, commercial banks weighted average lending interest rates (%), board responsibilities, CBK 91-Day T-Bill, NSE 20 Share Index

b. Dependent Variable: the combined ROI of pension funds

Source: Author's primary analysis (2025).

The findings in Table 15 show that the full regression model (Model 5), which incorporates all CG indicators alongside macroeconomic variables, attained an R^2 of 0.784 and an adjusted R^2 of 0.705. According to Srinivasan (2020) criteria, these values indicate strong explanatory power, suggesting that 78.4% of the variation in pension fund return on investment (ROI) is jointly explained by the included predictors. In comparison, the stepwise model (Model 4) accounted for 50.9% of the variance ($R^2 = 0.509$). The increase in explanatory power (change in $R^2 = 0.274$) demonstrates that integrating governance and macroeconomic factors substantially enhances model fit and predictive accuracy.

Table 16: ANOVA of the relationship between Combined ROI of pension funds, CG indicators and macroeconomic variables

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	114,707.750	15	7647.183	9.916	<.001b
1	Residual	31,619.041	41	771.196		
	Total	146,326.791	56			

Notes: a. Dependent Variable: the combined ROI of pension funds

b. Predictors: (Constant), Unemployment rate, Shareholder's Rights, Board structure and composition, Commitment to Corporate governance, Stakeholders' interests in board decisions, GDP Growth Rate (%), Role of stakeholders, Balance of Payments, Inflation (%), Exchange rate (KS/US\$), Disclosure and transparency, Commercial Banks weighted average lending interest rates (%), Board Responsibilities, CBK 91-Day T-Bill, NSE 20 Share Index

Source: Author's primary analysis (2025).

In the context of the Baron and Kenny (1986) mediation framework, the ANOVA results for Table 16 indicate that the overall regression model is statistically significant at $\alpha = .01$, with $F(15, 41) = 9.916$, $p < .001$. This confirms that the set of predictors included in the model collectively explains a significant proportion of the variance in the combined ROI of pension funds. Therefore, the model provides adequate explanatory power for proceeding with the interpretation of individual regression coefficients within the mediation analysis.

Table 17: The predictor impact of individual factors, the Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		VIF
	B	Std. Error	Beta	t	Sig.	Tolerance	
Constant	3765.447	1340.057		2.810	.008		
Board structure and composition	65.836	45.846	.315	1.436	.159	.109	9.144
Board Responsibilities	-59.126	36.245	-.292	1.631	.110	.165	6.062
Shareholder's Rights	-16.420	16.824	-.081	-.976	.335	.758	1.319
Disclosure and transparency	5.267	29.363	.026	.179	.859	.248	4.027
Commitment to Corporate Governance	2.280	10.412	.017	.219	.828	.826	1.211
Role of stakeholders	50.620	22.231	.222	2.277	.028	.552	1.812
Stakeholders' interests in board decisions	11.292	13.372	.066	.844	.403	.865	1.156
1 GDP Growth Rate (%)	39.113	20.035	.508	1.952	.058	.078	12.840
Inflation (%)	-298.125	43.908	-3.253	6.790	<.001	.023	43.558
Exchange rate (KS/US\$)	-142.011	23.363	-8.710	6.079	<.001	.003	389.578
Commercial Banks weighted average lending interest rates	248.618	42.849	4.680	5.802	<.001	.008	123.432
CBK 91-Day T Bill	1477.433	298.888	8.259	4.943	<.001	.002	529.691
Balance of Payments	-8066.328	1354.306	-4.534	5.956	<.001	.009	109.930
NSE 20 Share Index	-2.087	.365	-16.670	5.713	<.001	.001	1615.517
Unemployment rate	-73.318	78.120	-.604	-.939	.353	.013	78.659

Source: Author's primary analysis (2025).

The regression results presented in Table 17 indicate the existence of both positive and negative determinants of pension fund performance. Among the CG indicators, only the Role of Stakeholders (RS) exerted a statistically significant positive influence on the combined ROI of pension funds ($t = 2.277$, $p < .05$), suggesting that greater stakeholder participation enhances accountability, oversight, and investment decision-making. Regarding macroeconomic factors, inflation, exchange rates, balance of payments, and the NSE 20 Share Index exhibited significant negative effects on ROI ($p < .001$), whereas commercial banks' weighted average lending rates and the Central Bank of Kenya 91-day Treasury bill rate demonstrated significant positive effects, indicating that higher returns on interest-bearing investments improve pension fund performance. GDP ($t = 1.952$, $p = .058$) and Unemployment rate ($t = -.939$, $p = .353$) are not statistically significant at the 5% level. The results show VIFs are extremely high for several macroeconomic variables indicating severe multicollinearity. This suggests that the significant coefficients, for the independent economic effects could be described as conditional association after controlling for the other variables in the specification.

Model: Moderating effect of macroeconomic factors

$$\text{Combined ROI of Pension Funds} = 3765.447 + 65.836\text{BS\&R} - 59.126\text{BR} - 16.420\text{SR} + 5.267\text{D\&T} + 2.280\text{CCG} + 50.620\text{RS} + 11.292\text{SIBD} + 39.113\text{GDP} - 298.125\text{IR} - 142.011\text{ER(KSh/US\$)} + 248.618\text{CBWALI} + 1477.433\text{CBK91-Day T-Bill} - 8066.328\text{BP} - 2.087\text{NSE20} - 73.318\text{UR}$$

7. The Joint Effect of CG indicators, IS Index and Macroeconomic Variables on the Combined ROI of Pension Funds

Table 18. Model summary of the joint effect of CG indicators, IS Index and macroeconomic variables on the combined ROI of pension funds

Model	R	R-squared	Adjusted R Square	Std. Error of the Estimate	R square change	Change Statistics				Durbin-Watson
						F Change	df1	df2	Sig. F change	
1	.907a	.822	.751	25.49247	.822	11.573	16	40	<.001	1.438

Notes. a. Predictors: (Constant), Unemployment rate, Shareholder's Rights, Board structure and composition, Commitment to Corporate Governance, Stakeholders' interests in board decisions, GDP Growth Rate (%), Role of stakeholders, Balance of Payments, Inflation (%), Exchange rate (KS/US\$), Disclosure and transparency, Commercial Banks weighted average lending interest rates (%), Board Responsibilities, IS Index, CBK 91-Day T-Bill, NSE 20 Share Index.

b. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025)

The results presented in Table 18 show that the overall regression model achieved a coefficient of determination (R^2) of 0.822 and an adjusted R^2 of 0.751, indicating a strong model fit. This suggests that 82.2% of the variation in the combined ROI of pension funds is explained by the linear combination of CG indicators, the IS Index, and macroeconomic factors included in the model. The relatively high adjusted R^2 further confirms that the explanatory power of the model remains substantial even after accounting for the number of predictors, thereby supporting the robustness of the regression specification.

Table 19. The ANOVA of the joint effect of CG indicators, IS Index and macroeconomic variables on the combined ROI of pension funds

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	120332.160	16	7520.760	11.573	<.001b
1	Residual	25994.631	40	649.866		
	Total	146326.791	56			

Notes: a. Dependent Variable: Combined ROI of pension funds.

b. Predictors: (Constant), Unemployment rate, Shareholder's Rights, Board structure and composition, Commitment to Corporate governance, Stakeholders' interests in board decisions, GDP Growth Rate (%), Role of stakeholders, Balance of Payments, Inflation (%), Exchange rate (KS/US\$), Disclosure and transparency, Commercial Banks weighted average lending interest rates (%), Board Responsibilities, IS Index, CBK 91-Day T-Bill, NSE 20 Share Index.

Source: Author's primary analysis (2025).

The ANOVA results presented in Table 19 indicate that the overall regression model is statistically significant at the 1% level. The F-statistic of $F(16, 40) = 11.573$ with a p-value < 0.001 demonstrates that the model is jointly significant. This confirms that the set of predictor variables collectively provides a statistically significant explanation of variations in the combined ROI of RBA-registered pension funds, indicating strong overall explanatory power.

Table 20. Coefficients of the Joint Effect of CG indicators, IS Index and Macroeconomic Variables on the combined ROI of pension funds

		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part Correlation	Tolerance	VIF
1	(Constant)	3516.697	1233.038		2.852	.007					
	Board structure and composition	-20.829	51.371	-.100	-.405	.687	.366	-.064	-.027	.073	13.624
	Board responsibilities	-86.814	34.577	-.428	-2.511	.016	.245	-.369	-.167	.153	6.547
	Shareholders' Rights	-22.141	15.566	-.110	-1.422	.163	-.170	-.219	-.095	.746	1.340
	Disclosure and transparency	-8.190	27.340	-.041	-.300	.766	.302	-.047	-.020	.241	4.143
	Commitment to corporate governance	8.100	9.760	.062	.830	.412	-.133	.130	.055	.792	1.262
	Role of Stakeholders	33.588	21.213	.148	1.583	.121	.539	.243	.106	.511	1.957

Stakeholders' interests in board decisions	12.120	12.278	.071	.987	.330	.200	.154	.066	.865	1.156
IS Index	127.791	43.438	.693	2.942	.005	.429	.422	.196	.080	12.495
GDP growth rate (%)	37.243	18.402	.484	2.024	.050	-.038	.305	.135	.078	12.855
Inflation (%)	-287.343	40.473	-3.136	-7.100	<.001	-.227	-.747	-.473	.023	43.918
Exchange rate (KS/US\$)	-135.784	21.551	-8.328	-6.301	<.001	-.272	-.706	-.420	.003	393.373
Commercial banks weighted average lending interest rates	239.778	39.449	4.513	6.078	<.001	.155	.693	.405	.008	124.152
CBK 91-Day T-Bill	1428.483	274.875	7.985	5.197	<.001	.258	.635	.346	.002	531.639
Balance of Payments	-7594.110	1253.534	-4.268	-6.058	<.001	.110	-.692	-.404	.009	111.763
NSE 20-Share Index	-2.001	.337	-15.988	-5.947	<.001	.297	-.685	-.396	.001	1627.602
Unemployment rate	-58.870	71.880	-.485	-.819	.418	-.159	-.128	-.055	.013	79.028

Note: a. Dependent Variable: Combined ROI of pension funds.

Source: Author's primary analysis (2025).

The coefficient estimates in Table 20 indicate that corporate governance (CG), strategic asset allocation, and macroeconomic factors significantly influence pension fund financial performance. Among the governance indicators, only Board Responsibilities had a statistically significant effect on return on investment (ROI) ($t = -2.511$, $p < .05$), with the negative coefficient suggesting that excessive board oversight may constrain performance through governance rigidities and delayed investment decisions. The strategic asset allocation index positively affected ROI ($t = 2.942$, $p < .05$), highlighting the importance of effective asset allocation and portfolio diversification. Macroeconomic variables also exerted significant effects: GDP growth, commercial lending rates, and the 91-day Treasury bill rate positively influenced performance, whereas inflation, exchange rate volatility, balance of payments deficits, and declines in the NSE 20 Share Index negatively affected returns. Overall, macroeconomic conditions exerted stronger effects than governance and investment strategy variables, underscoring the need to integrate governance quality, investment strategy, and macroeconomic management in explaining pension fund performance.

The Joint Effects Model

$$\text{Combined ROI of pension fund} = 3516.697 - 20.829\text{BSC} - 86.814\text{BR} - 22.141\text{SR} - 8.190\text{\&T} + 8.100\text{CCG} + 33.588\text{RS} + 12.120\text{SIBD} + 127.791\text{IS Index} + 37.243\text{GDP} - 287.343\text{Inflation} - 135.784\text{EC} + 239.778\text{CBWALIR} + 1428.483\text{CBK} - 7594.110\text{BP} - 2.001\text{NSE} - 58.87\text{UR}.$$

VIII. Discussion of the Findings

8.1 Relationship between CG and Combined Return on Investment of Pension Funds

The first objective examined the relationship between corporate governance (CG) and the combined return on investment (ROI) of pension funds regulated by the Retirement Benefits Authority. The findings provide context-specific evidence on the influence of governance mechanisms on pension fund performance. Among the governance indicators, the Role of Stakeholders was the only variable with a statistically significant positive effect on ROI ($t = 2.934$, $p < .05$), suggesting that active stakeholder participation enhances accountability, aligns managerial decisions with beneficiaries' interests, and improves financial outcomes. This finding supports Stakeholder Theory (Freeman, 1984) and the G20/OECD Principles of Corporate Governance (OECD, 2023), which emphasize stakeholder engagement as a driver of organizational effectiveness and sustainable value creation.

Other governance dimensions exhibited positive but insignificant effects, indicating that governance effectiveness depends more on implementation quality than formal compliance. Consistent with Agency Theory (Jensen & Meckling, 1976) and prior empirical research (Allegrini & Greco, 2011; Conyon & Leech, 1993; Melis, 2000; Mehran, 1995; Ongore & K'Obonyo, 2011), the findings underscore the context-dependent nature of the governance–performance relationship and the importance of strengthening governance enforcement and stakeholder engagement.

8.2 Strategic Asset Allocation, Corporate Governance Dimensions, and Combined ROI of Pension Funds

The second objective examined whether strategic asset allocation, operationalized through the Investment Strategy Index (IS-Index), mediates the relationship between corporate governance (CG) and the combined return on investment (ROI) of pension funds. The results provide evidence of an empirical pathway linking governance, investment strategy, and pension-fund performance, although the reported regression estimates do not provide conclusive evidence of statistical mediation at the conventional 5% significance level.

The first-stage results showed that the CG model was significantly associated with the IS-Index, explaining 91.1% of its variation ($(R^2=.911)$, adjusted $(R^2=.899)$, $(F(7,49) = 71.65)$, $(p<.001)$). Board Structure and Composition was positively associated with the IS-Index $((B=.712)$, $(\beta=.629)$, $(t=5.032)$, $(p<.001)$), while the Role of Stakeholders was also positive and statistically significant $((B=.142)$, $(\beta=.115)$, $(t=2.143)$, $(p=.037)$). The remaining governance dimensions were not statistically significant. These findings suggest that governance arrangements concerned with board structure and stakeholder participation are particularly relevant to the formulation of investment strategies within occupational pension funds.

The second-stage results established a significant positive association between the IS-Index and combined ROI. The model explained 18.4% of the variation in ROI ($(R^2=.184)$, adjusted $(R^2=.169)$) and was statistically significant, $(F(1,55)=12.386)$, $(p<.001)$. The IS-Index coefficient was positive and significant $((B=79.179)$, $(\beta=.429)$, $(t=3.526)$, $(p<.001)$). This finding is consistent with Modern Portfolio Theory (Markowitz, 1952), which emphasizes the importance of asset allocation in balancing expected return and risk, and with empirical research showing that investment strategy and portfolio allocation are important determinants of pension-fund performance (Blake et al., 1999; Coggin et al., 1993; Grinblatt & Titman, 1989).

However, the final model requires a more cautious interpretation. When CG dimensions and the IS-Index were entered simultaneously, the model explained 40.5% of the variation in combined ROI ($(R^2=.405)$, adjusted $(R^2=.306)$, $(F(8,48)=4.087)$, $(p<.001)$). The Role of Stakeholders remained statistically significant $((B=77.630)$, $(\beta=.341)$, $(t=2.330)$, $(p=.024)$), whereas the IS-Index, although positive and relatively large in magnitude, was not statistically significant at the 5% level $((B=128.119)$, $(\beta=.695)$, $(t=1.860)$, $(p=.069)$). Thus, the results do not warrant the conclusion that the IS-Index definitively mediates the CG–ROI relationship. Rather, they indicate that investment strategy is positively associated with ROI when examined independently, but its unique association becomes statistically uncertain once the governance dimensions are controlled simultaneously. A formal indirect-effect test, preferably using bootstrap confidence intervals, would be required to establish mediation more conclusively.

From a theoretical perspective, the significant association between the Role of Stakeholders and ROI provides empirical support for the relevance of Stakeholder Theory (Freeman, 1984). In the pension-fund context, effective engagement with beneficiaries, employers, administrators, investment professionals, regulators, and other stakeholders may strengthen accountability, improve information flows, and support more informed investment decisions. The findings therefore suggest that stakeholder-oriented governance may have greater empirical relevance for performance than some formal governance dimensions when considered individually. This interpretation is also consistent with the G20/OECD Principles of Corporate Governance, which emphasize stakeholder rights, responsibilities, and access to relevant information (OECD, 2023).

The non-significant coefficients for Board Structure and Composition $((B=-37.750)$, $(p=.655)$), Board Responsibilities $((B=-91.704)$, $(p=.104)$), Shareholders' Rights $((B=-19.205)$, $(p=.452)$), Commitment to Corporate Governance $((B=-5.311)$, $(p=.725)$), and Stakeholders' Interests in Board Decisions $((B=27.301)$, $(p=.171)$) should not be interpreted as evidence that these governance mechanisms are ineffective. Rather, within this particular specification and sample, they do not exhibit statistically distinguishable unique associations with ROI after the other predictors are controlled. Similarly, the positive IS-Index coefficient should not be interpreted as evidence that information technology or digital infrastructure independently generates higher pension-fund returns, because the IS-Index measures investment strategy rather than information-technology capability.

Overall, the findings indicate that the governance–performance relationship in occupational pension funds is multidimensional. Stakeholder-oriented governance is directly associated with ROI, while board structure and stakeholder participation are associated with the formulation of investment strategy. Investment strategy, in turn, is positively associated with ROI in the standalone model. Taken together, these results support an integrated interpretation in which governance and investment policy operate as interconnected components of pension-fund performance, while the precise mediating mechanism requires further formal testing of indirect effects.

8.3 Moderating Role of Macroeconomic Variables

The empirical evidence demonstrates a robust, multi-theoretical framework governing pension fund performance. Specifically, interaction terms between governance indicators and macroeconomic variables increased the explanatory power of the models by 7.3%, 7.5%, and 7.0% in Models 2, 3, and 4, respectively ($p < .05$). The NSE 20 Share Index, inflation rate, and GDP growth rate emerged as significant moderators, demonstrating that prevailing economic conditions shape the effectiveness of governance mechanisms in enhancing pension fund performance. Robustness tests confirmed statistically significant ANOVA results across

all model specifications ($p < .001$). The fully specified Model 5, incorporating both governance and macroeconomic variables, exhibited strong explanatory power ($R^2 = .784$, Adjusted $R^2 = .705$; $F(15, 41) = 9.916$, $p < .001$), substantially improving model fit over the stepwise specification ($R^2 = .471$).

These results validate Arbitrage Pricing Theory (Ross, 1976), confirming that institutional performance is contingent upon macroeconomic sensitivities. Thus, maximizing institutional returns requires synthesizing strict compliance with the G20/OECD Principles of Corporate Governance (OECD, 2022) and Stakeholder Theory (Freeman, 1984), alongside strategic asset allocation to mitigate macroeconomic volatilities. .

8.4 Joint Effect of CG, Strategic Asset Allocation, and Macroeconomic Variables

The empirical evidence demonstrates a robust, multi-theoretical framework governing pension fund performance. The integrated regression model establishes that corporate governance, strategic asset allocation, and macroeconomic conditions jointly account for 82.2% of the variance in return on investment ($R^2 = .822$, $F(16, 40) = 11.573$, $p < .001$). Aligning with Modern Portfolio Theory (Markowitz, 1952) and prior empirical studies (Chung et al., 2022; Core et al., 1999; Sener & Selcuk, 2019), strategic asset allocation emerged as a critical positive driver of ROI ($t = 2.942$, $p < .05$). In contrast, board responsibilities exhibited a significant negative effect on fund performance ($t = -2.511$, $p < .05$). This inverse relationship highlights severe structural friction, suggesting that deficient fiduciary oversight and suboptimal strategic decision-making aggravate agency costs (Jensen & Meckling, 1976). Role of Stakeholders (RS) is however, not significant in the joint model ($t = 1.583$, $p = .121$).

Macroeconomic environmental factors revealed mixed results. While GDP growth and interest rates serve as performance enhancers, inflation, exchange rate volatility, balance of payments instability, and equity market contractions significantly impair fund returns. These findings validate Arbitrage Pricing Theory (Ross, 1976), confirming that institutional performance is contingent upon macroeconomic sensitivities. Thus, maximizing pension fund returns requires synthesizing strict compliance with the G20/OECD Principles of Corporate Governance (OECD, 2022) alongside strategic asset allocation to mitigate macroeconomic volatilities.

Table 21: Summary of the mediation and Moderation results

Model	Relationship/specification	R^2	Adjusted R^2	F	Key result
Model 1	CG $\rightarrow$ ROI	.362	.271	$F(7, 49) = 3.977$	CG significant overall
Model 2	CG $\rightarrow$ ISI	.911	.899	$F(7, 49) = 71.819$	BS&C and Role of Stakeholders significant
Model 3	ISI $\rightarrow$ ROI	.184	.169	$F(1, 55) = 12.386$	ISI significant
Model 4	CG + ISI $\rightarrow$ ROI	.405	.306	$F(8, 48) = 4.087$	Consistent with partial mediation
Model 5	CG + macro interactions	.784	.705	$F(15, 41) = 9.916$	Significant moderation
Model 6	Joint CG + ISI + macro model	.822	.751	$F(16, 40) = 11.573$	ISI and selected CG/macro variables significant

IX. Conclusion.

This study evaluated how corporate governance, strategic asset allocation, and macroeconomic factors influence the return on investment of pension funds registered under the Retirement Benefits Authority. Empirical analysis revealed that while corporate governance significantly impacts financial performance, its individual dimensions diverge in efficacy. Validating Stakeholder Theory's assertion that aligning organizational actions with stakeholder interests enhances performance, stakeholder participation emerged as the sole governance component yielding a statistically significant positive effect on financial returns. Besides board structure, transparency, and representation demonstrated positive yet statistically insignificant effects. This underscores Agency Theory's premise that structural mechanisms require effective execution, rather than mere implementation, to actualize financial benefits. Additionally, strategic asset allocation partially mediated the governance–performance relationship, whereas macroeconomic indicators, specifically inflation, GDP growth, and the NSE 20 Share Index, significantly moderated performance, thereby corroborating Modern Portfolio and Arbitrage Pricing Theories. Thus, sustaining pension fund performance demands a strategic integration of robust governance frameworks, optimal investment allocation, and responsiveness to macroeconomic realities.

X. Integrated Empirical Implications

This study examined the relationships among corporate governance (CG), strategic asset allocation (SAA), macroeconomic conditions, and the financial performance of occupational pension schemes in Kenya over the 2012–2022 period. The findings indicate that pension-fund performance is multidimensional and context dependent. Governance does not operate as a homogeneous institutional characteristic; rather, individual governance dimensions differ in their empirical relevance, while the governance–performance relationship varies with investment strategy and prevailing economic and capital-market conditions. The study therefore advances an

integrated perspective in which governance arrangements, investment decisions, and systematic economic conditions jointly explain variation in pension-fund performance.

9.1 Contribution to Theory and Knowledge

The study integrates Agency Theory (Jensen & Meckling, 1976), Stakeholder Theory (Freeman, 1984), Modern Portfolio Theory (Markowitz, 1952), and Arbitrage Pricing Theory (APT; Ross, 1976; Chen et al., 1986). Agency Theory provides a basis for examining fiduciary oversight, monitoring, accountability, and incentive alignment; Stakeholder Theory emphasizes participation, information exchange, and relationships among institutional stakeholders; MPT explains asset allocation, diversification, and risk–return trade-offs; and APT provides a framework for understanding the influence of systematic economic factors on investment returns.

Empirically, the aggregate governance model significantly explained variation in combined return on investment (ROI), $R^2 = .362$, adjusted $R^2 = .271$, $F(7, 49) = 3.977$, $p = .002$. However, the individual governance dimensions were heterogeneous. The Role of Stakeholders was the only dimension positively and significantly associated with ROI ($B = 95.770$, $\beta = .421$, $t = 2.934$, $p = .005$). This provides qualified empirical support for the relevance of stakeholder relationships while indicating that governance mechanisms do not necessarily have uniform associations with financial performance.

The study further contributes by examining strategic asset allocation, operationalised through the Investment Strategy Index (ISI), as a potential pathway linking governance and performance. The governance–investment strategy model explained substantial variation in ISI ($R^2 = .911$, adjusted $R^2 = .899$), with Board Structure and Composition ($t = 5.032$, $p < .001$) and the Role of Stakeholders ($t = 2.143$, $p = .037$) emerging as significant predictors. Separately, ISI was significantly associated with ROI, $R^2 = .184$, adjusted $R^2 = .169$, $F(1, 55) = 12.386$, $p = .001$. When ISI was introduced into the governance–performance model, the combined specification explained $R^2 = .405$ of the variation in ROI, adjusted $R^2 = .306$, $F(8, 48) = 4.087$, $p < .001$. Taken together, the sequential results are consistent with partial mediation, suggesting that investment strategy represents an empirical pathway through which governance may be associated with performance. Given the observational design, this pathway should not be interpreted as definitive evidence of a causal mechanism.

The study also contributes by incorporating macroeconomic conditions into the governance–performance relationship. The interaction models produced significant incremental explanatory contributions for the NSE 20 Share Index, inflation, and GDP, with ΔR^2 values of .073, .075, and .070, respectively. The full moderation model explained $R^2 = .784$ of the variation in ROI, with an adjusted $R^2 = .705$ and $F(15, 41) = 9.916$, $p < .001$. These results indicate that the empirical relevance of governance is conditional on the economic and capital-market environment in which pension schemes operate.

9.2 Methodological and Contextual Contribution

Methodologically, the study integrates multidimensional governance measurement through the Kenya Pension Fund Governance Index (KPGI), investment-strategy measurement through the ISI, longitudinal scheme-level financial observations, and macroeconomic indicators. The use of correlated random-effects estimation following Mundlak (1978) was appropriate because governance and investment-strategy measures were relatively persistent at the scheme level, while financial performance and macroeconomic conditions varied over time. The approach permits estimation of persistent institutional characteristics while accounting for correlation between observed covariates and unobserved scheme-specific heterogeneity. Interaction models were used to examine conditional relationships, while cluster-robust standard errors addressed heteroskedasticity and within-scheme dependence. These procedures constitute an appropriate application of established econometric methods rather than a claim of methodological novelty.

The contextual contribution arises from examining pension-fund investment in Kenya, an emerging-market environment characterized by regulatory investment constraints, market concentration, liquidity limitations, information asymmetry, and macroeconomic volatility. The findings should not be interpreted as statistically representative of pension systems globally. Rather, their broader relevance lies in analytical transferability. The integrated governance–investment–macroeconomic framework may provide a basis for comparative research in other emerging and frontier markets with similar institutional and financial-market characteristics.

9.3 Implications for Pension Governance and Investment Practice

The findings suggest that effective pension-sector regulation should consider not only formal compliance with governance requirements but also the substantive functioning of accountability, stakeholder engagement, information disclosure, fiduciary oversight, and investment decision-making. For trustees and investment managers, SAA should be treated as an integral component of governance and investment oversight. Portfolio decisions should be assessed against scheme liabilities, liquidity requirements, risk tolerance, long-term objectives, and prevailing macroeconomic and capital-market conditions.

The findings also highlight the importance of information flows among trustees, fund managers, administrators, custodians, actuaries, sponsors, and beneficiaries. Effective information exchange can strengthen fiduciary oversight, improve risk identification, and support more informed investment decisions, particularly in markets characterized by information asymmetry and investment concentration.

9.4 Overall Contribution and Conclusion

Taken together, the findings support an integrated understanding of pension-fund performance in which governance, investment strategy, and macroeconomic conditions constitute interconnected dimensions of institutional investment. The joint model further explained $R^2 = .822$ of the variation in ROI, with an adjusted $R^2 = .751$ and $F(16, 40) = 11.573$, $p < .001$. Within this specification, ISI remained positively associated with ROI ($t = 2.942$, $p < .05$), while Board Responsibilities was negatively associated with ROI ($t = -2.511$, $p < .05$). These results reinforce the central proposition that pension-fund performance cannot be adequately understood by considering governance, investment strategy, or economic conditions in isolation.

The principal contribution of the study is therefore the integration of three dimensions of institutional investment: who governs, how investment decisions are structured, and the economic conditions under which those decisions are implemented. Nevertheless, potential reverse causality, omitted-variable bias, measurement error, and other sources of endogeneity cannot be completely excluded. Accordingly, the estimated relationships are interpreted as conditional associations and empirical pathways rather than definitive causal effects. Within these limitations, the study extends pension-fund research beyond a conventional governance–performance framework toward a more integrated account of institutional investment in an emerging-market context.

REFERENCES

- [1]. Allegrini, M., & Greco, G. (2011). Corporate boards, audit committees and voluntary disclosure: Evidence from Italian listed companies. *Journal of Management and Governance*, 15(3), 381–402. <https://doi.org/10.1007/s10997-009-9129-y>
- [2]. Ambachtsheer, K. P. (2001). Public pension fund power. *The Journal of Portfolio Management*, 27(2), 61–74. [doi.org](https://doi.org/10.1007/s10997-009-9129-y)
- [3]. Besley, T., & Prat, A. (2005). *Pension fund governance and the choice between defined benefit and defined contribution plans* (CEPR Discussion Paper No. 3955). Centre for Economic Policy Research.
- [4]. Black, A., Fraser, P., & MacDonald, R. (1997). UK stock returns and business conditions. *Managerial Finance*, 23(1), 61–71. [doi.org](https://doi.org/10.1007/s10997-009-9129-y)
- [5]. Blake, D., Lehmann, B. N., & Timmermann, A. (1999). Asset allocation dynamics and pension fund performance. *Journal of Business*, 72(4), 429–461. <https://doi.org/10.1086/209624>
- [6]. Bodie, Z., Kane, A., & Marcus, A. J. (2008). *Investments* (8th ed.). McGraw-Hill/Irwin.
- [7]. Camenisch, M., & Eberhardt, C. (2017). Is governance related to investment performance and asset allocation? Empirical evidence from Swiss pension funds. *Swiss Journal of Economics and Statistics*, 153(3), 293–339. <https://doi.org/10.1007/BF03399263>
- [8]. Castrillón, M. A. (2021). The concept of corporate governance. *Visión de Futuro*, 25(2), 178–194. <https://doi.org/10.36995/j.visiondefuturo.2021.25.02R.005.en>
- [9]. Chen, N.-F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. *Journal of Business*, 59(3), 383–403. <https://doi.org/10.1086/296344>
- [10]. Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review*, 20(1), 65–91. <https://doi.org/10.5465/amr.1995.9503271992>
- [11]. Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14(1), 57–74. <https://doi.org/10.5465/amr.1989.4279003>
- [12]. Fama, E. F. (1990). Stock returns, expected returns, and real activity. *The Journal of Finance*, 45(4), 1089–1108. <https://doi.org/10.1111/j.1540-6261.1990.tb02428.x>
- [13]. Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.
- [14]. Grinblatt, M., & Titman, S. (1989). Portfolio performance evaluation. *The Review of Financial Studies*, 2(3), 393–421. <https://doi.org/10.1093/rfs/2.3.393>
- [15]. Heath, J., & Norman, W. (2004). Stakeholder theory, corporate governance and public management: What can the history of state-run enterprises teach us in the post-Enron era? *Journal of Business Ethics*, 53(3), 247–265. <https://doi.org/10.1023/B:BUSI.0000039418.75103.ed>
- [16]. Huberman, G. (2005). A simple approach to Arbitrage Pricing theory. In S. Bhattacharya & G. M. Constantinides (Eds.), *Theory of valuation* (pp. 289–308). World Scientific Publishing. https://doi.org/10.1142/9789812701022_0009
- [17]. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)

- [18]. Kwon, C. S., & Shin, T. S. (1999). Cointegration and causality between macroeconomic variables and stock market returns. *Global Finance Journal*, 10(1), 71–81. [https://doi.org/10.1016/S1044-0283\(99\)00005-8](https://doi.org/10.1016/S1044-0283(99)00005-8)
- [19]. Lishenga, L. (2011). Corporate governance reaction to declining firm performance: Evidence from the NSE. *International Journal of Governance*, 1(1), 1–20.
- [20]. Markowitz, H. (1952). Portfolio selection. *The Journal of Finance*, 7(1), 77–91. <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>
- [21]. Mitchell, O. S., & Yang, T. S. (2005). *Public pension governance, funding, and performance: A longitudinal appraisal* (Pension Research Council Working Paper No. 2005-2). The Wharton School, University of Pennsylvania.
- [22]. Obermann, T. P. (2005). *The effect of the privatization of pension plans on financial and regulatory systems in Latin America* (Working Paper No. 2005-27). Federal Reserve Bank of Atlanta.
- [23]. Ochieng, D. E., & Oriwo, E. A. (2012). The relationship between macroeconomic variables and stock market performance in Kenya. *DBA Africa Management Review*, 3(1), 38–49.
- [24]. OECD. (2020). *G20/OECD principles of corporate governance*. OECD Publishing. <https://doi.org/10.1787/ed750b30-en>
- [25]. Olweny, T., & Omondi, K. (2011). The effect of macroeconomic factors on stock return volatility in the Nairobi stock exchange, Kenya. *Economics and Finance Review*, 1(10), 34–48.
- [26]. Ongore, V. O., & K'Obonyo, P. O. (2011). Corporate governance and firm performance in Kenya. *International Journal of Economics and Financial Issues*, 1(3), 99–122.
- [27]. Roll, R. (1977). A critique of the asset pricing theory's tests: Part I: On past and potential testability of the theory. *Journal of Financial Economics*, 4(2), 129–176. [https://doi.org/10.1016/0304-405X\(77\)90009-5](https://doi.org/10.1016/0304-405X(77)90009-5)
- [28]. Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory*, 13(3), 341–360. [https://doi.org/10.1016/0022-0531\(76\)90046-6](https://doi.org/10.1016/0022-0531(76)90046-6)