EFFECT OF REAL ESTATE INVESTMENTS ON FINANCIAL PERFORMANCE OF PENSION FUNDS IN KENYA

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI
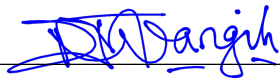
NOVEMBER, 2021

DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

Signed: _____ Date: ___21 Nov 2021___

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This research project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This research project is dedicated to my family for their continued support and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
APT	Arbitrage Pricing Theory
CAPM	Capital Asset Pricing Model
CMA	Capital Markets Authority
DC	Defined Contribution
DB	Defined Benefits
EPFO	Employee Provident Fund Organization
FP	Financial Performance
GDP	Gross3Domestic Product
IRR	Internal Rate of Return
MPT	Modern Portfolio Theory
NSE	Nairobi Securities Exchange
PF	Provident Fund
PS	Pension Scheme
RBA	Retirement Benefits Authority
REIT	Real Estate Investment Trust
ROA	Return on Assets
ROI	Return on Investments
SACCOs	Savings and Credit Cooperative societies

ABSTRACT

The pension fund market in Kenya has grown exponentially in the recent past and this trend is expected to continue. Pension funds are increasingly making investments in the real estate sector with the expectation of obtaining better returns. Kenya has experienced a wave of real estate investments as investor confidence has increased. The main motivation for investment in the real estate sector by pension funds is diversification with an aim of enhancing their return on investments. The purpose of this study was to determine the effect of real estate investments on the financial performance of pension funds in Kenya. Real estate investments, fixed income investments, listed equity, and fund size were all considered independent variables in this analysis. Descriptive research design was used. The target population was the 1340 pension funds in Kenya. The sample size was 134 pension funds which represented 10% of the entire population. Research variables data were derived from Retirement Benefits Authority (RBA) from 2016 to 2020. Regression and correlation analysis were used to test the study hypotheses by establishing the relationship between real estate investments and performance. The study found that real estate investments ($\beta=0.095$, $p=0.000$), fixed income investments ($\beta=0.082$, $p=0.001$) and listed equity ($\beta=0.033$, $p=0.008$) had a positive and significant effect on the performance among pension funds in Kenya. The study also found that fund size ($\beta=0.118$, $p=0.312$) had no significant effect on the performance among pension funds in Kenya. The results also indicated R^2 of 0.4735 which implied that the selected independent variables contributed 47.35% to variations in pension funds' performance. The study recommends that pension funds' policy makers should design policies that increase real estate investments as this will lead to an increase in financial performance. The study further recommends that trustees and managers of pension funds should develop strategies aimed at increasing both fixed income and listed equity investments as these lead to an increase in financial performance.

1.1 Background of the Study

All over the world, real estate has been a popular investment option for a long time (Muthuri, 2014). When compared to other investment assets classes such as equities, the rationale for this popularity can be attributed to the fact that real estate investment delivers a consistent and predictable rate of return in most circumstances. The trend of greater professionalism in real estate asset management also attests to this. Real estate investing, according to Van Loon and Aalbers (2017), has recently become the most important alternative investment asset class for pension funds. Real estate has various advantages, including simpler diversification and lower overall risk, hedging against inflation, and giving consistent cash flows to the portfolio. As a result, these advantages have become the primary motivators for pension funds to include real estate into their portfolios with the aim of boosting their overall financial performance (Muthuri, 2014).

Investment in real estate by pension funds is guided by three theories; Modern Portfolio Theory, Arbitrage Pricing Theory and the Capital Asset Pricing Model, all of which support the analysis of real estate investments and pension fund financial performance. According to Modern Portfolio Theory, investors seek higher returns over lesser returns and are also risk averse. This is due to the fact that higher returns allow the investor to have more for consumption and, when given the option to invest, they will choose companies with lower risk (Grasse, Whaley & Ihrke, 2016). Diversification helps to eliminate unsystematic risk. According to the Arbitrage Pricing Theory (APT), both fundamental and statistical factors influence market returns. The return of a specific asset is a linear function of factors in the economic environment that affect all securities. Capital Asset Pricing Model (CAPM) forecasts a security's expected rate of return based on statistics about the market's expected rate of return and also takes into account the market risk and systematic risk. Rossi (2016) observed that CAPM elaborates why some assets have greater returns on them and why projected returns differ over a given period.

Kenya's real estate industry has risen swiftly to be one of the country's most significant economic contributors. According to Kiunuhe, Doshi, Ngumy, and Karugu (2016), there is

a growing middle class, which has resulted in an active property market with corresponding increases in demand for residential, commercial, and retail properties. As a result of this demand, individual investors, institutional investors, and even private and public companies listed to the Nairobi Securities Exchange have increased their investment in real estate projects, resulting in the creation and adoption of new real estate investment models such as Real Estate Investment Trusts (REITs) in Kenya. Pension funds in Kenya have positioned themselves to take advantage of opportunities presented by this trend and have thus taken an active role in investing in real estate in the country (Kiunuhe et al., 2016).

1.1.1 Real Estate Investments

Land investment, as well as any permanent changes to the land, is referred to as real estate investment (Sagi, 2020). This includes the process of purchasing, renting, owning, managing or selling real estate or for profit. According to Del Giudice, De Paola, and Cantisani (2017), real estate investment can be simply defined as decisions on the amount of money that can be deployed in property investment opportunities. Investment properties such as land, residential, commercial, retail, industrial, and mixed-use developments, Real Estate Investment Trusts (REITs), corporate stocks with exposure to real estate, and real estate themed mutual funds are all examples of the products in the real estate investment sector. Sagi (2020) adds that real estate investment provides predictable cash flows as well as potential for capital gains on property sales.

Over the last 50 years, real estate has been a popular investment instrument. Property investments have always been thought of being low-risk, long-term, and illiquid assets. Property investment is important in investment portfolios because it is seen as a reliable source of income with strong capital growth potential (Del Giudice, De Paola & Cantisani, 2017). When compared to stocks and bonds, real estate investing offers a number of advantages, including being a low-volatility physical asset, creating an attractive income stream, long-term capital appreciation, and significant diversification benefits. However, real estate investment has a number of disadvantages; it is illiquid, requires experienced and intensive management, and also requires a significant amount of capital to develop a diverse portfolio (Muthuri, 2014).

According to Gathogo (2020), real estate investment can be measured as a percentage of the funds invested in real estate to the total funds in a pension scheme. Strategic and tactical

asset allocation are the two main asset allocation techniques. Strategic asset allocation entails determining allocation targets for each portfolio component based on each asset class's predicted returns, volatility, and correlation (Gathogo 2020). Tactical asset allocation entails actively altering portfolio weights based on short and medium term economic and market-cycle expectations. The proportional weight of real estate investments in the total value of the pension fund was used as a measure of real estate investment in the current study.

1.1.2 Financial Performance

Financial performance is the operational measure of how well a business generates revenues using assets from its principal mode of operation. Financial performance is thought to be comprised of three important aspects of business outcomes: market performance, profitability, and shareholder return. According to Batchimeg (2017), financial performance is simply the primary metric by which an organization may assess its progress towards stated objectives and this can be used to inform plans and future actions aimed at increasing performance.

Financial performance is critical since it is used to show an organization's resource efficiency and effectiveness. This, in turn, has the potential to raise an organization's worth (Gartenberg, Prat & Serafeim, 2019). Financial performance data is also used by investment analysts to assess an entity's ability to generate revenue and expand, both of which are important for future growth. Financial performance is critical in determining net income and analysing a company's financial risk. As a result, the nature of a pension fund's real estate investment can have a substantial impact on its members' overall financial wellbeing during their retirement years. As a result, pension funds must make numerous estimates in order to determine their overall financial performance, including forecasting future salary increments for covered employees, determining the actuarial rate to be used in determining the amount of pension payments, and calculating the return on assets accumulated in the pension fund (Batchimeg, 2017).

According to Kigen (2016), a variety of financial ratios can be used to assess the financial performance of pension plans. Financial ratios are defined as the relationship between two financial balances or calculations. Return on assets and return on equity are two critical financial indicators that can be used to evaluate the financial effectiveness of pension

systems. Return on assets (ROA) is the operational profit quotient and total asset ratio used to calculate an organization's earnings from all financial resources (Kigen, 2016). Return on equity (ROE), on the other hand, is a statistic that indicates how well management has utilised shareholders' capital.

1.1.3 Real Estate Investments and Financial Performance

The ability of pension funds to earn adequate revenues to meet their costs and benefit commitments in the medium and long term is reflected in their financial performance. This can be aided by associated sectoral reforms (Zhang, Cai, Liu & Kutan, 2018). Over the last few decades, the financial performance of pension funds has received a lot of attention in many jurisdictions, particularly among policymakers. This has been ascribed to the fact that pension funds are a worldwide concern since people in both the formal and informal sectors around the world will retire or leave employment at some point in their life (Zhang et al., 2018).

According Nassar (2018), in order to achieve efficient financial performance, pension funds must always be professionally managed and operate in a controlled framework. Professional management services are always offered at a cost, which has a detrimental influence on pension funds' overall financial performance. Members' contributions are the most important source of income for the pension plans and this should be complemented by investment income. Better investment returns from pension funds can help organizations attract and keep senior personnel, according to a study conducted in the United Kingdom (UK). Furthermore, strategic asset allocation is a hot topic among pension plans around the world as high or low returns are a result of investment choices made by the funds' managers (Nassar, 2018).

Hlavac (2011) examined the financial returns of Czech private pension plans and compared them to those of other Central and Eastern European (CEE) countries. From the study, financial returns of these schemes were shown to be primarily influenced by member contributions and operating costs incurred for provision of management services. According to studies conducted throughout the world, operational costs, amount of financial contributions, and other elements that impact the financial performance of pension plans are primarily internal and, more significantly, trustee-related. Various scholars have noted external factors such as fund managers' investment choices, risk

4

preferences associated with those choices, and the legal environment in which pension funds operate (OECD, 2016).

1.1.4 Pension Funds in Kenya

The Retirement Benefits Authority (RBA) regulates the pension industry in Kenya. RBA was established through an act of parliament; the Retirement Benefits Act of 1997. The pension industry is categorized into four broad schemes namely, National Social Security Fund, Civil Service Pension Scheme, Occupational Retirement Schemes and Individual Retirement Schemes (RBA, 2019). Acts of parliament established the National Social Security Fund and the Civil Service Pension Scheme which are open to all government employees, teachers, and formal sector workers in enterprises, respectively. Occupational Retirement Schemes comprise of employees from companies offering such plans while Individual Retirement Schemes comprise of formal or informal sector employees who join voluntarily. The latter two schemes are governed by their respective trust deeds and rules.

To protect pensioners' investments, the RBA requires fund managers to adhere to investing guidelines that define the allowable asset classes with the maximum percentage exposure for each. As a result, the rules provide an overview of the risk profiles associated with the major asset classes in which pension fund managers invest. Oversight of the pension fund has shifted away from compliance based towards risk based supervision in recent years. To this end, RBA provides asset class suggestions rather than recommending specific assets for investment. In selecting and developing a well-diversified portfolio, the pension system has the discretion to identify and select the most appropriate assets to maximize the fund's returns (Ngugi, Njuguna & Wambalaba, 2018).

The Kenyan pension fund sector has grown at an exponential rate in recent years, according to Deloitte (2016), and this trend is expected to continue. Pension funds are increasingly investing in real estate due to the promise of higher returns. As investor confidence has grown, Kenya has seen and experienced a surge in real estate investments. The primary motive for pension funds to invest in real estate is diversification with the goal of increasing their return on investment (Kigen, 2016).

1.2 Research Problem

Real estate has remained to be a popular investment for pension funds (Mwangi, 2018). This is because, in contrast to other asset classes, it has historically demonstrated a predictable rate of return which in most cases has been shown to be keeping pace with inflation. On the other hand, real estate investments have been deemed unsuitable for pension funds as a result of the increased emphasis on liquidity (Ngugi, Njuguna & Wambalaba, 2018). Asset managers throughout the world have been constructing real estate investment vehicles to suit the liquidity criteria of pension funds in order to attract them. The majority of these funds often hold a considerable amount of cash, which reduces the profits on property holdings (Mwangi, 2018).

In Kenya, the pension fund sector is estimated to cover only 15 percent of the country's entire work force with investments accounting for roughly 18 percent of GDP (Muli & Jagongo, 2019). This means that about 85% of Kenya's workers are not saving for retirement (RBA, 2019). The overall financial performance of Kenyan pension funds, however, has recently been plagued by a slew of issues. According to Ametefe (2018), investment decisions have contributed to the fall in the financial performance of Kenyan pension funds, particularly widespread real estate investment, despite the large benefit of predictable long-term returns owing to capital appreciation. The administration of real estate investments owned by pension funds has been shown to be poor, inefficient, less transparent, and laborious, resulting in bureaucracy and a high risk of corruption, all of these factors have had a considerable impact on these pension funds' financial performance. (Muli & Jagongo, 2019).

Previously, many studies have looked into how corporate variables affect financial success. The portfolio structure, real estate investments, and performance of UK defined contribution pension funds have been extensively studied. Ametefe (2018) discovered that real estate and bonds hedged against all of the inflation/interest rate metrics evaluated. The major subjects of discussion were portfolio structure and real estate investments. Defau and De Moor (2018) noted that active members receive greater attention than retired and dormant members. This was observed when they were assessing the impact of scheme and sponsor characteristics on asset allocation of Belgian pension funds. The debate focused

on the differences between investment in real estate and pension plans and the characteristics of the sponsor.

According to Kigen, (2016) administrative costs, investment costs, pension contributions, and cumulative fund assets all have a substantial impact on Kenyan pension fund financial performance. The study focused on portfolio size which differs from real estate investments. Gachoka (2013) studied the effect of investment strategies on the financial performance of private equity funds investing in Kenya and concluded that private equity funds structure their investments to ensure maximum returns to their investors. The lack of clear consensus among previous researchers is reason enough to conduct further study. Additionally, very few studies have been conducted in Kenya on real estate investments and FP of pension funds which is the gap the current study leveraged on by answering the research question; what is the effect of real estate investments on financial performance of pension funds in Kenya?

1.3 Research Objectives

The objective of this study was to determine the effect of real estate investments on financial performance of pension funds in Kenya.

1.4 Value of the Study

This study will be particularly valuable for stakeholders in the pension sector as it provides essential data for investments management. These stakeholders include pension scheme trustees, members, fund managers and regulatory bodies. The management of pension funds will benefit the most from this because it shows how they might improve their pension plans' financial performance by making investment selections.

The outcomes of this study will be used to guide and formulate policies by the government and other policymakers. The findings will serve as a reference for Kenyan pension funds and other financial institutions in making real estate investment decisions that will increase their financial performance and hence contribute to the sector's development.

The outcome of this study will be beneficial to future scholars because it will serve as a reference point. Scholars and researchers may find the findings valuable in identifying research gaps on the study's key concerns, as well as assessing empirical literature to generate new research ideas.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A review of theories under which his study is grounded will be presented in this section. Prior research work done on this subject area and similar areas are also discussed. This chapter also includes the determinants of financial performance, a conceptual framework showing how the study variables relate, and a summary of the literature review.

2.2 Theoretical Framework

In order to make pension funds even more profitable, real estate has been seen as a significant asset for these investors. In terms of reducing risk, investing in real estate is proved to be beneficial. Real estate is also advantageous since it provides strong, dependable cash flows, and provides stability in the face of inflation. This study was anchored on modern portfolio theory, arbitrate pricing theory and capital asset pricing theory.

2.2.1 Modern Portfolio Theory

Modern Portfolio Theory was introduced by Markowitz (1952) as a method of diversifying investment portfolios. The key premise of Modern Portfolio Theory is that investors prefer higher returns to lower returns and are also risk averse (Grasse, Whaley & Ihrke, 2016). This is due to the fact that higher levels of return allow the investor to spend more on consumption and, when given the option to invest, they will choose the investments with the lowest risk. Diversification can be used to eliminate unsystematic risk. This theory tries to maximize returns at a given risk or equally reduce risk at an anticipated level of returns by carefully picking proportions of diverse investments (Grasse, Whaley & Ihrke, 2016).

This idea distinguished between two sorts of risks that investors should be aware of: systematic and unsystematic risks. Unsystematic risk is connected with the degree to which an individual investment is variable, whereas systematic risk is linked with the volatility of the entire market or a portion of it (Dimmock, Wang & Yang, 2019). As a result, investors are advised to combine portfolios by ensuring that the unique risk represented by one investment in the portfolio is compensated by a lower specific risk in another.

For its unrealistic assumptions, such as the normal distribution of risk and return, Modern Portfolio Theory has received a lot of flak. Furthermore, the theory has been discovered to contain simplistic assumptions and its efficient financial markets model does not mirror the real world, despite the fact that it is relevant. This is because markets with low correlations to the global portfolio receive the least research and operate under the most restrictive market rules (Dimmock, Wang & Yang, 2019). It is hard to find data of adequate quality covering a sufficient time period and data collection can be time consuming and costly. Comparative analysis may be further complicated by differences in ownership and legal structures, valuation methodologies and language. Local factors may be more relevant in asset selection, which disadvantages an outside investor without a local partner. Finally, the absence of consistent and accurate market capitalizations makes the real estate performance index extremely difficult to calculate (Dimmock, Wang & Yang, 2019).

Modern Portfolio Theory is relevant to this research because real estate investment is viewed as a stable source of income as well as a solid capital growth investment. It is considered to be a less volatile investment than traditional assets such as stocks and bonds, providing a reliable inflation hedge and diversification benefits. As a result, pension funds will diversify into real estate to increase returns while reducing risk. Alternatively, they will only take on greater risk if the reward is greater. Real estate investment should therefore lead to improved financial performance according to this assertion.

2.2.2 Arbitrage Portfolio Theory

Arbitrage Portfolio Theory (APT) was coined by economist Stephen Ross (1976). It explains the relationship between portfolio asset returns and the linear combination of numerous independent macroeconomic variables. This theory is a one-period model that predicts an asset's returns using different risk variables and the same asset. Its focus is different from typical investment analysis and it's best suited for managing enormous pools of money. It is crucial to know how much risk your company is exposed to before deciding on the appropriate degree of risk (Ross, 1976). APT's core discovery is that the long-term average returns of financial assets are determined by a few stable factors.

Arbitrage Portfolio Theory acknowledges the numerous elements that contribute to daily stock and bond price volatility, but concentrates on the major dynamics affecting huge portfolios' aggregate assets (Kim, Korajczyk & Neuhierl, 2020). By recognizing these

forces, we can have a better sense of how they affect portfolio results. The ultimate goal is to improve overall portfolio design and performance by gaining a better grasp of portfolio construction and evaluation.

Because it does not rely on predicting how the market will operate, arbitrage pricing theory has been questioned. Instead, it publicly links the price of an asset to the underlying factors that influence it. The problem is that the theory doesn't specify what these components are, thus they have to be discovered through experimentation (Kim, Korajczyk & Neuhierl, 2020). Furthermore, APT is based on three major assumptions: perfect capital market competition, assurance that investors would always want more wealth, and that the stochastic process that creates asset returns can be described as a linear function of a set of risk factors (Reilly & Brown, 2012).

The current study is pertinent to APT since it is modelled in such a way that it isolates and prices assets individually. Real estate is not as smooth as stocks, and it is difficult for an investor to take advantage of a short-term arbitrage opportunity. The pension fund can profit from pricing discrepancies between the beginning and the completion of a real estate project's construction. As a result of capital appreciation, arbitrage opportunities emerge and if taken advantage of, they help to improve the pension fund's financial performance.

2.2.3 Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) was developed by William Sharpe (1964) and John Lintner (1965). The Capital Asset Pricing Model predicts how to assess risk and the expected return-risk relationship. A mean-variance efficient portfolio with the same mean-variance is often used to calculate the CAPM. To explain why some assets have higher expected returns than others, asset pricing theorists employ the CAPM (Rossi, 2016). The portfolio includes risky capital assets that are weighted by their market value, and these portfolios include both classic and non-traditional asset classes such as real estate and commodities. Sharpe (1964) introduces the implications that, regardless of risk preferences, an investor will keep hazardous assets in their portfolio whose individual risk profiles are defined by their covariance with the market and the reward to investors for bearing systematic risk.

CAPM critics argue that the model is oversimplified as a result of its two essential assumptions. The model assumes that investors can borrow or lend any amount of money at a risk-free rate and that the risk-free rate is consistent across all investors regardless of the amount borrowed or lent. Second, all investors have equal expectations, resulting in comparable probability distributions for future returns over the same time span. As a result, CAPM can calculate the risk price and risk measure for a given asset (Elbannah, 2015). There are no taxes or transaction costs associated with the acquisition or sale of assets, no inflation impacts or interest rate adjustments, and the capital markets are in equilibrium, with all investments priced properly.

Despite this, CAPM was important to the current research since it is used to aid decision-making when deciding between different real estate investments and assets in the face of risk and uncertainty. It attempts to explain asset prices while they are in a state of equilibrium. It is taken into account while purchasing real estate and analyzing a real estate investment portfolio's success. Real estate offers returns that are commensurate with market risk and the possibility for portfolio returns that have a premium above the risk free rate. Diversification also reduces systemic risk. This idea proposes that real estate investment and financial performance have a favorable link.

2.3 Determinants of Financial Performance

This section discusses the determinants of financial performance for pension funds. The four determinant of financial performance of pension funds are real estate investment, fixed income investment, listed equity investment and fund size. These factors were adopted in this study and are discussed in the following sections.

2.3.1 Real Estate Investment

The diversification benefit and potential that emerges from low correlation, as well as its appeal due to high yields, all contribute to the inclusion of real estate in a portfolio. From early stage, venture capital and growth capital are the three primary types of private equity investments in real estate (Sagi, 2020). The riskiest option is venture capital, which is the classic real estate investment model in which investors offer seed capital to new projects with a focus on good management.

The growth approach is offering cash to modest, well-established real estate enterprises in order to help them fund and expand their current projects. This aids in the recapitalization of their asset base. The goal of capital market arbitrage is to take advantage of pricing anomalies in the capital markets, and private corporations are included here (Sagi, 2020). The goal is to find low-cost equity or debt capital that will improve the return on investment. The high rates help pension funds perform better and provide investors with a favorable return on their money.

2.3.2 Fixed Income Investments

Treasury bills, notes, and commercial paper are fixed income assets through which entities raise money and investors buy them at a discount to the predicted maturity value. Investors profit by exploiting the difference between the purchase price and the value at maturity. Because they are often held for short periods of time, they are considered a relatively safe asset to invest in (Bodie et al., 2014).

Longer-term borrowing or debt instruments, such as corporate debt or bonds, pay periodic coupons over the life of the instrument and refund the face value to the bond holder at maturity. Default risk is a factor to consider here. Returns are generated when investors take advantage of pricing inefficiencies that exist between various securities, according to Reilly and Brown (2012).

2.3.3 Listed Equity

Investors purchase stock in publicly traded firms in the hopes of receiving dividends from the company's earnings, which are linked to the profitability of the company's investments. As a result, listed stock investments are riskier than fixed income and corporate debt/bonds (Bodie et al., 2014). The return and financial performance are dependent on investors spotting undervalued companies and profiting from market corrections induced by inefficiencies (Reilly & Brown, 2012).

Stock exchanges are critical in ensuring that money is allocated in financial markets in ways that reflect the risk associated with the various investment options available. However, owing of the high expenses involved with listing, the preference for mergers over floating options, and the rise of long-term risk capital providers, the number of listed businesses has decreased. Private equity funds invest in unlisted firms with the intention

of subsequently selling them for a profit. Even if large returns are possible, a good return from one fund does not guarantee a similar return from another, therefore investors must use investment strategies that work in their particular situation (McKinsey, 2017).

2.3.4 Fund Size

Larger schemes benefit from a high-risk, high-return approach since they have more investment flexibility and can make calculated betas while investing as well as take on bigger risks than smaller schemes (Kusa & Ongore, 2013). The size of a pension fund, as measured by contributions, number of members and value of assets, is a critical metric for determining pension success (Kigen, 2016).

For purposes of levy payment, the Retirement Benefits Authority (RBA) classifies schemes according to their fund size as measured by the value of their assets. According to Michira (2013), size counts when choosing a retirement fund to join. He believes that larger pension plans outperform smaller ones mainly due to economies of scale. This is in contrast to Bauer's (2010) results which claim that fund size has a detrimental impact on scheme performance.

2.4 Empirical Review

This section provides the literature from studies that are related to the current study both in concept and context. The studies are discussed from global perspective narrowed down to local perspectives.

2.4.1 Global Studies

Ametefe (2018) studied the real estate investment, "portfolio structure, "and performance of defined contribution pension funds in the United Kingdom. In all cases, public indices were used as a proxy for asset return. Between 1991 and 2015, data was obtained mostly via data streams and Bloomberg as well through other sources such as Cambridge Associates and other pension funds. It was concluded that real estate and bonds are hedges against inflation/interest rate fluctuations. Stocks and alternative assets all accounted for a significant share of portfolios constructed to with a view to maximize risk-adjusted returns relative to benchmarks.

Bhattacharya and Rastogi (2017) studied the influence of stock market gains on India's self-managed provident funds. Eighty-two (82) provident fund trusts were surveyed for

primary data over a nine-year period between 2005 and 2014. The information was gathered from trusts in ten different industries, including 18 public sector trusts and 64 private corporate trusts. The study's fair distribution and inclusive representativeness were addressed via stratified random sampling. The self-managed provident fund corpus would have gained 5.18 percent more than the mandated EPFO returns between 2005 and 2014, if a hypothetical portfolio had been used.

Defau and De Moor (2018) looked at how asset allocation and currency diversification in Belgian pension funds were influenced by plan and sponsor attributes. From 2001 to 2015, 182 Belgian pension funds were investigated. They discovered that members' age is a key consideration for pension funds. Age has often been valued in investment decisions based on data on the average age of active members, as opposed to the average age of retired and dormant members. The dependent variable in this study was the participant's age, whereas the current research is on real estate investments.

Investment restrictions and riskiness of asset allocations in defined-benefit (DB) pension funds were studied by Boon, Briere and Rigot (2014). The researchers studied public, corporate, and industrial pension systems in the US, Canada, and the Netherlands. Using panel data analysis, about 600 comprehensive funds' asset allocations were developed. The study's findings demonstrate that regulatory variables are more important in affecting asset allocations than individual and institutional characteristics of funds. As a result of risk associated capital requirements and the identification of unfunded obligations on the balance sheet, pension funds were found to be lowering their hazardous asset allocation, lowering liability discount rates and pursuing shorter maturity times on their bond portfolios.

Vancura (2012) investigated the importance of real estate in pension fund portfolios in the Czech Republic. The study used Markowitz portfolio theory to formulate the best market portfolio possible. After that, the optimal portfolio was compared to the portfolios of Czech pension funds and the loss due to asset class misallocation was calculated. Furthermore, the portfolio structures of all current pension funds in the Czech Republic were compared in order to see if they followed significantly different investment strategies or not. The research was based on quarterly data from 2000 to 2011. The analysis found that, despite

having larger returns than the portfolio's weighted average return, the proportion of stocks and real estate in the portfolio fell.

2.4.2 Local Studies

Gachoka (2013) investigated the financial performance of Kenyan private equity funds as well as the impact of various investing approaches on the funds' profitability. The study polled 20 licensed fund managers. The research used primary and secondary data. The study showed that private equity funds organize their investments to maximize returns for their investors. The study found that while investment procedures are important, they do not alter the assets invested in by private equity funds. The goal of this study is to determine the effect of a certain asset on the performance of Kenyan pension funds.

The effect of fund size on financial performance of Kenyan pension funds was investigated by Kigen (2016). The study's target demographic was Kenya's 1232 registered pension systems. Purposive sampling yielded a sample size of 93 registered pension systems. The study analyzed secondary data spanning from year 2011 to 2015. To convey quantitative data, tables, frequencies, charts, and graphs were used. Administrative, investment, and pension spending all had an effect on the financial success of Kenyan pension funds, the study discovered. The current study examined the effect of overall fund size rather than actual real estate investments.

Mungai (2017) studied how performance of Kenyan pension funds was being affected by alternative investments. Alternatives investments, in the study, included venture capital, private equity and real estate. Pension funds invest mostly in listed equities and government securities. Private equity, venture capital and real estate account only for a small proportion of total assets. Because the sample size was so limited, the findings may not apply to other pension funds.

Philita (2018) looked into the effects of portfolio diversification on Kenyan commercial banks' profit margins. All 40 commercial banks that were registered and licensed under the Banking Act were included in the study's target population. To achieve the study's goals, secondary data was used. According to the study, portfolio diversification, bank size, interest rate spread, and asset quality all affect commercial banks' financial performance in Kenya. Portfolio diversity, bank size, interest rate spread, asset quality, and financial

success were all found to have a positive correlation. This research did not include real estate investments as a dependent variable. In addition, the circumstances of the studies are not the same.

Investment decisions influenced the effectiveness of deposit-taking SACCOs in Nairobi, according to Kebiro 2019. There were 43 deposit-taking SACCOs in Nairobi County. Secondary data from 2014 to 2017 were analyzed. The authors used a descriptive cross-sectional approach using multiple linear regression to conduct their investigation. Fixed deposits, liquidity, company size, and age had no statistically significant effects on efficiency, however real estate, government securities, and stock investments did. The study focused on SACCOs while the current study will focus on pension funds.

2.5 Summary of the Literature Review

Several theoretical frameworks have elaborated the expected relationship existing between real estate investments and financial performance of pension funds. These theories are key in explaining the decisions of pension funds to invest in real estate as well as the effect of real estate investment on the financial performance of these pension funds. Modern Portfolio Theory, Arbitrage Portfolio Theory and Capital Asset Pricing Model were discussed in detail as they serve as the foundation of the study.

A good number of research studies have been carried out on this area on effect of real estate investments on financial performance of pension funds. These studies have been carried out in global and local context and have provided mixed results which have been presented in this section. The lack of consensus among international and local studies on how real estate investments affect financial performance of pension funds is an enough reason to conduct further studies. Additionally, studies done before in Kenya on real estate investments are few which was the gap the current study leveraged on by answering the research question; what is the effect of real estate investments on financial performance of pension funds in Kenya?

2.6 Conceptual Framework

A conceptual framework diagrammatically links independent and dependent study variables. The conceptual framework is crucial in research because it allows researchers to clearly establish the existing link between diverse research variables.

Independent variables   **Dependent variable**

```
┌─────────────────────────────┐
│ Real Estate Investments     │
│                             │
│   • % of allocation         │
│                             │
│                             │
└─────────────────────────────┘                    ┌──────────────────────────┐
                                                    │ Financial Performance    │
┌─────────────────────────────┐                    │                          │
│ Control Variables           │                    │   • Return on Assets     │
│ Fixed income investment     │                    │     (ROA)                │
│   • % of allocation         │                    │                          │
│ Listed equity investment    │                    │                          │
│   • % of allocation         │                    └──────────────────────────┘
│ Fund size                   │
│   • Log of total fund value │
└─────────────────────────────┘
```
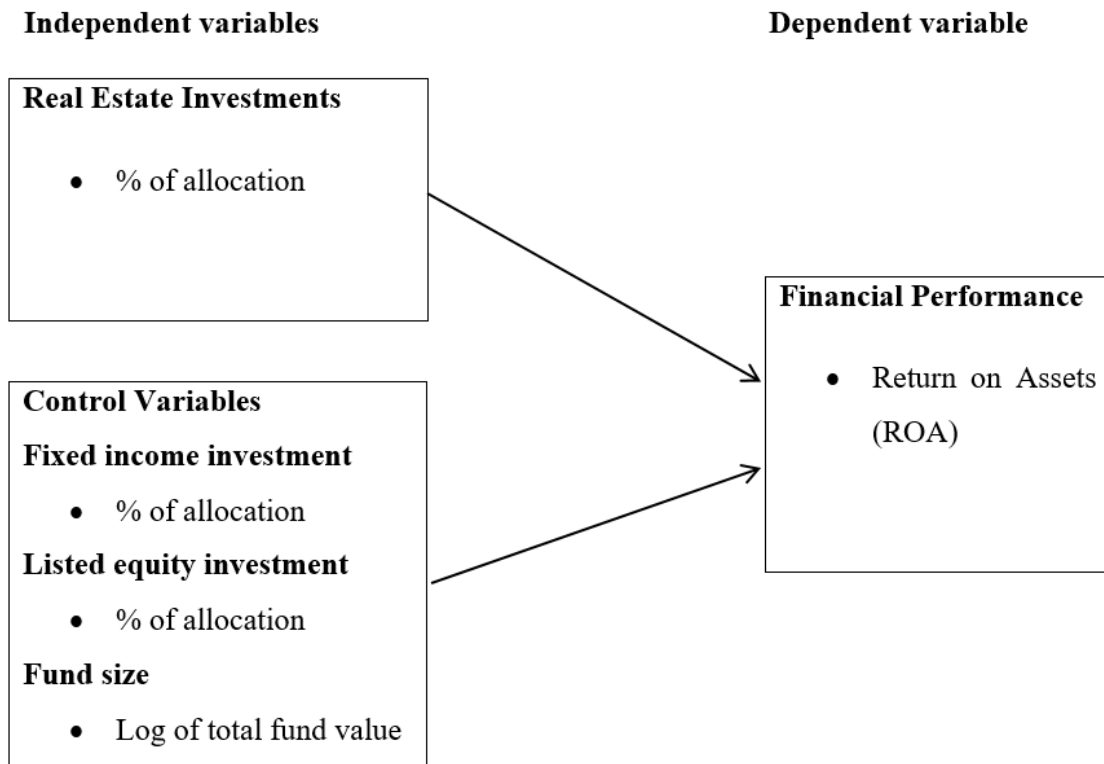
Source: Author (2021)

Figure 2.1: Conceptual Framework

The model developed illustrates the association existing between the variables. The predictor variable was real estate investments as given by % allocation. The control variables were investment in fixed assets as measured by % allocation, investment in listed equity as measured by % allocation and fund size as measured by the natural logarithm of the total value of a pension fund. Financial performance was the response variable that the study sought to explain and it was given by return on assets.

CHAPTER THREE

RESEARCH METHODOLOGY

33.1 Introduction

This chapter examines the methods that were employed in order to complete this research. Without a method, it would be difficult to go about doing the study. This chapter covered research design, data collection, diagnostic tests and statistical analysis.

3.2 Research Design

A research design is a strategy that is utilized when conducting research in order to establish an acceptable standard that has been effectively validated and performed for a long period of time and is regarded significant by various researchers in the field (Khaldi, 2017). This study employed a descriptive research design where the study's variables were described in terms of their characteristics.

3.3 Population and Sample

Population refers to the totality of the people or things to which researchers are interested in applying their results (Cooper & Schindler, 2016). A sample refers to the exact group of events, people, services, elements, houses, or other objects that a researcher wants to analyse. The Retirement Benefits Authority's 1340 registered pension funds made up the study's population (RBA). Secondary data was collected and examined during a five-year period, from 2016 to 2020.

3.4 Sample Technique and Sample Size

This section details the various sampling strategies and the steps used to identify the research population's final sample. It also describes the procedures that were followed in order to obtain, process, and analyze the data obtained in the following sections.

3.4.1 Sampling Technique

Taherdoost (2016) defined sampling technique as a procedure that comprises picking a sample of objects to represent all cases under consideration as part of the investigation. It outlines the surveyor's overall target population from which to pick the sample to study. This study adopted simple random sampling technique.

3.4.2 Sample Size

It is the process which is necessary to decide how many observations or repetitions should be included in a statistical sample before it can be calculated how large the sample size should be (Boddy, 2016). A sample of 10% (134) of the total population was selected while random sampling was used to select the institutions that were involved in the study. In a descriptive research design, a sample size of 10 to 50% is acceptable (Mugenda & Mugenda, 2003).

3.5 Data Collection

Data was acquired exclusively from secondary sources. Data from secondary sources was collected in a data collecting sheet and came from a range of publications from RBA and the sampled pension funds for the period between January 2016 and December 2020. Among the specific statistics collected were the value of real estate investments, fixed income investments, listed shares and fund size. RBA was chosen as the main source of data since it is the regulator of pension funds in Kenya and those funds are mandated by law to file financial reports with the regulator.

3.6 Diagnostic Tests

Testing for normality, stationarity, multicollinearity, homogeneous and autocorrelation was performed to assess model feasibility. The assumption of normalcy stated that the

dependent variable's residual was normally distributed and towards the mean. This was done using the Shapiro-Wilk test. If a variable had no normal distribution, it was adjusted using the logarithmic adjustment methodology. Stationarity test was utilized in determining if the statistical properties such as variance, mean, as well as autocorrelation change with the passage of time. The enhanced Dickey Fuller test was used to determine this attribute. It was decided to use robust standard errors if the data did not match this requirement (Khan, 2008).

Autocorrelation is a measure of how similar one time series is when compared to its lagged value across successive timings. The Wooldridge test was performed to determine the outcome, and the robust standard errors were incorporated in the model if the assumption was broken. An almost perfect linear connection between many independent variables is called multicollinearity. This research uses Variance Inflation Factors (VIF) and tolerance levels. A new measurement was used in place of any multicollinear variables. If the variance errors in a regression are distributed among the independent variables, heteroscedasticity confirms this. This was tested using the Breuch Pagan test and if data does not meet the homogeneity of variances assumption, robust standard errors were employed (Burns & Burns, 2008).

3.7 Data Analysis

The act of packing the acquired information, placing it in order, and organizing its primary components in such a way that the findings may be easily and effectively communicated, according to Cole and Trinh (2017). The researcher used STATA software for data analysis and presentation. Using descriptive statistics, the study summarized and discussed. The data was then statistically displayed in tables using percentages, frequencies, central tendency measurements, and dispersion. Inferential statistics such as Pearson correlation,

multiple regressions, ANOVA, and coefficient of determination were computed.

3.7.1 Analytical Model

Multiple linear regression model below was used:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon.$$

Where: **Y** = Financial Performance (return on assets)

X_1 = Real estate investment (value of real estate investment/total value of pension fund)

X_2 = Fixed income investment (value of fixed income investment/total value of pension fund)

X_3 = Listed equity (value of listed equity/total value of pension fund)

X_5 = Fund size given as the natural logarithm of total fund value

ε = error term

3.7.2 Operationalization of Study Variables

The study concepts were converted into measurable observations as below;

Table 3.1: Operationalization of Study Variables

Concept	Variable	Measurement
Financial Performance	Financial Performance	Return on assets
Determinants of Financial Performance	Real estate investment	Value of real estate investment/total value of pension fund
	Fixed income investment	Value of fixed income investment/total value of pension fund
	Listed equity	Value of listed equity/total value of pension fund
	Fund size	The natural logarithm of total fund value

Source: Author (2021)

3.7.2 Tests of Significance

Parametric tests were used by the researcher to determine the statistical significance of the results as well as the relevance of a particular parameter. Using the Variance Analysis (ANOVA), the F-test was used to determine the significance of the overall model and the t-test was used to determine the significance of specific variables.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter's goal was to analyze the data gathered in order to determine the effect of real estate investments on financial performance of Kenyan pension funds. Results were presented in tables using a variety of methods, including regression analysis and correlation analysis.

4.2 Descriptive Analysis

The standard deviation, the average, and the highest and lowest values of the variables are all presented in this study. The outcome for the chosen research variables are demonstrated in Table 4.1. For all of the pension funds in Kenya whose data was available for the research, STATA was used to examine the variables across a five-year period (2016 to 2020). The following table shows the descriptive statistics for the study's variables.

Table 4.1: Descriptive Statistics

	Obs	Minimum	Maximum	Mean	Std. Deviation
ROA	670	-.053	.061	.02151	.020880
Real estate	670	.079	.423	.19822	.069095
Fixed income	670	.006	.515	.26911	.103171
Listed equity	670	.001	.438	.18753	.105886
Fund size	670	6.072	8.730	7.78688	.572210
Valid N (listwise)	670				

Source: Research Findings (2021)

4.3 Diagnostic Tests

Before building the regression model, many diagnostic tests were performed. Stationarity testing, autocorrelation, multivariate collinearity, multivariate normality,

heteroscedasticity and normality testing are among the diagnostic procedures utilized in this study.

4.3.1 Multicollinearity Test

Multicollinearity is a statistical phenomenon that occurs when a number of predictor variables are highly connected. In studies when there are strong correlations between independent variables, the effects on the dependent variable are exaggerated. There is a perfect multicollinearity when a number of variables have multiple linear relationships.

Table 4.2: Multicollinearity Test for Tolerance and VIF

Variable	Collinearity Statistics	
	Tolerance	**VIF**
Real estate investments	0.675	1.481
Listed equity	0.713	1.403
Fixed income investments	0.718	1.393
Fund size	0.698	1.433

Source: Research Findings (2021)

The data was subjected to a Multicollinearity test. The VIF values were combined with the variable's Tolerance. Multicollinearity occurs when the tolerance value is more than 0.2 and the VIF is less than 10. Tolerance values over 0.2 and VIF values below 10 suggested that there was no multicollinearity.

4.3.2 Normality Test

In order to establish normality, Shapiro-Wilk and Kolmogorov-Smirnov tests were used. The list of alternative hypotheses and null hypotheses is below.

H_0: the secondary data was not normally distributed.

H_1 the secondary data was normally distributed

According to this definition, the null hypothesis should be rejected when the p-value is more than 0.05 and accepted when the p-value is less than 0.05; There is a summary of the findings in table 4.3 below.

Table 4.3: Normality Test

	Shapiro-Wilk		
	Statistic	Df	Sig.
Performance	.869	670	.853
Real estate investments	.918	670	.822
Fixed income investments	.881	670	.723
Listed equity	.874	670	.812
Fund size	.892	670	.784
a. Lilliefors Significance Correction			

Source: Research Findings (2021)

The p-value was larger than 0.05, indicating that the null hypothesis was not supported and that the data were thus normally distributed. This data may now be analyzed using ANOVA, Pearson's correlation, and regression analysis.

4.3.3 Heteroscedasticity Test

Cross-sectional units tend to exhibit homoscedastic error processes; however, unit-specific variances are more common and are referred to as group-wise heteroscedasticity. Residuals are used to compute Breuch Pagan group-wise heteroscedasticity when the command with the highest weight is used. Null hypothesis states that $\sigma 2i = \sigma 2$ for i =1t...Ng, where Ng is the number of cross-sectional units.

Table 4.4: Heteroscedasticity Test

Modified Wald test for group wise heteroscedasticity
H0: sigma(i) 2 = sigma 2 for all i
chi2 (670) = 324.67
Prob>chi2 = 0.1219

Source: Research Findings (2021)

The calculated p-value indicates that the null hypothesis of Homoscedastic error terms was not rejected since the p value was greater than 0.05 at 0.1219.

4.3.4 Autocorrelation Test

The researcher was concerned that the introduction of serial correlation into their model would cause inaccurate results and carried a test to detect this kind of serial correlation, the Breusch-Godfrey autocorrelation test was utilized.

Table 4.5: Test of Autocorrelation

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 669) = 0.318
Prob> F = 0.5648

Source: Research Findings (2021)

Table 4.5 shows that the null hypothesis of no serial link is not rejected since the p-value of 0.5648 is higher than 0.05.

4.3.5 Stationarity Test

Table 4.6 displays the results of the Levin-Lin Chu unit root test. All variables had p-values less than 0.05 indicating that the panel data does not contain unit roots. Panel data for all variables became stationary as a result of this.

Table 4.6: Levin-Lin Chu Unit-Root Test

Levin-Lin Chu unit-root test			
Variable	Hypothesis	p value	Verdict
Performance	Ho: Panels contain unit roots	0.0000	Reject Ho
Real estate investments	Ho: Panels contain unit roots	0.0000	Reject Ho
Fixed income investments	Ho: Panels contain unit roots	0.0000	Reject Ho
Listed equity	Ho: Panels contain unit roots	0.0000	Reject Ho
Fund size	Ho: Panels contain unit roots	0.0000	Reject Ho

Source: Research Findings (2021)

4.4 Correlation Results

For each predictor variable, correlation analysis was performed to determine the degree and direction of the correlation with the response variable. Table 4.7 shows the size and direction of the correlations between the research variables.

Table 4.7: Correlation Results

		ROA	Real estate investments	Fixed income investments	Listed equity	Fund size
ROA	Pearson Correlation	1				
	Sig. (2-tailed)					
Real estate investments	Pearson Correlation	.303**	1			
	Sig. (2-tailed)	.000				
Fixed income investments	Pearson Correlation	.288*	.217**	1		
	Sig. (2-tailed)	.000	.004			
Listed equity	Pearson Correlation	.254**	.038	.298**	1	
	Sig. (2-tailed)	.000	.565	.000		
Fund size	Pearson Correlation	.027	.162*	.195**	.001	1
	Sig. (2-tailed)	.482	.020	.007	.983	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
c. Listwise N=670

Source: Research Findings (2021)

Table 4.7 shows a positive and substantial correlation between real estate investments and performance (r=0.303) at a 5% level of significance. At the 5% significance level, data demonstrate that fixed income investments (r=0.288) is positively and substantially linked to performance. At the 5% level of significance, data suggest that listed equity and performance have a positive and significant correlation (r=0.254). Finally, there was a positive correlation between fund size and performance, although the correlation was not statistically significant.

4.5 Regression Results

Regression analysis was carried out to establish the extent to which financial performance is explained by the selected variables. The regression results were presented in Table 4.8.

Table 4.8: Regression Results

ROA	Coef.	std.err	Z	P>|z|	[95% conf.interval]	
Real estate	0.095	0.025	3.81	0.000	0.046	0.144
Fixed Income	0.082	0.025	3.21	0.001	0.032	0.131
Listed equity	0.033	0.012	2.64	0.008	0.058	0.008
Fund size	0.118	0.099	1.19	0.232	0.312	0.075
_cons	-0.277	0.126	-2.2	0.028	-0.523	-0.030
R squared =0.4735						
Wald chi2(4)=47.88						
Prob>chi2=0.000						

Source: Research Findings (2021)

ROA = -0.277+ 0.095 Real estate investments + 0.082 Fixed income investments+ 0.033 Listed equity investments

Table 4.8 outcomes designate that real estate investments, fixed income investments and listed equity investments had a significant positive effect on performance of pension funds while fund size has no statistically significant influence.

4.6 Discussion of Research Findings

The purpose of this study was to evaluate how real estate investments of Kenyan pension funds impact their performance. Descriptive design was used while the population was the 1340 Kenyan pension funds. The sample size was 10% which translated to 134 pension funds. Secondary data from RBA bulletins and annual reports of individual funds were used in the study. The real estate investments, fund size, fixed income investments, and listed equity investments were all considered predictor factors for the study. Descriptive and inferential statistics were used in the analysis.

27

According to a correlation analysis, the ROA of Kenyan pension funds is highly tied to the makeup of their portfolios. The study found that ROA and real estate investments are closely linked, with an increase in real estate investments leading to an increase in ROA. Both fixed income investments and listed equity investments also exhibited a positive and significant association with ROA of pension funds. There was a positive correlation between fund size and financial performance but the correlation was not statistically significant.

It was shown that 47.35% of the variance in performance of Kenya's pension funds may be attributed to the four factors included in the regression. Because the p-value was less than 0.05, the study's findings had significant predictive potential (0.000). This indicates that the model was able to accurately represent the connection between the study variables. In terms of individual performance, real estate investments, fixed income investments and listed equity are significant predictors of ROA. The results showed that fund size had a positive impact on financial performance, although the effect was not statistically significant.

These findings are in line with Mungai (2017) who researched on the effect of alternative investments on the financial performance of Kenyan pension fund. Alternative investments were venture capital, private equity, immovable property and real estate investment trusts. He found out that majority of pension funds had largest allocation in government securities and quoted equity, with very little allocation in venture capital, private equity and real estate investment trusts. All alternative investments except venture capital and private equity were found to possess positive relationship with pension funds financial performance.

It is also consistent with the results of Kebiro (2019) who assessed how investment decisions affect the efficiency of deposit taking SACCOs in Nairobi. The population of the study was all the 43 deposit taking-SACCOs in Nairobi County, Kenya. The study utilized secondary data from for five years 2014 to 2018 on annual basis. A descriptive cross-sectional design together with the multiple linear regression model were used for the analysis of the variables. The results indicated that investment in government securities, investment in shares and investment in real estate produced positive and statistically significant values for this study while investment in money market securities, firm liquidity, firm size and firm age were found to be statistically insignificant determinants of efficiency.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the preceding chapter and also identifies the study's shortcomings. The study also offers policymakers with recommendations and suggests topics for additional research.

5.2 Summary of Findings

This research sought to find out how real estate investments impact financial performance Kenyan pension funds which was expressed as return on assets (ROA). The selected independent variables were real estate investments, fixed income investments, listed equity, and fund size. A descriptive research approach was adopted. RBA regulatory filings and reports together with the annual reports of individual pension funds were used to collect secondary data which was analysed using STATA software. The data was gathered from the financial reports and annual regulatory filings of the sampled 134 pension funds' and it covered the five-year period from 2016 to 2020.

The first objective was to assess the influence of real estate investments on Kenyan pension funsa performance. At a 5% significance level, the correlation results reveal that real estate investments have a positive association with performance. Furthermore, the correlation was statistically significant. It is clear from the regression findings (β=0.095, p=0.000) that the real estate investments had a positive and substantial influence on pension funds' financial performance in Kenya.

The second goal was to study the influence of fixed income investments on the performance of Kenyan pension funds. Fixed income investments and performance have a

favorable and statistically significant relationship, according to research conducted at a 5% significance level. Regression results reveal that Kenyan pension funds' performance was boosted by fixed income investments to a significant extent ($\beta=0.082$, $p=0.001$).

The third goal was to assess the influence of listed equity on Kenyan pension scheme performance. Correlation statistics at the 5% significance level demonstrate a favorable association between listed equity and performance. Regression analysis revealed a statistically significant association between pension funds' listed equity and performance in Kenya ($\beta=0.033$, $p=0.008$).

The study's fourth objective was to examine how fund size affects Kenyan pension funds' performance. A 5% significance threshold indicated a favorable but not significant relationship between fund size and performance. It was observed that fund size had a favorable but non-significant influence on performance across Kenyan pension funds ($\beta=0.118$, $p=0.232$).

5.3 Conclusions

The research intended to establish the influence of real estate investments on financial performance of pension funds in Kenya. The study concludes that real estate investments have a significant influence on performance. This indicates that pension funds with high levels of investment in real estate will outperform those with low levels of real estate investment holding other factors constant.

The study discovered a strong link between fixed income investments and performance, indicating that pension funds with a higher proportion of fixed income investments perform better than those with less fixed income investments. Fixed income investments guarantee a pension fund a given amount of passive income on a funds' investment.

The research found a favorable and substantial influence of listed equity investments on performance of pension funds in Kenya. This may indicate that pension funds with more investments in listed equity outperform those with fewer investments in listed equity holding all other factors constant.

These findings are in line with Ferreira, Zanini and Alves (2019) who investigated the impact of revenue diversification on the risk and return of Brazilian banks. A sample was for the five-year period 2003 to 2014 was analysed by use of dynamic panel data generalized method of moments. The findings reveal that diversification into non-interest income had a major role in the financial performance of the studied banks.

5.4 Recommendations for Policy and Practice

The study suggests that diversifying one's portfolio into real estate investments may assist to increase financial performance. Therefore, the research proposes that policymakers among Kenya's pension funds develop rules that boost diversification into the real estate investments available, since this would result in an improvement of the performance of pension funds in the long run. Pension funds trustees should also advocate for an increase in real estate investments to enhance the return on investment.

Furthermore, it was shown that fixed income investments had a favorable link with performance. Therefore, the report suggests that Kenyan pension funds try to have more fixed income investments, since this will assist them in having a secure source of investment and which can be used as a security in case a short-term investment opportunity arises.

The study further found that diversifying one's portfolio into listed equity investments may assist increase performance. Therefore, the research proposes that policymakers among

Kenya's pension funds develop rules that boost diversification into the listed equity investments available, since this would result in an improvement of the performance of pension funds in the long run. Pension funds board members should also advocate for an increase in listed equity investments to enhance the return on investment.

5.5 Limitations of the Study

The debate focused on some of the aspects that are thought to influence the performance of Kenya's pension funds. There were four explanatory factors in particular that were examined in this research. In addition to these factors, there are a number of other factors that might affect the financial performance of pension funds. Some are within the control of the plan, such as management quality, while others are out of the control of management, such as the unemployment rate and political instability, and are thus difficult to regulate.

The investigation made use of quantitative secondary data. In addition, qualitative data that might explain additional variables that impact the link between real estate investments and pension funds' performance were not taken into consideration in the research. Qualitative approaches such as focus groups, open-ended surveys, and interviews may assist in the production of more specific results.

The study lasted five years (2016 to 2020). It is uncertain whether the effects will last long. Also unknown is whether or not comparable outcomes will be reached beyond 2020. For the research to be comprehensive, it should have been done over a longer period of time to account for major economic developments.

The researcher examined the data using an OLS regression model. There were many drawbacks to applying regression models, including the possibility of erroneous and misleading results, which may cause the value of a variable to vary, which made it

impossible to accurately generalize the findings of the study. In addition, if more data were included in the regression, the outcome may be significantly different.

5.6 Suggestions for Further Research

The study's data had an R square of 47.35%. The study's results show that additional factors impact the performance of Kenyan pension funds that were not considered. Other researches ought thus to focus on other factors for example; management quality, contributions, inflation rate, economic growth and political stability among other factors that affect performance among pension funds.

The study was limited to pension funds in Kenya. Additional research can be carried on a comparative study of pension funds in Kenya with other countries. Future research should look into how real estate investments affect other factors besides the performance, such as growth, efficiency, development, stability among others.

Because of the readily available data, the focus of this research was drawn to the last five years. Future studies may span a longer time period, such as ten or twenty years, and might have a significant impact on this study by either complementing or contradicting its conclusions. A longer study allows the researcher to catch the influence of business cycles such as booms and busts.

A regression model, which depended on a variable being changed, had its own set of restrictions. Methods like the Vector Error Correction Model (VECM) may help investigate the many relationships between real estate investments and performance of pension funds.

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APPENDICES

Appendix I: Research Data

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
1	2016	0.027	0.144	0.274	0.121	8.216
1	2017	0.022	0.151	0.411	0.259	8.218
1	2018	0.013	0.172	0.515	0.362	8.251
1	2019	0.012	0.165	0.357	0.204	8.269
1	2020	0.007	0.160	0.460	0.207	8.317
2	2016	0.033	0.235	0.140	0.013	8.338
2	2017	0.041	0.216	0.160	0.007	8.424
2	2018	0.039	0.242	0.163	0.010	8.414
2	2019	0.031	0.271	0.138	0.015	8.456
2	2020	0.039	0.305	0.155	0.002	8.486
3	2016	0.050	0.250	0.260	0.207	8.207
3	2017	0.039	0.162	0.338	0.185	8.288
3	2018	0.039	0.160	0.357	0.305	8.377
3	2019	0.036	0.184	0.322	0.270	8.425
3	2020	0.028	0.179	0.312	0.309	8.452
4	2016	0.011	0.129	0.387	0.234	7.558
4	2017	0.015	0.127	0.370	0.347	7.620
4	2018	0.003	0.159	0.373	0.220	7.588
4	2019	-0.016	0.164	0.332	0.339	7.565
4	2020	0.000	0.162	0.344	0.291	7.541
5	2016	0.041	0.405	0.045	0.107	8.058
5	2017	0.039	0.415	0.078	0.074	8.124
5	2018	0.031	0.344	0.302	0.150	8.166
5	2019	0.039	0.423	0.297	0.144	8.229
5	2020	0.050	0.357	0.236	0.084	8.329
6	2016	0.021	0.159	0.338	0.186	8.577
6	2017	0.025	0.150	0.293	0.141	8.628
6	2018	0.025	0.153	0.353	0.300	8.651
6	2019	0.003	0.159	0.349	0.296	8.699
6	2020	-0.015	0.150	0.455	0.222	8.730
7	2016	0.061	0.150	0.133	0.020	8.002
7	2017	0.043	0.108	0.046	0.107	8.051
7	2018	0.032	0.110	0.006	0.147	8.049
7	2019	0.041	0.094	0.035	0.118	8.143
7	2020	0.036	0.079	0.161	0.009	8.160

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
8	2016	0.029	0.320	0.167	0.014	7.982
8	2017	0.031	0.354	0.186	0.033	8.026
8	2018	0.025	0.273	0.218	0.065	8.077
8	2019	0.025	0.280	0.185	0.032	8.189
8	2020	0.032	0.260	0.125	0.028	8.282
9	2016	0.008	0.161	0.304	0.351	8.020
9	2017	-0.006	0.135	0.342	0.290	8.044
9	2018	-0.018	0.179	0.299	0.246	7.973
9	2019	0.003	0.179	0.242	0.389	7.974
9	2020	-0.015	0.185	0.251	0.298	7.995
10	2016	0.025	0.150	0.362	0.209	8.188
10	2017	0.025	0.108	0.343	0.190	8.236
10	2018	0.032	0.110	0.352	0.399	8.271
10	2019	0.008	0.094	0.441	0.289	8.329
10	2020	0.009	0.079	0.463	0.311	8.351
11	2016	0.019	0.307	0.311	0.158	8.390
11	2017	0.033	0.266	0.265	0.112	8.480
11	2018	0.034	0.172	0.302	0.349	8.528
11	2019	0.027	0.149	0.054	0.401	8.572
11	2020	0.004	0.228	0.091	0.438	8.626
12	2016	0.050	0.198	0.238	0.285	7.206
12	2017	0.039	0.205	0.232	0.279	7.199
12	2018	0.039	0.189	0.292	0.239	7.224
12	2019	0.036	0.177	0.359	0.206	7.319
12	2020	0.028	0.185	0.352	0.199	7.355
13	2016	0.033	0.225	0.332	0.279	7.723
13	2017	0.041	0.306	0.392	0.139	7.677
13	2018	0.039	0.325	0.159	0.206	7.537
13	2019	0.031	0.250	0.252	0.199	7.499
13	2020	0.039	0.197	0.177	0.330	7.479
14	2016	-0.036	0.089	0.228	0.076	7.687
14	2017	-0.026	0.123	0.379	0.226	7.724
14	2018	-0.008	0.107	0.280	0.128	7.561
14	2019	0.002	0.175	0.345	0.193	7.625
14	2020	-0.041	0.163	0.347	0.294	7.619
15	2016	-0.036	0.226	0.228	0.076	8.216
15	2017	0.004	0.191	0.379	0.226	8.218
15	2018	-0.020	0.203	0.280	0.128	8.251
15	2019	-0.031	0.188	0.345	0.193	8.269

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
15	2020	-0.053	0.208	0.247	0.294	8.317
16	2016	0.019	0.158	0.385	0.232	7.392
16	2017	0.033	0.148	0.381	0.229	7.391
16	2018	0.034	0.112	0.267	0.315	7.427
16	2019	0.027	0.153	0.243	0.290	7.495
16	2020	0.004	0.140	0.295	0.342	7.609
17	2016	0.018	0.180	0.385	0.232	7.709
17	2017	0.015	0.210	0.281	0.229	7.793
17	2018	0.018	0.200	0.267	0.315	7.796
17	2019	0.015	0.212	0.100	0.053	7.809
17	2020	0.015	0.209	0.263	0.110	7.739
18	2016	0.024	0.164	0.303	0.150	8.142
18	2017	0.012	0.156	0.309	0.156	8.216
18	2018	0.004	0.209	0.263	0.310	8.248
18	2019	-0.001	0.205	0.241	0.288	8.287
18	2020	-0.004	0.216	0.235	0.082	8.293
19	2016	0.040	0.284	0.203	0.150	7.027
19	2017	0.042	0.182	0.309	0.156	7.000
19	2018	0.023	0.139	0.305	0.153	6.977
19	2019	0.041	0.140	0.287	0.134	6.937
19	2020	0.041	0.119	0.300	0.147	6.934
20	2016	0.018	0.227	0.201	0.048	6.858
20	2017	0.015	0.225	0.234	0.081	6.861
20	2018	0.018	0.210	0.320	0.167	6.961
20	2019	0.015	0.154	0.292	0.139	7.039
20	2020	0.015	0.199	0.321	0.168	7.118
21	2016	0.016	0.161	0.346	0.194	8.338
21	2017	0.019	0.190	0.338	0.185	8.424
21	2018	0.019	0.189	0.316	0.164	8.414
21	2019	0.016	0.202	0.306	0.153	8.456
21	2020	0.016	0.182	0.310	0.157	8.486
22	2016	0.045	0.260	0.231	0.078	8.338
22	2017	0.045	0.260	0.250	0.297	8.424
22	2018	0.047	0.270	0.288	0.235	6.761
22	2019	0.028	0.163	0.321	0.168	6.794
22	2020	0.037	0.201	0.320	0.167	8.288
23	2016	0.027	0.295	0.060	0.213	8.207
23	2017	0.017	0.238	0.208	0.055	8.288
23	2018	0.013	0.151	0.041	0.112	8.377

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
23	2019	0.016	0.181	0.152	0.001	8.425
23	2020	0.011	0.177	0.300	0.247	8.452
24	2016	0.045	0.300	0.315	0.162	8.486
24	2017	0.045	0.236	0.373	0.221	8.338
24	2018	0.047	0.173	0.246	0.093	8.424
24	2019	0.028	0.162	0.234	0.082	6.072
24	2020	0.037	0.155	0.169	0.016	6.505
25	2016	0.042	0.238	0.489	0.136	7.511
25	2017	0.041	0.211	0.091	0.416	7.538
25	2018	0.043	0.216	0.148	0.223	7.508
25	2019	0.039	0.213	0.191	0.047	7.640
25	2020	0.036	0.228	0.239	0.286	7.651
26	2016	0.027	0.144	0.274	0.121	8.390
26	2017	0.022	0.151	0.411	0.259	8.480
26	2018	0.013	0.172	0.515	0.362	8.528
26	2019	0.012	0.165	0.357	0.204	8.572
26	2020	0.007	0.160	0.460	0.207	8.626
27	2016	0.033	0.235	0.140	0.013	7.673
27	2017	0.041	0.216	0.160	0.007	7.797
27	2018	0.039	0.242	0.163	0.010	7.617
27	2019	0.031	0.271	0.138	0.015	7.675
27	2020	0.039	0.305	0.155	0.002	7.686
28	2016	0.050	0.250	0.260	0.207	7.125
28	2017	0.039	0.162	0.338	0.185	7.092
28	2018	0.039	0.160	0.357	0.305	7.102
28	2019	0.036	0.184	0.322	0.270	7.169
28	2020	0.028	0.179	0.312	0.309	7.165
29	2016	0.011	0.129	0.387	0.234	7.469
29	2017	0.015	0.127	0.370	0.347	7.421
29	2018	0.003	0.159	0.373	0.220	7.434
29	2019	-0.016	0.164	0.332	0.339	7.441
29	2020	0.000	0.162	0.344	0.291	7.458
30	2016	0.041	0.405	0.045	0.107	7.102
30	2017	0.039	0.415	0.078	0.074	7.097
30	2018	0.031	0.344	0.302	0.150	7.090
30	2019	0.039	0.423	0.297	0.144	7.118
30	2020	0.050	0.357	0.236	0.084	7.125
31	2016	0.021	0.159	0.338	0.186	7.198
31	2017	0.025	0.150	0.293	0.141	7.279

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
31	2018	0.025	0.153	0.353	0.300	7.338
31	2019	0.003	0.159	0.349	0.296	7.416
31	2020	-0.015	0.150	0.455	0.222	7.426
32	2016	0.061	0.150	0.133	0.020	6.505
32	2017	0.043	0.108	0.046	0.107	7.511
32	2018	0.032	0.110	0.006	0.147	7.538
32	2019	0.041	0.094	0.035	0.118	7.508
32	2020	0.036	0.079	0.161	0.009	7.640
33	2016	0.029	0.320	0.167	0.014	7.651
33	2017	0.031	0.354	0.186	0.033	8.390
33	2018	0.025	0.273	0.218	0.065	8.480
33	2019	0.025	0.280	0.185	0.032	8.528
33	2020	0.032	0.260	0.125	0.028	8.572
34	2016	0.008	0.161	0.304	0.351	8.626
34	2017	-0.006	0.135	0.342	0.290	7.673
34	2018	-0.018	0.179	0.299	0.246	7.797
34	2019	0.003	0.179	0.242	0.389	7.617
34	2020	-0.015	0.185	0.251	0.298	7.675
35	2016	0.025	0.150	0.362	0.209	7.686
35	2017	0.025	0.108	0.343	0.190	7.125
35	2018	0.032	0.110	0.352	0.399	7.092
35	2019	0.008	0.094	0.441	0.289	7.102
35	2020	0.009	0.079	0.463	0.311	7.169
36	2016	0.019	0.307	0.311	0.158	7.165
36	2017	0.033	0.266	0.265	0.112	7.469
36	2018	0.034	0.172	0.302	0.349	7.421
36	2019	0.027	0.149	0.054	0.401	7.434
36	2020	0.004	0.228	0.091	0.438	7.441
37	2016	0.050	0.198	0.238	0.285	7.458
37	2017	0.039	0.205	0.232	0.279	7.102
37	2018	0.039	0.189	0.292	0.239	7.097
37	2019	0.036	0.177	0.359	0.206	7.090
37	2020	0.028	0.185	0.352	0.199	7.118
38	2016	0.033	0.225	0.332	0.279	7.125
38	2017	0.041	0.306	0.392	0.139	7.198
38	2018	0.039	0.325	0.159	0.206	7.279
38	2019	0.031	0.250	0.252	0.199	7.338
38	2020	0.039	0.197	0.177	0.330	7.416
39	2016	-0.036	0.089	0.228	0.076	7.426

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
39	2017	-0.026	0.123	0.379	0.226	8.216
39	2018	-0.008	0.107	0.280	0.128	8.248
39	2019	0.002	0.175	0.345	0.193	8.287
39	2020	-0.041	0.163	0.347	0.294	8.293
40	2016	-0.036	0.226	0.228	0.076	7.027
40	2017	0.004	0.191	0.379	0.226	7.000
40	2018	-0.020	0.203	0.280	0.128	6.977
40	2019	-0.031	0.188	0.345	0.193	6.937
40	2020	-0.053	0.208	0.247	0.294	6.934
41	2016	0.019	0.158	0.385	0.232	6.858
41	2017	0.033	0.148	0.381	0.229	6.861
41	2018	0.034	0.112	0.267	0.315	6.961
41	2019	0.027	0.153	0.243	0.290	7.039
41	2020	0.004	0.140	0.295	0.342	7.118
42	2016	0.018	0.180	0.385	0.232	8.338
42	2017	0.015	0.210	0.281	0.229	8.424
42	2018	0.018	0.200	0.267	0.315	8.414
42	2019	0.015	0.212	0.100	0.053	8.456
42	2020	0.015	0.209	0.263	0.110	8.486
43	2016	0.024	0.164	0.303	0.150	8.338
43	2017	0.012	0.156	0.309	0.156	8.424
43	2018	0.004	0.209	0.263	0.310	6.761
43	2019	-0.001	0.205	0.241	0.288	6.794
43	2020	-0.004	0.216	0.235	0.082	8.288
44	2016	0.040	0.284	0.203	0.150	8.216
44	2017	0.042	0.182	0.309	0.156	8.218
44	2018	0.023	0.139	0.305	0.153	8.251
44	2019	0.041	0.140	0.287	0.134	8.269
44	2020	0.041	0.119	0.300	0.147	8.317
45	2016	0.018	0.227	0.201	0.048	8.338
45	2017	0.015	0.225	0.234	0.081	8.424
45	2018	0.018	0.210	0.320	0.167	8.414
45	2019	0.015	0.154	0.292	0.139	8.456
45	2020	0.015	0.199	0.321	0.168	8.486
46	2016	0.016	0.161	0.346	0.194	8.207
46	2017	0.019	0.190	0.338	0.185	8.288
46	2018	0.019	0.189	0.316	0.164	8.377
46	2019	0.016	0.202	0.306	0.153	8.425
46	2020	0.016	0.182	0.310	0.157	8.452

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
47	2016	0.045	0.260	0.231	0.078	7.558
47	2017	0.045	0.260	0.250	0.297	7.620
47	2018	0.047	0.270	0.288	0.235	7.588
47	2019	0.028	0.163	0.321	0.168	7.565
47	2020	0.037	0.201	0.320	0.167	7.541
48	2016	0.027	0.295	0.060	0.213	8.058
48	2017	0.017	0.238	0.208	0.055	8.124
48	2018	0.013	0.151	0.041	0.112	8.166
48	2019	0.016	0.181	0.152	0.001	8.229
48	2020	0.011	0.177	0.300	0.247	8.329
49	2016	0.045	0.300	0.315	0.162	8.577
49	2017	0.045	0.236	0.373	0.221	8.628
49	2018	0.047	0.173	0.246	0.093	8.651
49	2019	0.028	0.162	0.234	0.082	8.699
49	2020	0.037	0.155	0.169	0.016	8.730
50	2016	0.042	0.238	0.489	0.136	8.002
50	2017	0.041	0.211	0.091	0.416	8.051
50	2018	0.043	0.216	0.148	0.223	8.049
50	2019	0.039	0.213	0.191	0.047	8.143
50	2020	0.036	0.228	0.239	0.286	8.160
51	2016	0.027	0.144	0.274	0.121	7.982
51	2017	0.022	0.151	0.411	0.259	8.026
51	2018	0.013	0.172	0.515	0.362	8.077
51	2019	0.012	0.165	0.357	0.204	8.189
51	2020	0.007	0.160	0.460	0.207	8.282
52	2016	0.033	0.235	0.140	0.013	8.020
52	2017	0.041	0.216	0.160	0.007	8.044
52	2018	0.039	0.242	0.163	0.010	7.973
52	2019	0.031	0.271	0.138	0.015	7.974
52	2020	0.039	0.305	0.155	0.002	7.995
53	2016	0.050	0.250	0.260	0.207	8.188
53	2017	0.039	0.162	0.338	0.185	8.236
53	2018	0.039	0.160	0.357	0.305	8.271
53	2019	0.036	0.184	0.322	0.270	8.329
53	2020	0.028	0.179	0.312	0.309	8.351
54	2016	0.011	0.129	0.387	0.234	8.390
54	2017	0.015	0.127	0.370	0.347	8.480
54	2018	0.003	0.159	0.373	0.220	8.528
54	2019	-0.016	0.164	0.332	0.339	8.572

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
54	2020	0.000	0.162	0.344	0.291	8.626
55	2016	0.041	0.405	0.045	0.107	7.206
55	2017	0.039	0.415	0.078	0.074	7.199
55	2018	0.031	0.344	0.302	0.150	7.224
55	2019	0.039	0.423	0.297	0.144	7.319
55	2020	0.050	0.357	0.236	0.084	7.355
56	2016	0.021	0.159	0.338	0.186	7.723
56	2017	0.025	0.150	0.293	0.141	7.677
56	2018	0.025	0.153	0.353	0.300	7.537
56	2019	0.003	0.159	0.349	0.296	7.499
56	2020	-0.015	0.150	0.455	0.222	7.479
57	2016	0.061	0.150	0.133	0.020	7.687
57	2017	0.043	0.108	0.046	0.107	7.724
57	2018	0.032	0.110	0.006	0.147	7.561
57	2019	0.041	0.094	0.035	0.118	7.625
57	2020	0.036	0.079	0.161	0.009	7.619
58	2016	0.029	0.320	0.167	0.014	8.216
58	2017	0.031	0.354	0.186	0.033	8.218
58	2018	0.025	0.273	0.218	0.065	8.251
58	2019	0.025	0.280	0.185	0.032	8.269
58	2020	0.032	0.260	0.125	0.028	8.317
59	2016	0.008	0.161	0.304	0.351	7.392
59	2017	-0.006	0.135	0.342	0.290	7.391
59	2018	-0.018	0.179	0.299	0.246	7.427
59	2019	0.003	0.179	0.242	0.389	7.495
59	2020	-0.015	0.185	0.251	0.298	7.609
60	2016	0.025	0.150	0.362	0.209	7.709
60	2017	0.025	0.108	0.343	0.190	7.793
60	2018	0.032	0.110	0.352	0.399	7.796
60	2019	0.008	0.094	0.441	0.289	7.809
60	2020	0.009	0.079	0.463	0.311	7.739
61	2016	0.019	0.307	0.311	0.158	8.142
61	2017	0.033	0.266	0.265	0.112	8.216
61	2018	0.034	0.172	0.302	0.349	8.248
61	2019	0.027	0.149	0.054	0.401	8.287
61	2020	0.004	0.228	0.091	0.438	8.293
62	2016	0.050	0.198	0.238	0.285	7.027
62	2017	0.039	0.205	0.232	0.279	7.000
62	2018	0.039	0.189	0.292	0.239	6.977

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
62	2019	0.036	0.177	0.359	0.206	6.937
62	2020	0.028	0.185	0.352	0.199	6.934
63	2016	0.033	0.225	0.332	0.279	6.858
63	2017	0.041	0.306	0.392	0.139	6.861
63	2018	0.039	0.325	0.159	0.206	6.961
63	2019	0.031	0.250	0.252	0.199	7.039
63	2020	0.039	0.197	0.177	0.330	7.118
64	2016	-0.036	0.089	0.228	0.076	8.338
64	2017	-0.026	0.123	0.379	0.226	8.424
64	2018	-0.008	0.107	0.280	0.128	8.414
64	2019	0.002	0.175	0.345	0.193	8.456
64	2020	-0.041	0.163	0.347	0.294	8.486
65	2016	-0.036	0.226	0.228	0.076	8.338
65	2017	0.004	0.191	0.379	0.226	8.424
65	2018	-0.020	0.203	0.280	0.128	6.761
65	2019	-0.031	0.188	0.345	0.193	6.794
65	2020	-0.053	0.208	0.247	0.294	8.288
66	2016	0.019	0.158	0.385	0.232	8.207
66	2017	0.033	0.148	0.381	0.229	8.288
66	2018	0.034	0.112	0.267	0.315	8.377
66	2019	0.027	0.153	0.243	0.290	8.425
66	2020	0.004	0.140	0.295	0.342	8.452
67	2016	0.018	0.180	0.385	0.232	8.486
67	2017	0.015	0.210	0.281	0.229	8.338
67	2018	0.018	0.200	0.267	0.315	8.424
67	2019	0.015	0.212	0.100	0.053	6.072
67	2020	0.015	0.209	0.263	0.110	6.505
68	2016	0.024	0.164	0.303	0.150	7.511
68	2017	0.012	0.156	0.309	0.156	7.538
68	2018	0.004	0.209	0.263	0.310	7.508
68	2019	-0.001	0.205	0.241	0.288	7.640
68	2020	-0.004	0.216	0.235	0.082	7.651
69	2016	0.040	0.284	0.203	0.150	8.390
69	2017	0.042	0.182	0.309	0.156	8.480
69	2018	0.023	0.139	0.305	0.153	8.528
69	2019	0.041	0.140	0.287	0.134	8.572
69	2020	0.041	0.119	0.300	0.147	8.626
70	2016	0.018	0.227	0.201	0.048	7.673
70	2017	0.015	0.225	0.234	0.081	7.797

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
70	2018	0.018	0.210	0.320	0.167	7.617
70	2019	0.015	0.154	0.292	0.139	7.675
70	2020	0.015	0.199	0.321	0.168	7.686
71	2016	0.016	0.161	0.346	0.194	7.125
71	2017	0.019	0.190	0.338	0.185	7.092
71	2018	0.019	0.189	0.316	0.164	7.102
71	2019	0.016	0.202	0.306	0.153	7.169
71	2020	0.016	0.182	0.310	0.157	7.165
72	2016	0.045	0.260	0.231	0.078	7.469
72	2017	0.045	0.260	0.250	0.297	7.421
72	2018	0.047	0.270	0.288	0.235	7.434
72	2019	0.028	0.163	0.321	0.168	7.441
72	2020	0.037	0.201	0.320	0.167	7.458
73	2016	0.027	0.295	0.060	0.213	7.102
73	2017	0.017	0.238	0.208	0.055	7.097
73	2018	0.013	0.151	0.041	0.112	7.090
73	2019	0.016	0.181	0.152	0.001	7.118
73	2020	0.011	0.177	0.300	0.247	7.125
74	2016	0.045	0.300	0.315	0.162	7.198
74	2017	0.045	0.236	0.373	0.221	7.279
74	2018	0.047	0.173	0.246	0.093	7.338
74	2019	0.028	0.162	0.234	0.082	7.416
74	2020	0.037	0.155	0.169	0.016	7.426
75	2016	0.042	0.238	0.489	0.136	6.505
75	2017	0.041	0.211	0.091	0.416	7.511
75	2018	0.043	0.216	0.148	0.223	7.538
75	2019	0.039	0.213	0.191	0.047	7.508
75	2020	0.027	0.144	0.274	0.121	7.640
76	2016	0.022	0.151	0.411	0.259	7.651
76	2017	0.013	0.172	0.515	0.362	8.390
76	2018	0.012	0.165	0.357	0.204	8.480
76	2019	0.007	0.160	0.460	0.207	8.528
76	2020	0.033	0.235	0.140	0.013	8.572
77	2016	0.041	0.216	0.160	0.007	8.626
77	2017	0.039	0.242	0.163	0.010	7.673
77	2018	0.031	0.271	0.138	0.015	7.797
77	2019	0.039	0.305	0.155	0.002	7.617
77	2020	0.050	0.250	0.260	0.207	7.675
78	2016	0.039	0.162	0.338	0.185	7.686

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
78	2017	0.039	0.160	0.357	0.305	7.125
78	2018	0.036	0.184	0.322	0.270	7.092
78	2019	0.028	0.179	0.312	0.309	7.102
78	2020	0.011	0.129	0.387	0.234	7.169
79	2016	0.015	0.127	0.370	0.347	7.165
79	2017	0.003	0.159	0.373	0.220	7.469
79	2018	-0.016	0.164	0.332	0.339	7.421
79	2019	0.000	0.162	0.344	0.291	7.434
79	2020	0.041	0.405	0.045	0.107	7.441
80	2016	0.039	0.415	0.078	0.074	7.458
80	2017	0.031	0.344	0.302	0.150	7.102
80	2018	0.039	0.423	0.297	0.144	7.097
80	2019	0.050	0.357	0.236	0.084	7.090
80	2020	0.021	0.159	0.338	0.186	7.118
81	2016	0.025	0.150	0.293	0.141	7.125
81	2017	0.025	0.153	0.353	0.300	7.198
81	2018	0.003	0.159	0.349	0.296	7.279
81	2019	-0.015	0.150	0.455	0.222	7.338
81	2020	0.061	0.150	0.133	0.020	7.416
82	2016	0.043	0.108	0.046	0.107	7.426
82	2017	0.032	0.110	0.006	0.147	8.216
82	2018	0.041	0.094	0.035	0.118	8.248
82	2019	0.036	0.079	0.161	0.009	8.287
82	2020	0.029	0.320	0.167	0.014	8.293
83	2016	0.031	0.354	0.186	0.033	7.027
83	2017	0.025	0.273	0.218	0.065	7.000
83	2018	0.025	0.280	0.185	0.032	6.977
83	2019	0.032	0.260	0.125	0.028	6.937
83	2020	0.008	0.161	0.304	0.351	6.934
84	2016	-0.006	0.135	0.342	0.290	6.858
84	2017	-0.018	0.179	0.299	0.246	6.861
84	2018	0.003	0.179	0.242	0.389	6.961
84	2019	-0.015	0.185	0.251	0.298	7.039
84	2020	0.025	0.150	0.362	0.209	7.118
85	2016	0.025	0.108	0.343	0.190	8.338
85	2017	0.032	0.110	0.352	0.399	8.424
85	2018	0.008	0.094	0.441	0.289	8.414
85	2019	0.009	0.079	0.463	0.311	8.456
85	2020	0.019	0.307	0.311	0.158	8.486

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
86	2016	0.033	0.266	0.265	0.112	8.338
86	2017	0.034	0.172	0.302	0.349	8.424
86	2018	0.027	0.149	0.054	0.401	6.761
86	2019	0.004	0.228	0.091	0.438	6.794
86	2020	0.050	0.198	0.238	0.285	8.288
87	2016	0.039	0.205	0.232	0.279	8.216
87	2017	0.039	0.189	0.292	0.239	8.218
87	2018	0.036	0.177	0.359	0.206	8.251
87	2019	0.028	0.185	0.352	0.199	8.269
87	2020	0.033	0.225	0.332	0.279	8.317
88	2016	0.041	0.306	0.392	0.139	8.338
88	2017	0.039	0.325	0.159	0.206	8.424
88	2018	0.031	0.250	0.252	0.199	8.414
88	2019	0.039	0.197	0.177	0.330	8.456
88	2020	-0.036	0.089	0.228	0.076	8.486
89	2016	-0.026	0.123	0.379	0.226	8.207
89	2017	-0.008	0.107	0.280	0.128	8.288
89	2018	0.002	0.175	0.345	0.193	8.377
89	2019	-0.041	0.163	0.347	0.294	8.425
89	2020	-0.036	0.226	0.228	0.076	8.452
90	2016	0.004	0.191	0.379	0.226	7.558
90	2017	-0.020	0.203	0.280	0.128	7.620
90	2018	-0.031	0.188	0.345	0.193	7.588
90	2019	-0.053	0.208	0.247	0.294	7.565
90	2020	0.019	0.158	0.385	0.232	7.541
91	2016	0.033	0.148	0.381	0.229	8.058
91	2017	0.034	0.112	0.267	0.315	8.124
91	2018	0.027	0.153	0.243	0.290	8.166
91	2019	0.004	0.140	0.295	0.342	8.229
91	2020	0.018	0.180	0.385	0.232	8.329
92	2016	0.015	0.210	0.281	0.229	8.577
92	2017	0.018	0.200	0.267	0.315	8.628
92	2018	0.015	0.212	0.100	0.053	8.651
92	2019	0.015	0.209	0.263	0.110	8.699
92	2020	0.024	0.164	0.303	0.150	8.730
93	2016	0.012	0.156	0.309	0.156	8.002
93	2017	0.004	0.209	0.263	0.310	8.051
93	2018	-0.001	0.205	0.241	0.288	8.049
93	2019	-0.004	0.216	0.235	0.082	8.143

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
93	2020	0.040	0.284	0.203	0.150	8.160
94	2016	0.042	0.182	0.309	0.156	7.982
94	2017	0.023	0.139	0.305	0.153	8.026
94	2018	0.041	0.140	0.287	0.134	8.077
94	2019	0.041	0.119	0.300	0.147	8.189
94	2020	0.018	0.227	0.201	0.048	8.282
95	2016	0.015	0.225	0.234	0.081	8.020
95	2017	0.018	0.210	0.320	0.167	8.044
95	2018	0.015	0.154	0.292	0.139	7.973
95	2019	0.015	0.199	0.321	0.168	7.974
95	2020	0.016	0.161	0.346	0.194	7.995
96	2016	0.019	0.190	0.338	0.185	8.188
96	2017	0.019	0.189	0.316	0.164	8.236
96	2018	0.016	0.202	0.306	0.153	8.271
96	2019	0.016	0.182	0.310	0.157	8.329
96	2020	0.045	0.260	0.231	0.078	8.351
97	2016	0.045	0.260	0.250	0.297	8.390
97	2017	0.047	0.270	0.288	0.235	8.480
97	2018	0.028	0.163	0.321	0.168	8.528
97	2019	0.037	0.201	0.320	0.167	8.572
97	2020	0.027	0.295	0.060	0.213	8.626
98	2016	0.017	0.238	0.208	0.055	7.206
98	2017	0.013	0.151	0.041	0.112	7.199
98	2018	0.016	0.181	0.152	0.001	7.224
98	2019	0.011	0.177	0.300	0.247	7.319
98	2020	0.045	0.300	0.315	0.162	7.355
99	2016	0.045	0.236	0.373	0.221	7.723
99	2017	0.047	0.173	0.246	0.093	7.677
99	2018	0.028	0.162	0.234	0.082	7.537
99	2019	0.037	0.155	0.169	0.016	7.499
99	2020	0.042	0.238	0.489	0.136	7.479
100	2016	0.041	0.211	0.091	0.416	7.687
100	2017	0.043	0.216	0.148	0.223	7.724
100	2018	0.039	0.213	0.191	0.047	7.561
100	2019	0.036	0.228	0.239	0.286	7.625
100	2020	0.027	0.144	0.274	0.121	7.619
101	2016	0.022	0.151	0.411	0.259	8.216
101	2017	0.013	0.172	0.515	0.362	8.218
101	2018	0.012	0.165	0.357	0.204	8.251

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
101	2019	0.007	0.160	0.460	0.207	8.269
101	2020	0.033	0.235	0.140	0.013	8.317
102	2016	0.041	0.216	0.160	0.007	7.392
102	2017	0.039	0.242	0.163	0.010	7.391
102	2018	0.031	0.271	0.138	0.015	7.427
102	2019	0.039	0.305	0.155	0.002	7.495
102	2020	0.050	0.250	0.260	0.207	7.609
103	2016	0.039	0.162	0.338	0.185	7.709
103	2017	0.039	0.160	0.357	0.305	7.793
103	2018	0.036	0.184	0.322	0.270	7.796
103	2019	0.028	0.179	0.312	0.309	7.809
103	2020	0.011	0.129	0.387	0.234	7.739
104	2016	0.015	0.127	0.370	0.347	8.142
104	2017	0.003	0.159	0.373	0.220	8.216
104	2018	-0.016	0.164	0.332	0.339	8.248
104	2019	0.000	0.162	0.344	0.291	8.287
104	2020	0.041	0.405	0.045	0.107	8.293
105	2016	0.039	0.415	0.078	0.074	7.027
105	2017	0.031	0.344	0.302	0.150	7.000
105	2018	0.039	0.423	0.297	0.144	6.977
105	2019	0.050	0.357	0.236	0.084	6.937
105	2020	0.021	0.159	0.338	0.186	6.934
106	2016	0.025	0.150	0.293	0.141	6.858
106	2017	0.025	0.153	0.353	0.300	6.861
106	2018	0.003	0.159	0.349	0.296	6.961
106	2019	-0.015	0.150	0.455	0.222	7.039
106	2020	0.061	0.150	0.133	0.020	7.118
107	2016	0.043	0.108	0.046	0.107	8.338
107	2017	0.032	0.110	0.006	0.147	8.424
107	2018	0.041	0.094	0.035	0.118	8.414
107	2019	0.036	0.079	0.161	0.009	8.456
107	2020	0.029	0.320	0.167	0.014	8.486
108	2016	0.031	0.354	0.186	0.033	8.338
108	2017	0.025	0.273	0.218	0.065	8.424
108	2018	0.025	0.280	0.185	0.032	6.761
108	2019	0.032	0.260	0.125	0.028	6.794
108	2020	0.008	0.161	0.304	0.351	8.288
109	2016	-0.006	0.135	0.342	0.290	8.207
109	2017	-0.018	0.179	0.299	0.246	8.288

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
109	2018	0.003	0.179	0.242	0.389	8.377
109	2019	-0.015	0.185	0.251	0.298	8.425
109	2020	0.025	0.150	0.362	0.209	8.452
110	2016	0.025	0.108	0.343	0.190	8.486
110	2017	0.032	0.110	0.352	0.399	8.338
110	2018	0.008	0.094	0.441	0.289	8.424
110	2019	0.009	0.079	0.463	0.311	6.072
110	2020	0.019	0.307	0.311	0.158	6.505
111	2016	0.033	0.266	0.265	0.112	7.511
111	2017	0.034	0.172	0.302	0.349	7.538
111	2018	0.027	0.149	0.054	0.401	7.508
111	2019	0.004	0.228	0.091	0.438	7.640
111	2020	0.050	0.198	0.238	0.285	7.651
112	2016	0.039	0.205	0.232	0.279	8.390
112	2017	0.039	0.189	0.292	0.239	8.480
112	2018	0.036	0.177	0.359	0.206	8.528
112	2019	0.028	0.185	0.352	0.199	8.572
112	2020	0.033	0.225	0.332	0.279	8.626
113	2016	0.041	0.306	0.392	0.139	7.673
113	2017	0.039	0.325	0.159	0.206	7.797
113	2018	0.031	0.250	0.252	0.199	7.617
113	2019	0.039	0.197	0.177	0.330	7.675
113	2020	-0.036	0.089	0.228	0.076	7.686
114	2016	-0.026	0.123	0.379	0.226	7.125
114	2017	-0.008	0.107	0.280	0.128	7.092
114	2018	0.002	0.175	0.345	0.193	7.102
114	2019	-0.041	0.163	0.347	0.294	7.169
114	2020	-0.036	0.226	0.228	0.076	7.165
115	2016	0.004	0.191	0.379	0.226	7.469
115	2017	-0.020	0.203	0.280	0.128	7.421
115	2018	-0.031	0.188	0.345	0.193	7.434
115	2019	-0.053	0.208	0.247	0.294	7.441
115	2020	0.019	0.158	0.385	0.232	7.458
116	2016	0.033	0.148	0.381	0.229	7.102
116	2017	0.034	0.112	0.267	0.315	7.097
116	2018	0.027	0.153	0.243	0.290	7.090
116	2019	0.004	0.140	0.295	0.342	7.118
116	2020	0.018	0.180	0.385	0.232	7.125
117	2016	0.015	0.210	0.281	0.229	7.198

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
117	2017	0.018	0.200	0.267	0.315	7.279
117	2018	0.015	0.212	0.100	0.053	7.338
117	2019	0.015	0.209	0.263	0.110	7.416
117	2020	0.024	0.164	0.303	0.150	7.426
118	2016	0.012	0.156	0.309	0.156	6.505
118	2017	0.004	0.209	0.263	0.310	7.511
118	2018	-0.001	0.205	0.241	0.288	7.538
118	2019	-0.004	0.216	0.235	0.082	7.508
118	2020	0.040	0.284	0.203	0.150	7.640
119	2016	0.042	0.182	0.309	0.156	7.651
119	2017	0.023	0.139	0.305	0.153	8.390
119	2018	0.041	0.140	0.287	0.134	8.480
119	2019	0.041	0.119	0.300	0.147	8.528
119	2020	0.018	0.227	0.201	0.048	8.572
120	2016	0.015	0.225	0.234	0.081	8.626
120	2017	0.018	0.210	0.320	0.167	7.673
120	2018	0.015	0.154	0.292	0.139	7.797
120	2019	0.015	0.199	0.321	0.168	7.617
120	2020	0.016	0.161	0.346	0.194	7.675
121	2016	0.019	0.190	0.338	0.185	7.686
121	2017	0.019	0.189	0.316	0.164	7.125
121	2018	0.016	0.202	0.306	0.153	7.092
121	2019	0.016	0.182	0.310	0.157	7.102
121	2020	0.045	0.260	0.231	0.078	7.169
122	2016	0.045	0.260	0.250	0.297	7.165
122	2017	0.047	0.270	0.288	0.235	7.469
122	2018	0.028	0.163	0.321	0.168	7.421
122	2019	0.037	0.201	0.320	0.167	7.434
122	2020	0.027	0.295	0.060	0.213	7.441
123	2016	0.017	0.238	0.208	0.055	7.458
123	2017	0.013	0.151	0.041	0.112	7.102
123	2018	0.016	0.181	0.152	0.001	7.097
123	2019	0.011	0.177	0.300	0.247	7.090
123	2020	0.045	0.300	0.315	0.162	7.118
124	2016	0.045	0.236	0.373	0.221	7.125
124	2017	0.047	0.173	0.246	0.093	7.198
124	2018	0.028	0.162	0.234	0.082	7.279
124	2019	0.037	0.155	0.169	0.016	7.338
124	2020	0.042	0.238	0.489	0.136	7.416

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
125	2016	0.041	0.211	0.091	0.416	7.426
125	2017	0.043	0.216	0.148	0.223	8.216
125	2018	0.039	0.213	0.191	0.047	8.248
125	2019	0.036	0.228	0.239	0.286	8.287
125	2020	0.027	0.144	0.274	0.121	8.293
126	2016	0.022	0.151	0.411	0.259	7.027
126	2017	0.013	0.172	0.515	0.362	7.000
126	2018	0.012	0.165	0.357	0.204	6.977
126	2019	0.007	0.160	0.460	0.207	6.937
126	2020	0.033	0.235	0.140	0.013	6.934
127	2016	0.041	0.216	0.160	0.007	6.858
127	2017	0.039	0.242	0.163	0.010	6.861
127	2018	0.031	0.271	0.138	0.015	6.961
127	2019	0.039	0.305	0.155	0.002	7.039
127	2020	0.050	0.250	0.260	0.207	7.118
128	2016	0.039	0.162	0.338	0.185	8.338
128	2017	0.039	0.160	0.357	0.305	8.424
128	2018	0.036	0.184	0.322	0.270	8.414
128	2019	0.028	0.179	0.312	0.309	8.456
128	2020	0.011	0.129	0.387	0.234	8.486
129	2016	0.015	0.127	0.370	0.347	8.338
129	2017	0.003	0.159	0.373	0.220	8.424
129	2018	-0.016	0.164	0.332	0.339	6.761
129	2019	0.000	0.162	0.344	0.291	6.794
129	2020	0.041	0.405	0.045	0.107	8.288
130	2016	0.039	0.415	0.078	0.074	8.216
130	2017	0.031	0.344	0.302	0.150	8.218
130	2018	0.039	0.423	0.297	0.144	8.251
130	2019	0.050	0.357	0.236	0.084	8.269
130	2020	0.021	0.159	0.338	0.186	8.317
131	2016	0.025	0.150	0.293	0.141	8.338
131	2017	0.025	0.153	0.353	0.300	8.424
131	2018	0.003	0.159	0.349	0.296	8.414
131	2019	-0.015	0.150	0.455	0.222	8.456
131	2020	0.061	0.150	0.133	0.020	8.486
132	2016	0.043	0.108	0.046	0.107	8.207
132	2017	0.032	0.110	0.006	0.147	8.288
132	2018	0.041	0.094	0.035	0.118	8.377
132	2019	0.036	0.079	0.161	0.009	8.425

Pension Fund	Year	ROA	Real estate	Fixed income	Listed equity	Fund size
132	2020	0.029	0.320	0.167	0.014	8.452
133	2016	0.031	0.354	0.186	0.033	7.558
133	2017	0.025	0.273	0.218	0.065	7.620
133	2018	0.025	0.280	0.185	0.032	7.588
133	2019	0.032	0.260	0.125	0.028	7.565
133	2020	0.008	0.161	0.304	0.351	7.541
134	2016	-0.006	0.135	0.342	0.290	8.058
134	2017	-0.018	0.179	0.299	0.246	8.124
134	2018	0.003	0.179	0.242	0.389	8.166
134	2019	-0.015	0.185	0.251	0.298	8.229
134	2020	0.025	0.150	0.362	0.209	8.329