MODERATED ANALYSIS OF ASSET ALLOCATION AND FINANCIAL PERFORMANCE OF PENSION FUNDS IN KENYA

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Moderated Analysis of Asset Allocation and Financial Performance of Pension Funds in Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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This thesis has been submitted for examination with our approval as the University Supervisors.

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DEDICATION

I dedicate this thesis to my parents; Adan Roba and Halima Tari, my wife Amina Guyo and children; Halima, Guyo and Harun for the relentless support they have given me in the pursuit of my academic endeavors.

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LIST OF ABBREVIATIONS AND ACRONYMS

AFCASS	Alexander Forbes Consulting Actuaries Schemes Survey
AfDB	African Development Bank
AGMs	Annual General Meetings
ARIMA	Autoregressive Integrated Moving Average
AuM	Assets under Management
AVR	Additional Voluntary Contribution
BLM	Black Litterman Model
CAPM	Capital Asset Pricing Model
CCE	Cash and Cash Equivalents
CMA	Capital Markets Authority
CPT	Contemporary Portfolio Theory
DB	Defined Benefit Scheme
DC	Defined Contribution Scheme
EABL	East Africa Breweries Limited
EAC	East African Community
EEC	European Economic Community
EPFs	Employee Provident Funds
FT	Financial Times

G6	Group of Six European Union Member States
GARCH-M	Generalized Autoregressive Conditional Heteroskedasticity in Mean
GDP	Gross Domestic Product
GIPS	Global Investment Performance Standards
IOPS	International Organization of Pension Supervisors
IPS	Investment Policy Statement
KRA	Kenya Revenue Authority
LAPF	Local Authorities Pension Fund
LAPF	Local Authorities Pension Fund
LP	Limited Partners
LPFs	Large Pension Funds
MIDAS	Mixed Data Sampling Approach
MPPM	Manipulation Proof Performance Measure
MPT	Modern Portfolio Theory
MV	Mean Variance
MWRR	Money Weighted Rate of Return
NSE	Nairobi Securities Exchange
NSSF	National Social Security Fund
OAG	Office of the Auditor General

OECD	The Organization for Economic Co-operation and Development
PAYG	Pay As You Go
PE	Private Equity
PGF	Pension Guarantee Fund
PMPT	Post Modern Portfolio Theory
PO	Portfolio Optimization
PPF	Parastatal Pension Fund
PPRFs	Private and Public Pension Reserve Funds
PPSSC	Private Pension System Supervisory Commission
PSPF	Public Service Pension Fund
PwC	Price Waterhouse Coopers
RBA	Retirement Benefits Authority
RBI	Reserve Bank of India
REITS	Real Estate Investment Trusts
ROA	Return on Assets
SD	Stochastic Dominance
SSA	Sub Saharan Africa
TWRR	Time Weighted Rate of Return
UK	United Kingdom

UNFPA	United Nations Population Fund
US	United States
VC	Venture Capital

DEFINITION OF TERMS

Financial Performance Financial performance is a broad measure of an organizations overall financial health over a predetermined period of time (Murerwa, 2015).

Government Securities A Government Security is a tradeable instrument issued by the Central Government or the State Governments. Such securities are short term (usually called treasury bills, with original maturities of less than one year) or long term (usually called Government bonds or dated securities with original maturity of one year or more) (RBA, 2021).

Guaranteed Funds A guaranteed fund" means an asset class issued by an approved issuer, whereby the approved issuer, guarantees the accumulated capital of the scheme fund or pooled fund together with the investment income thereof in accordance with the terms of the guaranteed fund contract entered into between the approved issuer and the scheme or pooled fund; or a Retirement Benefits Fund established as a statutory fund within the meaning of the provisions of the Insurance Act in which the capital of the scheme fund or pooled fund together with investment income thereof is guaranteed by the approved issuer in accordance with the terms of the policy of insurance issued to the scheme or pooled fund by the approved issuer (RBA, 2021)

Immovable Property Immovable property comprises land and improvements to land (OECD, 2014).

Listed Corporate Bonds A corporate bond is a long-term contract under which a borrower agrees to make payments of interest and

principal, on specific dates, to the holders of the bond (Brigham & Ehrhardt, 2013).

Portfolio Rebalancing Hong (2021) avers portfolio rebalancing is a tool to manage deviations from intended allocation in a portfolio. He posits that as the performance of portfolio components varies over time, component weights may deviate from their target allocations, exposing investors to a different risk-return profile than that of the intended allocation.

Quoted Equity Investments Equity investments is the portion of money invested within a firm through the purchase of the firm's shares. The investments in equities within the course reflects the daily trading in company stocks (Gathenya, 2015).

Time-Weighted Rate of Return (TWRR) TWRR computes period-by-period returns on an investment and removes the effects of external cash flows, which are generally client-driven, and best reflects the firm's ability to manage assets according to a specified strategy or objective" (GIPS, 2004).

ABSTRACT

The overall returns to pension fund's assets under management have been inconsistent as per reports from the RBA. The overall industry returns for the years 2016, 2017 and 2018 was negative 20%, 0% and 3 respectively. The total assets growth from 2017 to 2019 averaged 3% implying poor investment decisions and also higher expenses for managing the funds. Former employees and retirees of various public sector pension funds have lodged various claims regarding their underpaid pension benefits. NSSF lost Ksh.666.9 million through subscriptions to the botched Imperial and Chase bank corporate bonds. The investment has been cited by the OAG in the audit of the fund's books to June 2019 and bears a qualified opinion. Pension industry investments performance has been subject to significant volatility. Thus, the main objective of this study was to determine moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. The specific objectives of the study were to establish how financial performance of pension funds in Kenya is influenced by investments in the government securities, quoted equity investments, alternative investments, guaranteed funds and listed corporate bonds and to determine the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. This study was informed by modern portfolio theory, risk-return trade off theory, liquidity preference theory, arbitrage pricing theory and post-modern portfolio theory. The study adopted three philosophical positions; positivism, realism and interpretivism. A descriptive research design was used with data collection form used to gather secondary data. Stratified sampling was adopted which was appropriate for getting a sample from the heterogeneous population given the classification of pension funds as small, medium or large. The sample consisted of 294 registered schemes. Secondary data was obtained from the RBA for the study variables for the six-year period between 2016 - 2021. The data was analyzed using multiple linear regression and subjected to diagnostic tests. The study findings revealed that portfolio rebalancing played a moderating influence on the influence of asset allocation on the financial performance of pension funds in Kenya. The study established positive and significant influence of Kenyan government securities, alternative investments and guaranteed funds and a negative and significant influence of alternative investments and listed corporate bonds on pension fund performance. Based on the study findings, the study concluded that it is incumbent upon the pension fund trustees to ensure the fund manager they select possesses relevant knowledge, skills and competencies in portfolio management. In addition, the Retirement Benefits Authority may revise the exiting investments ceilings placed on different assets to ensure pension funds are able to build more efficient portfolios and rebalance the asset composition where necessary. The study recommends that the trustees and pension fund managers should regularly conduct analysis of pension fund portfolio held and its performance return attribution. In addition, trustees and pension fund managers should be trained in evaluation of pension fund performance so that they are able to participate meaningfully during the AGMs. Finally, the study recommends that RBA regularly reviews the quantitative limits placed on different asset classes to provide more room for creation of robust portfolios especially for alternative investments whose limits are generally low due to perceived risks.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

A pension fund is a pool of resources contributed by the employees to have enough resources to cater to their needs after retirement (Drucker, 2017). Consigli, Moriggia and Uristani (2018) posit that the main purpose of pension funds is to supply means for people to accumulate savings during their productive or working life in preparation for the financing of the consumption needs when they retire from active employment. A pension can perform two basic tasks; firstly, it generates income for individuals based on their previous economic activity (Wang, 2016; Androniceanu, 2017; Papik, 2017). Secondly, a pension can be seen as a type of insurance based on long-term contracts between savers and pension administrators (Hainaut, 2014; De Hann, 2016; Alda, 2017; Wiafe et al., 2017). The pension economics deals with issues of the allocation, recovery and redistribution of scarce resources throughout the life cycle of a saver (Thomas et al, 2014; Sun et al., 2017; Tao et al., 2017; Vassallo et al., 2017).

Juergens and Galvani (2020) aver that social pensions are important in providing social protection for the elderly by ensuring they have some level of basic income, redistributing income among generations, and providing insurance to the elderly. The increased role of pension funds and life-insurance companies in the economy has been bolstered by the aging populations and government policies encouraging private pension saving (Coletta % Zinni, 2013). Population aging is expected to accelerate between the years 2010 and 2030, as more people live to age 65 (AfDB, 2011). Population ageing is one of the most significant trends of the 21st century. It has important and far-reaching implications for all aspects of society. Around the world, two persons celebrate their sixtieth birthday every second – an annual total of almost 58 million sixtieth birthdays. With one in nine persons in the world aged 60 years or over, projected to increase to one in five by 2050, population ageing is a phenomenon that can no longer be ignored (UNFPA, 2012). Forecasts indicate that the elderly will constitute 4.5% of the population by 2030 from 3.2% in 2010. These

statistics underpin the importance of pension and retirement structures in ensuring social well-being of senior citizens. Pension assets have increased faster than GDP over the last two decades, highlighting the growing importance of retirement savings worldwide (OECD, 2022).

As per the Global Pension Statistics Report, 2022 by OECD, pension assets amounted to USD 58.9 trillion in the OECD at the end of 2021 and USD 60.6 trillion when taking into account non-OECD reporting jurisdictions. This is an increase of more than 7% compared to end-2020 when pension assets amounted to USD 54.3 trillion in the OECD and USD 56.3 trillion in the OECD area and beyond. The report states that pension funds mostly invested in bonds and equities at the end of 2021, accounting for more than half of investments in 35 out of 38 OECD countries. Pension assets have increased faster than GDP over the last two decades, highlighting the growing importance of retirement savings worldwide. The ratio between total OECD pension assets and total OECD GDP rose from 59% at end of 2001 to 64% at end of 2011 and 105% at end of 2021. Pension assets in the OECD area therefore exceeded the sum of the GDPs of all OECD countries at the end of 2021. Pension assets have also grown strongly in some non-OECD jurisdictions, exceeding GDP in some cases (OECD, 2022).

As per the RBA, the retirement benefits Assets under Management increased by 4.03 percent from Kshs. Kshs. 1,515.16 billion in June 2022 to Kshs. 1,576.22 billion in December 2022. Compared to the same period last year, the assets grew marginally by 1.86 percent, up from Kshs. 1,547.43 billion in December 2021. The marginal growth of the assets during the period is partly attributed to slow rebound of the financial market after the adverse effects of the Covid-19 pandemic; the uncertainties surrounding the 2022 presidential elections; and the Russia-Ukraine war. The schemes continued to invest heavily in government securities with the asset class accounting for 45.81 percent of the total assets under management. This was followed by guaranteed funds which accounted for 18.91 percent; investments in immovable property and quoted equities accounting for 15.76 percent and 13.66 percent of the total assets under management, respectively (RBA, 2022).

The OECD Global Pension Statistics Report, 2022 states that pension plans recorded positive real investment rates of return (net of investment expenses) in 41 out 70 reporting jurisdictions in 2021. The real net investment return was 3% in the OECD (on average). The report further states that pension plans in a number of jurisdictions did not manage to achieve positive real net investment returns, especially in non-OECD jurisdictions (19 out of 37 non-OECD jurisdictions), accounting for an average investment performance below 0% among non-OECD reporting jurisdictions. According to the ActServ Quarter 4, 2022 Pension Schemes Investment Performance Survey covering a sample size of 422 schemes with a total fund value of about Kshs. 879 billion in Kenya, overall pension fund returns computed for the quarter ending 30 December 2022 was 2.3% compared to 0.7% recorded in the s Quarter 4, 2022 and 3.0% in Q4 2020. The report states that performance was largely driven by gains in Fixed Income and Equity asset classes which increased to 2.9% and -0.1% from 2.2% and -4.4% respectively in Q4 2021 (ActServ, 2022).

Fortuin (2022) states that the savings rate and performance of an investment portfolio during the savings period are crucial in determining retirement income. Nyangoro & Njenga (2022) state that the pension sector in Sub-Saharan Africa (SSA) is characterized by low assets under management, investment in short-term assets (mainly government securities), low returns on investment, and restrictive regulatory frameworks. In Kenya, losses of billions of shillings of pensioners funds attributed to fund performance have been reported. Consequently, pension funds cannot meet their financial obligations when they fall due. Ogungbade et al. (2022) posits that it is vital for pension fund administrators assess the asset mix in the fund management process to avoid over-exposure to any one asset.

Zhao and Sutcliffe (2021) state the asset allocation is one of the most important decisions taken by such schemes. They state that influence on pension funds asset allocation decisions comes from scheme maturity, the scheme's funding ratio and a time trend. Mutula and Kagiri (2018) argue that pension funds need to gauge their financial performance versus long-term optimal benchmarks. The increased linkage between levels of future pensions and the performance of invested assets leads the

participants to situations where their retirement income will be subject to market uncertainties (Miriti, 2014).

1.1.1 Global Perspectives of Asset Allocation and Pension Fund Performance

In terms of global asset allocation, in most countries, bonds and equities were the two main asset classes in which retirement savings were invested at the end of 2021, accounting for more than half of investments in 35 out of 38 OECD countries, and 38 out of 46 other reporting jurisdictions. The combined proportion of bonds and equities was the highest (relative to the size of the portfolio) in Chile (98.2%), Romania (97.9%), the Dominican Republic (97.2%), Poland (97.1%), Mexico (96%), India (95.4%) and the Maldives (95.3%). However, pension providers are facing the materialization of the inflation risk, with inflation potentially undermining the asset values and the investment performance more than expected. The rise of inflation particularly affects the investment performance of some asset classes, such as those providing a fixed nominal stream of income. The rise of inflation may therefore lead to lower or even negative investment rates of return for pension providers, depending on their asset allocation (OECD, 2022).

Ennis (2022) posits that large public pension funds in the United States have piled into largely illiquid alternative investments, such as private equity, private real estate and hedge funds, in recent decades. The average allocation increased from less than 10% in 2001 to more than 30% at June 30, 2021. The motivation for this major asset allocation shift was to provide a diversification benefit plus an alpha owing to market inefficiency and the accessibility of skillful managers. He however states that the public pension fund composite underperformed the benchmark by an average of 1.21% per year over the study period. The margin of underperformance was significant, with a t-statistic of -3.4. The composite underperformed the benchmark consistently, i.e., in 12 of the 13 years of the study period.

Foo and Witkowska (2016) aver that he better performance of the market benchmarks relative to the country pension funds in the US and Europe indicates that the pension fund managers did not construct effective investment portfolios in all the countries and in both periods. The highest stock market returns are observed for

Poland, Germany, and the US for the longer period, and for the US and German stock indexes for the shorter investment period, while the European stock index (Euro Stoxx 50) experienced negative returns. The asset allocation of Latin American pension funds remained relatively conservative compared to the survey average, with an average fixed income allocation of 65%. Brazil (73%), Mexico (70%) and Argentina (65%) were the largest holders of fixed income within the region due to high local interest rates. On the other end of the spectrum, Peru and Colombia held the highest allocations to equities, at 48% and 36%, respectively. For alternative investments, such as hedge funds, real estate, and private equity, Colombia, Peru and Brazil recorded the highest allocations in the region, representing nine, seven and five per cent, respectively (Mercer, 2020).

1.1.2 Regional Perspectives of Asset Allocation and Pension Fund Performance

The number of older persons in SSA is projected to more than triple between 2015 and 2050 (United Nations, 2016). The challenge that SSA countries are likely to face is the low level of pension coverage and access. Fewer than 17 per cent of people of pensionable age in SSA receive an old-age pension, compared with a global average of 68 per cent (ILO, 2017; United Nations, 2016). Arezki and Sy (2016); RisCura (2020) state that pension assets in SSA countries tend to be small, and asset allocation tends to favour equities. The Southern African nations of Botswana, Eswatini, Namibia, and South Africa invest heavily in equities, whereas fixed-income assets (primarily government bonds) make up the majority of asset allocation in Nigeria and East Africa due to local regulations and the lack of alternative investment opportunities (AfDB 2018; Juvonen et al. 2019; RisCura 2020).

The basis of asset allocation takes into account, among other things, the development of regional capital markets, the accessibility of investment possibilities, and familiarity with alternative asset classes. The variety of alternative investment alternatives has increased in several countries due to their diversification into various asset classes. Private equity has attracted investments from nations including Botswana, Namibia, Nigeria, and South Africa (RisCura 2020). Juvonen et al. (2019) posits that the asset allocation of pension funds depends on (among other

factors) market trends, investment strategies, regulation and governance structures, risk appetites, tax structures, and the availability of assets domestically. Asset allocation may also depend on the type of retirement scheme under consideration—for example, in the case of DB pension funds, asset allocation is dependent on the scheme maturity, the funding ratio, and a time trend (Zhao & Sutcliffe, 2021).

Despite the huge pool of pension funds available in most African countries, there is apparent deficit of infrastructure across Africa. Investment of pension funds remains one of the principal opportunities towards the diversification of the economy. On the other hand, in most of the countries, especially African countries, Pension Fund Administrators (PFAs) that are responsible for channeling the funds into economic-enhancing investments have argued that real sector investors are finding it difficult to access accumulated pension funds due to inability to meet criteria in the investment guidelines (Fashola, 2016).

Sanusi and Kapingura (2021) state that pension funds are largely invested in debt assets, followed by listed equities in Africa. They state that pension fund managers on the continent cite the difficulties in allocating assets to economic-enhancing investments such as infrastructure or private equity because of an inability to meet regulated investment criteria. However, the funds that institutional investors often invest in are constrained to meet specific liquidity norms in African nations with well-developed pension systems. For instance, most nations place a cap on unlisted equity exposure, while others outright prohibit it (OECD, 2019).

The bulk of retirement industry assets, currently estimated at over 70 percent on average across the retirement industry, continue to be held in debt securities with the government. This is because the interests on offer are attractive, and these investments are also considered risk free. The perception of “risk free” is one that is continually being evaluated and does not mean the complete absence of risk. Private equity deals are continually reported in the East Africa region. Like stocks, the bulk of participation is by foreign investors seeking exposure to the regional markets not local institutional investors, such as retirement funds. In developed markets,

retirement funds are key investors in private equity given the longer-term nature and attractive return potential (World Bank, 2019).

On the product side, very little innovation has taken place in introducing new investment capabilities to the market. The attempts to introduce product capabilities such as private equity funds, Sub-Saharan market funds and such have not been successful with retirement funds. This has largely been due to a lack of adequate knowledge (awareness) by the trustees. As such, they fear taking a risk and investing in such products. However, some trustees also perceive these as foreign products, and would prefer home-grown solutions (World Bank, 2019).

Felician (2013) states that Tanzania's pension funds have heavily relied on the SSRA guidelines as well as the funds' internal investment policies and guidelines when allocating funds to investment assets. The asset allocation strategies varied from Fund to Fund and had some aspects of the strategic, dynamic, and tactical asset allocation strategies. There is need for periodic reviews of such policies and guidelines to make them relevant to the fast-changing investment and market conditions, as well as having training programmes in place for building the capacity of fund managers towards optimizations techniques.

1.1.3 Local Perspectives of Asset Allocation and Pension Fund Performance

A Ministry of Finance directive of 8 June 2016 provided the investment guidelines within which a pension fund's broad asset classes can invest in. The guidelines were meant to ensure adequate diversification within the approved asset classes. However, the pension funds through the investment policy statements retain full discretion as to which investment to make within any particular asset class. The components of the investment policy statement include objectives and definitions of the document, formulation of the investment strategy, asset allocation, stress and scenario testing, investment profile, portfolio mix, benchmarking with RBA limits and applicable costs (RBA, 2022).

Asset allocation for retirement savings consists of a wide range of assets including cash, bonds, property and equities (shares). Cash and money market instruments such

as T-bills and commercial paper are the most liquid assets, and real estate is among the most illiquid. Liquid assets tend to have lower rates of return than the less illiquid assets. Fund managers should strike a balance between liquidity and desired returns by establishing the minimum level of liquid assets they wish to hold in the investment portfolio (Mwachanya, 2015). The current prescriptive pension regulations, including quantitative asset restrictions on investment vehicles are effective in the short run, but have proved ineffective in the long-term. The results can be interpreted to imply that asset regulations imposing quantitative limits on different asset classes reduce the set of otherwise admissible investment policies with consequential effect on return on investments (Rono et al., 2010).

Asset mix has an immense positive influence on the financial performance of Occupational Pension Schemes. Those schemes that are more conservative will always fetch moderate returns as opposed to those schemes that have aggressive investment policies and act within the regulatory requirements of the Retirement Benefits Authority. The schemes should try as much as possible to come up with investment structures that are aggressive in order to bring forth more returns and justify their existence in the investment market (Namusonge, Sakwa, & Gathogo, 2017). Investment in fixed interest securities, government securities and investment in unquoted securities increased financial performance in individual benefit pension schemes, while investment in quoted securities decreased financial performance in individual benefit retirement schemes. It is prudent to invest in fixed interest securities, government securities, and unquoted securities while it's impudent to invest in quoted securities (Mwangi, 2018).

Asset allocation accounts for the highest percentage of the fund performance of occupational pension scheme in Kenya. Other factors such as asset class timing, choice of investment manager and security selection also affect scheme performance. There is a relationship between different asset classes and fund performance of occupational pension schemes with offshore investment having the strongest correlation (Wanjohi & Kariuki, 2019). Asset allocation explains 28% of the variability of fund returns. The remaining 72% is explained by other factors such as asset class timing, security selections and manager selection. Investments in equities

was relatively more important than investments in fixed deposits in determining the overall performance of the pension funds (Mwachanya, 2015).

1.1.4 Pension Funds in Kenya

Immediately after independence, retirement fund systems were put in place in Kenya. As per the RBA, the first retirement scheme; the National Social Security Fund (NSSF) was established in the year 1965 (RBA, 2000). The Retirement Benefits Act 1997 was introduced in Kenya in the year 2000 for the purposes of regulating the retirement benefits sector. The retirement industry consists of the following; NSSF, registered schemes totaling 1,258, registered individual schemes which are 45 in number, 32 umbrella schemes, the pension scheme for the civil servants, the 26 fund managers, 30 fund administrators, 14 funds custodians and actuarial service providers numbering 18 (RBA, 2022).

The Retirement Benefit Act was enacted to provide a regulatory framework for the retirement benefits industry. The regulatory framework was also required to streamline the industry and gain the required confidence to enable stakeholders and employees save more for retirement and in addition contribute towards raising the national domestic savings rate. The Act brought into existence the Retirement Benefits Authority to supervise the industry's management and development. RBA roles includes to regulate and supervise the establishment and management of retirement benefits schemes; protecting the interest of members and sponsors of retirement benefits schemes; developing and promoting the retirement benefits sector; advising the government on matters relating to retirement benefits and implementing all government policies relating thereto (RBA, 2022).

Prior to the establishment of the RBA, the retirement benefits sector had very little effective regulation and supervision. The interests of retirement scheme members and their beneficiaries were not sufficiently protected. There was anxiety about the design and financial viability of certain retirement plans in the country which called for an appropriate corrective action. The asset classes pension funds in Kenya are allowed to invest in are; cash and demand deposits in licensed banking institutions in the republic of Kenya, fixed deposits, time deposits and certificates of deposits in

institutions licensed under the banking act of the republic of Kenya, listed corporate bonds, mortgage bonds and fixed income instruments; loan stocks approved by the CMA, collective investment schemes incorporated in Kenya and approved by the CMA; commercial paper, non-listed bonds and other debt instruments issued by private companies and collective investment schemes incorporated in Kenya and approved by the CMA, East African community government securities and infrastructure bonds issued by public institutions and collective investment schemes incorporated in the East African community; preference shares and ordinary shares of companies listed in the securities exchange in the East African community); unlisted shares and equity instruments incorporated in Kenya and CMA approved collective investment schemes in Kenya; offshore investments in bank deposits, government securities, listed equities and rated corporate bonds and offshore collective investment schemes reflecting these assets; immovable property in Kenya, guaranteed funds; all exchange traded derivatives contracts approved by the CMA; all listed REITS incorporated in Kenya and authorized by the CMA; private equity and venture capital and any other asset (RBA, 2022).

Under Section 37 of the Retirement Benefits Act (1997), every scheme should maintain a prudent investment policy on the investment of the scheme funds. This is in a bid to maintain the scheme's capital funds and secure market rates of return on such investment. The filing of the IPS helps to maintain the capital funds and secure market returns on such an investment. The Investment Policy Statement represents the broad outlines of the investment principles and strategies to be adopted in managing a pension fund's portfolio (Miriti, 2014). Mannick (2015) states that regulations 2000 of the RBA Act requires that a scheme's IPS is expected to be revised and updated every three 3 years. The IPS must also be prepared under the advice of a professional investment advisor and submitted to the Authority.

Fraser and Jennings (2010) assert that an IPS can serve to identify a client's portfolio objectives and constraints, desired asset mixes, and approaches to monitoring performance. They aver that a well-crafted IPS can help the client and advisor converge on an appropriate risk-return trade-off. An investment policy outlines and prescribes a prudent and acceptable investment philosophy and defines the

investment management procedures and long-term goals for the Investor. The principal reason for developing a long-term investment policy and for putting it in writing is to enable the Investor and advisor to protect the Portfolio from ad hoc revisions of sound long-term policy. He argues that without an investment policy, in times of market turmoil, investors may be inclined to make ad hoc investment decisions that are inconsistent with prudent investment management principles.

1.2 Statement of the Problem

The overall returns to pension fund's assets under management has been inconsistent as per reports from the RBA. The overall industry returns for the years 2016, 2017 and 2018 was negative 20%, 0% and 3 respectively. The negative returns wiped out all the gains which were reported earlier (RBA, 2020). The total assets growth from 2017 to 2019 averaged 3% implying poor investment decisions and also higher expenses for managing the funds (RBA, 2020). Former employees and retirees of various public sector a private pension funds have lodged various claims regarding their underpaid pension benefits with the RBA and the high Court as per petition no. 57 of 2014 against the Trustees of their respective Pension Scheme due to breach of contract by their trustees and administrators (Kenya Law, 2015; RBA, 2016).

The National Social Security Fund (NSSF) lost Ksh.666.9 million through subscriptions to the botched Imperial and Chase bank corporate bonds. The investment has been cited by Office of the Auditor General in the audit of the fund's books to June 2019 and bears a qualified opinion (OAG, 2021). The financial performance of pension funds has in the past come under increased criticism (Gakure & Gakera, 2015). Mutuku, Kathurima, and Toroitich (2013) state that pension industry investments have been subject to significant volatility resulting in large variation in investment performance which contribute to negative returns periods.

Several studies have been conducted on asset allocation by pension funds in Kenya. Nyabuto (2022) investigated effect of portfolio diversification on financial performance of pension funds in Kenya. Akwimbi (2022) sought to find out the effect of corporate governance and investment strategy on financial performance of pension schemes in Kenya. Wanjohi and Kariuki (2019) carried out a study on the

relationship between asset allocation and fund performance of occupational pension schemes in Kenya. Mungai and Elly (2018) studied the effect of alternative investments on the financial performance of pension funds in Kenya. Nzioka (2015) conducted a study on analysis of asset allocation and the financial performance of individual pension schemes in Kenya. Mwachanya (2015) did a study on impact of asset allocation on financial performance of pension funds in Kenya. Ndungu (2014) in his study focused on the effect of asset allocation on the financial performance of pension schemes in Kenya.

The findings of these studies vary in terms of how asset allocation and portfolio rebalancing influences pension fund performance. A great quandary exists to the members of pension funds, elected trustees, fund managers and sponsors as to how the asset allocation and rebalancing of pension fund portfolio influences financial performance of pension funds. In an attempt to improve their performance, different pension funds have different investment policy statements which determine their asset allocation decisions. It is however not clear which assets in a pension fund portfolio and how portfolio rebalancing may influence pension fund performance. Therefore, this study seeks to establish how portfolio rebalancing moderates the influences of asset allocation on the financial performance of pension funds in Kenya.

1.3 Research Objectives

The following section addresses the objectives of the study;

1.3.1 General Objective

The main objective of this study was to assess the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya.

1.3.2 Specific Objectives

The study was guided by the following specific objectives;

1. To establish the influence of the government securities on the financial performance of pension funds in Kenya.
2. To establish the influence of the quoted equity investments on the financial performance of pension funds in Kenya.
3. To establish the influence of the alternative assets on the financial performance of pension funds in Kenya.
4. To determine the influence of the guaranteed funds on the financial performance of pension funds in Kenya
5. To establish the influence of the listed corporate bonds on the financial performance of pension funds in Kenya
6. To determine the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya.

1.4 Research Hypotheses

This study sought to address the following pertinent research hypotheses;

H_{01}: Investment in the government securities do not influence the financial performance of pension funds in Kenya.

H_{02}: Quoted Equity Investments do not influence the financial performance of pension funds in Kenya.

H_{03}: Investments in alternative assets do not influence the financial performance of pension funds in Kenya.

H_{04}: Investments in Guaranteed Funds do not influence the financial performance of pension funds in Kenya.

H_{05}: Investments in Listed corporate bonds do not influence the financial performance of pension funds in Kenya.

H_{06}: Portfolio Rebalancing does not have a moderating influence on the influence of asset allocation on the financial performance of pension funds in Kenya.

1.5 Significance of the Study

The reasons advanced in the problem statement was the primary motivation for this study. However, the study will also provide fund managers, pension fund trustees, the regulator of the retirement benefits sector, theorists and empirical researchers with pertinent information on asset allocation, portfolio rebalancing and financial performance. This will enable them to refocus on the investment guidelines, investment policy statements, asset allocation and portfolio rebalancing decisions and its bearing on the financial performance of pension funds as follows;

1.5.1 Theorists and Researchers

To theorists and researchers, the study adds to the existing body of knowledge and notably provides insights on the influence of asset allocation and portfolio rebalancing on the financial performance of pension funds in Kenya. This can help theorists and researchers understand better the relationships between the variables under study and other confounding variables. It also provides basis for further research on pension funds' investments to determine their economic plausibleness. The study will also provide evidence from a developing country's perspective on the application of the theories anchoring the study. Our understanding of the relationship between research variables is bolstered by theory and empirical findings which will provide useful knowledge to theorists and researchers. Moreover, the study bridges the gap between research and practice.

1.5.2 Fund Managers

To the fund managers, the study will help them critically evaluate their investment policies and movement of assets within acceptable tactical ranges to maximize

retirement returns for the members. An understanding of the relationship may also bolster their thoughts on underlying factors that may influence investment decisions and likely effect on the financial performance of pension funds. The compensation paid to fund managers for their services is anchored on the performance results of the pension funds that they are managing. This study can help them increasingly understand their investment decisions and how it impacts the risks they take, the return to members' funds and their own commissions and fees.

1.5.3 Regulator and Government

To the regulator; the Retirement Benefits Authority; the findings of the study can enable the regulator to appreciate which how investment ceilings imposed by the regulator which affect asset allocation contributes to the financial performance of pension funds, what risks they portend for the fund and the tactical ranges that should be introduced relative to the ceilings imposed. Consequently, this would aid in the revision of the regulatory ceilings placed on different investment classes by the regulator. The Kenyan Government would use the findings of the research for future policy formulation more so in terms of ensuring pension funds are able to meet their members claims without any default as part of financial security for the old population.

1.5.4 Pension Fund Trustees

To the pension funds trustees, the study can guide them in making right decisions in approving investment policy statements for the pension funds. The study findings can be useful in knowing which asset classes in the investment policy statements can have huge significance on their financial performance and consequently assist them in formulating an optimal Investment Policy Statement (IPS). The study can also help evaluate the performance of the fund managers by the trustees and make decisions on their retention.

1.6 Scope of the Study

The study focused on the pension firms that have been in existence for seven years between 2015 and 2021 and registered with the Retirement Benefits Authority (RBA). As at closure of business in December 2021, they were one thousand two hundred and fifty-eight (1,258) pension funds registered with RBA (RBA, 2021). The study, however, used a sample of 294 firms selected using stratified and random selection techniques. The choice of the pension schemes regulated by RBA was informed by availability of information and their significant contribution to savings mobilization and investments in Kenya. The asset classes used in the study are; government securities, quoted equity investments, alternative investment, guaranteed funds and listed corporate bonds. The financial performance measures used was time weighted return. The study used secondary data which was obtained from the annual reports submitted by different schemes to the RBA and also other research papers and market reports prepared by the regulator.

1.7 Limitations of the Study

The study makes noteworthy contributions to academic knowledge, research and practices on moderating influence of portfolio rebalancing on the relationship between asset allocation and financial performance of pension funds in Kenya. In addition, it makes contribution to understanding of individual asset classes and portfolio rebalancing considerations to the players in the pension industry, particularly to existing or potential members, pension managers, policy makers and the government, to make investment decisions that will determine pension performance. However, there are limitations that provide opportunities for further research experienced at the empirical stage of study. The study was limited only to pension schemes registered with the RBA. The data collected is only relevant to this part of the total population. This study emphasized more of quantitative approach rather than qualitative. In addition, RBA data available was only available for the period 2015 to the most current period due to adoption of a new system by the regulator and a new clearly laid down framework to ensure accuracy and completeness of data relayed to the regulator by the pension schemes. Consequently,

the limitations of this study are largely related to the methodologies used. The study had limited previous research studies on the topic particularly from developing countries. The study did not use other variables such as ROE, Tobin's Q, Sharpe's ratio and Profitability to measure financial performance. The study was also limited by fear of privacy of information. The information sought on the independent variables and the dependent variable can only be found in audited accounts and returns submitted by pension schemes to RBS. Given the confidentiality of information, RBA staff were reluctant to provide the information unless duly authorized by the Chief Executive Officer. I wrote to the Chief Executive Officer and assured RBA that the data will purely be used for academic purposes.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In an attempt to explain how portfolio rebalancing moderates the influence of asset allocation on the financial performance of pension funds in Kenya, a number of theories have been proposed by different theorists. These theories and models try to explain how firms can build an optimal investment portfolio to maximize likely return based on a given risk level, direct relationship between expected returns and risk and investors preference for short term maturity liabilities. This chapter reviews both theoretical and empirical literature on the association between portfolio rebalancing, asset allocation, and financial performance of pension funds in Kenya. The chapter develops a conceptual framework for the study. It also interrogates the gaps in studies conducted.

2.2 Theoretical Review

There are different theories developed by different scholars that seek to elucidate the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds. Swanson (2013) explicitly asserts, “The theoretical framework is the structure that can hold or support a theory of a research study”. Grant and Osanloo (2014) aver that the theoretical framework is the “blueprint” for the entire dissertation inquiry. It serves as the guide on which to build and support your study, and also provides the structure to define how you will philosophically, epistemologically, methodologically, and analytically approach the dissertation as a whole. Kivunja (2018) posits that the theoretical framework for your research proposal or thesis is not a summary of your own thoughts about your research. Rather, it is a synthesis of the thoughts of giants in your field of research, as they relate to your proposed research or thesis, as you understand those theories, and how you will use those theories to understand your data. This study is underpinned by modern portfolio theory, risk return trade off theory, liquidity preference theory,

agency theory and post-modern portfolio theory since all of them support both the dependent and predictor variables as shown in the conceptual framework.

2.2.1 Modern Portfolio Theory

This theory was founded by Harry Markowitz in his paper “Portfolio Selection”; published by the Journal of finance in 1952. The theory buttresses the fundamentals underlying the modern portfolio theory and presented the model of portfolio optimization. The presented model is known as the Mean-Variance model (MV model), whose aim was to find the portfolio that creates a balance between the return and the risk which were the two basic constraints of the model; and not to determine the portfolio by which the expected return is maximized (Radović et al. 2018). Portfolio diversification refers to investment of funds in a variety of asset classes. Diversification within asset classes aims at reducing exposure to risks associated with a company, sector or market segment (Donaldson et al., 2013).

The Modern Portfolio Theory entails the Theory of Portfolio Selection of Harry Markowitz (1952) and the Capital Asset Pricing Model (CAPM); a contribution by William Sharpe to the theory of price formation in financial assets (1964) (Garcia et al., 2015). The Modern Portfolio Theory outlines the selection and construction of asset portfolios whose premise is to maximize the portfolio expected return and concurrently minimize the attendant risk. As per Brodie (2009), the theory has four basic steps; security valuation which describes a universe of assets in terms of expected return and expected risk; determining how assets are to be distributed among classes of investment (asset allocation decision); reconciling risk and return in selecting the securities to be included (portfolio optimization); and dividing each stock’s performance (risk) into market-related (systematic) and industry/security-related (residual) classifications (performance measurement).

Markowitz's portfolio theory is the subject of research on different markets and in different periods of development, which shows that optimal portfolio forming is not the same in a different period (Agustini, 2016). Grounded on this theory, building an “efficient frontier” of optimal portfolios that yields the best possible return for a given risk level is likely. Harry Markowitz laid the foundations of MPT, the greatest

contribution of which is the establishment of a formal risk/return framework for investment decision making. The gist of MPT is that the market is difficult to beat and those who are successful in doing so are those who effectively diversify their portfolios and take above-average investment risks. (Mangram, 2013). Omisore et al. (2012) avers that the essential idea behind the MPT is that in the determining the choice of assets in an investment portfolio, this ought not be done independently but to consider how each asset fluctuates in price comparative to how every other asset change in the portfolio.

Grujić (2016) states that some assumptions that involve the behavior of the investors form the foundation of Markowitz's model. The main assumption is that the investors assess the risk of the portfolio based on how the expected yield changes. The next assumption says that the expected return and risk solely informs the decisions on investments made by investors. The third vital postulation suggests that for a given risk level, investors will choose the highest revenue and for a given revenue levels the lowest risk. Thus, the role MPT plays in explaining the performance of the current portfolios of pension funds cannot be overemphasized and is of significance to the financial performance of pension funds that are based on returns on investments. The modern portfolio theory has had an important bearing on how investors perceive portfolio risk and return. The theory demonstrates that portfolio diversification can reduce investment risk.

Rani (2012) states that for a given amount of risk, the MPT describes how to select a portfolio with the highest possible expected return. Or, for a given expected return, the MPT explains how to select a portfolio with the lowest possible risk (the targeted expected return cannot be more than the highest returning available security, of course, unless negative holdings of assets are possible). Surtee and Alagidede (2022) state that although MPT has shortcomings, it effectively uses market sentiment to predict low-risk, high-earning portfolios. In addition to the con pets forwarded by active and passive portfolio theory, the MPT (modern portfolio theory) outlines the importance of diversification in reducing the risk associated with a portfolio, which is achieved thanks to the credentials of diversification in eliminating specific risk (Yu & Zhang, 2023).

The modern portfolio theory is justified in the study as it provides a direct relationship between asset allocation, portfolio rebalancing and financial performance. It offers a useful way to explain how efficient portfolios can be formed by pension firms as they try to balance expected return and risk levels taken. However, MPT has some shortcomings in the real world. One of the biggest problems of this theory is ignoring transaction costs. The theory also assumes rationality of investors in that the profit maximization objective is only what the investors think about. Furthermore, it is necessary to examine the assumption that all investors have the same information. Considering all the limitations, the results of diversification will be contingent on data to be used for creating a model - whether there would be used longer or shorter series of data or future expectations will be installed in modelling. The portfolio theory, in addition to the lack of presumption of rationality of investors, has a disadvantage that does not take into account individual utility function of investors and individual attitude to risk. Therefore, there are always investors who are willing to take greater risk. The best example of this are the "venture capital" companies (Grujic, 2016).

Mangram (2013) posits that the problem, with respect to MPT, is that the majority of investigations of the topic focus on the highly complex statistics-based mathematical modeling and formulas which support the concept's theoretical assumptions. Typically, these investigations present their findings utilizing unnecessarily complicated rhetoric and intricate formulaic expressions. In opposite, the less complicated treatments are generally overly simplified, non-comprehensive, and lack the rigor requisite of serious scholars and practitioners. The theory in addition, does not consider personal, environmental, strategic, or social dimensions of investment decisions (Iyiola, Munirat & Nwufo, 2012).

2.2.2 Risk-Return Trade-Off Theory

According to the risk return theory, there is an expectation of greater return by investors taking high levels of risk. As explained by Markowitz (1952) as well as Fama and French (2001), the investors choice is affected by the risk and return of a given asset and for every higher level of risk taken, the investors will expect a greater

return to compensate for the high risks. The expected return of an asset rises with risk or uncertainty because investors hold a risky asset (security) if they are compensated with commensurably higher returns (Mollik & Bepari, 2015). Otweyo and Onyango (2017) state that investments and the investment performance are two realisms which form the foundation of risk and return relationship. First, investments are susceptible to some degree of risk because an investor stands the risk of losing all his cash when buying stocks, bonds, mutual funds or other investments. Second, the more risk an investor assumes the greater the investment returns he may achieve. Senthilnathan (2013) posits that risk can mean a chance of loss. When an asset has greater chances of loss, the asset can be considered as a risky asset. Return is a measure resulting from the total gain or loss with respect to an asset (share/bond), over a given period of time that is experienced by the owner.

Qamruzzaman (2014) suggests that the concept of risk/return suggests that low levels of investment risk will result in potentially lower returns, while high levels of risk will generate potentially higher returns. Of course, there are no guarantees. While increased risk offers the possibility of higher returns, it also can lead to bigger losses. Shah and Qayyum (2016) aver there is an equilibrium of risk return trade off where the longing for the lowest possible risk and the highest possible return are equivalent. A higher standard deviation means a higher risk and higher possible return. Consequently, for risk and return, they could be either positive relationship, negative relationship or no relationship. Investors who are risk averse may require compensation (premium) for having a risky asset. The risk premium which is usually positive in nature is a function of risk. In the capital asset pricing model (CAPM) framework, systematic risk or beta is the only relevant risk of an asset. The covariance of the asset return with the market return or by the covariance with other common factors related to investors' marginal utility in line with the intertemporal capital asset pricing model (ICAPM) by Merton's (1973) may be used to measure this.

Elton et al. (2014) mention that three concepts apply for CAPM. First, there should be some congruence between risk and return where for assets with higher risks, a higher level of return should be associated with the asset. Secondly, return is

positively linearly connected to risk, i.e., every time risk increases, return will equally increase. Thirdly, unsystematic risk is not rewarded since it can be diversified away. This theory was important to this study as it informed how the pension funds managers make investment decisions in balancing risks and returns. The expected return of an asset rises with risk/ uncertainty because investors hold a risky asset (security) if they are compensated with commensurably higher returns. In the capital asset pricing model (CAPM) framework, systematic risk or beta is the only relevant risk of an asset and it can be measured by the covariance of the asset return with the market return or by the covariance with other common factors related to investors' marginal utility in Merton's (1973) intertemporal capital asset pricing model (ICAPM). If the market portfolio (index) is the asset, the risk can be measured by the conditional variance of market return. Beta is the only asset/security specific parameter that influences the equilibrium return on a risky stock (Mandelker & Rhee, 1984).

Cadoni (2012) states that pension funds control large capitals and represent the biggest institutional investors in many countries. Despite their social security function, their performance is usually measured in terms of returns rather than risk. The 2008 financial crisis saw the default of some of the biggest pension funds worldwide. The authors argue this highlights the inadequacy of current performance measures. The case of the fund CalPERS (California Public Employees' Retirement System) is emblematic: by focusing on high rate-of-investment-returns whilst overlooking risk levels it suffered combined losses of 67 billion in 2008 and 2009, amounting to more than a third of its capitalization being forced to impose an increase in contributions to cover the losses.

Owusu et al. (2016) states that risk management is crucial to pension funds and a risk measure can efficiently demonstrate the risk embedded in the financial products. The study they conducted using mean-variance model via the Markowitz optimization technique (Markowitz, 1952, 1959) showed noteworthy progress in the efficient management of the pension fund considering their resource allocation to the numerous investment opportunities. The study showed the useful application of

Markowitz model in quantifying the risks associated with the investment portfolios at the Ghana's Social Security and National Insurance Trust.

This theory will be of importance to this study as it will seek to explain how pension fund trustees and fund managers will use risk return considerations in determining their investment policies and choice of asset classes within the investment ceilings and movement within tactical ranges approved by the RBA. However, the theory faces several criticisms. Valkanov and Zhang (2018) posit that the positive risk-return trade-off is hard to be detected because it is challenging to find appropriate proxies of conditional risk and expected return. Mollik and Bepari (2015) posit that although portfolio risk and returns are found to be significantly positively related in general, some inconsistencies were revealed in the context of relative risk for high-risk portfolios, suggesting the existence of some anomalies or mispricing in high-risk assets.

2.2.3 Liquidity Preference Theory

The liquidity preference hypothesis implies that the longer the term to maturity of a security, the higher its term premium (Ornelas & Antonio, 2014). Lee (2016) avers that Investors value financial assets not only for their intrinsic value, i.e., their expected dividend or payment stream, but also for their liquidity; their ability to help agents facilitate transactions. The theory was established against the backdrop of the great depression that came with unemployment that had persisted for some time by Keynes during the early 1930's. The quantity theory of money had no answer to economic problems in society. Dafermos (2012) states that the liquidity preference enlightens the inclination to prefer holding of cash compared to other types of wealth.

John Maynard Keynes advanced the Liquidity Preference Theory of Interest in his book "The General Theory of Employment, Interest and Money" in 1936. According to Keynes, interest is purely a monetary phenomenon because the rate of interest is calculated in terms of money. The three objectives for holding cash balances as enumerated by Keynes (1936) are the transaction motive, the precautionary motive and the speculative motive. The transactions motive refers to the fact that individuals

have a preference for liquidity in order to guarantee having sufficient cash on hand for basic transactions because income is not always readily available. With this motive, the level of an individual's income determines that amount of liquidity that is demanded; higher income levels equal a demand for more money to accommodate increased spending. The precautionary motive is connected to individuals' penchant for liquidity as additional security to cover unexpected events or problems that may require a substantial amount of cash. Individuals may also have a speculative motive to take on opportunities that may arise and offer a good rate of return. Basically, the speculative motive refers to investors' general reluctance to commit to tying up investment capital in the present for fear of missing out on a better opportunity in the future (Ogiriki & Andabai, 2014). Keynes holds that the transaction and speculative motives are relatively inelastic but are highly income elastic (Kumar, 2015).

Broeders et al. (2017) argue that pension funds might choose to invest in illiquid assets for three reasons. First, the possibility to be compensated for the lack of liquidity through the so-called liquidity premium. The liquidity level premium recompenses for the anticipated liquidity of an asset. The liquidity risk premium recompenses for the exposure to time difference in the liquidity levels. Second, pension funds invest in illiquid assets to match the liabilities in terms of inflation and interest rate risk. Third, illiquid asset classes may offer diversification benefits if their returns have low correlations with the returns on traditional asset class such as stocks and bonds. In our context, the amount pension funds invest in illiquid assets depends on their liquidity preference.

The liquidity preference theory is useful to this study as pensions funds may elect to invest proportion of their assets in liquid assets and some other proportion in illiquid assets based on anticipated cashflow needs. RBA regulations has capped cash and demand deposits in institutions licensed under the Banking Act of the Republic of Kenya at 5% and time deposits and certificate of deposits in institutions licensed under the Banking Act of the Republic of Kenya at 30%. Keynes' theory of liquidity preference has been criticized on the grounds that it is too narrow as an explanation of the rate of interest, because it unduly treats interest rate as the price necessary to overcome the desire for liquidity. In actual practice liquidity (desire for money)

arises on account of many factors and not only on account of motives mentioned by Keynes. As such it becomes too narrow an explanation of the rate of interest. Further, the rate of interest influences and in turn is influenced by other important factors like the rate of saving, propensity to consume and marginal efficiency of capital, which the liquidity preference theory completely ignores.

2.2.4 The Arbitrage Pricing Theory

An alternative for the CAPM, the arbitrage pricing theory (APT) was developed by Stephen Ross (1976). The APT model contains a set of macroeconomic variables assumed to replace the systematic risk in the CAPM without specifying which factors to use (Sekreter, 2017). The theory offers a multi-factor pricing model for securities. The author affirms that diversification of portfolios does not eliminate risks completely as there are economic forces that still influence stock returns. Studies by Chen, 1986; Roll and Ross, 1980 on the model shows that factors such as GDP, changes in inflation and interest rates affect expected stock return. The theory assumes that market action is less than always perfectly efficient, and therefore occasionally results in assets being mispriced – either overvalued or undervalued – for a brief period of time. However, market action should eventually correct the situation, moving the price back to its fair market value.

According to the APT, the relationship between the expected rate of return for a given stock, the risk-free return, and the return of other factors with its risk is a perfect linear relationship (Yao et al., 2014). In the APT, the expected rate of return is calculated as follows (Ross, 1976):

$$Ei = \rho + \gamma 1\beta i1 + \ldots + \gamma k\beta ik$$

Where Ei is the expected return on the i^{th} asset,

ρ is the risk-free return,

βik is sensitivity of i^{th} asset to the factor k, and

γk is the risk premium of factor k.

The Arbitrage pricing theory assumptions include; investors seek return tempered by risk. They are risk averse and seek to maximize their terminal wealth. Investors can borrow and lend at risk free rate. There are no market frictions such as transactions costs, taxes or restrictions on short selling. Investors agree on the number and identity of the factors that are important systematically in pricing assets. There are no riskless Arbitrage profit opportunities (Akpo, Hassan & Esuike, 2015). Akpo et al., (2015) avers that arbitrage pricing theory assumes that all investors assume the same economic variables to affect the financial assets prices and that riskless profit from arbitrage opportunities do not exist. Alshomaly and Masa'deh (2018) state that there is a linear relationship between the expected rate of return on a stock and the macroeconomic factors and not only one factor as in the CAPM. Nguyen et al., (2017) state that APT is a more generalized version of CAPM that allows the modeler to extend the CAPM by adding additional macroeconomic factors to the model. The APT can be qualified as an" open source" model. Namely, the reason is that the APT does not specify either the number or identity of the factors that drive the expected returns of an asset.

The theory will be used in this study to interrogate the association between systemic economic factors and pension fund performance and how perceived systemic factors may affect choice of assets and investment decisions by the pension fund trustees and fund managers. Huberman (2005) states that the main weakness of the theory is its generality. It fails to explain the theoretical reasons for selecting identified systemic factors as well as their number. It is difficult to test the theory, as the precise configuration of the market portfolio is not known. Estimation of the model also faces certain challenges relating to methodologies used (Roll, 1977).

2.2.5 Post-Modern Portfolio Theory

Modern Portfolio Theory is composed of the Theory of Portfolio Selection of Harry Markowitz (1952) and William Sharpe contributions to the theory of price formation in financial assets (1964) known as the Capital Asset Pricing Model (CAPM). Basically, the Modern Portfolio Theory is an investment framework for the selection and construction of investment portfolios based on maximizing the expected return

of the portfolio and the simultaneous minimization of investment risk. The Post-Modern Portfolio Theory (PMPT) allows models applied for portfolio management to be more adequate to reality, having higher power in representing economic reality (Dronin, 2012). Advanced in the 1980 by the Pension Research Institute (USA), the post-modern portfolio theory (PMPT) goal was to acclimatize the MPT to market realism. This encompassed assessing the minimum satisfactory return given the risk level taken by the investor. It has long been recognized that investors typically do not view as risky those returns above the minimum, they must earn in order to achieve their investment objectives. They believe that risk has to do with the bad outcomes (i.e., returns below a required target), not the good outcomes noted by the researchers in finance, economics and psychology, including Sharpe (1964). Markowitz advocates that a model premised on semi-variance would be desirable. Post Modern Portfolio Theory redefines risk as the possibility of failing to achieve objectives. More recently, a new Contemporary Portfolio Theory (CPT) has emerged that seeks to protect against failure even if it means jeopardizing upside potential.

Rasiah (2012) avers that apart from risk, return and correlation, the investment markets and the investor utility are also affected by other factors. Consequently, models used to allocate assets need to be dynamic enough to take into consideration the additional capital and economic factors and to use these in asset distribution and re-balancing decisions. Post-Modern Portfolio Theory and research in behavioral finance shows how to apply the theory to increase investment output and to improve the MPT principles to a different level of functionality. These enhancements are used by investment consultants to improve the decision making of those who rely on them to attain their financial objectives. Some of the problems PMPT has identified with the traditional approach to asset allocation are; the need to determine expected returns, standard deviation as a measure of risk and diversifying among highly correlated asset classes (Sumnicht, 2015). PMPT permits models that are more appropriate to reality to be used for portfolio management given those are more superior in representing the economic reality (Dronin, 2012; Rani, 2012).

Post-Modern Portfolio theory's downside measure generated a noticeable distinction between downside and upside volatility. In a distinctive way, the post-modern

portfolio theory seeks to maximize absolute return and minimize risk. It offers investors fresh prospects that were not given by the traditional Modern Portfolio Theory (Rasiah & Devinagi, 2012). Post-modern portfolio theory requires a well-documented, thoroughly scrutinized investment policy statement so as to deliver a proper structure for portfolio building, management and measurement. In the context of this study, Post-Modern Portfolio Theory will help interrogate the construction of a more vigorous and optimum portfolio combination that will enhance and maximize funds value and minimize its risks through diversification. Leković (2021) avers that PMPT, as the last phase in the evolution of the portfolio theory, is not yet widely accepted.

2.3 Conceptual Framework

Crawford (2020) posits that a conceptual framework is incredibly important. A conceptual framework is the logical conceptualization of your entire research project (Kivunja, 2018). Ravitch and Riggan (2017) posit that a conceptual framework is the total, logical orientation and associations of anything and everything that forms the underlying thinking, structures, plans and practices and implementation of your entire research project. A conceptual framework is a description of the way a researcher understands the factors and/or variables that are involved in the study and their relationships to one another (Luft et al., 2022). Ngulube (2018) avers that the way in which data are collected and interpreted depends on the researcher's conceptual perspective. The conceptualization of variables in any research is important as it forms the basis for testing hypothesis and making inference and generalizations of the key findings of the study (Ravitch & Riggan, 2017). Therefore, the conceptual framework in Figure 2.1 aims at showing the effect of the predictor variables on the response variable. It is based on the modern portfolio, risk-return trade off, liquidity preference, arbitrage pricing and post-modern portfolio theories respectively.

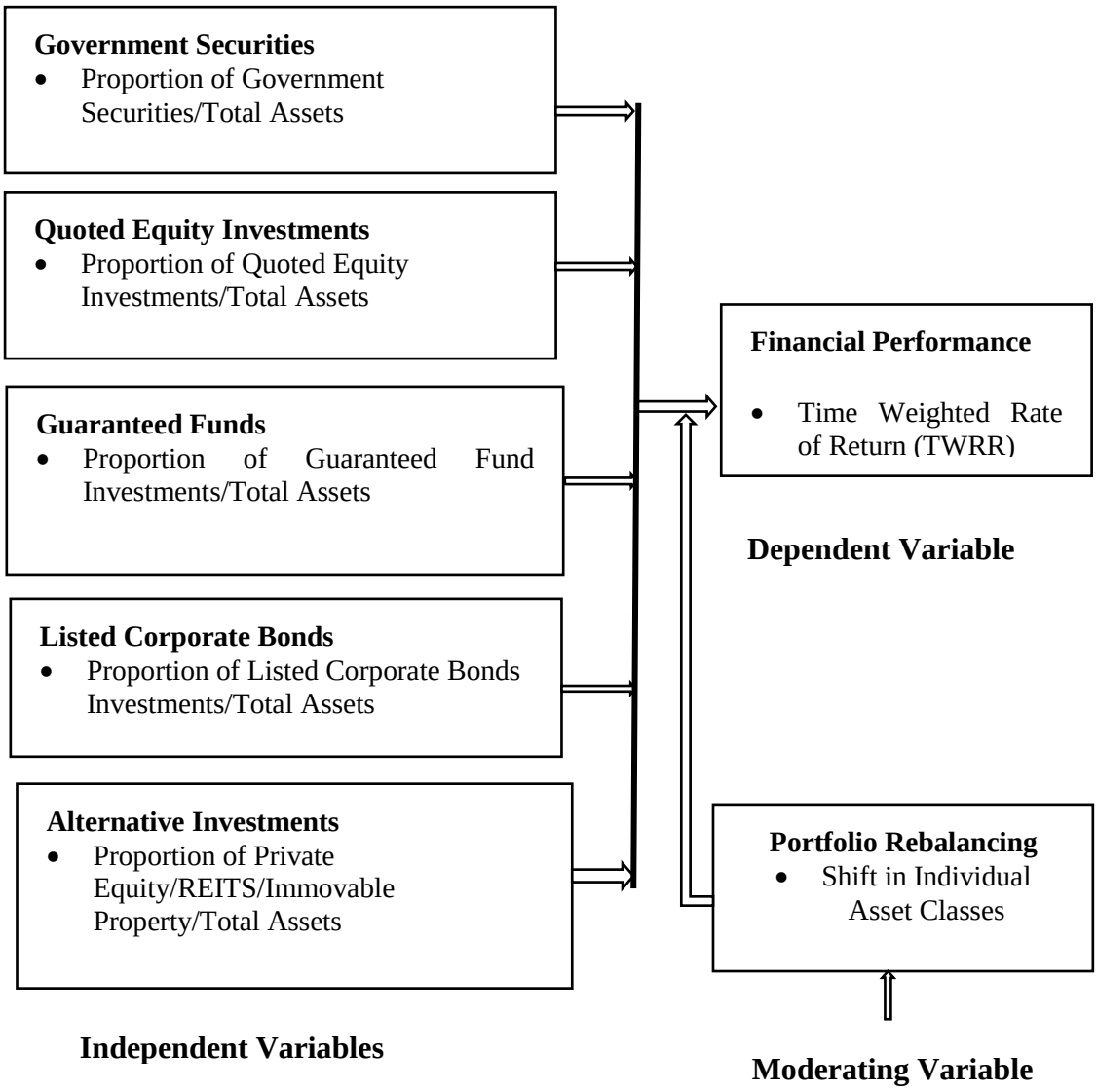

Figure 2.1: Conceptual Framework

2.3.1 Government Securities

Treasury bonds are medium- to long-term investments, and their maturity can range from one year to 30 years. There are many different types of Treasury bonds, but their basic operations are similar. Investors buying Treasury bonds are loaning the government money for a specified period of time, which is the bond's maturity. With most bonds, investors will receive interest payments every six months throughout that period of time, and at the end of that period they receive the face value amount that they invested. The minimum investment on a Treasury bond is Kshs. 50,000

(CBK, 2021). Treasury bills are a short-term investment, with maturities of 91 days, 182 days and 364 days (CBK, 2021).

The demand for long-dated bonds has increased, driven by stricter asset – liability matching regulations governing pension funds, new international accounting standards, as well as new risk-based regulations for insurance companies. Projections of rapidly ageing and longer-living populations in most OECD countries indicate that the demand for ultra-long paper is poised to grow further (Blommestein, 2007). Treasury bills are issued by governments through their central banks to resolve temporarily insufficient budget. Yet, treasury bills are also employed as one of open market operations (OMO) forms for monetary policy. Hence, by issuing treasury bills, central banks can raise short-term fund for governments and absorb surplus liquidity from financial markets simultaneously (Yi, 2014).

Wolski (2017) ranked investment vehicles based on risk measured with standard deviation and downside semi-standard deviation and found out that treasury bonds were the most effective, stocks ranked second and the stocks of companies in the real estate sector ranked third. Bektashi and Nuhiu (2017) aver that the central government, counties, and municipalities use government bonds to finance long-term governmental infrastructure projects like road and railway construction, education and healthcare, but also for the financing budget deficit and refinancing the existing government debt.

Okeyo (2014) asserts that pension funds will chose to invest in government securities because of fixed guaranteed income, interest income, stability of the investment and the low risk of the investment. Ringui (2012) avers that in a favorable political, macroeconomic and regulatory factor, bonds tend to perform better. Ndung'u (2016) investigated the effect of asset allocation on the financial performance of pension schemes in Kenya and established that there is a linear correlation between fund performance and the returns of the various asset classes with the strongest correlation being between overall fund performance and returns in Equities, fixed deposit and Government securities.

Mwachanya (2015) studied the Impact of asset allocation on financial performance of pension funds in Kenya and established that one unit change in government security in fund results in 0.047 units increase in fund returns. Bukwimba (2022) investigated pension fund's risk management investment portfolio in Tanzania using Value at Risk (VaR) based on the GARCH model and the Cornish-Fisher expansion models. In both models, the study established that Corporate Bonds (CBs) is the riskier asset in the NSSF investment portfolio followed by Fixed Deposits (FDs), Equity, Real Estates and Government Securities. Nanda and Atahau (2020) posit that pension fund regulators may consider the effect of mandatory regulation on pension fund performance since directing investment to government securities may reduce the pension fund returns. Government securities are preferred on the other hand was invested in because of fixed guaranteed income, interest income, stability of the investment and the low risk of the investment. Also, government bonds are preferred by some pension fund managers as it is a fixed income security (Okeyo, 2014).

2.3.2 Quoted Equity Investments

Roy and Joseph (2018) state that equity investment refers to the buying and holding of shares of stock on a stock market by individuals and firms in anticipation of income from dividends and capital gain. They aver that equity investment refers to the money that is invested in a firm by its owner or shareholder of common stock (ordinary shares) which is not returned in the normal course of the business. Investors recover it only when they sell their holdings to other investors, or when the assets of the firm are liquidated, and proceeds distributed among them after satisfying the firm's obligation. The optimal equity allocation of pension funds is subject to considerable debate. A high percentage of assets invested in equities results in significant exposure of pension wealth to fluctuations in stock market prices. While nominal defined-benefit pension liabilities can be hedged by investing in the replicating portfolio of fixed-income securities, considerable equity holdings may be optimal when indexation of benefits is contingent on the funding ratio of the pension fund (Bikker et al., 2007).

A report by the Pew Charitable Trusts (2018) indicates that increased allocations to stocks can result in greater financial returns but also heighten volatility and the risk of losses. The report states that pension fund yields are highly correlated with the volatile swings in stock returns; even relatively small differences can have a major effect on asset values. For example, a 1 percentage point difference in annual returns on $3.8 trillion equates to a $38 billion impact on pension assets in the US market. Among the various asset classes in which pension funds typically invest, equity can be regarded as the most representative 'risky' investment due to its high volatility and sensitivity to market situations (IOPS, 2017).

Titman, Wei and Xie (2016) posit that stock prices do quite well in those years in which capital expenditures increase given that higher investment expenditures are likely to be associated with greater investment opportunities and that higher investment expenditures may also indicate that the capital markets, which provide financing for the investments, have greater confidence in the firm and its management. As per OECD (2021), pension funds were mostly invested in equities and bonds at the end of 2020. These instruments together accounted for 74% of the investment of pension funds on average, directly or indirectly through collective investment schemes, among the 68 reporting jurisdictions.

Douglas and Sklar (2018) investigated what determines the UK defined benefit pension funds' investment decisions. The defined benefit funds in the UK were divided into four cohorts. Financial asset price data for the period to March 2016 was collected. There was an indication that funds buttressed by financially stronger corporates are likely to surge their equity holdings to benefit from their higher expected earnings from the equities. Richard et al. (2010) notes that long-term profitability of equity investments is not derived from the instruments themselves, but from a well-diversified portfolio at the international level. Therefore, significant investing in domestic equity markets is risky for pension funds due to country risk.

Okeyo (2014) posits that quoted equity investment yield long term gains, dividend and capital gain to the pension funds as an investment asset. Cornell (2009) posits that the performance of equity investments in the aggregate is inextricably linked to

economic growth. Earnings, the source of value for equity investments, are themselves driven by aggregate economic activity. Gerber and Weber (2007) state that a younger age structure and lower short-term benefits payouts are related to a higher share of equities and lower real estate holdings and that aging may lead to increased risk aversion and thus to a lower engagement of institutional investors in equities.

Owinyo (2017) investigated determinants of the financial performance of retirement benefit schemes in Kenya. The study noted that equity investment does not have an influence on the financial performance of retirement schemes. Mwachanya (2015) conducted research on the impact of asset allocation on financial performance of pension funds in Kenya. The study noted that of all the asset classes permitted by the Retirement Benefits Authority (RBA), investments in equities was relatively more important than investments in fixed deposits in determining the overall performance of the pension funds. Zhao and Sutcliffe (2021) investigated what determines the asset allocation of defined benefit pension funds and established a positive relation between the effective duration of pension liabilities, and the proportion of the pension fund invested in equities. In other words, UK companies with less mature pension schemes tend to increase the investment of their DB pension fund in equities. They also found that firms with a hard-closed pension scheme also have lower equity allocations.

2.3.3 Alternative Investments

Alternative investment assets are those which are not part of traditional asset classes such as cash, stocks, or bonds that retail investors are most familiar with. Alternatives investments encompass a wide range of asset classes, including private equity, real estate and private equity infrastructure funds, secondary funds, and private debt funds (World Economic Forum, 2020). Since the financial crisis, public pension plans – like other large institutional investors – have moved a significant portion of their portfolios into investments outside of traditional equities, bonds, and cash. These alternative investments include a diverse assortment of assets – private equity, hedge funds, real estate, and commodities. This shift reflects a search for

greater yields than expected from traditional stocks and bonds, an effort to hedge other investment risks, and a desire to diversify the portfolio (Aubry, Chen, & Munnell, 2017). Defau and De Moor (2021) posit that portfolio diversification trends play an essential role in the growing popularity of alternative assets, most probably because these assets allow the pension funds to optimize their portfolio structure.

Carlo and Kok (2021) posit that the last three decades have seen significant growth in pension fund exposure to private and alternative assets all over the world. Aubry (2022) avers that one of the most significant shifts in public pension investment policy over the past two decades has been the expansion into alternative investments – namely, private equity, hedge funds, real estate, and commodities. Overall, state and local plans have increased their holdings from 9 percent in 2001 to 34 percent in 2022. Not only have alternatives become a much larger share of public plans' portfolios, but their composition has also changed. Between 2001 and 2022, the portion of alternative investments allocated to real estate dropped sharply, while allocations to hedge funds and commodities have grown. Investments in alternative assets have increased in recent decades and should continue to do so (Platanakis et al., 2018). Some African countries invested more than 40% of their assets in alternative investments (OECD, 2018). Defau and De Moor (2021) posit that portfolio diversification trends play an essential role in the growing popularity of alternative assets, most probably because these assets allow the pension funds to optimize their portfolio structure.

A report by RBA states that recently introduced alternative asset classes in Kenya include REITs (development and income), private equity and venture capital, derivatives and exchange traded funds (ETFs). However, uptake of these alternative assets classes remains relatively low. Pension funds in Kenya have continued to invest mainly in traditional asset classes and less in alternative asset classes despite broadening of allowable investment asset classes (RBA, 2020). A market brief prepared by RBA in December 2022 states that investment in alternative assets such as private equity & venture capital continued to be attractive to schemes due to their diversification effects, which increased by 4.78 percent during the period (RBA, 2022).

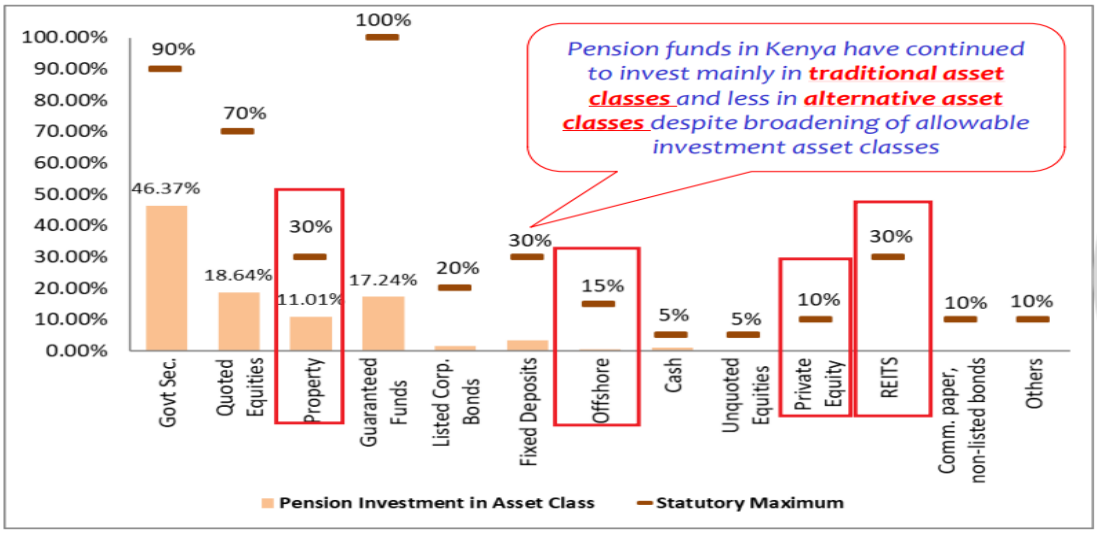

Figure 2.2: Investments in Alternative Investments by Kenyan Pension Schemes

Source: (RBA, 2020)

A report by the Africa Development Work Group and the International Finance Corporation 'gauging appetite of African institutional investors for new asset classes' states that pension fund investment in "alternative assets" still accounts for a very small share of assets, however — ranging from 0 to 2.7 percent of AuM for the five focus markets reporting as at the end of 2020 asset allocation data. The report states that investment in alternative assets has remained well below national limits. It further opines that pension funds' limited progress in diversifying into newer asset classes could be due to lack of capacity or familiarity with regards to evaluating associated risk. Moreover, in markets where regulatory or policy approaches to newer assets continue to emerge, asset managers may be awaiting further clarity. Alternative investments, in particular, suffer from a lack of appropriate integrated benchmarks in addition to the difficulty of calculating the expected return (Park, Kim, & Lee, 2022).

Kinyua (2022) investigated the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya. The study found out that alternative investments was found to be positively and significantly connected to return on investment. Mungai (2017) examined the effect of alternative investments on the financial performance of pension schemes in Kenya. The study

found out a positive relationship between investments in alternative asset classes and pension funds financial performance except for private equity and venture capital. Studying the impact of alternative investments is complicated by the fact that the reported fair value for many alternative investments is based on expert appraisals that may differ meaningfully from the true market value (Aubry, 2022).

Highly leveraged firms with low market-to-book ratios and volatile earnings performance are more likely to invest in alternative assets, indicating that financially constrained firms choose alternative investments to increase asset returns and minimize pension contributions (Anantharaman, 2011). A report by the Financial Services Regulatory Authority of Ontario (FSRA) indicates that illiquidity of alternative assets, such as private equity, real estate and infrastructure, and the absence of a ready secondary market affect their valuation. These factors also impact investment exit strategies, especially if an asset needs to be sold quickly under less favourable market conditions than when it was purchased. They argue that Overall transaction and governance costs tend to be higher with alternative assets.

2.3.4 Guaranteed Funds

Kupčík and Gottwald (2016) state that guaranteed funds (GF) include a portfolio which is very conservative and consists mainly of bonds and treasury bills. These are usually the funds that are managed by strict regulations. Pension Benefit Guarantee Schemes are insurance type arrangements with premiums paid by pension funds which take on outstanding obligations which cannot be met by the insolvent plan sponsors (OECD, 2009). Guaranteed funds are offered by insurance companies where the insurance company guarantees a minimum rate of return (the maximum rate by law that can be guaranteed being 4%). The funds in guaranteed schemes are mainly invested in low-risk securities, such as government securities, and thus have offered lower returns compared to segregated schemes. In cases where the fund's returns surpass the minimum guaranteed rate, the insurance company may at its own discretion decide to top up the minimum rate with a bonus rate of return. The benefit of such a fund is that regardless of market performance, the member enjoys the set minimum rate of return (RBA, 2021). Whelan (2015) avers that while pension

schemes with younger participants are inclined to invest much more in equities and more dangerous assets, funds with older members have a tendency to spend extra in guaranteed funds and dealt with return protections. Guaranteed investment contracts (GICs) - a form of zero-coupon bond typically sold to pension funds - are a modern variant. Insurers may also offer nominal, insured defined benefit pension plans (Davis, 2000).

Rono et al. (2010) states that huge proportions of pension schemes in the country are invested in guaranteed funds, a reflection of risk-averseness in pension fund investments and the shift in asset allocation patterns. He asserts that such conservative investments are impressive in risk locking portfolio losses and but could also reduce the potential of funds to generate retirement incomes in the future. Witmer (2017) opines that the guaranteed funds must maintain a minimum level of liquidity as a buffer against shareholder redemptions as well as to meet regulatory requirements. While pension schemes with younger participants are inclined to invest much more in equities and more dangerous assets, funds with older members have a tendency to spend extra in guaranteed funds and dealt with return protections (Whelan, 2015).

The guaranteed minimum rate of return for guaranteed pension issuers needs to be reviewed regularly to consider both economic performance and inflation trends, especially in countries where such rate is set as an absolute as opposed to relative. In most western economies the rate is set relative to other economic indicators for at least two good reasons. First, where the economic performance is good and the minimum guaranteed rate of return is relatively low, this becomes an inducement for the insurance companies to retain a higher portion of the real returns. Secondly, in times of very bad years, the insurance companies may be driven into financial crisis by requiring them to pay more than they are able to (Jia and Le-Ngoc, 2012). There is an insidious effect of inflation on the rate of return from “safe” investments over prolonged periods of time as is the case in guaranteed pension schemes as a major drawback to capital preservation strategy. This necessitates regular reviews of the guaranteed minimum rate of return to ensure it does not remain below the inflation rate (Pennacchi, 1999).

Kinyua (2022) investigated the relationship between investment strategy and financial performance of defined contribution pension funds in Kenya. Panel regression results established that investment in guaranteed funds was positively and significantly connected to financial performance of defined contribution pension funds in Kenya. Musembi (2018) posits that pensioners gain strategic value from guaranteed pension schemes through preservation of capital, transfer of investment risk, minimized administrative cost and higher return on economies of scale. However, he avers that guaranteed pension schemes may pose certain limitations including the variations on the trustee's involvement on decision making, rate of returns and regulation by government.

Bohnert (2015) investigated the impact of guarantees on the performance of pension saving schemes. Overall, the results indicated that guarantees in pension saving products are expensive in the sense that they can reduce a contract's performance, which considerably depends on the type of guarantee. In addition to this, financial guarantees have a substantial impact on the characteristics of risk-return profiles. Hadad, Yosef and Afik (2022) examined a guaranteed-return structured product as an investment risk-hedging instrument in pension savings plans and established that the guaranteed-return structured product can guarantee a minimal return on the pension savings portfolio and offer a higher portfolio return at a lower investment risk than the balanced investment portfolio. They concluded that the guaranteed-return structured product might be an excellent investment alternative for pension fund members.

2.3.5 Listed Corporate Bonds

The International Capital Markets Association, ICMA (2013) defines corporate bonds as transferable debt securities issued by Companies. They are one of a range of means, alongside equity share capital, bank lending, and other methods, by which Companies fund their business needs and their expansion (ICMA, 2013). Tendulkar and Hancock (2014) define corporate bonds to include all bonds except those issued by national and local governments, and supranational organizations and therefore include those issued by financial and non-financial institutions. Oji (2015) explains

that corporate bonds are bonds issued by private or public firms. Investors who purchase these bonds essentially lend money to the company that issues the bond, which in turn confers on the issuer a legal commitment to pay interest on the principal and return the principal to investors when the bond matures.

An OECD report 'Pension Markets in Focus 2022' states that public sector bonds, as opposed to corporate bonds, represented a larger share of the combined direct bond holdings (i.e., excluding investment via collective investment schemes) in a number of jurisdictions. For example, public sector bonds accounted for 100% of total direct bond holdings in Albania and Serbia, 99.9% in North Macedonia, 99.8% in Uganda, 99% in Kenya, 97.7% in Croatia and 97.1% in the Maldives but only 19.7% in Malta, 18.9% in New Zealand and 8.3% in Macau (China). Hervé, (2019) states that the development of bond markets in sub-Saharan Africa is characterized by a limited presence of companies. He asserts that it is clear that bond issues by companies have never really taken off in this continent, despite the ever-growing number of stock exchanges. In Kenya, since the successful issue of the Sh25 billion KenGen public infrastructure bond in 2009, the local corporate bond market has yet to scale back to the same heights. The recent history of collapsed issuers (Imperial Bank & Chase Bank) and defaults could be behind this phenomenon. Corporate bond turnover as a percentage of the Nairobi Security Exchange's total bond turnover stands at a negligible 0.08 percent compared to 99.92 percent for Treasury bonds (CMA, 2021).

Çelik et al. (2020) state that insurance companies and pension funds have traditionally been a dominant investor in the corporate bond market in all four regions. In the US, their relative share of corporate bond holdings decreased until the 2008 financial crisis as other types of investors, including MFIs increased in importance. Since the crisis their share of holdings has increased steadily and is now back to almost 50%. In the euro area as well, insurance companies and pension funds have been the largest holders of corporate bonds in every year for which data are available. In 2013, they accounted for 39% of the market but have declined slightly to 35% at the end of 2018 because of the increased holdings by MFIs. In the UK and Japan however, insurance companies and pension funds have lost their leading

position in the corporate bond market to MFIs after the financial crisis, but they still hold 32% and 31% of the outstanding amount of corporate bonds, respectively.

Maina and Kimutai (2018) investigated macro-economic variables and performance of corporate bonds at the Nairobi Securities Exchange, Kenya. The study demonstrated an inverse relationship between three macroeconomic variables; exchange rates, interest rates and inflation rates with performance of corporate bonds. Ngabirano (2016) investigated the determinants of corporate bond performance in Kenya. The study concluded that that there was a positive insignificant relationship between firm issue size and corporate bond performance. It also concluded that there was a negative insignificant relationship between bond rating and corporate bond performance, and between bond term and corporate bond liquidity. Wanyama (2017) investigated the effect of stock market development on the growth of corporate bond market in Kenya. The findings of the study concluded that stock market size has a positive relationship with corporate bond markets A large size of the stock market will cause the benefits to flow to the corporate bond market too.

Chovancova, Hudcovsky and Kotaskova (2019) examined the impact of stocks and bonds on pension fund performance. The study noted that there is a statistically significant positive correlation between the development of bond market indices and the appreciation of the pension portfolio. In practice, this result indicates that pension funds are significantly correlated with the main component used by most portfolio managers, which is currently fixed income securities. They argue that the dependence achieved is even stronger than that of the stock indices. Tonks (2016) did a study on pension fund administration and investment outcome in United Kingdom. The study noted that investment in corporate bonds and unlisted shares was critical in determining the pension funds' investment performance.

2.3.6 Pension Fund Portfolio Rebalancing

Portfolio rebalancing can help investors maintain an asset allocation that aligns with their needs, goals, and risk tolerance. As the performance of portfolio components varies over time, component weights may deviate from their target allocations,

exposing investors to a different risk-return profile than that of the intended allocation. Rebalancing is a tool to manage such deviations (Hong, 2021). Bams, Schotman and Tyagi (2016) state that pension funds actively rebalance their portfolio to counteract the impact of the returns on their portfolio.

Andonov, Bauer, and Cremers (2012) posit that pension funds' active returns are roughly equally driven by asset allocation, market timing, and security selection. Bams, Schotman and Tyagi (2016) conducted a study on the changes in portfolio weights of pension funds over time and how they reflect past returns using a database of pension funds from the US, Canada and Europe which spans the period from 1990 to 2011. They found out that pension funds actively rebalance their portfolio to counteract the impact of return on their portfolios significantly more than the rebalancing estimated for households.

Bikker, Broeders, and De Dreu (2007) state that in the short term, outperformance of equities over bonds and other investment categories automatically results in a higher actual equity allocation (and vice versa), as pension funds do not continuously rebalance their investment portfolios. In the medium term, outperformance of equities induces pension funds to increase their strategic equity allocation (and vice versa). The authors argue that the investment policies of pension funds are partially driven by the cyclical performance of the stock market.

Fischer et al. (2021) posit that when price shocks cause the portfolio weights to deviate from their optimal risk-return maximizing values, investors rebalance their portfolios. This portfolio rebalancing – also labeled negative feedback trading or contrarian investment – induces stabilizing dynamics. They aver that portfolio managers rebalance either periodically (i.e., monthly or quarterly) or in response to major events such as currency crises or stock market crashes in which pre-established parameter thresholds are breached.

Bams et al. (2016) argue that institutional investors with long horizons for investing should rebalance their portfolio to preserve the desired risk-return characteristics specified by their strategic asset allocation. This requires the investors to be countercyclical, that is, sell the assets that have performed better in the past and buy

the assets that have performed poorly. Rattray (2020) states that a pure buy-and-hold portfolio is untenable for most investors because it leads to a highly concentrated, undiversified portfolio. In essence, rebalancing to a constant asset mix means selling winners and buying losers. Huss and Maloney (2017) aver that well-managed dynamic rebalancing processes may lead to more predictable risk characteristics, while seemingly passive buy-and-hold portfolios may have the most variable and least predictable risk outcomes. The most dynamic portfolios require a combination of several separate rebalancing processes, each of which has its own rationale and its own effects on risk and return expectations. Hong (2021) who states that there is no evidence to the effect that rebalancing choices can reliably increase expected returns. Gains from portfolio rebalancing may be eroded by the cost of rebalancing is substantial (Dayanandan & Lam, 2015).

Portfolio rebalancing is a powerful risk-control strategy. Over time, as a portfolio's different investments produce different returns, the portfolio drifts from its target asset allocation, acquiring risk and return characteristics that may be inconsistent with an investor's goals and preferences. A rebalancing strategy addresses this risk by formalizing guidelines about how frequently the portfolio should be monitored, how far an asset allocation can deviate from its target before it's rebalanced, and whether periodic rebalancing should restore a portfolio to its target or to some intermediate allocation (Tokat & Wicas, 2007). Bams, Schotman and Tyagi (2016) aver that equities play a more important role than alternatives in rebalancing of the risky portfolio. They argue that alternatives as an asset class is slowest in rebalancing whereas equities is the fastest, bonds asset class is fastest in adjusting towards the strategic asset allocation whereas alternatives is the slowest. They further posit that pension funds rebalance poorly when stock market is doing well but rebalance strongly when stock market is doing poorly.

2.3.7 Financial Performance

Das and Swain (2017) posit that the financial performance of any organization plays a vital role in maintaining the company's existence and growth. Van Horne et al. (2010) defines pension performance as the earnings that members receive after

investment of their contributions. These diverge from one scheme fund to the other. A portfolio return is simply a weighted average of the expected returns of the securities constituting that portfolio. Financial performance measurement has been discussed as a key priority in all economic decision making relating to public and private companies to identify difficult locations and areas. Financial performance measurement is based on many decisions such as executive compensation, stock prices, stock risk, decisions related to investment, and many other cases (Chashmi & Fadaee, 2016). Performance is to markets as oxygen is to humans only noticeable by its absence (Das, Ericsson & Kalimipalli, 2013).

Retirement benefit schemes' financial performance can be assessed by evaluating the increase in income streams. The main source of funding for retirement benefit schemes is the contributions received. An increase in contributions can arise where there is an increase in scheme membership, an increase in individual contributions resulting from an increase in members' salaries and/or a change in scheme rules increasing the percentage of contributions. The other source of income for pensions is the net returns made from investment of contributions. Net returns will increase where economic factors are favourable and where prudent investment decisions are made that diversify risks (Owinyo, 2017).

Pandian and Narendran (2015) state that that in most of the organizations, financial data is used in distributing resources to their various departments. Therefore, to appraise the financial well-being of an entity, it is imperative that you analyze the financial data and the financial performance measurements. The financial performance analysis ascertains the financial fortes of a firm and its weaknesses by properly determining the relationships amongst the items of the statement of the financial position and the profit and loss account. The state that the goal of financial performance analysis is to determine the efficiency and performance of firm’s management, as reflected in the financial records and reports.

Plantinga (2007) posits that the difference between time weighted return and money weighted return is determined by the way both measures handle intermediate cash flows. A time weighted return measure accounts for the precise amount and timing of

the intermediate cash flows, whereas the money weighted return measure is based on assumptions regarding amount and timing. The Money-Weighted Rate of Return (MWRR) embodies the internal rate of return (IRR) of a fund over an explicit time period together with the influence of the cash contributions and withdrawals. Time-weightings considers the compounding of returns and is the method used in most industries (Gene, 2001).

2.4 Empirical Review

2.4.1 Government Securities

Mwangi (2018) investigated the effect of asset allocation on the financial performance of individual Benefit Pension Schemes in Kenya. Descriptive research design was used on a target population of 1400 registered schemes, with 32 schemes categorized as individual retirement benefit schemes identified for the study. From this, a sample of 30 schemes was derived applying relevant formula. Using a data collection sheet, secondary data was collected from the RBA and analyzed using STATA. The study findings indicated that government securities increased financial performance in individual benefit pension schemes.

Chovancova et al. (2019) investigated the impact of stocks and bonds on pension fund performance. Research data based on pension statistics from the Organization for Economic Co-operation and Development was used in the study. The study results indicated a statistically significant positive correlation between the development of bond market indices and the appreciation of the pension portfolio management of the asset management companies within the Organization for Economic Co-operation and Development member countries. Dopierała and Mosionek-Schweda (2021) investigated the impact of reforms introduced in the operation of Polish open pension funds on management style, risk exposure and related investment performance. Based on the data for the years 2007–2018, two panels were created. For each asset class, fixed-effect models as well as random-effect models were estimated. The results indicated that in the case of Polish open pension funds, limiting investments in Treasury debt instruments clearly resulted in increased risk and volatility of returns.

Sanga (2016) conducted a study assessment of financial performance of pension funds: a survey of selected pension funds in Tanzania. The study was mainly aimed at assessing financial performance of selected pension funds (NSSF, PPF, PSPF, and LAPF) in Tanzania. The data collection method was mainly documentary review obtained from annual reports of pension funds and administration of questionnaires and interview questions. The findings of the study concluded that government securities are much profitable as they are riskless securities and yield high returns. Ndungu (2014) did a study on the effect of asset allocation on the financial performance of pension schemes in Kenya. A sample of fifty (50) segregated schemes that have been in existence for more than ten years and which have used the same fund manager over the period of study were used for the study. Inferential analysis was carried out to find out the relationship between the independent variables and the dependent variables of the study. The study found a strong correlation between overall fund performance and returns from government securities.

Rhoda (2016) investigated consequence of liquidity risk management on the financial performance of retirement funds in Kenya. Data was collected from 80 pension schemes over the period 2011 to 2015 and Jensen's model used to calculate the risk adjusted returns. The study established that treasury bill rate had an influence on the pension fund earnings. Achieng (2013) investigated how the financial performance of pension funds is affected by asset distribution decisions. The study was based on the 1,244 pension schemes which were licensed and operating in Kenya as at 31 December 2011. The study established that government securities significantly affected the fund performance. Mwikali (2014) investigated the effect of investment guidelines on performance of pension schemes in Kenya. She carried out a descriptive survey study focused on a sample of 50 segregated schemes that were in existence for a period of ten years with fund values of Kshs 200 million as at 31 December 2014. Regression and variance analysis was carried out on the data collected. The findings of the study indicated that there was a strong correlation between investment in government securities and financial performance of pension schemes. Holding other factors constant, a unit increase in weight of fixed income

securities such as government securities would lead to a 1.732 decrease in financial performance.

Owinyo (2017) assessed the causal factors affecting the financial performance of pension schemes in Kenya. The study sampled 48 private pension funds registered with the RBA as at the end of 2013 and analyzed data collected using the return on assets (ROA) ratio and the multiple regression model. The study did not find a connection between fixed income securities and pension funds asset returns. This indicated that fixed income investments did not influence the financial performance of the pension funds. Mwachanya (2015) conducted a study on the impact of asset allocation on financial performance of pension funds in Kenya. The study adopted a descriptive survey and utilized a sample of 245 schemes that drawn from a population of 1214 schemes in Kenya. Secondary data on pension schemes asset allocation and returns was obtained from Retirement Benefits Authority. The study findings indicated that the asset classes that had the most impact on the performance of the fund were Government Securities with a moderate negative correlation with the overall performance of the funds. A study by Mungai (2017) established that government securities had a negative relationship with the return on investments of pension funds. The study utilized secondary data covering the period 2012 to 2016 and comprised a population of 442 segregated pension schemes and from which a sample of 90 schemes was selected and analyzed using multiple linear regression model.

2.4.2 Quoted Equity Investments

Sanga (2016) conducted a study assessment of financial performance of pension funds: a survey of selected pension funds in Tanzania. The study was mainly aimed at assessing financial performance of selected pension funds (NSSF, PPF, PSPF, and LAPF) in Tanzania. Data collection method was mainly documentary review obtained from annual reports of pension funds and administration of questionnaires and interview questions which involved 25 of Male and 25 female participants. The results show that pension funds with higher return on equity are highly considered to pay its members on time. Owinyo (2017) assessed the factors that influence the

financial performance of pension schemes in Kenya. Data was collected from the sampled 48 private pension funds registered with the RBA by end of 2013. Analysis was done using the return on assets (ROA) ratio and the multiple regression model. The study established that equities portfolio allocation significantly affects the financial performance of the retirement scheme.

A study Ndungu (2014) on the influence of asset distribution decisions on the financial performance of pension schemes established that returns in equities significantly affected pension fund performance. Fifty (50) segregated schemes were picked using stratified random sampling technique. The study used multiple regression analysis to analyze the data collected. Mwachanya (2015) conducted a study on the impact of asset allocation on financial performance of pension funds in Kenya. The study adopted a descriptive survey and utilized a sample of 245 schemes that drawn from a population of 1214 schemes in Kenya. Secondary data on pension schemes asset allocation and returns was obtained from Retirement Benefits Authority. The study findings indicated that of all the asset classes permitted by the Retirement Benefits Authority (RBA), investments in equities was relatively more important in determining the overall performance of the pension funds. Wanjohi and Kariuki (2019) did a study on the relationship between asset allocation and fund performance of occupational pension schemes in Kenya. The research was conducted through a descriptive survey and utilized secondary data available from RBA and Fund Managers. The result of the study indicated the existence of a positive significant relationship between equities and fund performance with a coefficient of 0.189. This is an implication that a unit increase in equity will increase fund performance by 0.189.

Mwangi (2018) investigated the effect of asset allocation on the financial performance of individual Benefit Pension Schemes in Kenya. Descriptive research design was used on a target population of 1400 registered schemes, with 32 schemes categorized as individual retirement benefit schemes identified for the study. Using a data collection sheet, secondary data was collected and analyzed using STATA. The study findings indicated that investment in quoted securities decreased financial performance of individual benefit retirement schemes. This led to the conclusion that

it is impudent to invest in quoted securities. Owinyo (2017) did a study on the determinants on the financial performance of retirement benefit schemes in Kenya. The study used quantitative design to determine the financial performance relationship with determinants of performance. The population for this study were the 1262 retirement benefit schemes registered with the Retirement Benefit Authority, RBA by close of 2013. Simple random sampling and Fisher's formula was used to come up with sample size of 48 private pension funds. The study findings revealed equity investment does not have an influence on the financial performance of retirement schemes.

Chumba (2018) conducted a study on the effect of selected internal factors on the performance of occupational pension schemes in Kenya. Descriptive research design was used in the study to analyse secondary data collected for 60 pension schemes registered with RBA as at 31st December 2018. The study findings suggested that investment in equities positively related to the performance of pension funds. A unit increase in investment in equity leads to an increase in ROA of 3.55%. Muia (2015) did a study on the effect of asset allocation on the financial performance of pension funds in Kenya. A sample of fifty (50) segregated schemes that have been in existence for more than ten years were adopted for the study from 1297 registered schemes as at December 2014. The study used inferential analysis. From the study, it was found out that there is a positive correlation between a pension fund's performance with the strongest correlation being between fund performance and quoted equities.

Njeru et al. (2015) did a study on the evaluation of financial performance on portfolio holdings held by pension funds in Kenya. The study took the form of a survey involving 1,262 pension funds in Kenya. A sample of 35 pension funds was selected for the study through judgmental sampling. The data was analyzed using inferential statistics. The study findings indicated that equities performed better compared to all other asset classes under study. Kiplagat (2014) investigated the effect of asset allocation on the financial performance of pension funds in Kenya. The study adopted a descriptive survey and utilized a sample of 40 schemes drawn

from a population of 1232 schemes in Kenya. The study found out that correlation was strongest between fund performance and portfolio weight of quoted shares.

Omondi (2013) investigated the relationship between asset allocation and financial performance of Pension funds In Kenya. The study adopted a descriptive survey and utilized a sample of 245 schemes that drawn from a population of 1214 schemes in Kenya. Secondary data on pension schemes asset allocation and returns was obtained from Retirement Benefits Authority and was analyzed using descriptive statistics. The study established that of all the asset classes permitted by the Retirement Benefits Authority (RBA), investments in equities was relatively more important than investments in fixed deposits in determining the overall performance of the pension funds. Miriti (2014) investigated the relationship between retirement benefits authority investment guidelines and financial performance of pension schemes in Kenya. The study population was 1188 being the number of occupational retirement benefits schemes registered with the RBA in Kenya as at October 2013. Systematic random sampling was used to pick a sample of 28 retirement benefit schemes from the population. A multiple regression model was used to analyze the data collected. The analysis indicated a negative relationship between preference and ordinary shares of quoted companies with financial performance of pension schemes. A unit increase in preference and ordinary shares of quoted companies will lead to a 0.008 unit decrease in the financial performance of pension schemes.

2.4.3 Alternative Assets

Carlo and Kok (2021) posit that the last three decades have seen significant growth in pension fund exposure to private and alternative assets all over the world. Aubry, et al. (2017) aver that in the last 10 years, public pension plans – like other large institutional investors – have moved a significant portion of their portfolios into investments outside of traditional equities, bonds, and cash. They assert that these alternative investments include a diverse assortment – private equity, hedge funds, real estate, and commodities. Flores, Campani, and Roquete (2021) did a study on the impact of alternative assets on the performance of Brazilian private pension funds. They used a sample of 1,329 funds (399 inactive and 930 active). The time

frame selected covered 120 months (from January 2009 to December 2018). They compared the performance of pension funds without additional alternative assets versus the portfolio with alternative assets. Several performance measures were used, considering Brazilian regulations and a rebalancing strategy. The study established that almost all alternative assets improved the performance of the Brazilian private pension plans.

Anantharaman (2011) investigated the determinants and consequences of investments in alternative assets by corporate pension plans. The study used a sample derived from all S&P 500 firms that have defined benefit pension plans. Spearman correlations of the explanatory variables with the dependent variables of interest were obtained. The study established that alternative investments earn higher returns in the pre-crisis period, but also perform more poorly during the crisis period, suggesting that the potential diversification benefits from investing in this asset category may be overstated. Mungai (2017) conducted a study on the effect of alternative Investments on the financial performance of pension funds in Kenya. Alternative investments were private equity, venture capital, real estate investment trusts, immovable property and bonds. He found out that majority of pension schemes had largest allocation in fixed income and government securities, and quoted equity, with little allocation in private equity and venture capital and real estate investment trusts.

Baker and Filbeck (2013) investigated the effect of alternative investment-instruments, benchmarks and strategies on financial performance of pension firms in New Jersey State. The study established a robust positive connection between alternative investments and financial outcome of pension firms in New Jersey. Further, the study outcome indicated that fund managers shift to alternative investments was occasioned by unattractive incomes in conventional asset classes. Kinyua (2022) conducted a study on investment strategy and financial performance of defined contribution pension funds in Kenya. Secondary data was used in the study. The target population comprised of 1172 registered defined contribution pension funds in Kenya as of December 2018. A sample size of 289 defined contribution pension funds were involved in the study. The regression analysis

conducted established a significantly positive relationship between alternative investments was found to be positively and significantly connected to return on investment.

Peng and Wang (2020) did a study on the alternative investments as a solution to the funding shortage of US public pension plans. They examined the impact of alternative investments on investment performance. Using data from 92 largest plans 2001–2014, the study found out that alternative investments especially private equity, had a positive effect on investment performance, but the effect was small and unsustainable. The study also found out that plans with a lower funded ratio and higher investment return expectation were more likely to allocate more assets to alternative investments and that the prospect of relying on alternative investments to meet investment return expectations remains a long-term challenge for state and local governments.

Jackwerth and Slavutskaya (2016) investigated the total benefit of alternative assets to pension fund portfolios. Using a large, merged database of hedge funds returns from February 1994 to December 2012 and a sample of U.K. pension funds (including mutual funds that are suitable for pension investing), they analyzed strategies where a pension fund invests 90% in a pension fund and 10% in an alternative asset. They compare this strategy to an investment of 100% into the pension fund. The study results indicate that using a random portfolio of hedge funds as an alternative asset improves the average pension fund performance by an annualized ΔMPPM of 0.79%, which is superior to adding most other alternative assets such as foreign equity, real estate, the risk-free rate, a random portfolio of mutual funds, commodities, a random fund of funds, as well as some counter-cyclical and non-cyclical assets.

Mungai (2017) evaluated the effect of alternative investments on the financial performance of pension funds in Kenya. Secondary data for 5 years (2012-2016) was provided by RBA. The study comprised 90 schemes which were selected using stratified sampling technique. Alternative investments included private equity & venture capital, real estate investments, immovable property & private bonds. From

the regression coefficients, private bonds had the largest contribution to the ROI followed by immovable property. The study found out that private bonds had a greater contribution to return on investment than quoted equity by 0.583.

2.4.4 Guaranteed Funds

Gale et al. (2016) posits that the benefit of capital preservation from guaranteed funds may become completely useless if inflation rate remains above the guaranteed minimum rate of return given by the guaranteed pension funds issuers. Bohnert (2015) investigated the impact of guarantees on the performance of pension saving schemes using insights from the existing literature. A choice of relevant articles were made and the same examined in more depth subsequently. Relevant journals were selected in the field of risk and insurance and actuarial science (journal selection). Out of the universe of finance literature, 14 relevant journals were identified with the help of ABS and VHB rankings and journal lists. Overall, the results show that guarantees in pension saving products are expensive in the sense that they can reduce a contract's performance, which considerably depends on the type of guarantee. In addition to this, financial guarantees have a substantial impact on the characteristics of risk-return profiles. Chumba (2018) conducted a study on the effect of selected internal factors on the performance of occupational pension schemes in Kenya. Descriptive research design was used in the study to analyse secondary data collected for 60 pension schemes registered with RBA as at 31st December 2018. The study found out that there was a negative and weak relationship between investment in guaranteed funds and fund value.

Musembi (2018) conducted a study on guaranteed pension funds in Kenya with the primary focus of the study being to establish the benefits of guaranteed pension's schemes, its limitations and establish measures that can be undertaken to enhance guaranteed pension schemes in Kenya. The study used descriptive research design. The target population of the study was 829 pension schemes that included guaranteed pension schemes listed by the Retirement Benefit Authority of Kenya. The study adopted random sampling method. Descriptive statistics was used to analyze data collected. The study established that the pensioners gained strategic value from

guaranteed pension schemes through preservation of capital, transfer of investment risk, minimized administrative cost and higher return on economies of scale. However, the study also noted limitations of guaranteed funds including variations on the trustee's involvement on decision making, rate of returns and regulation by government.

A study by Kinyua (2022) investigated influence of investment strategy and financial performance of defined contribution pension funds in Kenya. Secondary data was obtained from the audited financial reports of the defined contribution pension funds in Kenya. A sample size of 289 defined contribution pension funds were involved in the study. The study applied correlation analysis and panel regression analysis to analyze panel data collected. The panel regression results established that guaranteed funds was positively and significantly connected to financial performance of defined contribution pension funds in Kenya. Owinyo (2017) assessed the determinants of financial outcome of pension funds in Kenya. The study explored the impact of the determinants as well as stakeholders' perception regarding these determinants on pension funds' financial outcome. The findings of the study established that investing in guaranteed funds does not affect the financial outcome of pension funds.

Chege (2013) investigated the factors influencing the choice of investment options by registered fund managers in Kenya. The population of study comprised the sixteen registered fund managers in Kenya in 2013 and the descriptive research design was employed. Primary data was used and was collected from the respondents' questionnaires. Analysis of the data was by use of descriptive statistics and inferential statistics. The results indicated that guaranteed funds had the least risk at a factor of zero.

2.4.5 Listed Corporate Bonds

Bessembinder and Maxwell (2008) posit that corporate bonds are a favored investment for pension funds, whose long horizon obligations can be matched reasonably well to the relatively predictable, long-term stream of coupon interest payments from bonds. Correspondingly, most or all of a bond issue is often absorbed into stable "buy-and-hold" portfolios soon after issue. A bondholder is exposed to

several kinds of risks. However, bonds are considered low risk compared to other financial assets. A study by Mwenda (2014) concluded that there is a high positive correlation between investment in listed corporate bonds and the financial performance of pension funds. A random sample of 28 schemes was selected from a population of 1188 registered pension schemes by the Retirement Benefit Authority. Data from the sample was collected for the period 2003 to 2009. Multiple regression model techniques were adopted to show the relationship between the dependent and independent variables.

Miriti (2014) investigated the relationship between retirement benefits authority investment guidelines and financial performance of pension schemes in Kenya. The study population was 1188 being the number of occupational retirement benefits schemes registered with the RBA in Kenya as at October 2013. Systematic random sampling was used to pick a sample of 28 retirement benefits schemes from the above population. A multiple regression model was used to analyze the data collected. The estimated model indicates a unit increase in corporate bonds will lead to 0.221 units decrease in profitability of the pension schemes. Kiplagat (2014) did a study on the effect of asset allocation on the financial performance of pension funds in Kenya. The study adopted a descriptive survey and utilized a sample of 40 schemes drawn from a population of 1232 schemes in Kenya. The correlation indices for the relationships between ROI and corporate bonds was -0.209 respectively, which was below -0.4. These results indicate that there is a weak and negative correlation between ROI and corporate bond investments.

Muia (2015) did a study on the effect of asset allocation on the financial performance of pension funds in Kenya. A sample of fifty (50) segregated schemes that have been in existence for more than ten years and which have used the same fund manager over the period of study were adopted for the study from 1297 registered schemes as at December 2014. To establish the relationship between the independent variables and the dependent variable of the study, inferential analysis was conducted. The coefficient of determination was carried out to measure how well the statistical model was likely to predict future outcomes. The study findings revealed that the

increase in the investments in fixed income assets negatively impacted on the financial performance of pension schemes.

A study by Tonks (2016) on pension fund administration and investment outcome in United Kingdom established that investment in corporate bonds was critical in determining the pension funds' investment performance. Onyango (2011) investigated the relationship between investment strategies and financial performance of pension funds in Kenya. Using a sample of 36 pension funds, performance evaluation models which include Sharpe's Ratio, Treynor's Index and Jensen's Index were used to test the relationship between investment decisions and financial performance. The study established that pension funds that invest more in equity stocks perform better than those that invest more in bonds and other fixed securities.

Oello (2018) did a comparison of performance of corporate bonds, government bonds and equities at the Nairobi Securities Exchange. The study adopted descriptive research design and the population was companies that had issued bonds at the Nairobi Securities Exchange between 2014-2017. The study noted significant difference between risks and return on equities and bonds and recommended that investment managers may attention to decision between investing in government, corporate bonds or equities as they portend different risks and returns to investors.

Xiao and Xiao (2009) did a study on the adequacy of Bond supply and cost of pension benefits: a financial economics perspective. The study assessed the adequacy of the supply of bonds, quantifying the price impact, gauging the actuarial cost, and proposing appropriate government policy measures. The study utilized data for nominal AAA corporate yields estimated using quarterly data from 1962 Q1 to 2008 Q3 under different specifications. The same was analyzed using regression. The study findings indicated that the supply of long-term bonds is far from sufficient to meet the growing demand by pension funds. The inadequate supply may result in a statistically and economically significant impact on bond yields and an actuarially significant impact on the cost of providing pension benefits. The study points out that

the ramifications should not hold back the shift to bonds by pension funds but instead, governments should take effective measures to spur bond supply.

2.4.6 Pension Fund Portfolio Rebalancing

Park, Kim and Lee (2022) investigated asset allocation efficiency from dynamic and static strategies in underfunded pension funds. The study attempted to conduct a comparative analysis between dynamic and static asset allocation to achieve the long-term target return on asset liability management. Vector autoregression was used to estimate and forecast long-term interest rates. Based on asset allocation simulations, the study derived that dynamic asset allocation which has been mirroring economic changes actively has a higher annual yield and risk-adjusted return than static asset allocation. Institutional investors with long horizons for investing should rebalance their portfolio to preserve the desired risk-return characteristics specified by their strategic asset allocation. This requires the investors to be countercyclical, that is, sell the assets that have performed better in the past and buy the assets that have performed poorly (Bams, Schotman & Tyagi, 2016).

Kinyua, Muturi, and Simiyu (2022) investigated investment strategy and financial performance of defined contribution pension funds in Kenya. The study examined the effect of investment strategy on financial performance of defined contribution pension funds in Kenya. A sample size of 289 defined contribution pension funds were involved in the study and were selected by applying stratified random sampling method. The study established that a positive association exists between investment strategy and financial performance of defined contribution pension funds in Kenya. The study concluded that that investment strategy explained up to 57.76% of the variations in the return on investment.

Using historical data to form hypothetical portfolios, Hong (2021) evaluated the impact of rebalancing methods on portfolio returns. The study tested a total of 14 different rebalancing approaches. The study found out that portfolios with fewer components can be more efficiently rebalanced than portfolios with many components. The study also did not find any evidence to the effect that rebalancing choices can reliably increase expected returns. Dayanandan and Lam (2015) did a

study on portfolio rebalancing using data from the U.S. for the 20-year period 1983-2012 to examine whether there is evidence that statistically significant value exists for various portfolio rebalancing strategies. The study found that the differences in return from various periodic-cum-threshold rebalancing strategies compared to a buy-and-hold strategy is only 11 basis points and that the mean difference of various periodic rebalancing strategies from a buy-and-hold strategy is not statistically significant except for quarterly or semi-annual portfolio rebalancing strategies. The study also found out that gains from portfolio rebalancing may be eroded by the cost of rebalancing is substantial.

A study by Bams et al. (2016) investigated asset allocation dynamics of pension funds. The study used an international database that spans over 20 years and focused on portfolio rebalancing. The study findings indicated that a significant proportion of the change in the weight of equity is related to passive change in portfolio due to realized equity returns. Moreover, pension funds follow asymmetric rebalancing, they rebalance poorly when stock market is doing well but rebalance strongly when stock market is doing poorly. Actual change in equity portfolio only partially reflects strategic changes. The results of the study also indicated that US and defined benefit pension funds rebalance less. Moreover, external managers and active managers can be identified as the major source of poor rebalancing. Lastly, between asset classes, pension funds are more passive in alternative investments.

Kim and Lee (2020) investigated equity market integration and portfolio rebalancing. The study used EPFR database, which provides country allocation information of international mutual funds collected directly from fund managers or administrators. The study sample consisted of 385 equity mutual funds and the period from 1999m12 to 2017m12. The data was analyzed using regression. Study results indicated that the propensity to rebalance is stronger in bad times, especially during major international financial crises, than in good times. A study by Bikker, Broeders and De Dreu (2007) on stock market performance and pension fund investment policy: rebalancing, free float, or market timing established that the investment policies of pension funds are partially driven by the cyclical performance of the stock market. The study also finds that rebalancing is much stronger after

negative equity returns, indicating that pension funds respond asymmetrically to stock market shocks. Furthermore, investment policies of large funds deviate from those of small funds: large funds hold more equity and their equity allocation is more strongly affected by actual equity returns, reflecting less rebalancing. The largest funds react highly asymmetrically to equity returns. Their positive excess equity returns lead to adjustments in equity portfolios of more than 100 percent, reflecting "overshooting" of free floating, or positive-feedback trading. Apparently, managers of large funds have greater risk tolerance, particularly in bull markets.

Boďa and Kanderová (2018) studied the true effect of rebalancing in terms of a higher return or a lower risk. Focusing upon rebalancing strategies in quadratic tracking, the study investigated whether rebalancing contributes to higher returns or lower risks. The investigation was conducted as a case study of tracking the S&P 500 Index by means of its constituents in four different time periods spanning from 2011 to 2017. Different approaches to stock pre-selection (according to investment styles induced by market capitalization and the P/B ratio), portfolio nominal sizes (ranging between 10 and 30 stocks) and rebalancing (including periodic, deviation or no rebalancing at all) were considered. The results suggest that the effect of rebalancing is generally more apparent with return and less with risk, and that risk may in times of turbulent markets be aggravated by rebalancing interventions.

2.4.7 Financial Performance

Tonks (2005) carried out a study on pension fund management and investment performance. The study established that the value of the pension fund will increase over time due to contributions and the investment returns on the fund. These investment returns depend on the asset allocation and portfolio decisions of fund managers. Small changes in the investment returns, increase to large changes in the value of the pension fund at retirement. The evidence on fund managers' performance is that on average they do not add very much value over and above a passive strategy of investing in the market index. However, this average disguise the fact that some fund managers perform well, and others perform poorly. Identifying and understanding the persistence of the poor performance of some fund managers is

an important issue in the pensions area, and one in which further research would be worthwhile.

Antolin (2008) did a comparative study on the financial performance of pension plans. The study was sponsored by OECD in collaboration with the World Bank and some private sector institutions and began at the end of 2006. The main aim was to compare investment performance of privately managed pension funds across several OECD, Latin American and Central and Eastern European (CEE) countries. The study first provided an analysis of aggregate investment performance by country on a risk adjusted basis using relatively standard investment performance measures. The second stage of the study involved evaluating potential relationships between the characteristics of each pension system, individual regulatory environments and investment performance. The study established that the Sharpe ratio and attribution analysis show that, for those countries with enough information and data to adjust returns accordingly, privately managed pension funds have obtained a risk premium against short-term investment alternatives. It was also clear from the findings that pension funds have generally underperformed with respect to the hypothetical portfolio with the highest (mean) return for a given level of risk. The results also confirmed that in several countries investment restrictions have had a negative impact on performance.

Nguthu (2009) did a study on the effect of assets allocation on retirement Benefits schemes performance in Kenya. A sample of 40 schemes was drawn from a population of 400 segregated occupational schemes in Kenya. The secondary data on retirement benefit schemes assets allocation and returns was obtained from Retirement benefits Authority was analyzed using regression analysis and descriptive statistics. Regression was done on the fund returns to the policy returns over time to determine the policy impact on variation over time. Regression was also done on the compounded annual fund returns to the compounded annual policy returns among schemes to determine the impact of assets allocation differences of schemes on the variability of returns. To determine the level of returns which is explained by assets allocation, the researcher computed the ratio of the average annualized total returns for each scheme to the average annualized policy returns. The study shows that the

variation in returns over time for retirement benefit schemes is explained up to 62.4% by investment policy adopted by the trustees of the scheme. Other factors such as securities selection, timing of investments and managers selection explain the remainder. Differences in investment policies were explained by 37% of the variations on the return among different schemes.

Kusewa (2009) did a study on the impact of regulation of the retirement benefits sector on the financial performance of occupational retirement benefit schemes in Kenya. The study covered five years before and five years after the enactment of the regulations in the year 2000. The study used the total contributions from members for the year, fund values at year end and the average annual percentage increase in the size of the fund as indicators of financial performance. According to the study, the increase in total contributions is influenced by the number of members in the scheme, the member's pay (where the pension is a proportion of the salary) and the additional voluntary contributions made by members. The fund value at the end of the year is the balance of total contributions and investment income net of the withdrawal benefits and other expenses. This is what is reinvested in the scheme to give a return to members. The fund value, therefore, gives an indication of the size of the scheme in terms of its assets value. Thirty occupational retirement benefit schemes were considered as the sample of the study and scheme administrators provided the data for this study. For each scheme in the sample, their fund values as well as total contributions were analyzed within a span of ten years, five before 2000 and five after the year 2000. Using the matched or paired t-test, findings indicated that there was a significant positive impact in the financial performance of the population of occupational retirement benefit schemes in the period in which the regulations have been in place.

The key to successful pension-plan investing is finding an investment solution that manages the volatility of asset returns relative to liabilities and generates enough return so that the plan's commitment is fulfilled. Brinson et al. (1986) developed a method to attribute the returns to the different factors determining returns. Because of this framework it is likely to see which investment decisions have the greatest impact on the returns and the volatility of these returns.

Table 2.1: Performance (Return) Attribution

		Selection	
		Actual	Passive
Timing	Actual	(IV)	(II)
		Actual Portfolio Return	Policy and Timing Return
	Passive	(III)	(I)
		Policy and Security Selection	Policy return (Passive Benchmark Return)

Active Returns Due to:	
Active Asset Allocation	II – I
Security Selection	III – I
Other	IV - III - II + I
Total	**IV – I**

Source: Brinson et al. (1986)

Quadrant I indicate the total return provided by the investment policy adopted by the plan sponsor. The policy "portfolio" thus represents a constant, normal allocation to passive asset classes. Investment policy, then, identifies the plan's normal portfolio composition. Assessing the policy return consists of applying the normal proportions of each investable asset class to the corresponding passive yields. Quadrants II and III shift the focus to active management. Quadrant II reports the return attributable to a portfolio reflecting both policy and active asset allocation. Whether active allocation involves anticipating price moves (market timing) or reacting to market disequilibria (fundamental analysis), it results in the under or overweighting of asset classes relative to the normal weights identified by policy. The aim of a dynamic asset allocation is to heighten the return and/or decrease the risk of the portfolio compared to its policy benchmark. The policy and active asset allocation return is computed by applying the actual asset class weights to their respective passive benchmark returns. Quadrant III presents the returns to a portfolio attributable to

policy and security selection. Security selection involves active investment decisions concerning the securities within each asset class. This framework postulates that the return from policy and security selection is obtained by applying the normal asset class weights to the actual active returns achieved in each asset class. Lastly, Quadrant IV denotes the actual return realized by the plan over the performance evaluation period. This is the outcome of the plan's actual asset class weights interacting with the actual asset class returns.

Ammann and Zingg (2008) focused on the performance of Swiss pension funds by looking at the linkage of the governance of pension fund and their performance. A sample size of 96 pension funds and only those who reported total assets of not less than CHF 190 billion were considered in the study. The study noted that good corporate governance, with well set targets and strategies of investments is of key importance on the success of the pension funds. On the other, hand, it was argued that controlling and steering investment rules, and communication have no significant influence on performance.

Hinz et al. (2010) states that there is an extreme stress on the short rates of return by the traditional methods of performance assessment of the pension funds. Because the objective of mandatory second pillars is to ensure adequate retirement income to individuals, monthly or annual returns of pension are not totally meaningful if they are not measured against a benchmark or against an objective. In the absence of more appropriate long-term performance measures, the prevailing stressing on the short-term returns creates motivations for pension fund managers to focus their efforts on maximizing short-term returns. However, the funds with better short-term performance are not necessarily those best aligned with the long run performance of a pension system. In general, the purpose of measuring portfolio performance is to determine whether portfolio managers add value with respect to passive or naïve investment strategies, typically represented by feasible and hopefully well diversified benchmarks. Under the Efficient Markets Hypothesis, it is difficult for managers to add value, so it should not be surprising to find that the different pension systems have had performances similar to their benchmarks (Walker & Iglesias, 2007).

2.5 Critique of the Existing Literature Relevant to the Study

Previous studies on portfolio rebalancing and financial performance of pension funds have not been comprehensive enough. Most of the previous studies focused on asset allocation by pension funds but did not factor in portfolio rebalancing within the approved investment policy statement and tactical ranges allowed by the RBA. In addition, there have been no clear studies on how portfolio rebalancing moderates the influence of asset allocation on the financial performance of pension funds in Kenya. From reviewed relevant literature, there are varied outcomes and conclusions which have been made from the past studies done with the objective of assessing how financial performance of retirement funds are affected by the choice of assets and how portfolio rebalancing may moderate the influence of asset allocation on the financial performance of pension funds in Kenya. This is compounded by conflicting outcomes for different choices of assets and shifts in individual asset classes and their influence on pension fund performance.

Mwangi (2018) investigated the effect of asset allocation on the financial performance of individual Benefit Pension Schemes in Kenya. The study findings indicated that investment in fixed interest securities, government securities and investment in unquoted securities increased financial performance while investment in quoted securities decreased financial performance. The study has gaps since it only evaluated asset allocation by 30 Individual retirement benefits schemes and did not consider other types of pension schemes. The study did not also look at other issues that can affect pension funds financial performance apart from asset allocation. Sanga (2016) conducted a study on financial performance of selected pension funds (NSSF, PPF, PSPF, and LAPF) in Tanzania. The findings of the study concluded that government securities are much more profitable as they are riskless securities and yield high returns. The study assessed financial performance of selected pension funds in Tanzania and therefore presented a contextual gap. Further, the study evaluated investment strategy, fund returns and fund size as determinants of pension fud performance. The study negated individual asset classes which are key components of an investment portfolio held by a pension fund.

Park, Kim and Lee (2022) investigated asset allocation efficiency from dynamic and static strategies in underfunded pension funds. The study noted that dynamic asset allocation has a higher annual yield and risk adjusted return than static asset allocation. The study had gaps given that the expected rate of return for each asset class was computed using the ex-ante (or forward-looking). In addition, the study did not factor risk return considerations and risk perception by small pension funds which may prefer static asset allocation through investing in government securities and guaranteed funds where investment return is assured with minimal risks unlike large pension funds which may take riskier positions. The study fails to account for the rebalancing costs of adjusting the portfolio. Mungai (2017) investigated the effects of alternative investments on the financial performance of pension schemes in Kenya. The study results established a positive relationship between the alternative asset classes and return on investments except private equity and venture capital. The study had gaps as it did not evaluate the risk return characteristics of alternative assets and failed to consider the minimal proportions of alternative investments in overall pension fund portfolios held by different schemes. This is because alternative assets are complex and risky. There is a need to ensure pension fund trustees and fund managers are well appraised on probable risks in investing different classes of alternative assets.

Given the varied performance between retirement funds and alternative views by different writers on the perceived relationship between the study variables, this study sought to evaluate the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. There was no comprehensive analysis done in Kenya that incorporated asset classes like guaranteed funds and listed corporate bonds and the moderating effect of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. This study addressed the identified gaps by seeking to explain how portfolio rebalancing moderates the influence of asset allocation on the financial performance of pension funds in Kenya.

2.6 Research Gaps

From the foregoing review of relevant literature, it was apparent that research in the area of asset allocation, portfolio rebalancing and financial performance of pension funds have been done but not in a comprehensive approach. The previous researchers concentrated on a few assets in pension funds' portfolios and looked at each in isolation. This study covers additional essential financial assets that were omitted from the previous studies like guaranteed funds and listed corporate bonds. This makes the study more comprehensive. In addition, the study focuses on portfolio rebalancing by examining shifts in individual asset classes across the study period. From survey of relevant literature, there are few studies specific to Kenya on the link between portfolio rebalancing decisions by pension funds and the financial performance. This study therefore intended to fill these pertinent gaps in literature by studying how financial performance was influenced by portfolio rebalancing and asset allocation decisions as guided by the approved Investment Policy Statements.

Table 2.2: Showing Research Gaps

Researcher(s) and Year	Study Objective	Key Findings	Research Gap(s)	Addressing the Gaps
Mwangi (2018)	To establish the effects of investment in fixed interest assets, government securities, quoted securities and unquoted securities on the financial performance of individual retirement benefit schemes	Investment in fixed interest securities, government securities and investment in unquoted securities increased financial performance while investment in quoted securities decreased financial performance.	The study focused on the individual retirement benefit schemes and therefore presented a contextual gap	The study is going to focus on all pension funds registered with the RBA.
Chovancova et al. (2019)	To investigate the connection between stock and bond	The study results indicated a statistically	Research data was based on pension statistics from	The study was done in Kenya to address the contextual gap.

	markets and pension funds.	significant positive correlation between the development of bond market indices and the appreciation of the pension portfolio management.	the OECD and therefore the study presented a contextual gap.	
Sanga (2016)	Assessing financial performance of selected pension funds (NSSF, PPF, PSPF, and LAPF) in Tanzania	The findings of the study concluded that government securities are much profitable as they are riskless securities and yield high returns.	The study was aimed at assessing financial performance of selected pension funds in Tanzania and therefore presented a contextual gap.	The study was done in Kenya to address the contextual gap.
Ndungu (2014)	To determine the effect of asset allocation on the financial performance of pension schemes in Kenya.	Established that returns in equities, fixed deposit, and Government securities significantly affected the fund performance	The study sample was based on fifty (50) segregated schemes that have been in existence for more than ten years and therefore presented a methodological gap.	The study focused on all pension funds registered with the RBA
Owinyo (2017)	To assess the determinants on the financial performance of retirement benefit schemes in Kenya	The study found no connection between fixed income securities and pension funds' performance.	The study used ROA as the tool used to measure pension funds financial performance and therefore presented a conceptual gap	TWRR will be used in the current study to overcome the conceptual gap
Rhoda (2016)	To determine the effect of liquidity risk on the financial performance of pension funds	The study established that fund age, fund size and Treasury bill rate had an	The study factored in fund size and fund age intervening variables and therefore	The study used portfolio rebalancing as moderating variable to overcome the

	in Kenya.	influence on the pension fund earnings.	presented a methodological gap.	methodological gap.
Achieng (2013)	To establish the relationship between asset allocation and financial performance of pension funds in Kenya	Asset allocation explains 28% of the variability of fund returns. The remaining 72% is explained by other factors such as asset class timing, security selections and manager selection.	The study did not consider retirement benefits schemes that have invested in guaranteed funds, Individual Pension Plans and Umbrella Funds and therefore presented a contextual gap	The study utilized all pension funds registered with RBA to overcome the contextual gap.
Mungai (2017)	To assess the effects of alternative investments on the financial performance of pension schemes in Kenya.	The regression coefficients yielded a positive relationship between this alternative asset classes and return on investments except private equity and venture capital.	The study focused only on segregated schemes and therefore presented a contextual gap.	The study utilized all pension funds registered with RBA to overcome the contextual gap.
Mwikali (2014)	To investigate the effect of investment guidelines on the performance of pension funds in Kenya	The findings indicated a strong correlation between investment in government securities and financial performance of pension schemes.	The study focused only on segregated schemes and therefore presented a contextual gap.	The study utilized all pension funds registered with RBA to overcome the contextual gap.
Mwachanya (2015)	To establish the impact asset allocation on financial performance of pension funds in Kenya.	The study established that of all the asset classes permitted by the RBA, investments in	The sample included schemes that invested in segregated funds, were in existence for at	The study utilized all pension funds registered with RBA which were classified into small,

		equities was relatively more important than investments in fixed deposits in determining the overall performance of the pension funds.	least 7 years and had a fund value of at least Kshs. 100 million and therefore presented a contextual gap.	medium and large to overcome the contextual gap.
Miriti (2014)	To establish the relationship between adherence to retirement benefits authority investment guidelines and financial performance of pension schemes in Kenya	A unit increase in preference and ordinary shares of quoted companies and listed corporate bonds will lead to 0.008 units and 0.221 decrease in financial performance of pension schemes respectively.	The study looked at individual assets as explanatory variables and therefore presented a conceptual gap.	The study used portfolio rebalancing as a moderating variable to bridge the conceptual gap.
Chumba (2018)	To assess the effect of selected firm internal factors on the performance of occupational schemes in Kenya	Investment in equities and immovable properties positively related to pension funds' performance. Fund value and investment in guaranteed funds however, had a negative and weak impact on performance.	The study used ROA as the tool used to measure pension funds financial performance and therefore presented a conceptual gap	TWRR was used in the current study to overcome the conceptual gap
Musembi (2018)	To establish the benefits of guaranteed pension schemes and its limitations	Pensioners gained strategic value from guaranteed pension schemes through preservation of	The study used a population of 829 pension funds that have included guaranteed funds inn their portfolio and	The study utilized all pension funds registered with RBA which were classified into small, medium and

		capital, transfer of investment risk, minimized administrative cost and higher return on economies of scale	therefore resented a contextual gap.	large to overcome the contextual gap.
Muia (2015)	To determine the effect of asset allocation on the financial performance of pension funds I Kenya	Increase in investments in fixed income assets negatively impacted financial performance of pension schemes.	The study focused only on segregated schemes and therefore presented a contextual gap.	The study utilized all pension funds registered with RBA.
Oelo (2018)	To compare the performance of corporate bonds, government bonds and equities.	The study noted significant difference between risks and return on equities and bonds	The population of the study was companies that had issued bonds at the NSE hence contextual difference.	The study focused on pension funds registered with RBA.
Flores, Campani & Roquete (2021)	To assess the impact of alternative assets on the Brazilian private pension funds.	Almost all alternative assets improved performance of Brazilian private pension plans.	The study focused on Brazilian private pension funds and therefore contextual gap.	The study focused on pension funds registered with in Kenya to overcome contextual gap.
Baker and Filbeck (2013)	To assess the effect of alternative investments on the financial performance of pension firms in New Jersey State	The study established a robust positive connection between alternative investments and financial outcome of pension funds in New Jersey State.	The study focused on pension funds in New Jersey State and therefore contextual gap.	The study focused on pension funds registered with in Kenya to overcome contextual gap.
Park, Kim and Lee (2022)	To investigate asset allocation efficiency from dynamic and static strategies	Dynamic asset allocation has a higher annual yield and risk adjusted return	The study, we calculated the expected rate of return for each asset class	The study used the ex post (or trailing) method to determine the expected

	in underfunded pension funds	than static asset allocation.	using the ex-ante (or forward-looking) method hence methodological differences.	rate of return for each asset class
Dayanandan and Lam (2015)	To investigate whether statistically significant value exists for various portfolio rebalancing strategies.	Gains from portfolio rebalancing may be eroded by the cost of rebalancing if substantial.	The study focused on pension funds in the USA and therefore a contextual gap.	The study focused on pension funds registered with in Kenya to overcome contextual gap.

2.7 Summary of the Literature Reviewed

The above chapter reviewed the various theories that explain the link between independent and dependent variables and the following theories tend to support the study; Modern Portfolio Theory, Risk Return Trade off Theory, Liquidity preference Theory, The Arbitrage Pricing Theory and the Post-Modern Portfolio Theory. A conceptual model was developed to provide a greater understanding of the subject matter. The relationships between the response variable and the predictor variable are clearly shown in the conceptual framework and explained using concepts that capture the key variables with emphasis on the following; government securities, quoted equity, guaranteed funds, alternative investments and listed corporate bonds. A critical review of empirical literature was undertaken in cognizance of the efforts and contributions made by other researchers in the area to identify knowledge gaps. The study presented and explained portfolio rebalancing as moderating variable.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research design, target population, data collection and data analysis are discussed. Peniel (2016) defines research design' as drawing a tentative outline, a blue print and a scheme, planning or arranging a strategy of conducting research with a thorough knowledge about research methodology. It is a logical and systematic plan for collecting data, measurement and analysis of data and prepared for a research study. Research design encapsulates the processes for doing a study as well as when and under what circumstances the data was obtained. This was to specify a plan for generating empirical evidence that would be used to answer the research questions.

3.2 Research Philosophy

Žukauskas et al. (2018) assert that research philosophy is the basis of research, which involves the choice of research strategy, formulation of the problem, data collection, processing, and analysis. The paradigm of scientific research, in turn, consists of ontology, epistemology methodology, and methods. Saunders et al. (2009) posit that a research philosophy is the underlying basis of data collection methods. They state that research philosophy is a system of beliefs and assumptions about the development of knowledge. Whether you are consciously aware of them or not, at every stage in your research you will make a number of types of assumption (Burrell & Morgan, 1979). These include assumptions about human knowledge (epistemological assumptions), about the realities you encounter in your research (ontological assumptions) and the extent and ways your own values influence your research process (axiological assumptions). Mkansi and Acheampong (2012) aver that Research philosophy classifications such as ontology, epistemology, and anxiology and their conflicting applications to the 'quantitative-qualitative' debates, are a major source of dilemma to research students in establishing their relevance to subject areas and discipline.

Mayer (2015) identifies Ontology and Epistemology as two main ways of thinking in research philosophy. It is imperative that research designs are philosophically informed so that one can defend the choices made amongst many alternatives. The term Ontology is from two Greek words (onto, which means 'being') and (logia, which means 'science, study or theory'). Ontology refers to a branch of philosophy concerned with articulating the nature and structure of the world (Wand & Weber, 1993, p. 220). It specifies the form and nature of reality and what can be known about it. Ontology is a branch of philosophy that studies the nature of reality and the essence of its existence (Burrell & Morgan, 1979). Ontology is defined by (Crotty: 2003:10) as "the study of being". It is concerned with "what kind of world we are investigating, with the nature of existence, with the structure of reality as such". Guba and Lincolin (1989:83) state that the ontological assumptions are those that respond to the question 'what is there that can be known?' or 'what is the nature of reality?'.

Saunders et al. (2009) assert that the first aspect of ontology objectivism. This portrays the position that social entities exist in reality external to social actors concerned with their existence. The second aspect is subjectivism which holds that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence. Subjectivism is our own meanings that we attach the social realities that we interact with in our daily lives. The variables under investigation in this thesis were real, external and independent of the researcher. To ensure objectivity in data collections, analysis and interpretation, the researcher tried as much as possible to reduce the subjective views in this study.

Epistemology refers to assumptions about knowledge, what constitutes acceptable, valid and legitimate knowledge, and how we can communicate knowledge to others (Burrell & Morgan 2016). Epistemology is the study of the nature of knowledge and how it is acquired and presents a similar two-fold debate between positivism and interpretivism -also referred to as phenomenology (Becker & Niehaves, 2007). Epistemology, or the study of knowledge, is "a way of understanding and explaining how I know what I know" (Crotty, 1998). According to Denzin and Lincoln (2005), epistemological inquiry looks at the relationship between the knower and the

knowledge and asks, “how do I know the world?”. Epistemology is the study of what is considered acceptable knowledge in a given field of study. Axiology refers to the role of values and ethics. We see this in the opening vignette where parts of the electorate felt their values have been ignored by mainstream politicians. One of the key axiological choices that you will face as a researcher is the extent to which you wish to view the impact of your own values and beliefs on your research as a positive thing. Consequently, you will need to decide how you deal with both your own values and those of the people you are researching (Thornhill et. al., 2009).

Park et al. (2020) states that positivism relies on the hypothetico-deductive method to verify a priori hypotheses that are often stated quantitatively, where functional relationships can be derived between causal and explanatory factors (independent variables) and outcomes (dependent variables). Positivist research, however, does not always rely on quantitative methods. “Positivism” is basically about using an existing theory to generate a hypothesis. It also deals with causal relationships (Hughes & Sharrock, 2016). Interpretivism is a dominant philosophical approach that helps our understanding of the social world by meaningful interpretations of the world inhabit by people, which they have already interpreted by the meanings they produce and reproduce as a necessary part of their everyday activities together (Chowdhury, 2014). The philosophy of realism is that there is a reality quite independent of the mind. In this sense, realism is opposed to idealism, the theory that only the mind and its contents exist. Realism is a branch of epistemology which is similar to positivism in that it assumes a scientific approach to the development of knowledge. This assumption underpins the collection of data and the understanding of those data (Thornhill et. al., 2009).

The study adopted three philosophical positions. They included positivism, realism and interpretivism. The theories that informed this study include modern portfolio theory, risk return trade off theory, liquidity preference theory, Black Litterman model and post-modern portfolio theory. This study adopted a deductive research approach given that sampled data was used to infer about the population which consisted of all pension schemes registered with Retirement Benefits Authority. This study used epistemology, positivism and deductive approach for research design,

choice of sampling technique, data collection and data analysis given that this the research variables revolved around resources available to pension schemes and how trustees and fund managers make investment decisions over these resources. The choice of research design, data collection and analysis in this chapter was guided by research philosophy. Consequently, the outcome of this thesis can be used to make logical conclusions in line with the general objective of the research.

3.3 Research Design

Toshkov (2016) states that a research design is about getting valid answers to research questions in a reliable and efficient way. It is about exploiting the validity and scope of application (generalizability) of scientific inferences given the goals of the researcher and constraints of practical and ethical nature. Research design ought to specify the different methods to be utilized in solving the research problem, sources and information related to the problem and, time frame and the cost budget (Rajasekar et al., 2013). Essentially, the research design creates the foundation of the entire research work. This study used descriptive survey research design. Omair (2015) states that descriptive study designs are valuable for simply telling the anticipated characteristics of the sample that is being studied. Descriptive research deals with how variables are related, hypothesis testing, and the development of generalizations, principles, or theories that have universal validity (Peniel, 2016).

3.4 Target Population

Asiamah et al. (2017) avers that the target population is determined using selection criteria to select individuals of the general population who can, at best, share experiences and thoughts under the most convenient conditions. Population is a collective term used to define the aggregate number of things (or cases) which are the focus of your study and neither does it mean a number of people (Walliman, 2011). So, a population can consist of certain types of objects, organizations, people or even events. The target population for this study was 1,258 registered schemes as per RBA as at 31 December 2021.

3.5 Sampling Frame

The registered pension fund providers Kenya as at close of the year on the 31 December 2021 constituted the sampling frame for this study. Sampling frame refers to a frame from which a sample of target population can be drawn (Rahi, 2017). It is a list of all units in the population from which research sample will be selected. A "sample frame is the listing of the units from which a sample is to be selected" (Ralph, 2013). Bryman (2012), Cooper and Schindler (2011) define a sample frame as a list of all the accessible cases in a population from which a sample is drawn. A sampling frame is a list of all the items where a representative sample is drawn for the purpose of the study (Nachmias & Nachmias, 2008).

3.6 Sample and Sampling Technique

Alvi (2016) defines sample as a group of relatively smaller number of people selected from a population for investigation purpose. Ajay and Micah (2014) posit that sampling is related with the selection of a subset of individuals from within a population to estimate the characteristics of whole population. The study used a purposive sampling procedure to identify the sample units. Etikan et al (2016) aver that the purposive sampling technique, also called judgment sampling, is the deliberate choice of a participant due to the qualities the participant possesses. It is a non-random technique that does not need underlying theories or a set number of participants. Defining the number of observations to include in a sample is what is referred to as size estimation (Ajay & Micah, 2014). The sample size is an important feature of any study or investigation in which the aim is to make inferences about the population) from a sample.

Mugenda and Mugenda (2003) suggested a formula for determining the sample size in social science research. Cochran (1977) developed a formula to calculate a representative sample for proportions as follows;

$$n_0 = \frac{z^2 pq}{e^2}$$ ……Equation 1

Where:

n_0 is the sample size;

z is the selected critical value of desired confidence level;

p is the estimated proportion of an attribute that is present in the population, q=1- p and;

e is the desired level of accuracy.

For example, suppose we want to calculate a sample size of a large population whose degree of variability is not known. Assuming the maximum variability, which is equal to 50% (p =0.5) and taking 95% confidence level with ±5% precision, the calculation for required sample size will be as follows: p = 0.5 and hence q =1-0.5 = 0.5; e = 0.05; z =1.96

$$\text{So, } n_0 = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384.16 = 384$$

Cochran (1963) explained that if the population is determinate, then the size of the sample can be reduced a little. This is due to the fact that a very large population provides proportionally more information than that of a smaller population. He proposed a correction formula to calculate the final sample size in this case which is given below;

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}} \qquad \text{……..…Equation 2}$$

In the equation 2 above;

n_0 is the sample size derived from equation and N is the population size. Now, suppose we want to calculate the sample size for the population of our study where, population size is N =1258.

$$\frac{384}{1 + \frac{(384 - 1)}{1258}}$$

$$= 294.$$

The sample consisted of 294 registered schemes which was 24% of the target population. The above sample size was acceptable in the light of research specialists as; Gay and Diehl (1992), Manion and Morrison (2000); Gall and Borg (2007) and who all agree that a ten per cent sample is adequate for a descriptive study.

Since the population of pension funds is diverse, we shall apply proportional stratification to obtain the sample size for each stratum. According to Kothari (2004) the formula for this is;

$$\text{ni} = \frac{\text{Ni}}{\text{N}} * n \quad \text{..... Equation 3}$$

Where:

Ni represents the sample size for the strata.

N_i represents the population size of the strata.

N represents the total population size.

n represent the total sample size.

By use of the equation 3 we generated the following for the various types of financial institutions:

Table 3.1: Sample Size of Various Types of Pension Schemes

Size of the Fund	Population	Sample Size
Small (Less than Kshs. 100,000,000	565	132
Medium (Kshs. 100,000,000 to Kshs. 999,999,999)	498	116
Large (above Kshs. 1 billion)	195	46

Source: RBA (2022)

3.7 Data Collection Procedure

The study used data collection form to obtain quantitative data for analysis. Andrews et al. (2012) posits that the practicality of utilizing existing data for research is becoming more prevalent in a time where vast amounts of data are being collected and archived by researchers all over the world. Melissa (2017) stated that secondary data analysis is analysis of data that was collected by someone else for another primary purpose. The consumption of the existing data offers a feasible option for researchers who may have inadequate time and resources. The source of the secondary data was Retirement Benefits Authority (RBA) and Kenya National Bureau of Statistics reports.

The secondary data collection form was divided into four sections, the first section comprised of personal data of the scheme or fund, section two covered asset class/portfolio distribution and section three covered questions on portfolio performance attribution and section four on moderator (contribution density).

3.8 Data Processing and Analysis

Ibrahim (2015) defines data analysis as the process of performing certain calculations and evaluation in order to extract relevant information from data is called data analysis and avers that the data analysis may take several steps to reach certain conclusions. Simple data can be organized very easily, while complex data requires

proper processing. The word “processing” means the recasting and dealing with data making ready for analysis. Flick (2013) states that whatever the data are, it is their analysis that, in a decisive way, forms the outcomes of the research.

3.8.1 Model Specification

The study employed the linear regression model to analyze the influence of portfolio asset class on the financial performance of pension funds in Kenya. The model analysis was used to test the statistical significance of the various independent variables (Investment in government bonds, equity investments, offshore investments, money market placements and real estate investments) on the dependent variable (performance as measured by the time weighted return). With the research data expected to have both time and cross-sectional dimensions, the study estimated the linear panel regression as proposed by Greene (2008). Regression analysis is a statistical technique for estimating the relationship among variables which have reason and result relation. The central goal of the univariate regression analysis is to assess the relationship between a response variable and one predictor variable and express the linear relation equation between the two variables. Regression models with one dependent variable and more than one independent variable are called multi-linear regression (Ulden, Nesse, 2013). Prabhat and Meenu (2015) define regression as a statistical tool for calculating the probability of occurrence of any phenomenon or for predicting the phenomenon or relationship between different variables.

Kothari (2004) posits that in regression analysis, we form a linear composite of explanatory variables in such a way that it has maximum correlation with a criterion variable. Where there is a solitary metric criterion variable, then the technique is suitable. The solitary metric criterion variable is supposedly a function of other explanatory variables. The main objective in using this technique was to predict the variability of the dependent variable based on its covariance with all the independent variables. In this study, the following linear regression equation was utilized to determine the influence of portfolio asset class on the financial performance of pension funds in Kenya;

$$R_{it}=\beta 0 + \beta_1 GS_{it} + \beta_2 QEI_{it} + \beta_3 AI_{it} + \beta_4 GF_{it} + \beta_5 LCB_{it} + \epsilon \ldots\ldots\ldots \text{ Model 1}$$

Where:

R_{it} is TWRR for firm *i* and year t;

TWRR is Time Weighted Rate of Return firm *i* and year t;

GS is Government Securities firm *i* and year t;

QEI is Quoted Equity Investments firm *i* and year t;

AI is Alternative Investments firm *i* and year t;

GF is Guaranteed Funds firm *i* and year t;

LCB is Listed Corporate Bonds firm *i* and year t;

β_0 is the constant term;

$\beta_1, \beta_2, \beta_3, \beta_4$ are the associated regression coefficients;

ϵ is the error term;

Subscript *i* = *Firms*

Subscript *t* = *Years*

In addition, portfolio rebalancing was used as a moderating variable. The regression equation after interaction is given by:

$$R_{it}=\beta_0+\beta_1 GS_{it}*PR+\beta_2 QEI_{it}*PR+\beta_3 AI_{it}*PR+\beta_4 GF_{it}*PR+\beta_4 LCB_{it}*PR+ \epsilon \ldots \text{ Model 2}$$

Where:

R_{it} is TWRR for firm *i* and year t;

TWRR is Time Weighted Rate of Return firm *i* and year t;

GS is Government Securities firm *i* and year t;

QEI is Quoted Equity Investments firm *i* and year t;

AI is Alternative Investments firm *i* and year t;

GF is Guaranteed Funds firm *i* and year t;

LCB is Listed Corporate Bonds firm *i* and year t;

PR is the moderating variable portfolio rebalancing;

β_0 is the constant term;

$\beta_1, \beta_2, \beta_3, \beta_4$ are the associated regression coefficients;

ϵ is the error term;

Subscript *i* = *Firms*

Subscript *t* = *years*

3.9 Diagnostic Tests

It was imperative to evaluate the goodness-of-fit of data models precisely by not only using omnibus tests, but tests planned for a certain direction of the alternative. These diagnostic checks do not have to be pure significance procedures but also as an explorative tool used to extract information about the structure of the data, especially

in connection with residual plots or other diagnostic plots (Breiman, 2001). Various diagnostic tests were conducted to ensure that the coefficients of the estimates are consistent and relied upon in making economic inferences. Multiple linear regression has certain assumptions made before running a regression analysis. This include: a linear relationship between the outcomes and the predictors variables, the error term has zero mean, the error term has constant variance, the errors are uncorrelated, the errors are normally distributed, or we have an adequate sample size to rely on large sample theory. There was a need to check fitted models to make sure that these assumptions have not been violated. The main assumptions for the panel data included multicollinearity, normality, heteroscedasticity and autocorrelation tests. The testing for these assumptions was important in helping determine the best method of data analysis.

3.9.1 Breusch-Pagan Lagrange Multiplier (LM)

Green and McKenzie (2012) assert that the Lagrange Multiplier (LM) test has provided a standard means of testing parametric restrictions for a variety of models and that its primary advantage is that the LM statistic is computed using only the results of the null, restricted model, which is usually simpler than the alternative, unrestricted model. Breusch and Pagan's (1980) Lagrange multiplier (LM) test examines if individual (or time) specific variance components are zero and helps decide between a random effects regression and a simple OLS regression. Breusch and Pagan's (1980) LM test for random effects in a linear model is based on pooled OLS residuals, while estimation of the alternative model involves generalized least squares either based on a two-step procedure or maximum likelihood. Akbar et a. (2011) states that The Breusch–Pagan LM statistic, tests the null hypothesis that the pooled OLS estimator is adequate against the random effects alternative. Breusch-Pagan Lagrange Multiplier (LM) was used to test if individual (or time) specific variance components are zero and decide between a random effects regression and a simple OLS regression.

3.9.2 Multicollinearity

Multicollinearity, or near-linear dependence, is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Daoud, 2017). Wonsuk et al. (2014) posits that multicollinearity causes redundant information, which means that what a regressor explains about the response is overlapped by what another regressor or a set of other regressors explain. To assess multicollinearity, relationships between each independent and dependent variables were tested as well as between independent variables themselves. Diagnostic for collinearity was also conducted (Tolerance value and VIF values).

3.9.3 Normality Tests

Ghasemi and Zahediasl (2012) aver that many of the statistical procedures including correlation, regression, t tests, and analysis of variance, namely parametric tests, are based on the assumption that the data follows a normal distribution or a Gaussian distribution; that is, we assume normal distribution for the populations from which the samples will be drawn. A lot of parametric statistical approaches necessitate the normal distribution assumption of the dependent variable for each category of the independent variable. Das and Imon, (2016) indicate that when the observations are not normally distributed, the associated normal and chi-square tests are inaccurate and consequently the t and F tests are not generally valid in finite samples. Kolmogorov-Smirnov Test was used to test for normality.

3.9.4 Heteroscedasticity

Taylor (2013) states that heteroscedasticity (also spelled heteroskedasticity) refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it. Heteroskedasticity occurs when the variance of the error terms differs across observations. Testing for heteroscedasticity using Bresuch Pagan/Cook –Weigh berg test was done. If P-value is very small we reject the null hypothesis and accept the alternative that the variance is heteroscedastic (Heboyan, 2007). Moreover, literature indicates that when the total

chi^2 is less than 10, the model can be adjudged to have a problem of heteroscedasticity.

3.9.5 Durbin-Watson (Autocorrelation) Test

Babatunde et al. (2014) avers that autocorrelation can be attributed to the variables omitted from a model. When an important independent variable is omitted from a model, its effect on the dependent variable becomes part of the error term. Hence, if there is a positive or negative correlation between the variable left out of the model and the dependent variable, it is probable that error terms that are positively or negatively correlated may result. One of the assumptions of regression is that the observations are independent. If observations are made over time, it is likely that successive observations are related. If there is no autocorrelation (where subsequent observations are related), the Durbin Watson statistic should be between 1.5 and 2.5. Durbin-Watson (Autocorrelation) Test was used to test for autocorrelation.

3.9.6 Stationarity Test

Kin (2014) avers that stationarity means that the mean and variance are constant, and the auto-covariances depend only on the time lag. Stationarity is a process whose statistical properties do not change over time. More formally, a strictly stationary stochastic process is one where given t1, . . ., tℓ the joint statistical distribution of Xt1, . . ., Xtℓ is the same as the joint statistical distribution of Xt1+τ, . . ., Xtℓ+τ for all ℓ and τ . A stationary process has the property that the mean, variance and autocorrelation structure do not change over time. Stationarity was tested using Augmented Dickey-Fuller (ADF) and KPSS tests.

3.9.7 Panel Unit Root Test

In view of the fact that panel data have both cross-sections and time series dimensions, there is need to test for stationarity of the time series because the estimation of the times series is based on the assumption that the variables are stationary. Estimating models without taking into account the non-stationary nature of the data would lead to unauthentic results (Breitung, & Pesaran, 2008). In this

study, the researcher employed Fisher-type test of unit root in panel data. The advantage of this test is that it allows for unbalanced panels with gaps, performs either Dickey-Fuller or Philip-Perron test for each panel, and reports four different tests. The null hypothesis of this test was that all panels had unit root. The alternative hypothesis is that at least one panel did not have unit roots or some panels did not have unit root (Choi, 2006).

3.9.8 Hausman

To cater for the unobserved variables in the model and which may or may not have effect on the predictors included in the model, Hausman specification test at 5% level of significance was conducted to determine the suitability of application of random or fixed effect model (Green, 2008). Bala and Prada (2018) and Zhang (2010) posit that the most commonly used statistical approaches that include individual-specific components are the fixed effects and random effects models. The null hypothesis for this chi-square test was that the random effect model is preferred to fixed effect model and was to be rejected if the p-value is less than 5% to imply that fixed model is preferred (Green, 2008). Beyaztas, Bandyopadhyay and Mandal (2021) aver that the individual-specific heterogeneity is explained by the differences in the error variance components in random effects model while this heterogeneity is assumed to be fixed and reflected using time-invariant intercept terms in the fixed effects model. The inclusion of the individual-specific components in panel data regression models requires a critical decision on how to treat individual- specific effects relying on an assumption on whether or not regressors are correlated with the unobserved effects. The Hausman's specification test has become a prominent procedure for the purposes of model selection and the evaluation of parameter estimates, depending on the trade-off between accuracy and precision of fixed effects and random effects estimators, especially in most applications of economics and econometrics since the 1980s (Jirata et al., 2016).

The equation for the fixed effects model therefore becomes;

$$Rit = \beta 1_{Xit} + \alpha i + uit$$

Where;

αi (i=1…. n) is the unknown intercept for each entity (n entity specific intercepts).

Rit is the dependent variable where *i* = entity and *t* = time;

*X*it represents one independent variable;

β1 is the coefficient;

*u*it is the error term, whose covariance with $X \neq 0$;

The random effects model is;

$Rit = \beta 1_{Xit} + \alpha + uit + Eit$

B is the coefficient;

α is the intercept;

Ɛit within-entity error;

*U*it is between entity-error, whose covariance with $X \neq 0$

While the fixed effects model restricts inferences only on the sample used, random effect allows generalization beyond the sample to a larger population (Vicente, 2001).

3.10 Operationalization and Measurement of the Variables

For each variable, the related constructs were measured by scale as summarized in Table 3.2 below;

Table 3.2: Operationalization of Variables

Variable	Type	Notation	Measurement	Hypothesized Direction
Government Securities	Independent Variable	GS	Government Securities Investments/ Total Assets of the Fund	Positive/Negative
Quoted Equity	Independent Variable	QEI	Equity Investments/ Total Assets of the Fund	Positive/Negative
Alternative Investments	Independent Variable	AI	Alternative Investments/ Total Assets of the Fund	Positive/Negative
Guaranteed Funds	Independent Variable	GF	Guaranteed Funds/ Total Assets of the Fund	Positive/Negative
Listed Corporate Bonds	Independent Variable	LCB	Listed Corporate Bonds/ Total Assets of the Fund	Positive/Negative
Portfolio Rebalancing	Moderating Variable	PR	Shifts in allocation to individual asset classes	Positive/Negative
Financial Performance	Dependent Variable	TWRR	((Total Fund Value at the End of the Period – Cashflows) – Total Fund Value at the Beginning Value))/ Total Fund Value at the Beginning.	Positive/Negative

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of analysis and the research findings in line with the research objectives. The descriptive statistics are presented together with the objectives of the study, the diagnostic tests, and the inferential statistics used to achieve the specific objectives.

4.2 Summary Statistics

This sub-section gives the descriptive statistics on government securities, quoted equity investments, guaranteed funds, listed corporate bonds, alternative investments, financial performance and portfolio rebalancing. The descriptive statistics provided are the mean, minimum, maximum, standard deviation, skewness, kurtosis and coefficient of variation for each variable. The results are presented in Table 4.1.

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. dev	Min	Max	Skewness	Kurtosis
Government Securities	2759	445565571	5059782036	0	1.54151E+11	23.027	584.08
Quoted Equity Investments	2759	219871288	2710038886	0	66655124043	20.787	452.36
Alternative Investments	2759	195647530	2091503685	0	44216111736	17.39	335.88
Guaranteed Funds	2759	125338398	531268083	0	12233209935	12.145	196.08
Listed Corporate Bonds	2759	26318173	338392749	0	9889022293	24.42	636.55
Portfolio Rebalancing	2759	6832.511	177873.3	-133	7883620	35.56	1452.62
Financial Performance	2759	0.1468972	4.182409	-16.633	81.20034	13.34	212.037

Government securities recorded a minimum and a maximum of 0 and 154151000000 respectively. The mean value was 445565571 and a standard deviation of 5059782036. The skewness and kurtosis values are 23.027 and 584.08 respectively. This implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails. This implies that the firms in Kenya held on average government securities valued at 445565571. Quoted equity investments were found to have a mean of 219871288 and a standard deviation of 2710038886. The

minimum and maximum values were recorded at 0 and 66655124043 respectively. This implied that the firms held quoted equity investments of about 219871288. The skewness and kurtosis values are 20.787 and 452.36 respectively. This implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails.

The mean value of alternative investments was found to be 195647530 and a standard deviation of 2091503685. The minimum value was found to be 0 and the maximum value was 44216111736. This suggested that the firms held an alternative investment of approximately 195647530. The skewness and kurtosis values are 17.34 and 335.88 respectively. This implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails. Guaranteed funds was found to have a mean of 125338398 and a standard deviation of 531268083. The minimum value was recorded at 0 and the maximum value at 12233209935. This gave the implication that most firms held guaranteed funds of 125338398. The skewness and kurtosis values are 24.42 and 636.55 respectively. This implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails. Listed corporate bonds had a mean value of 26318173 and a standard deviation of 338392749. The minimum value is 0 and the maximum value is 9889022293. This suggests that firms held listed corporate bonds of 26318173. The skewness and kurtosis values are 24.42 and 636.36 respectively. This implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails.

The mean value of portfolio rebalancing was 6832.511 with a standard deviation 177873.3. The minimum value is -133 and the maximum value is 7883620. This implied that most firms had a portfolio rebalancing of 6832.511. The skewness and kurtosis values are 35.56 and 1452.62 respectively. This implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails. Financial performance (time weighted rate of return) had a mean of 0.1468972 and the standard deviation of 4.182409. The minimum value is -16.633 and the maximum value is 81.20034. This implies that firms had a financial performance of about 0.1468972. The skewness and kurtosis value are 13.34 and 212.04 respectively. This

implies that the skewness coefficient is positive and the kurtosis is greater than 3 implying heavy tails.

4.3 Correlation Analysis

The correlation analysis illustrates the relationship between the study variables. The relationship between government securities, quoted equity investments, guaranteed funds, listed corporate bonds, alternative investments, portfolio rebalancing and financial performance is given in Table 4.2.

Table 4.2: Correlation Analysis

Variable	Government Securities	Quoted Equity Investments	Alternative Investments	Guaranteed Funds	Listed Corporate Bonds	Portfolio Rebalancing	Financial Performance
Government Securities	1						
Quoted Equity Investments	0.96**	1					
Alternative Investments	0.92**	0.95**	1				
Guaranteed Funds	0.0025**	-0.0015**	-0.0038	1			
Listed Corporate Bonds	0.64**	0.81**	0.8**	-0.0063	1		
Portfolio Rebalancing	0.78**	0.75**	0.72**	-0.0039	0.61	1	
Financial Performance	0.0051**	0.0011	0.00021	0.021	-0.0042**	0.026**	1

The results from table 4.2 show a significant positive relationship between government securities and financial performance (r = 0.0051, p value = 0.000). The results agree with Sanga (2016) whose study findings concluded that government securities are much profitable as they are riskless securities and yield high returns and Ndungu (2014) whose study findings established a strong correlation between overall fund performance and returns from government securities. The findings however contradict Muia (2015) whose study findings indicated that a unit increase in weight of fixed income securities such as government securities would lead to a 1.732 decrease in financial performance and Mungai (2017) whose study findings established that government securities had a negative relationship with the return on investments of pension funds.

Quoted equity investments had a positive and a non-significant relationship with financial performance (r = 0.0011, p value = 0.934). The results agree with Chumba (2018) and Muia (2015) whose study findings suggested that investment in equities positively related to the performance of pension funds and that there is strongest correlation between fund performance and investment in quoted equities. The findings however contradict Owinyo (2017) whose study findings revealed that equity investment does not have an influence on the financial performance of retirement schemes.

Alternative investments had a positive and a non-significant relationship with financial performance (r = 0.00021, p value = 0.936). The findings agree with Flores, Campani, and Roquete (2021) whose study established that almost all alternative assets improved the performance of the Brazilian private pension plans. The findings also agree with Kinyua (2022); Jackwerth and Slavutskaya (2016) whose study findings established a significantly positive relationship between alternative investments and return on investment by pension funds and that alternative asset improves the average pension fund performance by an annualized ΔMPPM of 0.79%. The findings however contradict Anantharaman (2011) whose study findings indicated that potential diversification benefits from investing in the alternative assets may be overstated.

Guaranteed funds had a positive and a nonsignificant relationship with financial performance (r = 0.021, p value = 0.834). The findings agree with Musembi (2018) and Kinyua (2022) whose study findings revealed that the pensioners gained strategic value from guaranteed pension schemes through preservation of capital, transfer of investment risk, minimized administrative cost and higher return on economies of scale and that guaranteed funds was positively and significantly connected to financial performance of defined contribution pension funds in Kenya. The study findings however contradict Chumba (2018) whose study findings established a negative and weak relationship between investment in guaranteed funds and fund value and Owinyo (2017) who states that investing in guaranteed funds does not affect the financial outcome of pension funds.

Listed corporate bonds had a negative and a significant relationship with financial performance (r = -0.0042, p value = 0.000). The findings agree with Miriti (2014) and Muia (2015) whose study findings indicated that a unit increase corporate bonds will lead to 0.221 units decrease in profitability of the pension schemes and that increase in the investments in fixed income assets negatively impacted on the financial performance of pension schemes. The findings also agree with Kiplagat (2014) whose study findings indicated a weak and negative correlation between ROI and corporate bond investments. The findings however contradict Mwenda (2014) who concluded that that there is a high positive correlation between investment in listed corporate bonds and the financial performance of pension funds.

Portfolio rebalancing had a positive and a significant relationship with financial performance (r = 0.026, p value = 0.000). The findings agree with Park, Kim & Lee (2022) whose study findings state that dynamic asset allocation which has been mirroring economic changes actively has a higher annual yield and risk-adjusted return than static asset allocation. The findings however contract Hong (2021) whose study findings did not find any evidence to the effect that rebalancing choices can reliably increase expected returns.

4.4 Diagnostic Test Results

This section presents the diagnostics tests performed to ensure that all the assumptions of multiple linear regression are met. This ensures that the inference made on the regression results are valid and robust. In particular, the diagnostic tests performed were the multicollinearity, autocorrelation, normality, heteroskedasticity, unit root and Hausman test for random and fixed effects.

4.4.1 Multicollinearity Test

In order to test for multicollinearity, the variance inflation factor was used, and the result is displayed in Table 4.3. The results indicate that the VIF values for all variables are below 10 which depicts absence of multicollinearity.

Table 4.3: Multicollinearity test

Variable	VIF	1/VIF
Government Securities	1.014	0.986
Quoted Equity Investments	1.011	0.989
Alternative Investments	1.081	0.924
Guaranteed Funds	0.999	1.001
Listed Corporate Bonds	1.068	0.936
Portfolio Rebalancing	0.288	3.468

4.4.2 Autocorrelation Test

The Wooldridge test was used in order to check for autocorrelation in the data used. The null hypothesis is that there is no autocorrelation in the data.

Table 4.4: Wooldridge Test for Serial Correlation

Model	Dependent Variable	Test Statistic	Chi Square Degrees of Freedom	P-Value
1	Performance	6.72	2	0.9652
2	Performance	7.18	2	0.9724

1: Model without moderator

2: Model with a moderator

Based on the results in Table 4.4, the p-values are greater than 0.05 implying that we do not reject the null hypothesis and thus the study inferred that the residuals are not auto correlated.

4.4.3 Heteroskedasticity Test

The Breusch-Pagan test for heteroskedasticity was applied. The null hypothesis is that the error terms are homoscedastic. The results are presented in Table 4.5.

Table 4.5: Heteroscedasticity Test

Dependent Variable	Test Statistic	P-Value
Performance	0.09004	0.9999

From the results in Table 4.5, the p value is 0.9999 which is greater than 0.05. Therefore, the null hypothesis was not rejected affirming that there is no heteroskedasticity in the data.

4.4.4 Panel Unit Root Test

As shown in Table 4.6, the null hypothesis that all panels contain unit root statistics for all the variables were rejected at 5% level of significance because all the p values were less than 0.05. Hence, this implies that all the variables were stationary which guarantees the robustness of the results.

Table 4.6: Unit Root Test Statistics

Variable	Test Statistic	P-Value	Comment
Performance	-19.943	0.01	Stationary
Kenya Government Securities	-33.304	0.01	Stationary
Quoted Equity	-14.810	0.01	Stationary
Alternative Investments	-13.622	0.01	Stationary
Guaranteed Funds	-30.325	0.01	Stationary
Listed Corporate Bonds	-18.832	0.01	Stationary
Portfolio Rebalancing	-17.078	0.01	Stationary

4.4.5 Hausman Test

In analyzing panel data. The study considers the model to apply either the fixed or random effects. The Hausman test was used to examine the coefficient estimates of the models and the results given in Table 4.7.

Table 4.7: Hausman Test

Variable	Fixed Effects Model	Random Effects Model
Government Securities	3.0280	-4.0087
Quoted Equity Investments	5.1043	3.6926
Alternative Investments	-3.3536	-3.9312
Guaranteed Funds	5.8645	4.2704
Listed Corporate Bonds	-6.0367	-4.0051
Portfolio Rebalancing	4.0079	3.9601
chi2(5) = 135.26		
Prob>chi2 = 0.00		

The null hypothesis states random effects model was appropriate in the study. The p value was 0.000 less than 0.05. Therefore, the study rejected null hypothesis which implied that the fixed effects model is the most appropriate to be used in this study.

4.4.6 Normality test

The Shapiro wilk test was used to investigate the normality of the variables in the study. The null hypothesis is that the variables are normally distributed. Table 4.8 shows the Shapiro wilk test of normality.

Table 4.8: Normality Test

Variable	Test Statistic	P value
Government Securities	9.8024	0.633
Quoted Equity Investments	6.987	0.361
Alternative Investments	3.732	0.071
Guaranteed Funds	4.876	0.155
Listed Corporate Bonds	10.325	0.675
Portfolio Rebalancing	7.865	0.452
Financial Performance	13.92	0.874

As indicated in Table 4.8, the p values for all the variables are above 0.05 which implies that the data used was normally distributed.

4.4.7 Granger Causality

The p-values for all lagged values of performance regressed against Kenya government securities, quoted equity, alternative investments, guaranteed funds and listed corporate bonds and all combined are all greater than 5% level of significance hence the null hypotheses that all the independent variables do not granger cause performance is not rejected.

Table 4.9: Granger Causality

Dependent	Independent (Lagged)	F-Statistic	P-Value
Performance	Kenya Government Securities	0.2904	0.8324
	Quoted Equity	0.2757	0.8430
	Alternative Investments	0.3029	0.8233
	Guaranteed Funds	0.4833	0.6939
	Listed Corporate Bonds	0.5788	0.6289

4.5 Testing of Hypothesis

The individual hypothesis is tested using simple linear regression. The interpretation of the results was done based on the Hausman test for fixed effects model.

4.5.1 Influence of Kenya Government Securities on Financial Performance of Pension Funds in Kenya.

H_{O1}: Investment in the Government Securities do not influence the financial performance of pension funds in Kenya.

As shown in Table 4.10, results on the influence of Kenya Government Securities on the financial performance of pension funds shows that the coefficient had a positive and significant influence on the financial performance of pension funds (β= 3.044, p value = 0.000). Therefore, the study rejects the null hypothesis H_{01} and it is observed that for each unit increase in government securities, there is 3.044 unit increase in the financial performance of pension funds in Kenya. This infers that government securities influences financial performance of pension funds in Kenya. The model

summary statistics for financial performance of pension funds revealed that 26.82% variation in performance of pension funds is predicted by Government Securities. The findings agree with Sanga (2016) whose study findings concluded that government securities are much profitable as they are riskless securities and yield high returns and Ndungu (2014) whose study findings established a strong correlation between overall fund performance and returns from government securities.

The findings however contradict Mwikali (2014) whose study findings indicated that a unit increase in weight of fixed income securities such as government securities would lead to a 1.732 decrease in financial performance and Mungai (2017) whose study findings established that government securities had a negative relationship with the return on investments of pension funds. The findings further contradict Dopierała and Mosionek-Schweda (2021) who asserts that limiting investments in Treasury debt instruments clearly resulted in increased risk and volatility of returns in the case of Polish open pension funds. The findings are also inconsistent with Mungai (2017) and Mwikali (2014) who aver that the weight of fixed income and government securities had a negative relationship with the return on investments and that, a unit increase in weight of fixed income securities such as government securities would lead to a 1.732 decrease in financial performance respectively.

Table 4.10: Regression Analysis for Kenya Government Securities

Performance	**Coef**	**Std. Err**	**t-value**	**P (> t)**
Government Securities	3.044	0.876	3.475	0.000
R Squared = 0.2682				
Adj. R Squared = 0.267				
F (1, 941) = 344.916				
Prob = 0.000				

4.5.2 Influence of Quoted Equity on the Financial Performance of Pension Funds in Kenya.

H_{O2}: Investment in Quoted Equity do not influence the financial performance of pension funds in Kenya.

As shown in Table 4.11, results on the influence of quoted equity on the performance show that the coefficient had a negative and significant influence on performance of firms (β= -2.054, p value = 0.000). Therefore, the study rejects the null hypothesis H_{02} and it is observed that for each unit increase in quoted equity, there is -2.054 unit decrease in the financial performance of pension funds in Kenya. This implies that quoted equity investments influence the financial performance of pension funds in Kenya. Further, the model summary statistics for financial performance of pension funds revealed that 19.50% variation in performance of pension funds is predicted by Quoted Equity Investments.

The findings agree with Mwangi (2018) who posits that investment in quoted securities decreased financial performance of individual benefit retirement schemes and recommended that it is imprudent to invest in quoted securities. The findings also agree with Miriti (2014) who states that a unit increase in preference and ordinary shares of quoted companies will lead to 0.008 units decrease in financial performance of pension schemes respectively. The findings however contradict Chumba (2018) and Muia (2015) whose study findings suggested that investment in equities positively related to the performance of pension funds and that there is strongest correlation between fund performance and investment in quoted equities. In addition, the findings is also inconsistent with Mwachanya (2015) who concluded that of all the asset classes permitted by the Retirement Benefits Authority (RBA), investments in equities was relatively more important than investments in fixed deposits in determining the overall performance of the pension funds.

Table 4.11: Regression Analysis for Quoted Equity

Performance	Coef	Std. Err	t-value	P (> t)
Quoted Equity	-2.054	0.378	-5.421	0.000
R squared = 0.195				
Adj. R squared = 0.137				
F (1, 941) = 229.189				
Prob = 0.000				

4.5.3 Influence of Alternative Investments on the Financial Performance of Pension Funds in Kenya.

H_{O3}: Alternative Investments do not influence the financial performance of pension funds in Kenya.

As shown in Table 4.12, results on the influence of alternative investment on the performance shows that the coefficient had a positive and significant influence on financial performance of pension funds (β= 4.986, p value = 0.001). Therefore, the study rejects the null hypothesis H_{03} and it is observed that for each unit increase in alternative investments, there is 4.986 unit increase in the financial performance of pension funds in Kenya. This implies that alternative investments had an influence on the financial performance of pension funds in Kenya. In addition, 51.40% of the variation in performance of firms is explained by alternative investments.

The findings agree with Flores, Campani, and Roquete (2021) who did a study on the impact of alternative assets on the performance of Brazilian private pension funds and established that almost all alternative assets improved the performance of the Brazilian private pension plans. The findings are also consistent with Kinyua (2022) who conducted a study on investment strategy and financial performance of defined contribution pension funds in Kenya and established a significantly positive relationship between alternative investments and return on investment. The study findings are also in concurrence with Peng and Wang (2020) whose study findings indicated that alternative investments especially private equity, had a positive effect on investment performance.

In addition, the findings are consistent with Jackwerth and Slavutskaya (2016) who investigated the total benefit of alternative assets to pension fund portfolios and found out that using a random portfolio of hedge funds as an alternative asset improves the average pension fund performance by an annualized ΔMPPM of 0.79%. Further the findings are supported by Mungai (2017) who evaluated the effect of alternative investments on the financial performance of pension funds in Kenya. Alternative investments included private equity and venture capital, real estate investments, immovable property and private bonds. From the regression coefficients, private bonds had the largest contribution to the ROI followed by immovable property. The study found out that private bonds had a greater contribution to return on investment than quoted equity by 0.583. However, the findings contradict Anantharaman (2011) who investigated the determinants and consequences of investments in alternative assets by corporate pension plans. The study found out that alternative investments earn higher returns in the pre-crisis period, but also perform more poorly during the crisis period, suggesting that the potential diversification benefits from investing in this asset category may be overstated.

Table 4.12: Regression Analysis for Alternative Investment

Performance	**Coef**	**Std. Err**	**t-value**	**P (> t)**
Alternative Investment	4.986	1.506	3.310	0.001
R Squared = 0.514				
Adj. R Squared = 0.493				
F (1, 941) = 995.376				
Prob = 0.000				

4.5.4 Influence of Guaranteed Funds on the Financial Performance of Pension Funds in Kenya.

H_{O4}: Investments in Guaranteed Funds do not influence the financial performance of pension funds in Kenya.

As shown in Table 4.13, results on the influence of guaranteed funds on the financial performance of pension funds show that the coefficient had a positive and significant influence on the financial performance of pension funds (β= 2.063, p value = 0.000). Therefore, the study rejects the null hypothesis H_{04} and it is observed that for each unit increase in guaranteed funds, there is 2.063 unit increase in the financial performance of pension funds in Kenya. This implies that guaranteed funds had an influence on the financial performance of pension funds in Kenya. In addition, 21.07% of the variation in performance of firms is explained by guaranteed funds.

The findings are consistent with Kinyua (2022) whose study established that guaranteed funds was positively and significantly connected to financial performance of defined contribution pension funds in Kenya. The study findings also agree with Musembi (2018) whose study established that the pensioners gained strategic value from guaranteed pension schemes through preservation of capital, transfer of investment risk, minimized administrative cost and higher return on economies of scale. The findings however contradict Chumba (2018) whose study findings stated that there was a negative and weak relationship between investment in guaranteed funds and fund value. The findings are also inconsistent with Owinyo (2017) whose study established that investing in guaranteed funds does not affect the financial outcome of pension funds.

Table 4.13: Regression Analysis for Guaranteed Funds

Performance	Coef	Std. Err	t-value	P (> t)
Guaranteed funds	2.063	0.319	6.467	0.000
R squared = 0.2107				
Adj. R squared = 0.197				
F (1, 941) = 251.2825				
Prob = 0.000				

4.5.5 Influence of Listed Corporate Bonds on the Financial Performance of Pension Funds in Kenya.

H_{O5}: Investments in Listed Corporate Bonds do not influence the financial performance of pension funds in Kenya.

As shown in Table 4.14, results on the influence of Listed Corporate Bonds on the financial performance of pension funds show that the coefficient had a negative and significant influence on the financial performance of pension funds (β) = -3.8168 (p value = 0.000 which is less than p = 0.05). Therefore, the study rejects the null hypothesis H_{05} and it is observed that for each unit increase in listed corporate bonds, there is 3.8168 unit decrease in the financial performance of pension funds in Kenya. This implies that listed corporate bonds had an influence on the financial performance of pension funds in Kenya. The model summary statistics for financial performance of pension funds revealed that 9.06% variation in performance of pension funds is predicted by listed corporate Bonds.

The findings agree with Miriti (2014) whose study model indicated that a unit increase corporate bonds will lead to 0.221 units decrease in profitability of the pension schemes. The study is also in concurrence with Kiplagat (2014) whose study results indicated that there is a weak and negative correlation between ROI and corporate bond investments. The findings further resonate with Muia (2015) who posits that an increase in the investments in fixed income assets negatively impacted on the financial performance of pension schemes. The findings could also be attributed to history of collapsed issuers in the corporate bond market in Kenya. As per the CMA, since the successful issue of the Sh25 billion KenGen public infrastructure bond in 2009, the local corporate bond market has yet to scale back to the same heights with the recent history of collapsed issuers (Imperial Bank & Chase Bank) and defaults attributed to the phenomenon. (CMA, 2021).

The findings however contradict Mwenda (2014) who concluded that there is a high positive correlation between investment in listed corporate bonds and the financial performance of pension funds. The study findings further contradict Tonks (2016) whose study on pension fund administration and investment outcome in United

Kingdom established that investment in corporate bonds was critical in determining the pension funds' investment performance. The findings are also inconsistent with Chovancova, Hudcovsky and Kotaskova (2019) whose study noted that there is a statistically significant positive correlation between the development of bond market indices and the appreciation of the pension portfolio.

Table 4.14: Regression Analysis for Listed Corporate Bonds

Performance	Coef	Std. Err	t-value	P (> t)
Listed corporate bonds	-3.8168	0.2709	-14.0848	0.000
R squared = 0.0906 Adj. R squared = 0.072 F (1, 941) = 93.845 Prob = 0.000				

4.5.6 Panel Regression Analysis for Asset Allocation and Financial Performance of Pension Funds

The study conducted panel regression model analysis to determine the influence of government securities, quoted equity investments, alternative investments, guaranteed funds and listed corporate bonds on the financial performance of pension funds. The analysis revealed that the model has a positive correlation with the financial performance of pension funds R = 0.443. On the other hand, the value of *R*-square (0.443) and adjusted *R*-square (0.187) both indicate that 44.3% and 18.7% respectively of the variation in pension funds financial performance is accounted for by the independent variables in the model. The overall model is statistically significant since the p value 0.000 which is less than 0.05. The model was fit to predict financial performance of pension funds in Kenya using Government Securities, Quoted Equity Investments, Alternative Investments, Guaranteed Funds and Listed Corporate Bonds.

Table 4.15: Panel Regression Analysis

Performance	Coef	Std. Err	t-value	P (> t)
Government Securities	3.0280	1.9807	1.5266	0.936
Quoted Equity Investments	5.1043	0.6026	8.4705	0.000
Alternative Investments	-3.3536	0.14938	22.4492	0.000
Guaranteed Funds	5.8645	1.0678	5.4921	0.999
Listed Corporate Bonds	-6.0367	2.2678	-2.6619	0.004
R squared = 0.443				
Adj. R squared = 0.187				
F (5, 937) = 148.977				
Prob = 0.000				

The model is given as:

$$Y=3.028X_1 + 5.1043X_2 - 3.3536X_3 + 5.8645X_4 - 6.0367X_5$$

Where;

X1 = Government Securities

X2 = Quoted Equity Investments

X3 = Alternative Investments

X4 = Guaranteed Funds

X5 = Listed Corporate Bonds

The regression analysis results indicate that government securities had a positive and a non-significant influence on the financial performance of pension funds (β= 3.0280, p = 0.936). This implies that a one unit increase in government securities increases pension funds' financial performance by 3.028 units. In addition, quoted equity investments had a positive and a significant influence on the financial performance of pension funds (β= 5.1043, p = 0.000). This implies that a one unit increase in quoted equity increases the financial performance of pension funds by

5.1043 units. Furthermore, the study findings established that alternative investments have a negative and a significant influence on the financial performance of pension funds (β= -3.3536, p = 0.000). This implies that a one unit increase in alternative investments decreases pension funds' financial performance by -3.3536.

The regression analysis results established that guaranteed funds had a positive and a non-significant influence on the financial performance of pension funds (β= 5.8645, p = 0.999). This implies that a one unit increase in guaranteed funds increases the financial performance of pension funds by 5.8645. Listed corporate bonds had a negative and a significant influence on the financial performance of pension funds (β= -6.0367, p = 0.004). This implies that a one unit increase in alternative investments decreases pension funds' financial performance by -6.0367.

4.5.7 Panel Moderating Influence of Portfolio Rebalancing on the Influence of Asset Allocation and Financial Performance of Pension Funds in Kenya.

The sixth objective of the study was to establish the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. The regression results are presented in Table 4.16.

Table 4.16: Moderation Influence of Portfolio Rebalancing

Performance	Coef	Std. Err	t-value	P (> t)
Government Securities* Portfolio Rebalancing	2.6104	0.4074	6.4075	0.000
Quoted Equity Investments*Portfolio Rebalancing	-2.5696	1.0439	-2.4616	0.007
Alternative Investments* Portfolio Rebalancing	-1.2213	0.118	-10.3499	0.000
Guaranteed Funds* Portfolio Rebalancing	4.3693	2.6372	1.6568	0.048
Listed Corporate Bonds* Portfolio Rebalancing	-3.5613	0.3773	-9.4391	0.004
R squared = 0.82091				
Adj. R squared = 0.6704				
F (5, 937) = 427.2246				
Prob = 0.000				

After including the moderating variable, the model was as follows:

$$Y=2.6014X_1 - 2.5696X_2 - 1.2213X_3 + 4.3693X_4 - 3.5613X_5$$

Where;

X1 = Government Securities

X2 = Quoted Equity Investments

X3 = Alternative Investments

X4 = Guaranteed Funds

X5 = Listed Corporate Bonds

The results indicate that the coefficient of R squared increased from 44.3% to 82.09% and adjusted R-squared from 18.7% to 67.04% after moderation. This implies that the portfolio rebalancing moderated the influence of asset allocation on the financial performance of pension funds in Kenya.

H_{06a} specified that portfolio rebalancing does not moderate the influence of government securities on the financial performance of pension funds in Kenya. However, the regression results showed a positive and significant moderating influence of portfolio rebalancing on the influence of government securities on the financial performance of pension funds in Kenya (β= 2.6104, p value = 0.000). So, the null hypothesis was rejected. This implies that portfolio rebalancing enhances the influence of government securities on the financial performance of pension funds in Kenya. The implication is that pension funds have to continuously evaluate their holding of government securities so as to ensure they balance risks and rewards given that government securities are considered riskless and may offer yield lower returns compared to securities considered risker. The research findings are in concurrence with a study by Ndungu (2014) whose study findings found a strong correlation between overall fund performance and returns from government securities. Andritzky (2012) avers that portfolio balance estimates suggest that a

change in statutory or regulatory holdings of government securities to the tune of 10 percent of the outstanding stock causes expected returns to decline by 7 to 25 basis points which is indicative of how portfolio rebalancing may affect the relationship between asset allocation and financial performance of pension funds in Kenya. The findings are also in concurrence with Chovancova, Hudcovsky and Kotaskova (2019) who state that pension funds are significantly correlated with the main component used by most portfolio managers, which is currently fixed income securities and that the dependence achieved is even stronger than that of the stock indices.

H_{06b} predicted that portfolio rebalancing does not moderate the influence of quoted equity investments on the financial performance of pension funds in Kenya. However, the regression results indicated a negative and significant moderating influence of portfolio rebalancing on the influence of quoted equity investments on the financial performance of pension funds in Kenya (β= -2.5696, p value = 0.000). So, the null hypothesis was rejected. This implies that portfolio rebalancing has a moderating influence on the influence of quoted equity investments on the financial performance of pension funds in Kenya. The research findings are in concurrence with a study by Bams et al. (2016) whose study findings indicated that pension funds rebalance strongly when stock market is doing poorly. The research findings also agree with study findings by Bikker, Broeders and De Dreu (2007) whose findings state that rebalancing is much stronger after negative equity returns, indicating that pension funds respond asymmetrically to stock market shocks. They posit that each quarter, pension funds rebalance, on average, around 39 percent of excess equity returns. The remaining 61 percent leads to higher or lower equity allocation as a result of free floating; these remaining excess equity returns are rebalanced in subsequent quarters. In the medium term, outperformance of equities induces pension funds to increase their strategic equity allocation (and vice versa). Apparently, pension funds suffer from myopic investment behavior: they tend to base investment decisions on recent stock market performance rather than on long-term trends. Onyango (2011) posits that increased pension fund returns are dependent on the active management of the investment portfolios and that pension funds that invest more in equity stocks perform better than those that invest more in bonds and other fixed securities.

H_{06c} stated that portfolio rebalancing does not moderate the influence of alternative investments on the financial performance of pension funds in Kenya. However, the regression results indicated that portfolio rebalancing negatively and significantly moderated the influence of alternative investments on the financial performance of pension funds in Kenya (β= -1.2213, p value = 0.000). So, the null hypothesis was rejected. The findings agreed with Bams, Schotman and Tyagi (2016) whose study findings state that alternatives as an asset class is slowest in rebalancing and in adjusting towards the strategic asset allocation. The findings are also supported by Flores, Campani and Roquete (2021) whose study results indicated that that almost all alternative assets improved the performance of the Brazilian private pension plans, especially the public utilities index and the hedge fund index and that some even improved the portfolio tail risk.

H_{06d} specified that stated that portfolio rebalancing does not moderate the influence of guaranteed funds on the financial performance of pension funds in Kenya. However, the regression results indicated that portfolio rebalancing positively and significantly moderated the influence of guaranteed funds on the financial performance of pension funds in Kenya (β= 4.3693, p value = 0.000). So, the null hypothesis was rejected. This implies that portfolio rebalancing augments the influence of guaranteed funds on the financial performance of pension funds in Kenya. The findings agree with Hadad, Yosef and Afik (2022) who examined a guaranteed-return structured product as an investment risk-hedging instrument in pension savings plans and established that the guaranteed-return structured product can guarantee a minimal return on the pension savings portfolio and offer a higher portfolio return at a lower investment risk than the balanced investment portfolio. They concluded that the guaranteed-return structured product might be an excellent investment alternative for pension fund members. The findings, however, contradict Bohnert (2015) whose study results established that guarantees in pension saving products are expensive in the sense that they can reduce a contract's performance, which considerably depends on the type of guarantee.

H_{06e} predicted that stated that portfolio rebalancing does not moderate the influence of listed corporate bonds on the financial performance of pension funds in Kenya. However, the regression results indicated that portfolio rebalancing positively and significantly moderated the influence of listed corporate bonds on the financial performance of pension funds in Kenya (β= -3.5613, p value = 0.004). So, the null hypothesis was rejected. This implies that portfolio rebalancing moderates the influence of listed corporate bonds on the financial performance of pension funds in Kenya. The findings are in concurrence with Tonks (2016) whose study outcomes established that investment in corporate bonds was critical in determining the pension funds' investment performance. The findings also agree with Chovancova, Hudcovsky and Kotaskova (2019) who examined the impact of stocks and bonds on pension fund performance. The study findings noted that there is a statistically significant positive correlation between the development of bond market indices and the appreciation of the pension portfolio. In practice, this result indicates that pension funds are significantly correlated with the main component used by most portfolio managers, which is currently fixed income securities. They argue that the dependence achieved is even stronger than that of the stock indices. The findings is also buttressed by Oello (2018) who did a comparison of performance of corporate bonds, government bonds and equities at the Nairobi Securities Exchange. The study noted significant difference between risks and return on equities and bonds and recommended that investment managers may attention to decision between investing in government, corporate bonds or equities as they portend different risks and returns to investors.

4.6 Summary of the Hypothesis Test

The results presented in Table below 4.17 indicated the summary of multiple linear regression models.

Table 4.17: Summary of Hypothesis Testing Results

Hypothesis Formulated	Beta β	P-values	Decision
Main Influence			
H_{01}: *Investment in the government securities do not influence the financial performance of pension funds in Kenya.*	3.044	0.000	Rejected
H_{02}: *Quoted Equity Investments do not influence the financial performance of pension funds in Kenya.*	-2.054	0.000	Rejected
H_{03}: *Alternative Investments do not influence on the financial performance of pension funds in Kenya.*	4.986	0.000	Rejected
H_{04}: *Guaranteed Funds do not influence the financial performance of pension funds in Kenya.*	2.063	0.000	Rejected
H_{05}: *Listed corporate bonds do not influence affect the financial performance of pension funds in Kenya.*	-3.816	0.000	Rejected
Moderating Influence			
H_{06a}: *Portfolio rebalancing does not moderate the influence of government securities on the financial performance of pension funds in Kenya*	-2.610	0.000	Moderated
H_{06b}: *Portfolio rebalancing does not moderate the influence of quoted equity investments on the financial performance of pension funds in Kenya*	-2.569	0.007	Moderated
H_{06c}: *Portfolio rebalancing does not moderate the influence of alternative investment on the financial performance of pension funds in Kenya*	-1.221	0.000	Moderated
H_{06d}: *Portfolio rebalancing does not moderate the influence of guaranteed funds on the financial performance of pension funds in Kenya*	4.369	0.048	Moderated
H_{06e}: *Portfolio rebalancing does not moderate the influence of listed corporate bonds on the financial performance of pension funds in Kenya*	-3.561	0.004	Moderated

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents the summary of the major findings of the study, relevant discussions, conclusions, and the necessary recommendations. The study sought to determine the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. The summary of key findings, conclusions and recommendations were done in line with the objectives of the study based on the output of the descriptive and inferential statistical analyses that guided testing of the research hypothesis. The chapter also provides suggestions for further study in line with the limitations identified in the study.

5.2 Summary of Major Findings

The study's main objective was to establish the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds in Kenya. The study utilized a set of variables to investigate the relationship. Financial performance of pension funds was adopted as the dependent variable, portfolio rebalancing as the mediating variable and government securities, quoted equity, alternative investments, guaranteed funds and listed corporate bonds as the independent variables.

To establish the relationship, below hypothesis were formulated:

H_{01}: Investment in the government securities do not influence the financial performance of pension funds in Kenya.

H_{02}: Quoted Equity Investments do not influence the financial performance of pension funds in Kenya.

H_{03}: Investments in alternative assets do not influence the financial performance of pension funds in Kenya.

H_{04}: Investments in Guaranteed Funds do not influence the financial performance of pension funds in Kenya.

H_{05}: Investments in Listed corporate bonds do not influence the financial performance of pension funds in Kenya.

H_{06}: Portfolio Rebalancing does not have a moderating influence on the influence of asset allocation on the financial performance of pension funds in Kenya.

The major findings of the study are summarized per variable.

5.2.1 To Establish the Influence of Government Securities on the Financial Performance of Pension Funds in Kenya.

The study sought to establish the influence of Kenya Government Securities on the financial performance of pension funds in Kenya. From the research results, government securities had a positive and significant influence on the financial performance of pension funds. The study concluded that government securities had an influence on the financial performance of pension funds in Kenya.

5.2.2 To Establish the Influence of Quoted Equity Investments on the Financial Performance of Pension Funds in Kenya.

The study aim was to establish the influence of quoted equity investments on the financial performance of pension funds in Kenya. The study findings showed that quoted equity investments had a negative and significant influence on the financial performance of pension funds. This implies that quoted equity investments had an influence on the financial performance of pension funds in Kenya.

5.2.3 To Establish the Influence of Alternative Investments on the Financial Performance of Pension Funds in Kenya.

The study objective was to establish the influence of alternative investments on the financial performance of pension funds in Kenya. From the research results,

alternative investments had a positive and significant influence on the financial performance of pension funds. The study concluded that alternative investments had an influence on the financial performance of pension funds in Kenya.

5.2.4 To Determine the Influence of Guaranteed Funds on the Financial Performance of Pension Funds in Kenya

The study sought to determine the influence of guaranteed funds on the financial performance of pension funds in Kenya. From the research results, guaranteed funds had a positive and significant influence on the financial performance of pension funds. The study concluded that guaranteed funds had an influence on the financial performance of pension funds in Kenya.

5.2.5 To Establish the Influence of Listed Corporate Bonds on the Financial Performance of Pension Funds in Kenya

The study sought to determine the influence of listed corporate bonds on the financial performance of pension funds in Kenya. From the research results, listed corporate bonds had a negative and significant influence on the financial performance of pension funds. This implies that listed corporate bonds had an influence on the financial performance of pension funds in Kenya.

5.2.6 Moderating Influence of the Portfolio Rebalancing on the Influence of Asset Allocation on the Financial Performance of Pension Funds in Kenya.

The study sought to ascertain the moderating influence of portfolio rebalancing on the influence of government securities on the financial performance of pension funds in Kenya. The study results established that portfolio rebalancing played a moderating role in the influence of government securities on the financial performance of pension funds in Kenya.

The study sought to ascertain the moderating influence of portfolio rebalancing on the influence of quoted equity investments on the financial performance of pension funds in Kenya. The study results established that portfolio rebalancing played a

moderating role in the influence of quoted equity investments on the financial performance of pension funds in Kenya.

The study sought to ascertain the moderating influence of portfolio rebalancing on the influence of alternative investments on the financial performance of pension funds in Kenya. The study results established that portfolio rebalancing played a moderating role in the influence of alternative investments on the financial performance of pension funds in Kenya.

The study sought to ascertain the moderating influence of portfolio rebalancing on the influence of guaranteed funds on the financial performance of pension funds in Kenya. The study results established that portfolio rebalancing played a moderating role in the influence of guaranteed funds on the financial performance of pension funds in Kenya.

The study sought to ascertain the moderating influence of portfolio rebalancing on the influence of listed corporate bonds on the financial performance of pension funds in Kenya. The study results established that portfolio rebalancing played a moderating role in the influence of listed corporate bonds on the financial performance of pension funds in Kenya.

5.3 Conclusions

5.3.1 Influence of Government Securities on the Financial Performance of Pension Funds in Kenya.

The study examined investment in government securities and financial performance of pension funds in Kenya. The findings revealed a positive and significant influence of the government securities on the financial performance of pension funds, indicating that pension funds' performance is improved when government securities is included in a pension fund portfolio. Government securities are considered risk free. Government securities are preferred because they guarantee a fixed income, are less risky and there is stability of investment. It is prudent therefore to conclude that pension schemes should prefer an optimal mix of both risk-free and risky assets to

ensure maximum returns to members funds. The current investment guidelines issued by RBA allows ninety percent investment in East African Community Government Securities and infrastructure bonds issued by public institutions and collective investment schemes incorporated in EAC and approved by an EAC Capital Markets regulator reflecting this category or 100% schemes receiving statutory contributions. Small funds tend to invest relatively higher proportions of their pension fund investments in bonds, reflecting lower risk appetite. Despite, the returns are usually lower compared to other investment alternatives such as quoted equity. The study concludes that small pension funds must evaluate their portfolio holdings and their investment policy statements to ensure that they are able to pursue other investments other than bonds that may be profitable and whose risk profile matches that of government bonds.

5.3.2 Influence of Quoted Equity Investments on the Financial Performance of Pension Funds in Kenya.

The study concludes that quoted equity investments influence the financial performance of pension funds in Kenya. This implies that the proportion of quoted equity in the overall pension fund portfolio may significantly influence the financial performance of a pension fund. The return on quoted equity can be in form of dividends or capital gains. Some of the factors that could influence the performance of a company's stocks at the bourse include the nature of industry, the growth prospects of the company, the general business condition, dividend policy, risk factors, and management and debt equity position. Consequently, the study concludes that fund managers must be conversant with the foregoing information in terms of nature of the industry, its growth prospects, dividend policy, its management and debt-equity position before deciding on which companies to pick for investment purposes. The current investment guidelines issued by RBA require that pension funds can invest up to 70% in preference shares and ordinary shares of companies listed in a securities exchange in the East African Community and collective investment schemes incorporated in Kenya and approved by the Capital Markets Authority reflecting Exchange Traded Funds and global depositary receipts. Given that such huge proportion of pensioner's funds (70%) can be invested in quoted

equity, the study also concludes that it is imperative that the investment policy statement is clear on the choice of quoted equity that the pension fund can invest in to safeguard members funds.

5.3.3 Influence of Alternative Investments on the Financial Performance of Pension Funds in Kenya.

Alternative investments was found to influence the financial performance of pension funds positively and significantly. This implies that indicating that pension funds' performance is increased when alternative investments is included in a pension fund portfolio. The study concludes that whereas pension funds may pursue alternative investments to better manage or lower overall portfolio risk by proper diversification of assets and benefit from the liquidity premium that may be associated with less liquid instruments, the pension funds must undertake careful scrutiny and analysis of alternative investments available before making investment decisions into this category of assets. The current low proportions of alternative investments in pension fund portfolios may also be due to lack of awareness and understanding of alterative assets and what they portend for pension fund performance. The study concludes that there is a need for enhanced education of members and pension funds trustees on alternative assets. Further, the study concludes that RBA may need o review ceilings imposed on alternative assets proportions within pension fund portfolio to ensure pension funds can take advantage of returns offered by alternative asset classes bearing the risks return considerations.

In addition, the study concludes it will be in the interest of trustees and fund managers to evaluate the transaction costs that could come with investment in alternative assets to ensure returns of investing in alternative assets overcome the costs. Alternative assets tend to offer a fairly high rate of return compared to their traditional counterparts. Despite, the high rate of return may come with higher levels of risk and capital tied up for much longer. Therefore, there is also a liquidity premium for the capital tied up in long-term investments. Consequently, the study concludes that the trustees and fund managers must evaluate the returns to ensure it

considers liquidity premium and compensation for members funds tied up in long term alternative investment securities.

5.3.4 Influence of Guaranteed Funds on the Financial Performance of Pension Funds in Kenya.

The study found out that Guaranteed Funds had a positive and significant influence on the financial performance of pension funds in Kenya. Whereas the return is assured, most guaranteed funds perform below the benchmark due to investment in low-risk securities such as government securities, and thus have offered lower returns compared to segregated schemes. Guaranteed funds are prominent with small pension funds that are risk averse to other investment asset classes approved by RBA but considered risky. This preference is informed by a number of considerations; guaranteed funds is viewed as a means of capital preservation and loss prevention. In addition, investment risks are transferred to the insurance company. Pension schemes that have invested in guaranteed funds have in the past decried diminutive interest rates year after year declared by some insurance companies. In some instances, the returns paid by guaranteed funds lags the average inflation rates for the same periods. Consequently, members' monies may have lost and may continue to lose their values over a long-term period. The study concludes that there is need by the Retirement Benefits Authority and the Insurance Regulatory Authority to set rules that will ensure pension funds meet a relative return guarantee, defined in relation to the industry average or some market benchmark.

5.3.5 Influence of Listed Corporate Bonds on the Financial Performance of Pension Funds in Kenya.

The study concludes that listed corporate bonds has a negative and significant influence on the financial performance of pension funds. This suggests that inclusion of listed corporate bonds in the pension fund's portfolio significantly influenced the financial performance of the pension funds. This study concludes that fund managers and trustees must undertake proper analysis of companies and entities floating corporate bonds to reduce risks of loses in case the issuing entities suffer losses or ae

faced with adverse regulatory actions such as the case of Chase Bank and Imperial Bank that were placed under receiverships.

5.3.6 Moderating Influence of the Portfolio Rebalancing on the Influence of Asset Allocation on the Financial Performance of Pension Funds in Kenya.

The study findings revealed that portfolio rebalancing had significant moderating influence on the influence of asset allocation on the financial performance of pension funds in Kenya. The study found out that portfolio rebalancing had a significant moderating influence on all the variables used in the study. Given the foregoing, the study concludes that it is incumbent upon the pension fund trustees to ensure the fund manager they select possesses relevant knowledge, skills and competencies in portfolio management. In addition, the Retirement Benefits Authority may revise the exiting investments ceilings placed on different assets to ensure pension funds are able to build more efficient portfolios and rebalance the asset composition where necessary.

5.4 Contribution to Theory and Knowledge

The findings of the study will contribute to the existing body of knowledge on the moderating influence of portfolio rebalancing on the influence of asset allocation on the financial performance of pension funds, achieved by testing empirically their influence. The available empirical study evidence contributes to the extension of current knowledge within the bounds of important bounding assumptions and aids in explaining, predicting, and understanding pension fund financial performance issues. The regulator (RBA), researchers, fund managers, trustees and members will all significantly benefit from this. Theories are formulated as an overview about a phenomenon that explains how or why the phenomenon occurs as well as to challenge and extend existing knowledge within the bounds of critical assumptions. The study findings contribution to the theory is that they provided critical information concerning key investment decisions in terms of choice of asset classes in a portfolio and perhaps the portfolio rebalancing and how it affects pension funds' performance in Kenya. The study results tend to confirm and extend knowledge of

the modern portfolio theory, the risk-return trade off theory, liquidity preference theory, the arbitrage pricing theory and post-modern portfolio theory.

One of the main contributions of the study is it brings about the understanding of the nature of the relationship between government securities, quoted equity investments, alternative investments, guaranteed fund, listed corporate bonds, portfolio rebalancing and financial performance of pension funds in Kenya. The study results confirm that government securities, alternative investments and guaranteed funds had a positive and significant impact on the financial performance of pension funds in Kenya. However, quoted equity and listed corporate bonds had a negative and significant influence on the financial performance of pension funds. The asset allocation is driven by the investment policy guidelines as contained in the investment policy statement. The findings are consistent with the modern portfolio theory and risk return trade off theory. The theories offer a useful way to explain how efficient portfolios can be formed by pension firms as they try to balance expected return and risk levels accepted.

The study also found out that portfolio rebalancing had significant moderating influence on the influence of asset allocation on the financial performance of pension funds in Kenya. The findings are consistent with the liquidity preference theory as pension funds may elect to invest proportion of their assets in liquid assets and some other proportion in illiquid assets based on anticipated cashflow needs and rebalance their portfolios between liquid and illiquid assets if need be based on forecasted cash inflows and outflows. The study findings is also consistent with the arbitrage pricing theory which interrogate the association between systemic economic factors and pension fund performance and how perceived systemic factors may affect choice of assets and investment decisions by the pension fund trustees and fund managers. This in particular affected the performance of specific asset classes which then informed portfolio rebalancing. The findings of the study were also in concurrence with the post-modern portfolio theory which interrogates the construction of a more vigorous and optimum portfolio combination that will enhance and maximize pension funds value and minimize its risks through diversification.

The pension funds investment process mobilization of pension savings from members, appointment of fund manager, administrator and custodian, formulation of investment policy statement, investment of members funds and monitoring of investment performance through quarterly trustee meetings and annual general meetings. The trustees play a critical role as a fiduciary and have specific responsibilities including acting solely in the interest of the plans' participants and their beneficiaries and with exclusive purpose of providing benefits and avoiding conflicts of interest; ensuring that the plans offers a diversified investment approach that minimizes risk of long-term losses; following the plan documents; paying only reasonable plan expenses (not necessarily the lowest costs); monitoring investments; and avoiding prohibited transactions. The study results thus contribute to the orientation of the nature of relationship between trustees and members of the pension funds on one hand and trustees and fund managers on the other hand.

The findings of the study are also significant because it will be relied on by the players in the pension industry; particularly pension fund members, trustees, fund managers, regulators, policy makers and government. This is because the findings will provide critical information concerning investment asset classes available, asset allocation decisions by pension funds and portfolio rebalancing decisions and the influence on financial performance of pension funds. Knowledge of these critical factors in pension fund performance will help members critically evaluate the performance of trustees and fund managers in maximizing returns on their funds while minimizing risks at the same time. The investment process and management of assets under management is critical to pension fund performance and there is need for the pension fund managers to apply the Mean-Variance model (MV model) of the Modern Portfolio Theory by Harry Markowitz. The Mean-Variance model (MV model) aims to find the portfolio that creates a balance between the return and the risk. The MPT is also aligned well to pension funds investment process as it prescribes investment process as security valuation which describes a universe of assets in terms of expected return and expected risk; determining how assets are to be distributed among classes of investment (asset allocation decision); reconciling risk and return in selecting the securities to be included (portfolio optimization); and

dividing each stock's performance (risk) into market-related (systematic) and industry/security-related (residual) classifications (performance measurement).

Further, the research provides both theoretical and practical evidence on the application of the modern portfolio theory, risk-return trade off theory, liquidity preference theory, arbitrage pricing theory and post-modern portfolio theory. The study findings tend to confirm and extend knowledge of the modern portfolio theory, the risk return-trade off theory, the liquidity preference theory, the arbitrage pricing theory and the post-modern portfolio theory. For the MPT, the study findings indicated that choice of asset classes in the pension fund portfolio and tactical shifts in the portfolio through rebalancing influenced financial performance of pension funds. For the risk return trade off theory, the study findings indicated that the trustees and fund managers of pension funds should be cognizant of the risk and return for each of the assets when constructing a diversified portfolio. For the arbitrage pricing theory, the study findings and recommendations indicate that pension funds must consider both systematic and unsystematic factors that may affect individual asset classes and the pension fund portfolio given the effect of systematic and unsystematic factors on the pension fund portfolio.

In terms of the practical contribution, knowledge of how individual assets influence financial performance of pension funds will help in the design and formulation of policies to guide pension funds' investments. Further, the study findings on portfolio rebalancing will buttress to need to ensure pension funds formulate and review their investment policy statements in light of risk return objectives and ensuring that through portfolio rebalancing, the pension fund realizes both strategic ad tactical asset allocations to maximize returns on members funds. Knowledge on pension funds asset allocation and portfolio rebalancing will assist pension fund trustees and fund managers develop efficient asset portfolios as guided by the modern portfolio theory. The arbitrage pricing theory will help in identifying systematic and unsystematic risk factors determining pension returns. Given challenges facing pension funds' performance, the study will be an important cog in finding solutions to problems of poor pension performance. The regulator will use the study findings

to ensure pension funds allocate more assets to alternative asset classes within acceptable risks to bolster pension fund performance.

5.5 Recommendations of the Study

The study recommendations are in line with the objectives, findings and conclusions of the study.

5.5.1 Investments in Government Securities

From the findings, investment in Kenya Government Securities had a positive and significant influence on the financial performance of pension funds. The study concluded that government securities influenced the financial performance of pension funds in Kenya. RBA investment guidelines allows up to 90% investments in East African Community Government Securities and infrastructure bonds issued by public institutions and collective investment schemes incorporated in East African Community (EAC) and approved by an EAC Capital Markets regulator reflecting this category or up to 100% in the case of scheme receiving statutory contributions. As such, pension funds may elect to invest 90% to 100% in government bonds. In order to generate competitive returns while maintaining reasonable caution when investing in accordance with regulatory requirements as well as client needs, the study advises pension fund managers and trustees to strike a balance between investing the entirety of members' contributions in government securities and managing the ideal portfolio composition.

5.5.2 Quoted Equity Investments

The study findings indicated that quoted equity investments had a negative and significant influence on the financial performance of pension funds. The study recommends that due diligence must be undertaken on the nature of the industry and the company’s financial performance and prospects before investing in its stocks. Further, the study recommends that the proportion of quoted equity in the fund’s assets under management and approved quoted equity levels in the approved investment policy statement may need to be reviewed to ensure pension funds invest

in alternative asset classes available that can positively and significantly influence pension funds' performance.

5.5.3 Investments in Alternative Assets

Results on the influence of alternative investment on the financial performance of pension funds show that the coefficient had a positive and significant influence on the financial performance of pension funds. The study recommends that pension fund trustees and investment managers must strike a balance between investment in traditional asset classes and alternative investments to ensure members derive benefits accruing from diversification into alternative assets. In addition, the study recommends that the pension funds trustees and fund managers must undertake careful scrutiny and analysis of alternative investments available before including allowable proportions of alternative assets in the investment policy statement as alternative asset vary and may include private equity, venture capital, immovable properties, REITS and private bonds.

Lastly, the study recommends education of pension funds members, trustees and fund managers on the range of alternative investment options available. This can be done through the Trustee Development Programme Kenya (TDPK) and during members education forums and annual general meetings to ensure all members, trustees and fund managers ae well appraised of opportunities and risks in alternative investments.

5.5.4 Guaranteed Funds' Investments

The study concluded that guaranteed funds had a positive and significant influence on the financial performance of pension funds. The study concluded that inclusion of guaranteed funds in a pension fund portfolio influenced the financial performance of pension funds in Kenya. However, funds in guaranteed schemes are mainly invested in low-risk securities, such as government securities, and thus have offered lower returns compared to segregated schemes. The study recommends that guaranteed funds should put into consideration annual inflation rates when deciding on the rate of returns to ensure beneficiaries are compensated for any loss of return suffered due

to effect of inflation on the minimum guaranteed returns. Alternatively, funds in the guaranteed schemes could also be invested in the inflation protected assets.

The study further recommends that RBA may also consider setting rules that will ensure pension funds meet a relative return guarantee, defined in relation to the industry average or some market benchmark. In addition, it may consider floating guarantee than fixed guarantee along the savings phase. This floating guarantee depends on the development of the 1-year interest rate until retirement. Under floating guarantee, the current 1-year interest rate is assigned to each annual contribution made and is valid until retirement so that, at each point of time, there is a different minimum return. This will help ensure capital preservation and prevent loss of members' funds where the guarantee offered does not exceed the prevailing inflation rates.

The guaranteed minimum rate of return for guaranteed pension issuers needs to be reviewed regularly. This is due to the fact that when the economy is performing well and the minimum guaranteed rate of return is low, the insurance companies are encouraged to keep a larger percentage of the real returns. In addition, by forcing insurance firms to pay more than they can afford to in extremely bad years, they may be forced into a financial disaster. Finally, the trustee's role in management of guaranteed funds should be enhanced to ensure they play their role effectively in oversight of investment decisions taken by fund managers as far as investment in guaranteed funds is concerned.

5.5.5 Listed Corporate Bonds Investments

The study found out that Listed Corporate Bonds had a negative and a significant influence on the financial performance of pension funds in Kenya. This could be attributed to the failure of Imperial Bank and Chase Bank which were placed under receivership with outstanding debt in corporate bonds issued to the public. The findings could also be attributed to slow growth of corporate bond market in Kenya. The study recommends that pension funds must do proper due diligence over corporate bond issues in the market and should proactively monitor financial performance of the issuers to protect the pensioners retirement funds. The

government must also strengthen governance in the issuance of listed corporate bonds and review the investor protection laws in place to safeguard investor confidence. Further, this will enhance confidence of pension schemes in investing in listed corporate bonds. The supply of long-term bonds is far from sufficient to meet the growing demand by pension funds. The inadequate supply may result in a statistically and economically significant impact on bond yields and an actuarially significant impact on the cost of providing pension benefits. The ramifications should not hold back the shift to bonds by pension funds. The study recommends that governments should take effective measures to spur bond supply.

5.5.6 Moderating Influence of the Portfolio Rebalancing on the Influence of Allocation on the Financial Performance of Pension Funds in Kenya.

The study findings revealed that portfolio rebalancing had significant moderating influence on the influence of asset allocation on the financial performance of pension funds in Kenya. This implies that choice of portfolio mix significantly determines pension fund's portfolio. The study recommends that the trustees and pension fund managers should regularly conduct analysis of pension fund portfolio held and its return attribution to ensure choice of assets complies with investment policy statements approved by members and complies with regulations issued by RBA. The study recommends that trustees and pension fund managers should be trained on evaluation of pension fund performance so that they are able to participate meaningfully during the Annual General Meetings when trustees and fund managers present pension fund performance. Understanding portfolio performance is integral to this. Finally, the study recommends that RBA regularly reviews the quantitative limits placed on different asset classes to provide more room for creation of robust portfolios by pension fund managers especially for alternative investments whose limits are generally low due to perceived risks.

5.6 Suggestions for Further Research

The study has shown that there is need for further research on other financial performance of pension funds in Kenya. From the results, government securities, quoted equity, alternative investments, guaranteed funds and listed corporate bonds

explain to some extent financial performance of pension funds in Kenya, with some percentage not being explained. When portfolio rebalancing was introduced as moderating variable, the coefficient of R squared increased from 44.3% to 82.09% and adjusted R-squared from 18.7% to 67.04%. This implies that the portfolio rebalancing moderated the influence of asset allocation on the financial performance of pension funds in Kenya. The study suggests further research to be carried out on the other determinants of financial performance of pension funds in Kenya not captured in the current study. The study selected the best performing five asset classes as the independent variables; government securities, quoted equity, alternative investments, guaranteed funds and listed corporate bonds. Therefore, future researchers could implore the possible influence of all the other asset classes on the financial performance of pension funds. Importantly, future researchers can examine factors contributing to the slow uptake of other asset classes such as unlisted shares and equity instruments of companies, offshore investments in bank deposits government securities, listed equities and rated Corporate Bonds and offshore collective investment schemes, all exchange traded derivatives contracts approved by the Capital Markets Authority, all listed REITS incorporated in Kenya and approved by the CMA, private equity & venture capital and debt instruments for the financing of 10% infrastructure or affordable housing projects approved under the Public Private Partnerships Act, 2013. Other areas of study could be the influence of trustees' competencies and level of involvement in setting the investment policy statements and the appraisal of fund managers' performance.

Because the study only focused on portfolio rebalancing as a moderating variable, future researchers could also consider introducing different variables in testing for moderation effect of such variables on the influence of asset allocation on the financial performance of pension schemes. This is because as much as this study used this variable; there are other variables which may influence financial performance of pension funds. Given Kenya's role in East African Community and the need to strengthen cross border regulations, the study can be expanded to cover other pension funds within the East African community. The study considered pension funds registered with the Retirement benefits Authority in Kenya. Future researchers can also consider including unregistered pension funds in their studies.

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APPENDICES

Appendix I: Letter of Introduction

The Chief Executive Officer,

Retirement Benefits Authority,

Rahimtullah Tower, 13th Floor,

Upper Hill Road, Opp UK High Commission.

P.O. Box 57733 - 00200

Nairobi, Kenya.

REF: CONSENT FOR PROVISION OF ACADEMIC DATA

I am a student at Jomo Kenyatta University of Agriculture and Technology pursuing Doctor of Philosophy in Finance. I am currently conducting a study on 'moderated Analysis of Asset Allocation on the Financial Performance of Pension Funds in Kenya'. The data for the study will be sourced from financial reports and audited accounts submitted by pension funds to the Retirement benefits Authority.

The information obtained will exclusively be used for academic purposes and will be treated with utmost confidentiality. The findings will purely be used for academic purposes. I therefore seek your approval to obtain the requested data.

Yours faithfully,

Roba Adan Abdi Boyante

HD435-6191/2015

Appendix II: Retirement Benefit System in Kenya

Scheme Type	National Social Security Fund	Public Service Pension Schemes	Occupational Schemes	Individual Schemes
Legal Structure	An Act of Parliament	An Act of Parliament	Established under Trust	Established under Trust
Membership	○ Employees in the formal sector. institutions with 5+ staff members	All public service employees, including civil servants, teachers and disciplined forces. Separate scheme for armed forces	Formal sector workers in companies that operate retirement schemes	Open to all on voluntary basis
Funding	Funded	Non-funded	Funded	Funded
Regulation	RBA	Act of Parliament	RBA	RBA

Source: RBA (2022)

Appendix III: Data Collection Form

Name of the Fund: _____

Year	**Amounts Invested in Government Securities**	**%**	**Amounts Invested in Quoted Equity**	**%**	**Amounts Invested in Immovable Property**	**%**	**Amounts Invested in Guaranteed Funds**	**%**	**Amounts Invested in Listed corporate Bonds**	**%**	**Financial Performance (Time Weighted Rate of Return)**
2015											
2016											
2017											
2018											
2019											
2020											
2021											

(TWRR)= [(1+HP1) ×(1+HP2) ×⋯×(1+HPn)] −1

TWR= Time-weighted return

n= Number of sub-periods

HP= (Initial Value + Cash Flow)/End Value− (Initial Value + Cash Flow)

HP_n= Return for sub-period *n*

Appendix IV: Investment Guidelines by RBA

Item	Categories of Assets	Maximum Percentage of Aggregate Market Value of Total Assets of Scheme or Pooled Fund
1	Cash and Demand Deposits in institutions licensed under the Banking Act of the Republic of Kenya.	5%
2	Fixed Deposits. Time Deposits and Certificate of Deposits in institutions licensed under the Banking Act of the Republic of Kenya.	30%
3	Listed Corporate Bonds, Mortgage Bonds and Fixed Income Instruments; loan stocks approved by the Capital Markets Authority; collective investment schemes incorporated in Kenya and approved by the Capital Markets Authority reflecting this category; and global depository receipts.	20%
4	Commercial Paper. Non-listed bonds and other debt instruments issued by private companies provided that the bond or the instrument has been given investment-grade rating by a credit rating agency registered by the Capital Markets Authority, and collective investment schemes incorporated in Kenya and approved by the Capital Markets Authority reflecting this category.	10%
5	East African Community Government Securities and infrastructure bonds issued by public institutions and	90%, or 100%in the case of scheme

	collective investment schemes incorporated in East African Community (EAC) and approved by an EAC Capital Markets regulator reflecting this category.	receiving statutory contributions
6	Preference shares and ordinary shares of companies listed in a securities exchange in the East African Community and collective investment schemes incorporated in Kenya and approved by the Capital Markets Authority reflecting this category; Exchange Traded Funds: and global depositary receipts.	70%
7	Unlisted shares and equity instruments of companies incorporated in Kenya and collective investment schemes incorporated in Kenya and approved by the Capital Markets Authority reflecting this category.	5%
8	Offshore investments in bank deposits government securities, listed equities and rated Corporate Bonds and offshore collective investment schemes reflecting these assets.	15%
9	Immovable property in Kenya.	30%
10	Guaranteed Funds.	100%
11	All exchange traded derivatives contracts approved by the Capital Markets Authority.	5%
12	All listed Real Estate Investment Trusts incorporated in Kenya and approved by the Capital Markets Authority.	30%
13	Private Equity & Venture Capital.	10%
14	Debt instruments for the financing of 10% infrastructure	10%

	or affordable housing projects approved under the Public Private Partnerships Act, 2013 or as may be prescribed by the Cabinet Secretary responsible for matters relating to housing.	
15	Any other assets.	10%

Appendix V: Industry Investments Per Asset (December 2021)

Assets Category	December 2020		December 2021	
	Kshs (Billion)	%	Kshs (Billion)	%
Government Securities	625.65	44.72	706.99	45.69
Quoted Equities	218.12	15.59	254.60	16.45
Immovable Property	251.27	17.96	254.51	16.45
Guaranteed Funds	230.60	16.48	259.79	16.79
Listed Corporate Bonds	5.25	0.38	6.80	0.44
Fixed Deposits	39.04	2.79	27.85	1.80
Offshore Investments	11.38	0.81	19.41	1.25
Cash	12.24	0.87	9.54	0.62
Unquoted Equities	3.42	0.24	3.48	0.23
Private Equity	0.969	0.07	2.96	0.19
REITS	0.503	0.04	0.37	0.02
Commercial paper, non-listed bonds by private companies	0.059	0.00	0.01	0.00

Source: RBA (2021)

Appendix VI: List of Registered Umbrella Retirement Benefit Schemes as at 31st December 2022

Scheme	Postal Address	Telephone No.
Amana Umbrella Pension Scheme	9480-00100 Nairobi	313356
APA Life Umbrella Retirement Fund	30389-00100 Nairobi	3641000
British American Insurance Umbrella fund	30375-00100 Nairobi	2710927
CFC Life Assurance Ltd Umbrella Fund	30364-00100 Nairobi	2866000
CIC Umbrella Retirement Benefits Scheme	59485-00200 Nairobi	2823000
CICAM Umbrella Retirement Fund	59485-00200 Nairobi	2823000/0703099132
Co-op Trust Investment Retirement Benefits Scheme	48231-00100 Nairobi	0703071000
County Pension Fund	28938-00200 Nairobi	2046901
Cytonn Umbrella Retirement Benefits Scheme	20695-00200 Nairobi	0709101000
Enwealth Umbrella Fund	52840-002000 Nairobi	020-8160312
Fusion Umbrella Retirement Benefits Scheme	47538-00100 Nairobi	27101149
ICEA LION Umbrella Retirement Benefits Scheme	46913-00100 Nairobi	2750000
ICEA LION Guaranteed Umbrella Fund	46913-00100 Nairobi	2750000
Kenindia Umbrella Provident Fund	30377-00100 Nairobi	3310699
Kenya Orient Umbrella Pension Fund	34530-00100 Nairobi	2728603
Kivuli Umbrella Fund	79217-00200 Nairobi	2323343
Madison Umbrella Retirement Benefits Scheme	47382-00100 Nairobi	2864000
Minet Kenya Umbrella Retirement Fund	20102-00200 Nairobi	4975000
Mwavuli Pension Fund	15850-00100 Nairobi	2220099

Ngao Umbrella Pension Scheme	30375-00100 Nairobi	2710927
Octagon Umbrella Retirement Benefits Scheme	10034-00100 Nairobi	6001948
Old Mutual Umbrella Retirement Benefits Scheme	30059-00100 Nairobi	2728881
Sanlam Umbrella Retirement Fund	44041-00100 Nairobi	2781000
Pioneer Umbrella Retirement Fund	20333-00200 Nairobi	2220814
Suluhu Umbrella Scheme	58013-00200 Nairobi	2717137
Takaful Umbrella Fund	1811-00100 Nairobi	2725134
The Jubilee Insurance Umbrella Retirement Scheme	30376-00100 Nairobi	3281000
The Kenyan Alliance Insurance Company Limited	30170 Nairobi	221449
The Monarch Umbrella Retirement Fund	44003-00100 Nairobi	310032
UAP Umbrella Retirement Benefit Scheme	23842-00100 Nairobi	2850000
Zamara Fanaka Retirement fund (Provident & pension Sections)	52439-00200 Nairobi	4969000

Source: RBA (2022)

Appendix VII: Individual Retirement Benefit Schemes Registered With RBA - 2022

Name	Address	Town
Amana Personal Pension Plan	9480-00100	Nairobi
Apollo Insurance Co. Limited Individual Pension Arrangement	30389	Nairobi
Benefits at Work Personal Pension Scheme	27932-00100	Nairobi
Blue MSMEs Jua Kali Individual Retirement Benefits Scheme (Mbao Pension Plan)	30664-00100	Nairobi
British American Personal Pension Plan	30375-00100	Nairobi
CFC Life Individual Pension Plan	30664-00100	Nairobi
Chancery Personal Pension Plan	55537-00200	Nairobi
CIC (Jipange Personal Pension Plan)	59485-00200	Nairobi
NCBA Individual Pension Plan	30437-00100	Nairobi
CPF Individual Pension Scheme	28938-00200	Nairobi
Cytonn Personal Retirement Benefits Scheme	20695-00200	Nairobi
Dry Associates Personal Provident Fund	684-00606	Nairobi
Enwealth Diaspora & Expatriates Retirement Fund	52840-00200	Nairobi
Enwealth Personal Pension Scheme	52840-00100	Nairobi
Fahari Retirement Plan	52439-00200	Nairobi
GA Life Personal Provident Plan	42166-00100	Nairobi
GA Life Personal Pension Plan	42166-00100	Nairobi
ICEA Lion Individual Retirement Benefits Scheme	46143	Nairobi
Jubilee Insurance Company Limited Personal Pension Plan	30376	Nairobi
Kenindia Assurance Co. Ltd Personal Pension Plan	30377	Nairobi
Kenyan Alliance Insurance Co. Ltd Individual	30170	Nairobi

Retirement Benefits Scheme		
Madison Personal Pension Plan	47382	Nairobi
Mafao Fund	58013-00200	Nairobi
Mercantile Personal Provident Fund Scheme	20680-00200	Nairobi
Minet Individual Pension Plan	48279-00100	Nairobi
Mwavuli Individual Pension Plan	10472-00100	Nairobi
NTISL Personal Pension Plan	72866-00200	Nairobi
The Heritage All Company Ltd Individual Retirement Benefit Scheme	30390-00100	Nairobi
The Kenya Orient Individual Pension Plan	34530-00100	Nairobi
The Monarch Personal Pension Plan	44003	Nairobi
Octagon Personal Pension Plan	10034-00100	Nairobi
Old Mutual Individual Retirement Benefits Scheme	30059-00100	Nairobi
Pan Africa Life Personal Pension Plan	44041-00100	Nairobi
Pioneer Assurance Individual Retirement Benefits Scheme	20333-00200	Nairobi
Stanlib Individual Pension Plan	30550-00100	Nairobi
UAP Life Assurance Individual Retirement Benefits Plan	43013-00100	Nairobi
Wakili Personal Retirement Benefits Plan	72219-00200	Nairobi
Zamara Vuna Pension Plan	52439-00200	Nairobi
Zimele Personal Pension Plan	76528-00508	Nairobi

Source: RBA (2022)

Appendix VIII: List of Approved Fund Managers - 2022

Fund Manager	Address	Physical location
ABSA asset Management Limited	30120-00100	1st Floor, ABS Headquarters, Waiyaki Way
African Alliance Kenya Investment Bank Limited	27639-00506	Kenya Re Towers Upper Hill
Altree Capital Kenya Limited	14500-00800	2nd Floor, the Exchange, 55 Westlands Road
Amana Capital Limited	9480-00100	Saachi Plaza, Argwings Kodhek Road
Apollo Asset Management Company Limited	30389-00100	Apollo Centre, Westlands
Britam Asset Managers Kenya Limited	30375-00100	Britam Centre, Upper Hill
CIC Asset Management Limited	59485-00200	CIC Plaza II, Mara Road
Co-op Trust Investment Services Limited	48231-00100	Co-operative Bank House, Haile Selassie Avenue
Cytonn Asset Managers Limited	20695-00200	6th Floor, Chancery, Valley Road
Dry Associates Limited	684-00606	Dry Associates House, Brookside Groove, Waiyaki Way
Fusion Investment Management Limited	47538-00100	20th Floor, 4th Avenue Towers, Ngong Avenue
GenAfrica Asset Managers Limited	79217-00200	1st Floor, Arlington Block, 14 Riverside Drive, Westlands
Genghis Capital Limited	9959-00100	6th Floor, Reliable Towers, Westlands

ICEA Lion Asset Management Limited	46143-00100	ICEA Lion Centre, Chiromo Road
Kenindia Asset Management Company Limited	44372-00100	Kenindia House, Loita Street
Madison Investment managers Limited	20092-00100	Madison Insurance House, Upper Hill
Nabo Capital Limited	10518-00100	7th Floor, International House
Natbank Trustees and Investment Services Limited	72866-00200	National bank Building, Harambee Avenue
NCBA Investment Bank Limited	44599-00100	NCBA Centre Annex, Hospital Road
Old Mutual Investment Group Limited	11589-00400	Old Mutual Building, Upper Hill
Orient Asset Managers Limited	34530-00100	Capitol Hill Towers, Cathedral Road
Sanlam Investments East Africa Limited	67262-00200	Africa Re Centre, Upper Hill
Zimele Asset Management Company Limited	76528-00508	Fedha Towers, Muindi Mbingu Street

Source: RBA (2022)

Appendix IX: List of Registered Custodians – 2022

Custodian Name	Address	Physical Location
Bank of Africa Kenya Limited	69562-00400	Reinsurance Plaza, Taifa Road
Equity Bank Kenya Limited	75104-00200	Equity Bank Centre, Upper Hill
Family Bank Limited	74145-00200	Family Bank Towers, Muindi Bingu Street
I & M Bank Limited	30238-00100	I & M Bank House, 2nd Ngong Avenue
KCB Bank Kenya Limited	30664-00100	KCB Towers, Upper Hill
National Bank of Kenya Limited	72866-00200	National Bank Building, Harambee Avenue
NCBA Bank Kenya PLC	44599-00100	NCBA House, Uhuru Highway
Prime Bank Limited	43825-00100	Prime Bank, Riverside Drive
SBM Bank (Kenya) Limited	34886-00100	SBM Bank, Riverside Mews
Stanbic Bank Kenya Limited	72833-00200	CFC Stanbic Centre, Westlands
Standard Chartered Bank Kenya Limited	30003-00100	Standard Chartered Bank head Office, Westlands
The Cooperative Bank of Kenya Limited	48231-00100	KUSCCO Centre, Upper Hill

Source: RBA (2022)

Appendix X: List of Registered Administrators – 2022

Name	Address	Physical Location
APA Life Assurance Limited	30389-00100	Apollo Centre, Westlands
Benefits at Work Limited	27932-00100	Vision Plaza, Mombasa Road
Britam Life Assurance Company Kenya Limited	30375-00100	British American Centre, Upper Hill
Chancery Wright Insurance Brokers Limited	55537-00200	Crawford Park, Statehouse Road
CIC Life Assurance Limited	59485-00200	CIC Plaza, Mara Road
CPF Financial Services Limited	28938-00200	CPF House, Haile Selassie Avenue
Eagle Africa Insurance Brokers Limited	30076-00100	Longonot Road, Upper Hill
Enwealth Financial Services Limited	52840-00200	Morning Side Office Park, Ngong Road
ITSL Trust Company Limited	46143-00100	ICEA Lion Centre
Kenindia Assurance Company Limited	44372-00100	Kenindia Assurance, Loita Street
Kenya Orient Life Assurance Limited	34530-00100	Capitol Hill Towers, Cathedral Road
Kingsland Court Benefits Services Limited	10285-00100	Flamingo Towers, Mara Road, Upper Hill
KUSCCO Mutual Assurance Limited	28403-00200	KUSCCO Centre, Upper Hill
Liaison Financial Services Limited	58013-00200	Liaison House, Statehouse Avenue
Liberty Life Assurance Kenya	30364-00100	Liberty House, Mamlaka Road

Limited		
Madison Life Assurance Kenya Limited	47382-00100	Madison Insurance House, Upper Hill
Minet Kenya Financial Services Limited	20102-00200	Minet House, off Nyerere Road
Octagon Pension Services Limited	10034-00100	Westpark Suites, Parklands
Pacific Insurance Brokers (EA) Limited	50565-00200	Rose Avenue, off Denis Pritt
Pioneer Assurance Company Limited	20333-00200	Pioneer House, Moi Avenue
Roberts Insurance Brokers Limited	73415-00200	Top Plaza, Kindaruma Road
Saham Assurance Company Kenya Limited	20680-00200	Ecobank Towers, Muindi Bingu Street
Sanlam Life Insurance Limited	44041-00100	Pan Africa House, Kenyatta Avenue
Sapon Insurance Brokers Limited	47628-00100	West End Place, off Langata/Mbagathi Round About
Sedgwick Kenya Insurance Brokers Limited	40709-00100	Zep Re Place, Upper Hill
Takaful Insurance of Africa Limited	1811-00100	CIC Plaza, Mara Road
The Jubilee Insurance Company of Kenya Limited	30376-00100	Jubilee Insurance House
The Kenyan Alliance Insurance Company Limited	30170-00100	Chester House, Koinange Street
The Monarch Insurance	44003-00100	Prudential Assurance Building,

Company Limited		Wabera Street
UPA Life Assurance Limited	23842-00100	Bishop Garden Towers, Bishops Road
Zamara Actuaries, Administrators & Consultants Limited	52439-00200	Landmark Plaza, Argwings Kodhek Road
Zimele Asset Management Company Limited	76528-00508	Ecobank Towers, Muindi Bingu Street

Source: RBA (2022)