EFFECT OF RISK ON RETURN OF PENSION SCHEMES IN NAIROBI KENYA

BY

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DECLARATION

I declare that the work in this dissertation has not been previously published or submitted for a degree at any other University. I also declare that this is my original work and contains no material written or published by any other person except where reference is made and duly acknowledged

Signature……. Date……

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I do hereby confirm that I have examined the master's dissertation of Charles Chirchir and have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

Signature…… Date……

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ABSTRACT

Kenyans have a tendency of not taking care of their old people and that little attention is ever given to the old once they retire from their respective jobs after many years of service. This has given rise to studies that try to find out the root cause of people not saving well for their old age or if they do, why their returns are not as beneficial as they had wished for. The objective of the study is therefore to establish the risk-return impact on pension funds in Kenya through various savings schemes known as Pension Schemes/Funds (Pension Schemes and Funds to be used interchangeably).This study used empirical design to investigate how pension investment risks affect their return by use of Sharpe Ratio and finding out the relationship between pension fund returns and asset allocation.A sample of 45 pensions funds registered in Nairobi County by Retirements Benefits Authority was selected and historical monthly performance or returns data for all investments used i.e. fixed income, equities and offshore. Risk adjustment measures of Standard Deviation and Sharpe Ratio were applied to test the riskiness of the investments. Analysis of the data collected was summarised using tables in order to derive the study findings. Accordingly, the study viewed risk-returns in terms of the ratios and returns as per the sectors in investments for Pensions Funds in 45 schemes based Nairobi Kenya. The initial analysis showed that there is a link between the asset allocation and risk factor at all the schemes with a high mean of 1.24%. However, the difference in returns for the various schemes seems to be insignificant. This implies that the assumed risks by policy makers might not have existed, but to be sure of the relationship between risk return and decision making, the regression results were clearly indicative that the variables can be linked. The study concludes that investment decisions should be based on the best estimates of as it remains a factor in the calculation of returns and is therefore prudent to use risk measures such as Sharpe Ratio in making investment decisions. Policy makers such as RBA, CMA, CBK and Ministry of Finance should review impact of risk on market development.

Key words: pension schemes/funds, risk adjustment measures, asset allocation and returns

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DEDICATION

This research dissertation is dedicated to my entire family for their prayers, love, support and encouragement during my studies.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

APT - Arbitrage Pricing Theory

CAL - Capital Allocation Line

CAPM - Capital Asset Pricing Model

IRA - Insurance Regulatory Authority

MSCI - Morgan Stanley Capital International

SSA - Strategic Asset Allocation

TAA - Tactical Asset Allocation

NSE - Nairobi Securities Exchange

RBA - Retirement Benefits Authority

QAR - Quantitative Asset Restrictions

DEFINITION OF TERMS

Investment Policy – A document drafted between a portfolio manager and a client that outlines general rules for the manager.

This statement provides the general investment goals and objectives of a client and describes the strategies that the manager should employ to meet these objectives. Specific information on matters such as asset allocation, risk tolerance, and liquidity requirements would also be included in an IPS.

Provident Fund – Voluntarily established savings by the employee and employer with each contributing a minimum of 2% and maximum of 15% towards a fund that will be managed by a fund manager through investment. a provident fund and a pension fund is that the provident fund is be paid out in full on death or retirement

Pension Fund – A fund established by an employer to facilitate and organize the investment of employees' retirement funds contributed by the employer and employees. One-third of the value of the pension fund is paid out as a lump sum. The balance is used to purchase a monthly annuity.

Investment Return – The return on an investment portfolio which could contain a single asset or multiple assets

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Several changes in accounting and regulatory rules have led to more volatile investment environment and hence resulting to complex management of investment risks. Pension managers and administrators in Kenya have always faced with a myriad of challenges that involve staying properly funded and matching assets to liabilities and must now manage a broader set of issues in an increasingly tough environment (Mutuku, 2008). There is need to grow returns and contain risk, a duality that presents many pension funds with a risk/reward dilemma. According to Fama *et al* (1969), solving this problem demands rather a different approach of managing for a total outcome rather than focusing on the returns of individual asset classes i.e. attribution. Similarly, in the current risk-return environment, generalizations about marketplace risks may no longer apply. Rather, it is critical to recognize the risks pertinent to people's pension funds and manage them dynamically as well as strategically across the entire plan.

1.1.1 Concept of pension funds

The Kenya Pensions sector has developed since independence (Odundo, 2011). The regulation of this sector has gradually changed over time under various Acts of Parliament. The Acts include The Trustee Act (CAP 167), The Provident Fund act (CAP 191), the NSSF Act (CAP 258) as well as the Retirement Benefits Act (CAP 197).

However, in spite of all the Acts, there have been numerous cases of funds misappropriation and the general feeling of malaise by the public (Nkonge, 2010). This prompted the Kenya government to create the Retirement Benefits Authority enacted in 1997 for

regulating, supervising and promoting of retirements benefits sector. This Act became operational in 2000 (GoK, 2000).

There are various Retirements benefits but generally divided into two major categories; occupational retirement benefit schemes (which are predominantly registered segregated pension schemes) and individual retirement benefit schemes mostly provided by registered insurance companies regulated by Insurance Regulatory Authority (IRA).

The occupational schemes are established by an employer to provide retirement benefits for its employees in which case the employer is referred to as the sponsor or funder. On the other hand, the individual schemes are established and run by insurance companies and could be utilized by any individual person whether unemployed, self-employed or employed by any organization. For the private schemes, this could involve pension schemes in which funds are paid out on a regular period or could involve provident funds in which a lump sum one-off payment is made to the beneficiary.

The Retirement Benefits Authority (RBA) has regulated this sector which has 28 individual registered schemes and 1,216 registered schemes (corporate). The Pension schemes however face difficulties as most of them are not run with a well-defined strategic plan (Agola, 2012). This has been complicated further by the fact that modern life has made retirement at 55 or 60 appear a young age in which retirees are still increasing the baby boom thus making the schemes lose a lot of money through supporting individuals that outlive the projected life support period for a retired person (Agola, 2012).

1.1.2 Concept of Investment

The dialogue of return on investment is based on Markowitz Portfolio Model. The Markowitz model is a single-period model, where an investor forms a portfolio at the beginning

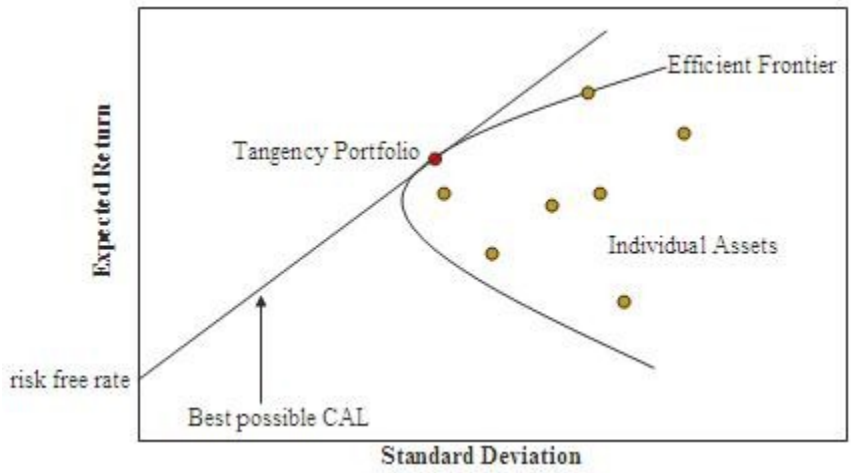
of the period Markowitz (1952). The investor's objective is to maximize the portfolio's expected return, subject to an acceptable level of risk (or minimize risk, subject to an acceptable expected return).

The assumption of a single time period, coupled with assumptions about the investor's attitude toward risk, allows risk to be measured by the variance (or standard deviation) of the portfolio's return. As securities are added to a portfolio, the expected return and standard deviation change in very specific ways, based on the way in which the added securities co-vary with the other securities in the portfolio. The best that an investor can do is bounded by a curve that is the upper half of a hyperbola. This curve is known as the efficient frontier. According to the Markowitz model, investors select portfolios along this curve, according to their tolerance for risk. An investor who can live with a lot of risk might choose portfolio above the tangency, while a more risk-averse investor would be more likely to choose portfolio below the tangent line. One of the major insights of the Markowitz model is that it is a security's expected return, coupled with how it co-varies with other securities, that determines how it is added to investor portfolios. Building on the Markowitz framework, Sharpe (1964), Lintner (1965) and Mossin (1966) independently developed what has come to be known as the Capital Asset Pricing Model (CAPM).

This model assumes that investors use the logic of Markowitz in forming portfolios. It further assumes that there is an asset (the risk-free asset) that has a certain return. This study assumes that fund managers are able to utilize the model repeatedly to optimize returns of pension funds with carefully while avoiding risks.

FIGURE 1

Markowitz portfolio model



Source: Adopted from Markowitz (1959)

1.1.3 Concept of Risk

Investing in individual stocks can be risky. Stocks or equities (both listed and unlisted) are susceptible to changes in the domestic and world economy as well as changes in the company and political environment. Stocks are also somewhat illiquid. The growth of a stock or equity investment is susceptible to a number of risks; therefore, a stock's growth is not solely determined by interest rates. Stocks are susceptible to a number of risks (Harvey *et al*, 2005). These risks include; interest-rate risk, inflation risk, company/institution risk, financial risk, liquidity risk, political risk, regulatory risk, exchange-rate risk and market risk: Overall market movement may affect the price of a company's stock. Investors often monitor the way a stock responds to movement in the market. A measure of how sensitive a stock is to movements in the market is called a beta (β). A stock with a beta of one moves very closely with the market. A stock with a beta that is greater than one is be more volatile than the market or index. A stock

with a beta of less than one is less volatile than the market or index. Betas can help investors determine a stock's market risk (Sharpe, 1964).

When an investor is building and monitoring portfolio, it is important to track the beta of that portfolio, or the weighted beta of each of the individual stocks or offshore funds in that portfolio. This tells the investor how risky the overall portfolio is in comparison to the market. A diversified portfolio moves with the market: one company's successes or failures cannot affect it as much. In this regard it is imperative to note the principle of good investing: stay diversified. Investors are advised not to invest solely in individual stocks implying they should invest in a broad range of financial assets. Fama (1983) advised that investors should not invest solely in large-cap stocks either concluding that an investor should broaden and deepen the portfolio to include international and small-cap stocks as well.

1.1.4 Concept of Risk–Return on Investments

The concept of profile trade-off is based on two realities of investments and investment performance. First, all investments carry some degree of risk i.e. the reality that you could lose some or all of your money or investment when you buy stocks, bonds, mutual funds or other investments. Second, not only do different types of investments carry different levels of risk, but the more risk you assume, the greater the investment return you are likely to achieve (Harvey *et al*, 2005).

Ross *et al* (2009) indicate that risk comes in many forms, but when talking about the profile tradeoff, the primary measure of risk is volatility, or the degree to which an investment fluctuates in price. Different asset categories are subject to different levels of price fluctuation. For instance, stocks can fluctuate widely from one year to the next (or even from one day to the

next), whereas the swing in bond prices tends to be less dramatic, and price fluctuations for money market or so-called capital preservation investments are even lower (Harvey *et al*, 2005).Unsystematic risks are likely to have an effect on at most a small number of assets. Unsystematic risk can be diversified away to smaller levels by including a greater number of assets in the portfolio (specific risks "average out"). The amount of systematic risk present in a particular asset relative to that in an average risky asset can be measured using beta coefficient (Robert & Douglas, 2005).

The gain or loss from investments is known as the return. The return usually has two components. The income component of return that entails receiving cash directly as a result of owning the investment and secondly the value of the asset held often change leading to a capital gain or capital loss (Sharpe, 1964).

1.2 Statement of the Problem

After many years of working many people have been left in shock when they retire. They always have to take so long as to be paid their retirement dues and more so they have no idea or prior education on what exactly their retirement package entails (Agolla, 2012). The scholar found out that fraud and political risk were a big risk unknown to the retirees and to which they have very little control over. On the other hand, Ombajo (2006) while studying fund managers on the Nairobi Securities Exchange (NSE) noted that although pension funds are required to have the best returns from the heavy investments sunk into the funds, that does not often happen to be the case according to the records of returns from majority on these investment funds. Pension contributors in majority of funds do not understand how their funds are invested while the

pensions fund managers do not exactly explain to the pensioners how their money is invested especially in the risky field of stocks (Blake & Lehmann, 2002).

Ibbotson and Kaplan (2000) in his study on pensioner investment in the USA point out that asset allocation was important in the determination of the pension fund performance explaining 93.6% of the returns recorded by a pension fund. Ciampi (2001) found out that in 94 balanced mutual funds and 58 pension funds, asset allocation explained virtually 40% of variations across funds and 100% of the funds returns. The study carried out in the US had a very different climate in terms of economics and other factors including demographics warranting a comparative study for the Kenya case. Cousins and Massey (2009) in their study of defined benefits in Britain observed that the insurance of pensioners involves transferring assets to the insurer, which leaves a depleted asset portfolio to cover the longer-term liabilities that have higher interest, inflation and longevity risk. Similarly, Byrne and Winter (2009) looking at longevity of pensioners drawing their pensions found that fund managers underestimated the living years of a retired person.

With increased level of compliance and schemes funds being managed by professional fund managers, the use of QAR (Quantitative Asser Restrictions) is very questionable as this limits the fund manager's ability to professionally invest in the schemes funds based on the risk return consideration (Mutuku, 2008).

Although all the scholars are expounding on the need to have special care in investing funds on the risky markets, there is shortage of literature and empirical work on the effect of risk on return on the pension schemes. It is from the above realization that this study was borne. The study is therefore be guided by the question; "is there any correlation between risk, assets allocation and pension funds returns?"

1.3 Objective of the Study

The general objective of this study is to establish the effect of risk on return on pension schemes or funds in Nairobi Kenya.

1.3.1 Specific Objectives

The specific objectives of this study are to:-

1. Establish the relationship between risk and return of pension schemes performance within and between the industry
2. Evaluate the relationship between risk adjustment (Sharpe Ratio) and returns of pension schemes
3. Determine the relationship between asset allocation (diversification strategy by Fund Managers and Trustees to manage risk) and returns of pension schemes

1.4 Research Questions

The study seeks to answer the following questions:

1. Does risk management in asset allocation influence pension scheme returns?
2. Is there a relationship between risk and return on pension funds?

1.5 Significance of the Study

First, this study would be of great importance to pensioners who need to be well informed about the investment decisions of their fund managers. This would avert losses that many Kenyan pensioners may suffer because of decisions that were previously based on excitement, rumors and tittle-tattle.

Second, the study would benefit investment professionals including licensed stockbrokers, investment advisers, and investment bankers who will improve decisions in a bid to maximize value for their clients. The investment professionals normally are the fund managers and the people pensioners look upon to be the custodians of their hard earned savings in life on retirement.

Third, the study would benefit regulatory authorities and policy makers such as the Retirement Benefits Authority, Insurance Regulatory Authority, Capital Markets Authority, the Treasury and Central Bank of Kenya in understanding whether the various pension funds on the market influences the perception of riskiness associated with a certain sector and the observed returns.

Finally, the study would be a boost to the body of knowledge and field of scholars dealing with pension funds, securities markets and investment in general in both the developing and developed world for the ever growing list of pensioners. The study will add to the contribution of other scholars who have carried out similar studies to support or oppose theories of investment specifically in pension funds.

1.6 Justification of the Study

This research seeker to investigate the impact of risk on return that fund managers face in their implementation of pension funds investment strategies. First, the research findings can be of importance to the government for policy formulation and implementation of policies relating to pension schemes for retiring civil servants and private workers.

Second, the study would be of significance to educational planners in developing suitable retirement education programs that encourage retirees to take risks and innovatively create new

businesses. Finally, the study would contribute to the knowledge body of scholars and professionals who seek to improve and strengthen the theory and practice of investment and funds allocations specifically in management of pension funds.

1.7 Scope of the Study

The pension funds scope in both public and private sector is wide and dynamic. This research therefore undertook the study of both sectors in a sampled approach. This study therefore uses two largest private pension administrators which are based in Nairobi City of Nairobi County. The pension administrators administer a large number of segregated schemes managed by different fund managers reporting to different trustee boards.

This is due to the need to manage study area in affordable and timely manner. The sampled groups of pension funds were chosen specifically to meet the sample criteria as explained in later chapters for study methodology. Apart from the fund managers NSE, CBK were very useful as well as the RBA in making the study a success in terms of getting the list of registered pension schemes.

1.8 Limitations of the Study

As this study is based on historical data, it is difficult to make a conclusion from the findings which might be usable to the future. The fact that data has been fully used and archived means that policy makers and academicians will always use projections in making any decisions for the future. The nature of work at most pensions funds managers implies use of partial interviews in which the managers are interviewed and left with the interview guide to help them give more in-depth information. However, that means the information given could be subject to manipulation by the managers and hence much bias.

Finally, most fund managers in the pension sector always have the code of secrecy at the back of their mind since they are keeping critical client funds. It is therefore most likely that while carrying out any exercise that does involve the real pensioner some information might have to be withheld for fear of the unknown.

CHAPTER TWO

LITERATURE REVIEW

2.1 Portfolio Theory

A portfolio is a collection of securities. As most securities available for investments have indeterminate returns and thus risky, one needs to establish which portfolio to own. This problem has been referred to as the portfolio selection problem. In an attempt to solve this problem, Markowitz (1952) published a landmark paper that is generally viewed as the origin of modern portfolio theory approach to investing.

Markowitz asserts investors should base their portfolio decisions solely on expected returns and standard deviations. Investors should estimate the expected return and standard deviation of each portfolio and then choose the best one on the basis of these two parameters. Expected return can be viewed as a measure of potential reward associated with any portfolio over the holding period and standard deviation can be viewed as a measure of the risk associated with the portfolio. This theory is relevant to the study at hand as it is most likely the basis of fund managers using to allocate investment decisions.

2.2 Arbitrage Pricing Theory

Arbitrage Pricing Model (APT) is an equilibrium pricing model. APT was developed by Ross (1976). In APT, Ross does not assume risk- aversion or reliance on the mean- variance rule. Rather, APT explains the relationship between expected return and risk as arising because there are no arbitrage opportunities in security markets. It is based on the law of one price i.e. two items that are the same cannot sale at different prices.

Arbitrage is a strategy that makes positive return without requiring an initial investment. For example, opportunities for arbitrage arise from differences in an asset's price when this asset is traded on two or more markets. A profit with zero investment is made by buying the asset at the low price and simultaneously selling the asset at the high price. All investors would prefer such a strategy irrespective of their risk attitude (risk averse, risk-neutral or risk seeker). If investors can find a strategy that earns a positive return with a zero net initial investment, then all investors will investors will follow this strategy. As a result, the price of assets will change until, in equilibrium, the positive return drops to zero and the arbitrage opportunity vanishes from the market. The APT is the risk-return relationship that applies in the equilibrium situation with no arbitrage opportunities.

In the capital markets, arbitrage could be exercised in short-selling of risky securities, where investors can sale shares they do not own. The investor borrows the shares from a broker and then sells the shares in the market to receive the proceeds from the sale. At some future date, the investor must buy the stocks in the market to replace the shares borrowed. When arbitrage opportunities are available, the economy is not in equilibrium. This theory is also very relevant in the study of risk return as it is a guide used by fund managers to assess the market strengths of their shares invested on the market.

2.3 Developed Market Studies

Several studies have been carried out on the significance of assets allocation on performance. Ibbotson and Kaplan (2000) in their study of US retirement benefits funds concluded that the main determinant of the investment performance of a retirement benefits fund is the asset allocation rather than the stock selection. They considered 94 balanced mutual funds and the quarterly returns for 10 years and also 58 retirement benefits funds for 5 years. Policy

weights were used to calculate the policy returns for both the pensions and mutual funds. Data was analyzed to determine the returns behavior over time, across funds and what level of returns was explained by assets allocation. Over time, specific policies explain less than half of the remaining time series variation of funds returns. Asset allocation explained about 40% of the variations of returns among funds. The method of data analysis used was of regression analysis and also ration analysis. This study can use a similar method.

Brinson *et al* (1986) in their study of US corporate pension plans concluded that investment policy explained 93.6% of the total variation of the actual returns of the funds. In their study, 91 retirement benefits funds were sampled over a period of 10 years. The funds selected had a discretionary mandate with the investment managers. The assets classes considered were the equities and bond portfolios and cash equivalent portfolios. The fund returns were decomposed to the selection and timing reasons. Regression of the policy returns against actual returns was done and the level of correlation determined. This same method can be well replicated in this study.

Dimson *et al* (2002) and earlier on Cornell (1999) observed that considerable amount of evidence exists in competitive capital markets that additional risk is compensated by additional expected returns (e.g. the equity risk premium). This means that in both the long and the short run, there is a linear trade-off between risk and return, as in the capital assets pricing model, CAPM (Sharpe, 1964). It also means that equities are not relatively more attractive for long term investors. There is empirical evidence that equities are not a good hedge for pension scheme liabilities, and so there is no particular hedging advantage in equities over other forms of investment (Sutcliffe, 2004). In this particular case for example, the UK private pension funds

had a deficit of £160 billion in July 2003. The reason for this deficit was because over the period January 2000 to March 2003, the FTSE All Share index fell to less than half its initial value.

The UK cult of the equity meant that pension scheme losses from this stock market fall were much larger than would otherwise have been the case. The equity losses were an important factor in pension schemes reporting large deficits, closing to new members and increasing their contribution rates. In these circumstances, the asset allocation decision depends on the risk-return preferences of the trustees, in consultation with the employer. A high equity proportion leads to a high risk, high expected return outcome; while a low equity proportion gives a low risk, low expected return outcome. In the absence of taxation, risk sharing and default insurance, the asset allocation is based on the risk-return preferences of the employer and employees; and so varies between schemes, probably in an unpredictable manner. This conclusion means that where they apply, the asset allocation should be determined primarily by taxation, risk sharing and default insurance.

David *et al* (1999) observed that there are little cross-sectional variations in average ex-post returns to strategic asset allocation, market timing and security selection. Long-run asset allocations, however modeled, account for the bulk of the time series variation in returns. Their study was based on 306 retirement benefits funds over a period of 8 years with the sampled funds having a single investment manager over the period with monthly pension returns available for 8 assets classes. Value weighted benchmark returns were computed for each fund. The recorded funds had to be decomposed to both the active and passive returns. From the data analysis which involved regression of the benchmark returns against the actual returns, it revealed that UK retirement benefits funds earned negative returns from active portfolio management. The analysis also indicated that 96% of the variation of returns is explained by

strategic assets allocation. Cross-sectional variation of returns of about 0.32% is explained by the security selections. Besides the assets allocation factor, chief among other qualitative factors influencing the UK pension performance is the legal and economic environments. The pension industry is dominated by five large pension managers who use their reputation to acquire more clients and retain old ones other than changing their fees.

2.4 Investment Management Process

According to Sharpe (1999), the investment decision-making follows a five step procedure. These include the setting of investment policy, performing securities analysis, construction of a portfolio, revision of a portfolio and evaluating the performance of the portfolio.

2.4.1 Setting of the investment policy and its construction

An investment manager in charge of a scheme must be concerned with the clients return preferences. Different schemes have different objectives such as capital preservation, growth of the scheme and maximizing returns. These objectives are reflected in the trustee's attitude towards risk and expected return. The trustees of a scheme have to establish their schemes' risk tolerance in line with the schemes objectives.

Managers of schemes may adopt a passive or active management style of the scheme. Passive management involves holding the assets for relatively long period with the assumption that securities markets are relatively efficient. The optimal mixture of the assets changes only when client preference change, benchmarks change or there is consensus about risk and return (Sharpe, 1999).

According to the scholar, securities selection involves the detailed forecasting of the expected returns, standard deviation and the covariance for all the individual securities under

consideration and then establishing the efficient set from which identical portfolio is identified. At this point, the schemes funds are further separated to assets class portfolios, the very process called asset allocation.

2.4.2 Portfolio Revision

Previously purchased assets with time are reviewed to check whether they are optimal and this means that individual securities are scrutinized since there are changes in market prices, changes in trustees' attitude towards risks and return and also the fund manager's forecasts for returns. Managers will in response review the portfolio and select new securities change the weights to ensure that an optimal portfolio is maintained (Sharpe, 1999).

Wandera (2012) in his studies for investments showed that equities have returns of 12.6% up from 10.7% in the previous period with offshore investments as the worst performing asset category with returns of 0.9%. This has the implication that the preferred asset classes are long term. Highest attraction is mostly in equities and property since their return grows with time and at a rate that mirrors inflation in the long term. According to Wandera (2012), the bulk of most investments by fund managers biased towards these two asset classes in addition to government securities, especially five to tenyear government bonds, which are also a good avenue. For most fund managers, the plan is always to make investments that beat inflation.

2.4.3 Retirement Benefits Schemes Performance Evaluation

In performance evaluation, one needs to determine whether superior returns are due to luck of due to the actions of the highly skilled fund manager. Traditionally, the returns of a portfolio are computed on a monthly basis and reported to trustees on quarterly intervals. The returns could either be money weighted or time weighted returns. The returns of a portfolio are measured relative to the portfolio risk as measured by the standard deviation of the portfolio.

The essence of performance evaluation is to compare an actively managed scheme returns against the returns of an alternative benchmark portfolio. An appropriate benchmark should be relevant and feasible, as well as exhibiting risk similar to that of the actively managed portfolio (Sharpe, 1999).

2.5 Determination of Investment Performance

The main determinants of investment performance of the retirement benefits funds industry can be grouped into three main categories: investment regulations, investment practices, and the ability of the retirement benefits funds managers to diversify their portfolios abroad. In his studies on how investment is carried out on pensions funds, results by Mwangangi (2009) show that generally expected return; the risk-taking capacity; risk level in the desired investment; nature of risk in the global investment markets and investment portfolio desired were the most influential factors that determined investment decisions across all the firms.

Further, Mwangangi found that, the least influential results across the pension schemes were consistency in returns, decision-making preferences of the decision makers, benchmarking with other pension funds, social responsibility issues and the nature of the fund owners. Studies from other regions on investment determinants can be reviewed in detail in the next 3 sections.

2.5.1 Investment Regulations

In most emerging market countries, the regulation of private retirement benefits are based on quantitative investment limits. Regulators in emerging markets consider investment limits to protect pensioners' rights better than regulations based on prudent man rule. This argument can be defended on the basis that the underdevelopment and lack of transparency of local securities markets makes them susceptible to manipulation and excess volatility; and that

the general public, retirement benefits funds board of trustees, and pension managers lack financial sophistication. Investment restrictions aim at ensuring minimum portfolio diversification, diluting ownership concentration limits, and avoiding self-investment in the retirements benefits funds' sponsoring company.

Reasons advance supporting these restrictions include the assumption that retirement benefits fund managers cannot properly manage the currency risk involved in investing abroad. More importantly, in many countries, there is widespread belief among the government and sometimes shared by the public that scarce domestic capital should be invested domestically. For example, most retirement benefits funds in Asia do not invest in foreign securities at all. Whatever approach a country chooses for the management of its retirement benefits fund assets, the rules have to ensure that management (the agent) acts in the best interest of the contributors (the true principal) and does not follow individual interests or political pressure. To secure these prerogatives requires a re-thinking of governance structure, regulation and supervision (Holzmann, 2000).

A study of Latin Americas by Srinivas *et al* (1999) concluded that the return on investments, expected pension replacement rates and the net welfare from pension reforms decreases under the draconian regulatory framework than under liberal retirement benefit funds management regime. Srinivas et al used monthly returns of retirement benefits funds from inception to 1998 and benchmarks from the stock exchange. Risk adjusted pension performance in Chile have suffered because of the increased regulations and underperforming balanced market benchmarks. After the regulations were relaxed in the late 1980s, retirements benefits funds have outperformed the market benchmark. With this liberalization of assets allocation,

both the absolute and the risk adjusted returns were enhanced and outperformed the market benchmark.

There are a number of convincing arguments however against using investment limits as a regulatory tool. Davis (2001) examines the rationale, nature and financial consequences of two alternative approaches to portfolio regulations for the long-term institutional investor sectors of life insurance and retirements benefits funds. The approaches are respectively; prudent person rules and quantitative portfolio restrictions. Among the conclusions are that regulations of life insurance and pensions needed not to be identical. Prudent rules are superior to quantitative restrictions for retirement benefits funds except in certain circumstances. Another argument against use of investment limits is that they are applied asymmetrically to securities issued by the private institutions and those issued by both governmental and quasi-governmental institutions. As a result, retirement benefits funds may be biased to overweight government securities beyond what an optimal asset allocation rule will dictate. Besides investment limits, additional measures aimed at safeguarding pensioners' life savings have been enacted Latin America and Eastern Europe. They include the imposition of minimum required returns and the obligation of fund managers to disclose the market value for all assets and portfolio returns. Affiliates are also allowed to switch funds easily to better than average past returns schemes (Chan-Lau, 2004).

The QAR set in Kenya have outlived their use as concluded by Makau (2008). First, the schemes are not binding with many prudent managers and only a few schemes are restricted by the guidelines primarily offshore and property investments. Second, the industry is now well regulated and orderly with RBA having restored sanity and orderliness thus curtailing past abuses. Third, appointment of managers is mandatory with stringent investigation and assessment of a fund manager before acceptance into that position. Finally, Makau notes that

capital market are developing rapidly and that new products allow managers to hedge against different risks available with variety of instruments with continued lengthening of yield curves. This offers members a choice of various investments by offering different alternatives reflecting different risk appetite.

2.5.2 Investment Practices

In contrast to retirement benefits funds in mature markets, retirements benefits funds in emerging markets make their decisions on asset allocation and equity selection internally without the help of external consultants. Furthermore, in retirement benefits funds managed by private financial institutions, there are strict "Chinese walls" between retirement benefits fund managers and other asset managers in the institution (Chan-Lau, 2004).

Assets can be divided into two groups; strategic assets allocation (SAA) and tactical assets allocation (TAA). The SAA refer to neutral asset allocation that aims to achieve the investor's long-term objectives based on long-term risk and return outlook for the asset classes. The TAA on the other hand aims to take advantage of perceived inefficiencies in asset pricing in the short term. The decision rule that defines how TAA is implemented could be different for each investor. The investor must then decide on how to rebalance the portfolio in response to market fluctuations that move the asset allocation of the portfolio away from the SAA. The explicit rules are the "strategies" for doing so which includes buy-and-hold, constant mix and active tactical strategies (Perold *et al*, 1988).

The SAA is a method that establishes and adheres to what is a 'base policy mix'. This is a proportional combination of assets based on expected rates of return for each asset class. For example if stocks have historically returned 10% per year and bonds have returned 5% per year, a mix of 50% stocks and 50% bonds would be expected to return 7.5% per year. If one asset

were declining in value, you would purchase more of that asset and if that asset value should increase, you would sell it. There are no hard and fast rules for timing of portfolio rebalancing under strategic or constant-weighting asset allocation. However, a common rule of thumb is that the portfolio should be rebalanced to its original mix when any given asset class moves more than 5% from its original value.

The TAA can be described as a moderately active strategy, since the overall strategic asset mix is returned to when desired short term profits are achieved. These demands for discipline since the manager must be able to recognize when short-term opportunities have run their course. This then enables manager to rebalance the portfolio to their long-term asset position. In their study of asset allocation explaining percentage of performance, Ibbotson and Kaplan (2000) examined 10 year return of 94 balanced US balanced mutual funds versus the corresponding indexed returns. The asset classes included were large-cap US stock, small-cap US stock, non-US stock, US bonds and cash. They found that the linear correlation between monthly index return series and the actual monthly return series was measured at 90.2%, with shared variance of 81.4%. In conclusion, they observed that asset allocation explained 40% of the variation of returns across funds, and that it explained virtually 100% of the level of funds returns.

It should be however be noted that increased asset allocation to equities has mainly been guided by efficiency and diversification considerations. Whether an investor chooses a precise asset allocation strategy or a combination of different strategies depends on that investor's goals, age, market expectations and risk tolerance (Holzman et al, 2000).

2.5.3 Foreign Investment

Limitations on the supply of local market instruments, and their negative impact on retirement benefit fund's portfolio diversification necessitate the need to raise foreign investment channels. Roldos (2009) suggested that increased investment in foreign securities can be achieved through global diversified fixed income and equity mutual funds. Roldos concludes that diversification benefits arise by internationally using asset swaps without hurting the development of the local capital markets.

National authorities however may be reluctant to promote foreign investment due to concerns about risk management skills in the local management skills pool. They may also be interested in keeping scarce local capital invested domestically without any foreign intervention as practiced in Asia countries. The low asset allocation to foreign equities may also be explained by disastrous portfolio performances in many Eastern Europe markets leading to skepticism (Ciampi, 2000; Holzmann, 2006).

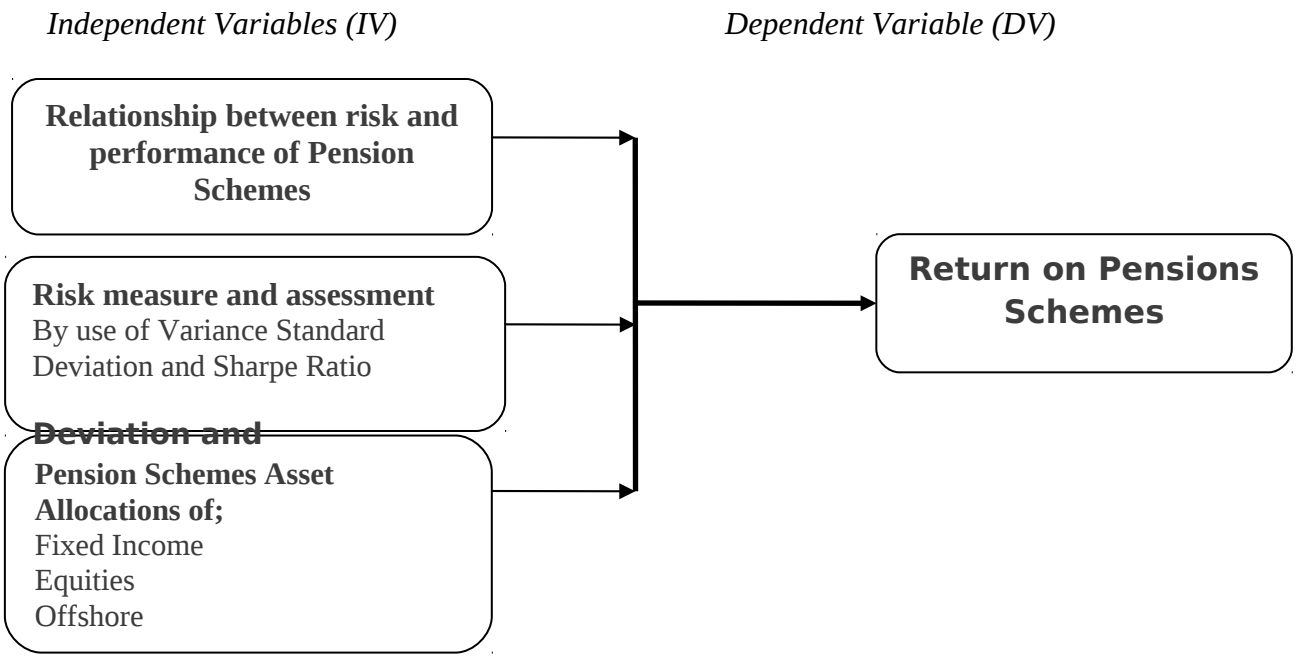
2.6 Conceptualization

A conceptual framework is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Kothari, 2008). When clearly articulated, a conceptual framework has potential usefulness as a tool to scaffold research and, therefore, to assist a study to make meaning of subsequent findings (Sekaran, 2009).

Such a framework should be intended as a starting point for reflection about the research and its context. The framework is a research tool intended to assist a study to develop awareness and understanding of the situation under scrutiny and to communicate this. In this study the independent variables are risk management though asset allocation and risk. The dependent variable is returns on pension funds.

FIGURE 2

Conceptual Framework



Source: Author (2014)

2.7 Definition and Measurement of Variables

The above figure shows the independent and independent variables. The relationship between risk and performance of pension schemes is essential in this study. The other two variables are risk measures and asset allocations or diversification into fixed income, equities and offshore asset classes.

Sharpe Ratio which measures risk is used as a risk ratio and in collaboration with standard deviation and variance. It is calculated by using standard deviation (SD) and excess return ($R-R_{fR}$) to determine reward per unit of risk;

$S_i = \frac{R-R_{fR}}{SD}$

Where:

R = Mean return

R_{fR} = Risk free return

SD = Standard Deviation

The Sharpe ratio makes inherent assumptions which stalk from the capital asset pricing model (CAPM) (Treynor, 1962; Sharpe, 1964; Lintner, 1965; Mossin, 1966): it assumes either - 1) normally distributed returns or - 2) mean-variance preferences.

Both assumptions are uncertain:

i. The returns generated by most hedge funds display negative skewness (Kat and Lu 2002)
ii. In addition to the mean and variance, people also care about skewness (they like it positive) and kurtosis (they don't like it), and higher instants matter too (Scott and Horvath 1980)

Variance is a term used to measure the degree of risk in an investment. Variance is calculated by finding the average of the squared deviations from the mean rate of return;

$(s^2) = \Sigma [(x_i - \bar{x})^2]/n - 1$……Equation (i)

Where:

s^2 = Variance

Σ = Sum of every term in the equation

x_i = Sample observation

$\bar{x}$ = The mean. This represents the average of all the returns

n = The sample size, which is 45 in this study

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods that were used in collection of data germane in answering the research questions. It is thus divided into; research design, study population, sample design, data collection, data analysis methods, ethical issues and expected output. This chapter explained how the study was carried out and what the researched does to obtain the desired results and gives a detailed explanation of how the study was implemented.

3.2 Research Design

An analytical study of the assets allocation of retirement benefits funds in Kenya and returns there on is carried out. The study then provides an investigation of the performance of multi-asset class portfolios in order to determine the effect of allocation of the performance of retirement benefits funds in Kenya.

Since the study utilized secondary data, an empirical study design is be used. Sekaran (2009) recommended the use of empirical study design if and when the data being collected had a total historical implication and cannot be changed at the time of field study.

3.3 Study Population

The target population of this study consists of the 82 segregated Pension Schemes based in Nairobi County, have been operational in the last 5 years, are above Kes. 100 million in size and have invested in all the three asset classes of fixed income, equities and offshore. The main reason for this choice was that those funds in Nairobi are most likely to exhibit all or most of the management skills and risk return processes that this study seeks to explore. Data was collected from two largest Pension Fund Administrators headquartered in Nairobi and RBA using a data

capture tool. The two largest Pension Fund Administrators control more than 60% of the segregated pension schemes in Nairobi (this is per RBA data of 2013).

Kothari (2004) defines populations a larger collection of all subjects from where a sample is drawn. It refers to an entire group of individuals, events or objects having common observable characteristics (Mugenda&Mugenda, 2003). The scholars observe that a population is the total collection of elements about which one wants to make inferences. A similar view is expressed by Kothari (2004) when he defines a population as the researcher's universe.

Kothari states that the target population for study is the entire set of units for which the study data are to be used to make inferences. Thus the target population defines those units for which the findings of the study are meant to generalize.

3.4 Sample Size

Stratified random sampling was used as it allows generalizability to a larger population with statistically determinable margin of error and allows use of inferential statistics (Mugenda&Mugenda 2003) hence regarded as a powerful technique.

For the purpose of this study, proportionate stratification was used and 30% of the Nairobi County population was used. The sample size was45 (being 55% of the 82 target population). This sample involved clustering into sizes with the actual number to be determined depending on the satisfaction of the following inclusion criteria set as follows:

- Must have been in existence for at least 5 years
- Has invested in local equities, offshore investment, fixed income and cash
- Had a consistent manager to ensure that consistency in asset allocation
- Was worth KSh.100 million to ensure sufficient returns for computational needs
- Should have asset allocation results

3.4.1 Sampling Technique

The sample involved a period long enough to cover at least more than the average duration of an investment management contract which in Kenya is commonly three years thus providing fair assessment of the importance of strategic asset allocation to portfolio performance. The sample was developed using proportionate sampling strategy. With proportionate stratification, the sample size of each stratum is proportionate to the population size of the stratum. This meant that each stratum has the same sampling fraction (Kothari, 2004).

Systematic random sampling was used; there exists a list of 82segregated pension schemes registered by RBA within the Nairobi County

1st: 1 to 9 - picked at random

Step = Population =82=5

Sample Size 45

1st	2nd	3rd
8	8 + 5	13+5

3.5 Data Collection

Secondary data on monthly returns and assets allocation was obtained from two Pension Fund Administrators in Nairobi and RBA. This is reliable since all registered schemes must submit the data to RBA as a compliance measure. The data collected has individual asset class weighting, individual asset class returns and overall portfolio returns for all reporting quarters of the review period.

The currency is Kenya shillings and empirical data used a data capture sheet in appendix 1 is the main instrument of data collection. This was explained in the introduction letter to help respondents

3.6 Data Analysis and Techniques

The data is collected is summarized in tables in order to determine the returns variability over time, the monthly returns are regressed against the corresponding asset allocation returns and the coefficient of determination computed (R^2). In order to evaluate the variation among funds, a cross-sectional regression of compound and annual returns over the entire period carried out and the R^2 statistic explained by the return difference which in turn is explained by assets allocation, the main concern of the study.

The analysis of the data includes the calculation of benchmark returns for the period under study. Similarly, returns were analyzed to determine the return effects of policy and active management for each of the funds and their mean annualized compound rates of return for the sampled schemes over the period. Finally, regression of the total compound annual rate of return of each fund on the compound annual policy returns and R^2 value was be computed. All the report results were then produced through descriptive statistics in tables showing percentages, ratios and regression analysis. Excel 2010 tool was used.

The following regression model was used to indicate and calculate the relationship between the dependent variable and the independent variables:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$ **.....Equation (ii)**

Where:

Y is the dependent variable which is the return of pension funds

β_0 is the constant term

β_i is the coefficient of the independent variable X_i representing policy weights

X_1 is independent variable showing various returns on fixed income asset classes in period *i*

X_2 is independent variable showing various returns on equities asset classes in period *i*

X_3 is independent variable showing various returns on offshore asset classes in period *i*

e is the error term (which explains any noise or interference in data or sample)

Descriptive statistics of Mean, Median, Minimum, Maximum, Variance and Standard Deviation are used.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRATATIONS

4.0 Introduction

This section deals with the study findings from the field of study in which the investments of retirement benefit schemes were assessed to determine the way they are affected by risk. Of particular concern was the investment policy stating asset allocations and total returns on the investment as viewed when risk is considered in the retirement benefit schemes. The study objectives are determined and a regression carried out to establish a link between the two variables in order to obtain results for the main objective of the study. Figures and tables are used to present data. The chapter provides major findings and results of case study and discusses the findings and results against the literature reviews.

4.1 Study Response Rate

The study targeted a total of82segregated Pension Schemes based in the County of Nairobi. However only 45pension schemes' returns were received.The study response rate was 55% indicating an adequate response rate. According to Mugenda and Mugenda (1999) a response rate of 50% is adequate for statistical analysis purpose; a rate of 60% is good and a response rate of 70% and over is excellent.45 data capture sheets were used to collect the data from the two Fund Administrators – Alexander Forbes Financial Services and AON Minet Insurance Brokers.

4.2 Analysis of the industry – 45 Pension Schemes

Risk return and asset allocation analysis:

TABLE 1

Fixed Income Asset Allocation Analysis

	Fixed Income Asset Class
Median return	0.98%
Mean return	1.02%
Maximum return	8.93%
Minimum return	-7.18%
Variance	0.08%
Standard Deviation	9.67%
Asset Allocation	53.32%
Sharpe Ratio	15.50%
Observations	45

The study sought to analyze the mean, maximum and minimum returns and as well the variance, standard deviation and Sharpe Ration of the 45 pension scheme returns; fixed income allocation with the asset allocation of 53.32%. Fixed income asset class has a low variance of 0.08% and medium standard deviation of 9.67% implying that the fixed income asset class returns are not far from the mean and each other hence less risky.

TABLE 2

Equities Asset Allocation Analysis

	Equities Asset Class
Median return	2.55%
Mean return	1.64%
Maximum return	16.90%
Minimum return	-21.29%
Variance	0.38%
Standard Deviation	21.45%
Asset Allocation	35.89%
Sharpe Ratio	7.50%
Observations	45

The study sought to analyze the mean, maximum and minimum returns and as well the variance, standard deviation and Sharpe Ration of the 45 pension scheme returns; equities allocation with the asset allocation of 35.89%. Equities asset class has the highest variance of 0.38% and medium standard deviation of 21.29% implying that the equities asset class returns are far from the mean and each other hence the most risky asset class. This can also be explained by the oscillations in the NSE 20 Share Index.

TABLE 3

Offshore Asset Allocation Analysis

	Offshore Asset Class
Median return	1.42%
Mean return	1.39%
Maximum return	8.80%
Minimum return	-6.46%
Variance	0.12%
Standard Deviation	11.89%
Asset Allocation	10.79%
Sharpe Ratio	11.20%
Observations	45

The study sought to analyze the mean, maximum and minimum returns and as well the variance, standard deviation and Sharpe Ratio of the 45 pension scheme returns; equities allocation with the asset allocation of 10.79%. Offshore asset class has a medium variance of 0.12% and medium standard deviation of 11.89% implying that the offshore asset class returns are not deviating much from the mean and each other therefore has a medium risk.

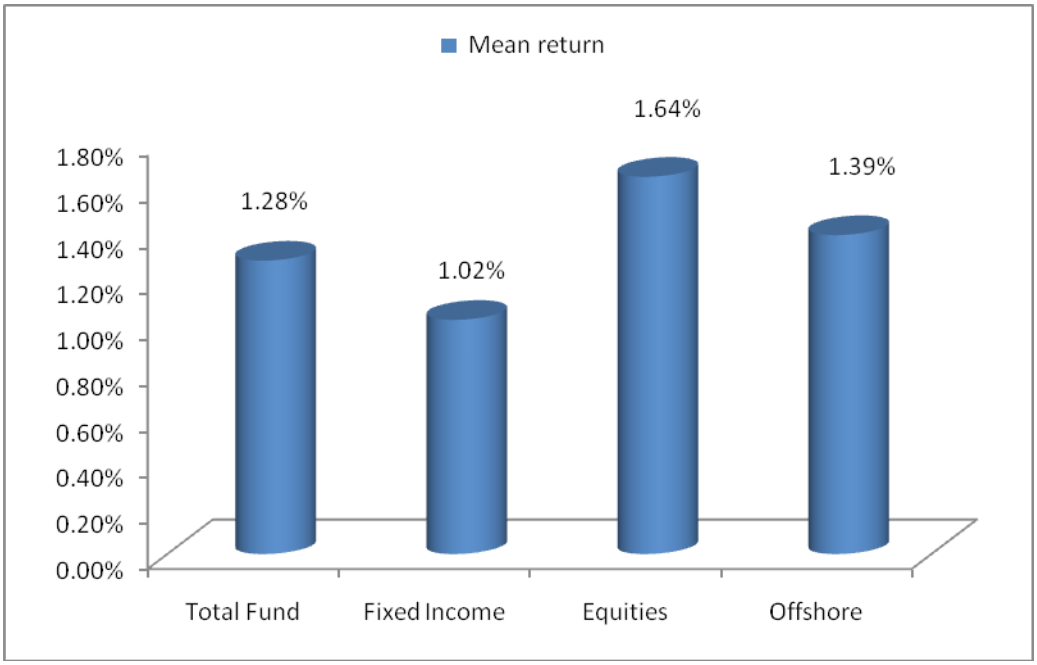
TABLE 4

Summary Returns and Asset Class Allocation

	Total Fund	**Fixed Income**	**Equities**	**Offshore**
Median	1.39%	0.98%	2.55%	1.42%
Mean	**1.28%**	**1.02%**	**1.64%**	**1.39%**
Maximum	7.28%	8.93%	16.90%	8.80%
Minimum	-5.84%	-7.18%	-21.29%	-6.46%
Variance	0.06%	0.08%	0.38%	0.12%
Standard Deviation	8.73%	9.67%	21.45%	11.89%
Asset Allocation	**100.00%**	**53.32%**	**35.89%**	**10.79%**
Sharpe Ratio	6.0%	15.5%	7.5%	11.2%

FIGURE 3

Mean Returns of the Pension Schemes



Total fund mean return is a weighted average of the three asset classes;

i.e. $(r_1*w_1)+(r_2*w_2)*(r_3*w_3)$…….**Equation (iii)**

Where:

w_1, w_2, and w_3 = Asset class weights

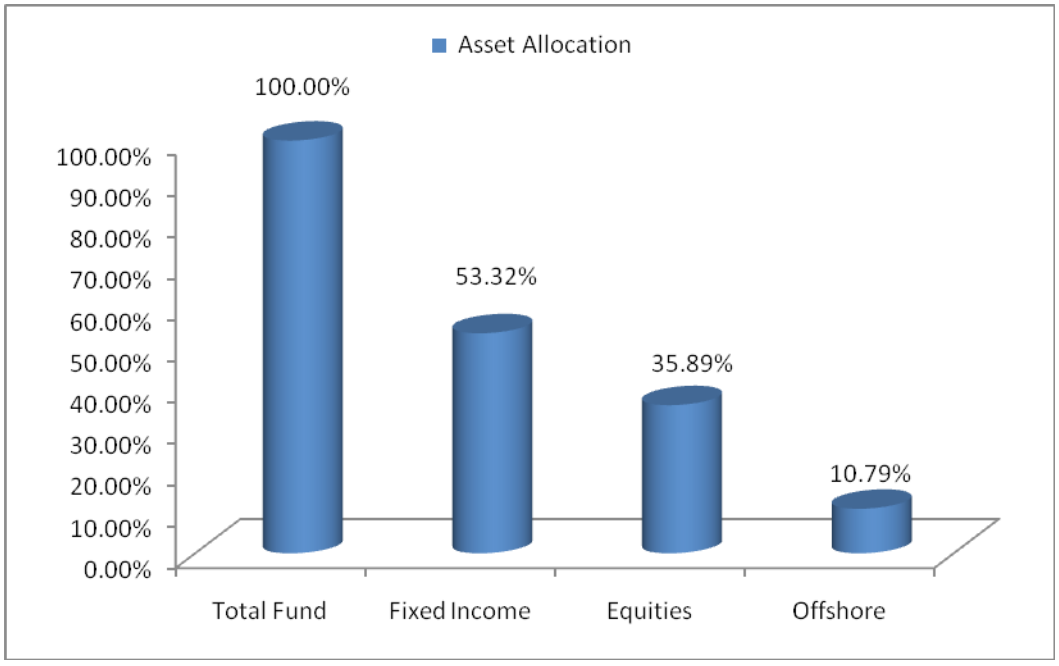
r_1, r2, and r_3 = Asset class returns in period **t**

The highest return of 1.64% is in equities asset category whereas Sharpe Ratio indicates that they are the riskiest with 7.5% (the lowest Sharpe Ratio value) and that is in the normal direction of risk-return-relationship. The Sharpe Ration value for fixed income is the highest at 15.5% meaning they are the safest assets which again are in agreement with the general view of the market.

Based on the analysis of the 45 pension schemes, the higher the risk the higher the return, equities asset allocation is the most risky followed by offshore. This confirms with the normal risk return theories.

FIGURE 4

Asset Allocation of the Pension Schemes



Most of the assets are in fixed income category which happens to have the lowest return. The second category in asset allocation is equities which also has the second highest return. The fixed income allocation is the highest due the safety factors and the offshore asset allocation category is lowest due to uncertainty factors.

4.3 Framework for Risk Management in Asset Allocation

The data consisted of the total return of each of the 45 schemes that responded from the field survey. The data collected was presented in tables as per the data capture summary sheet in the appendix. Policy return is the part of the total return based on the results of the assets allocation policy stipulated by the Scheme Trustees. Active return is the remainder which depends on both the manager's ability to overweight and underweight in each asset classes.

TABLE 5

Asset Allocation

	Total Fund	**Fixed Income**	**Equities**	**Offshore**
Asset Allocation	100.00%	53.32%	35.89%	10.79%

The framework is explained by the following:

$TR_{i,t} = w1_i r1_t + w2_i r2_t + \ldots\ldots\ldots wA_i Rk_t$ ..... **Equation (iv)**

Where:

$w1_i, w2_i \ldots\ldots wk_i$ = Investment Policy Weights

$r1_t, \ldots\ldots Rk_t$ = Asset Class Portfolio Returns in period **t**

Given the total returns to the schemes and the estimated policy returns, we solved for the schemes active returns.

4.4 Asset Allocation and Returns

Asset allocation has been used by Fund Managers to mage risk. To determine how asset allocation affected differences in returns, it was necessary to derive the variation over time of the returns of the different funds. This was in order to determine how much risk was involved in policy returns variations. Data on each of the funds actual return and the policy return was used over the entire period of the study from 2009 to 2013. The impact of the variation over time was determined by regression of the total fund returns against its policy returns and reporting on the R^2 value for each of the fund in the study. This was followed by examining the mean and median. A lower R^2 shows that the fund manager involved practices an active tactical approach to managing of funds.

Results from the analysis are represented in table 4.2. The result of the median pension fund was 1.39% and the mean was slightly lower at 1.28%. This shows that the 1.28% of the variability over a pension fund is explained by the policy allocation risk. The closeness of the mean and median shows that fund managers for the schemes under analysis adopts a cautious approach with risk in mind to management of the pension schemes. The approach is adopted because of the quantitative assets restrictions (QAR) placed by the RBA and also adopted by the trustees in their investment policies.

4.5 Risk on Returns of Pension Schemes

The second variable of the study was concerned with assessing the relationship of risk on returns of pension schemes. To establish the relationship, it was necessary to get the cross-sectional analysis in order to establish risks across one another. This was done by finding out the cross sectional regression of the compound annual total returns, TR_i for the entire period 2009 to 2013, on the compound annual policy returns PR_i as shown in the analysis in Table 4.3. The R^2

value represents the goodness of fit for the correlation coefficient which summarizes the way one variable explains another variable in a given model.

Results in Table 4.3 indicate that multiple R^2 statistic of regression for the pension fund sample was 42.7%. This therefore means that42.7% of the return is explained by total risk which is a combination of other factors such as asset allocation, security selection, market timing and individual manager calculation of returns methodology. The cross sectional R^2 depended on how much the funds engaged in active management. The difference of 57.3% can be was explained by the policy differences and other factors not covered in this study.

The standard deviation as shown in Table 4.3 is an indication that risk is a continuous yet unavoidable factor to be considered by the fund managers and if possible always calculated within all asset classes. Scholars who support this view include Brinson (1986) and Ibbotson (2000). Locally, Muriuki (2006) and Nkonge (2010) established that risk was a key factor for consideration in the calculation and allocation of pension scheme management.

Similarly, using Sharpe Ratio which is used to measure and compare the level of risk in a portfolio for our study a Pension Fund. The lower the Sharpe ratio, the better a portfolio has performed relative to the risk taken. In the survey the 6% indicates that Fund Managers take medium risk in their investment decisions. In other words Fund Managers place their investments based on the policy restrictions and most investments are invested in fixed income securities followed by equities and then offshore investments.

TABLE 6

Standard Deviation, R Statistic and Sharp Ratio

Regressed Type (2009-2013)	**Actual values**
R	42.7%

R Square	18.2%
Adjusted R Square	18.1%
Standard Deviation	7.6%
Sharpe Ratio	6.0%
Observations	45

4.6 Variable Explanations

To determine the percentage of the return explained by the policy return by each of the fund, the ratio of the compound annual policy return, PRi divided by the compound annual total return TRi was computed. The results indicate that policy accounted for a little more than the total return of pension fund. An adjustment for the total expenses resulted to percentage closer to 100%. This shows that on average, pension funds are not adding value above their policy benchmark because of the combination of policy decisions making and the associated risks. The result is in justification of what Sharpe (1991) had envisaged when he pointed out that after aggregation of all the investors, the performance before costs must be equal to the performance of the market. The significance of F statistic which is positive and large is used to indicate the closeness of the established variables. The closer the value of F-significance is to zero and away from the p-value (0.05), the more significant the results of R^2 are in explaining the variations in a correlation.

4.6 Multiple regression analysis

In this study, a multiple regression analysis was conducted to test the effect of risk on return on pension fund's returns. The researcher applied Excel 2010 to code, enter and compute the measurements of multiple regressions for the study.

TABLE 7

Risk Effects and R Statistic

Regressed Type (2009-2013)	Actual values

R	42.7%
R Square	18.2%
Adjusted R Square	18.1%
Standard error of the estimate	7.9%
Observations	45

R-Square (coefficient of determination) is a commonly used statistic to evaluate model fit. R-Square is 1 minus the ratio of residual variability. The adjusted R2 is the percentage of variance in the dependent explained jointly by the independent variables 18.1% of risk changes could be attributed to the combined effect of the predictor variables.

TABLE 8

Testing for ANOVA Significance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.491	4	0.307	5.191[a]	0.012[b]
	Residual	7.723	41	0.059		
	Total	11.214	45			

a. *Predictors*: returns of; fixed income, equities and offshore asset classes

b. *Dependent Variable*: Return of pension funds

From the table above it shows that the variables used in the study are significant, the probability value of 0.012 which is less than 0.05 suggesting that the dependent variables combined well explain the variations in the dependent variable.

TABLE 9

Regression Analysis Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.01	0.0052		1.7	0

Fixed Income asset class returns	0.8	0.652	0.791	2.93	0
Equities asset class returns	0.32	0.201	0.304	2.8	0.1
Offshore asset class returns	0.2	0.088	0.109	1.9	0

Predictors: (Constant**)** Fixed Income asset class returns, Equities asset class returns and offshore asset class returns

Dependent: Total return of pension funds

$Y = 0.007 + 0.801X_1 + 0.317X_2 + 0.196X_3$ ..... **Equation (v)**

The values, 0.801, 0.317 and 0.719 were the un-standardized coefficients and indicate the extent to which asset class diversification (risk) influences returns of pension funds.

The first variable constant of 0.007 represented the constant which predicted performance or returns of pension funds holding the management of risk through diversification to fixed income, equities and offshore asset classes.

A change in fixed income asset allocation would influence the return of pension schemes by a factor of 0.801 with P value of 0.03 while an adjustment in equities asset allocation would affect returns of pension funds by a factor of 0.317 with P value of 0.05 and finally any variation in offshore asset class would change returns of pension funds by a factor of 0.196 with P value of 0.03. This notwithstanding, all the variables were significant since the P values were less than 0.05

4.7 Chapter Summary

The first objective has indicated that the higher the risk the higher the return. The second objective indicated two main results namely; most of the allocation is in fixed assets and least in offshore; and that most of the return came from equity asset allocation and fixed income asset allocation had the lowest returns. The third objective indicated that fixed income assets had the

highest Sharpe Ratio value indicating that they are the safest assets and equity assets had the lowest Sharpe Ratio value indicating that they are the riskiest

In this chapter, findings of the study were fully presented and justification to various other scholars who have had similar studies was incorporated. The study variables were individually highlighted and their relationship established in order to establish fully the main objective of the study. This led to the preparation of the next chapter of study conclusion, recommendations and suggestions on further studies.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presented the discussion of key data findings, conclusion drawn from the findings highlighted and recommendation made there-to. The conclusions and recommendations drawn were focused on addressing the purpose of this study which was to analyze the effect of risk on return of pension schemes in Nairobi County from the analysis and data collected, the following discussions, conclusions and recommendations were made.

5.2 Conclusions

The study objective was to establish the effect of risk on return on pension schemes or funds in Nairobi County with a use of historical data for the period 2009-2013 which constituted 60 months. Accordingly, the study viewed risk-returns in terms of the ratios and returns as per the sectors in investments for pension funds in 45 schemes in Nairobi Kenya. The initial analysis showed that there is a link between the asset allocation and risk factor at all the schemes with a high mean of 1.28%. However, the difference in returns for the various schemes seems to be insignificant. This implies that the assumed risks by policy makers might not have existed, but to be sure of the relationship between risk return and decision making, the regression results were clearly indicative that the variables can be linked.

With the above findings, investment decisions should be based on the best estimates of risk as it remains a factor in the calculation of returns. It is therefore prudent to have the Sharpe ratios fully incorporated in place when making investment decisions. The various schemes use benchmarks provided by NSE as well as Central Bank to estimate their risks.

From the summary above, it has been shown that there is a positive relationship between risk and return. That is;

i. the higher the risk the higher the return

ii. the fixed income assets having the lowest return but at the same time being the most allocated assets indicate that there is an inverse relationship

iii. the fixed income assets are the safest, followed by the offshore and lastly by equities and the return however is highest for equity, followed by offshore and lastly by fixed income assets.

It can then be concluded that the riskier the assets the higher the return.

5.3 Recommendations

Policy makers such as the RBA, CMA, Central Bank of Kenya and the Ministry of Finance should review the impact of risk assessment on market development. This is important since the Kenyan economy is growing and matters to do with financial management are imperative in economic growth. The proper establishment of what risks exists on the market become very critical as the economy grows hence the need to carefully consider the risk-assessment in pension funds.

5.4 Suggestions for Further Studies

There is need to have a further study in the pensions sector to establish the relationships among the various schemes or funds using another measurement of variables apart from risk-return. Another area of recommended study is the use of multiple factors instead of using singular variable measures in this a suggestion is given for use of fund human resource management factors where training background and best practices could support the study.

5.5 Chapter and Study Summary

The study sought to establish the effect of risk on return on pension schemes or funds in Nairobi County. Previous chapters highlighted sections on problem statement, literature review, methodology and the various analysis procedures applied in the study to achieve the objective. This culminated into a summary of conclusions, recommendations and suggestions of further study to bring this particular study to an end.

REFERENCES

Agolla, W. (2012).*Challenges facing strategic plans implementation at Pensions Department, Ministry of Finance, Kenya*. Unpublished MBA thesis, University of Nairobi

Altman, E. I. (1975), Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy, *Journal of Finance*, Sep, 589-609.

Asher, N. & Newman, D. (2001). Hong Kong and Singapore: Two Approaches to the Provision of Pensions in Asia. *Journal of Pensions Management, vol.7*(2)

Blake, D. & Lehman, B.N. (2001), Asset Allocation Dynamics and Retirement Benefits fund Performance. *Journal of Business, vol 72*, no.4

Brinson, Gary P., L. Randolp Hood, and Gilbert L.Beebower.(1986), Determinants of Portfolio Performance.*Financial analyst Journal, vol42*, no.4 (July/August): 39-44

Bryne& Winter (2009).Living with Longevity.*Pensions: An International Journal, vol 14* (2), p 115-127

Bodie, Z., and Merton, R.C. (2002).International Pensions Swaps.*Journal of Pensions Economic and Finance, vol 1*(2), 77-83

Ciampi, T.V. (2001). Mexico Moves Towards Equity Investment in Pensions Funds. *Journal of Pensions and Investment, vol 29*(1), 14-15

Cousins, R. & Massey, C. (2009).Defined-Benefits Schemes.*Financial Management Journal, vol3* (2), pg 11-19

Danielsson, J & de Vries, C. G. (1997),"Tail Index and Quantile Estimation with very high Frequency Data". *Journal of Empirical Finance, 4*, 23,241258.

Davis, P.E. (2001). Portfolio Regulation of Life Insurance Companies and Pensions Funds

Fama, E.F., Fisher, L., Jensen, M.C., and Ross., (1969), "The Adjustment of Stock Prices to new Information," *International Economic Review10*. 1-21

Frederic S. M. and Stanley G. E. (2008), *Financial Markets and Institutions*, Addison – Wesley publishing company, Third Edition.

Goetzmann, William, *et al.*, 2002. *Sharpening Sharp Ratios*. NBER working paper No. W9116, Yale School of Management, New Haven, CT

Harvey, C.R., Geert B., and Lundland, C. T., (2005), "Liquidity and Expected Returns: Lessons from Emerging Markets,'' (May 26). AFA 2004 *San Diego Meetings; EFA 2003 Annual Conference Paper No*. 690.

Ibbotson, R.G., and Kaplan, P.D. (2000). Does Asset Allocation Policy Explain 40, 90 or 100 percent of Performance? *Financial Analysis Journal, vol 56* (2), 26-33

Jensen, M.C. (1968), "The Performance of Mutual Funds in the Period 1945-1964," *Journal of Finance 23*, pp. 389-416.

Jones, C. P. (2006), *Investment Management, Translated by Dr Reza Tehrani and AsgarNoorbakhsh* – NegahDanesh publication.

Kat, Harry M., and Sa Lu, 2002. *An excursion into the statistical properties of hedge fund returns* Working paper # 0016, Cass Business School, London

Kenya Gazette Suppliment No.67 (1997).*Retirements benefits Act (1997)*. Government Printers, Nairobi

Kenya Gazette Suppliment No.67 (2000).*Retirements benefits Act (1997)*. Government Printers, Nairobi

Kothari C. R. (2003). *Research Methodology: methods and Techniques.*(4th Ed.). New Delhi: VishwaParakashan.

Markowitz, H., (1952), "Portfolio Selection,"*Journal of Finance*, *7*, 77-91

Mitchel, D.S. (2009). *Redisigning Public Sector Pension in Developing Countries*. Pension Research Council Working Paper, 2002-2009, University of Pennsylvania

Mugenda O. M and MugendaA.G (2003).*Reserch Methods: Qualitative and Quantitative Approaches.* Nairobi: Act Press.

Muller, S.A. (2003). Investment Choice in Defined Contribution Plans: The Effects of Retirement Education on Asset Allocation, *Benefits Quarterly*, International Society of Certified Employee Benefit Specialists

Muriuki, J.N. (2006). *Beta, Firm Size, Book -Market Equity & Stock Returns: Evidence from the NSE.* Unpublished MBA Project, University of Nairobi.

Munywoki, S.K. (1998). *An estimation of systematic return risk at the NSE*. Unpublished MBA Project, University of Nairobi.

Mutuku, Z.N. (2008). *Is it time to do away with the investment guidelines*? RBA Newsletter, vol 7(3), 3

Mwangangi, G. (2009) Determinants of pensions funds investment in Kenya. Unpublished MA thesis, University of Nairobi.

Nkonge, T.N. (2010). *Effects of Stock Splits on Security Returns of Firms Listed on the NSE*. Unpublished MBA Project, University of Nairobi.

Ombajo, N. M. (2006). *Share price reaction to Stock Market Segmentation of NSE*. Unpublished MBA project, University of Nairobi.

Robert,C. and Douglas, P.(2005),"Managing Risks and Designing Products for Agricultural Micro-Finance: Features of an Emerging Model," *Agricultural Journal11*(2), 1- 45

Radolf, H. (2005). Determinants of Portfolio Performance – 20 years later. *The financial Journal, vol 61* (2), 6-17

Ross, S.A, Westerfield, R.W., and Jordan, B.D. (2009).*Fundamentals of Corporate Finance* 4th Ed, New York, Irwin McGraw- Hill

Ross, S.A. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*, *12*, 341- 360

Sekaran, U. (2006). *Research Methods for Business: a skill building approach.*(4th Ed.). London: John Wiley & Sons.

Scott, Robert C., and Philip A. Horvath, 1980.On the direction of preference for moments of higher order than the variance.*The Journal of Finance*, 35(4), 915–919.

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium. *Journal of Finance*, 19, 425-442.

Sharpe, W. F. (1966). Mutual fund performance, *Journal of Business*, 39 (1) Part 2, Supplement, 119-138.

Sutcliffe, C.M.S. (2004). *The cult of the Equity for Retirements Benefits Funds: Should it get the Boot?* University of Southampton, Discussion paper in Accounting and Finance

Treynor, J. (1965). How to rate management of investment funds, *Harvard Business Review*, 43 (1), 63-75.

Wandera, S. (2012).*Pensions fund managers and their bets on investment*. Research paper on investments and insurance for the old age, Nairobi, Kenya

Wanyama, R. (2001). *Pension Schemes and Provident Funds Investment Portfolios in Kenya: Implications of Investment Guidelines under RBA Act 1997 and Regulations 2000*. Unpublished MBA thesis, University of Nairobi

Werner, T and Upper, C (2003), *Time Variation in the Tail Behaviour of Bunds Futures Returns*, ECB Working Paper No. 199; Economic Research Centre of the Deutschen Bundesbank Discussion Paper No. 25/02.

APPENDICES

APPENDIX I

Data Capture Sheet

Section A: General Questions

1. Indicate the year Pension Scheme was established…….

2. What is the actual size of the scheme in Ksh.(Millions)…….

3. Indicate asset classes the Scheme is invested in; *fixed income, equities and offshore*

   Yes No

4. Name of Scheme……

Section B: Schemes actual returns in the last 5 years 2009-2013

	ACTUAL ARETURNS			
Month	**Total Fund**	**Fixed Income**	**Quoted Equities**	**Offshore**
31-Jan-09				
28-Feb-09				
31-Mar-09				
30-Apr-09				
31-May-09				
30-Jun-09				
31-Jul-09				
31-Aug-09				
30-Sep-09				
31-Oct-09				
30-Nov-09				
31-Dec-09				
31-Jan-10				
28-Feb-10				
31-Mar-10				
30-Apr-10				
31-May-10				
30-Jun-10				
31-Jul-10				
31-Aug-10				
30-Sep-10				

31-Oct-10				
30-Nov-10				
31-Dec-10				
31-Jan-11				
28-Feb-11				
31-Mar-11				
30-Apr-11				
31-May-11				
30-Jun-11				
31-Jul-11				
31-Aug-11				
30-Sep-11				
31-Oct-11				
30-Nov-11				
31-Dec-11				
31-Jan-12				
29-Feb-12				
31-Mar-12				
30-Apr-12				
31-May-12				
30-Jun-12				
31-Jul-12				
31-Aug-12				
30-Sep-12				
31-Oct-12				
30-Nov-12				
31-Dec-12				
31-Jan-13				
28-Feb-13				
31-Mar-13				
30-Apr-13				
31-May-13				
30-Jun-13				
31-Jul-13				
31-Aug-13				
30-Sep-13				
31-Oct-13				
30-Nov-13				
31-Dec-13				

Section C: Schemes Actual asset allocation for the scheme from 2009 to 2013

	ACTUAL ASSET ALLOCATION			
Month	**Total Fund**	**Fixed Income**	**Quoted Equities**	**Offshore**
31-Jan-09				
28-Feb-09				
31-Mar-09				
30-Apr-09				
31-May-09				
30-Jun-09				
31-Jul-09				
31-Aug-09				
30-Sep-09				
31-Oct-09				
30-Nov-09				
31-Dec-09				
31-Jan-10				
28-Feb-10				
31-Mar-10				
30-Apr-10				
31-May-10				
30-Jun-10				
31-Jul-10				
31-Aug-10				
30-Sep-10				
31-Oct-10				
30-Nov-10				
31-Dec-10				
31-Jan-11				
28-Feb-11				
31-Mar-11				
30-Apr-11				
31-May-11				
30-Jun-11				
31-Jul-11				
31-Aug-11				
30-Sep-11				
31-Oct-11				
30-Nov-11				
31-Dec-11				
31-Jan-12				

29-Feb-12				
31-Mar-12				
30-Apr-12				
31-May-12				
30-Jun-12				
31-Jul-12				
31-Aug-12				
30-Sep-12				
31-Oct-12				
30-Nov-12				
31-Dec-12				
31-Jan-13				
28-Feb-13				
31-Mar-13				
30-Apr-13				
31-May-13				
30-Jun-13				
31-Jul-13				
31-Aug-13				
30-Sep-13				
31-Oct-13				
30-Nov-13				
31-Dec-13				

APPENDIX II

Pension Schemes Listing

PENSION SCHEME NUMBER	PENSION SCHEME NAME	PENSION SCHEME NUMBER	PENSION SCHEME NAME
1	ALEXANDER FORBES PROVIDENT FUI	24	KAA PENSION SCHEME
2	NIC BANK PENSION SCHEME	25	NBK PENSION SCHEME
3	BAMBURI CEMENT SRBS	26	KNH SRBS
4	CONSOLIDATED BANK SRBS	27	KWS PENSION FUND
5	BAT KENYA RETIREMENT FUND	28	CITI BANK SRBS
6	BOC KENYA STAFF BENEFITS SCHEME	29	HFCK SRBS
7	COMMERCIAL BANK OF AFRICA SRBS	30	NSSF KENYA SRBS
8	CENTRAL BANK OF KENYA SRBS	31	GENERAL MOTORS SRBS 2006
9	CMC SRBS	32	NHC SRBS
10	NAMPAK PENSION SCHEME	33	KNEC SRBS
11	EABL SRBS	34	STANDARD GRP. SRBS
12	GLAXO SMITHKLINE SRBS	35	STANDARD CHARTERED BANK SRBS
13	KENYA COMMERCIAL BANK SRBS	36	UNILEVER KENYA SRBS
14	TOTAL KENYA SRBS	37	UNION OF EA SRBS
15	KPA SRBS	38	KENGEN SRBS
16	KPC SRBS FUND	39	CONSOLIDATED BANK SRBS
17	KENYA AIRWAYS PROVIDENT FUND	40	HELB SRBS
18	TOYOTA KENYA SRBS	41	VIVO ENERGY PROVIDENT
19	KTDA PROVIDENT	42	GENERAL MOTORS PENSION FUND
20	KTDA PENSION	43	OXFAM PROVIDENT FUND
21	LOCAL AUTHORITIES PENSION FUND	44	CONSOLIDATED BANK SRBS
22	KENYA-RE SRBS	45	KEPHIS PROVIDENT FUND
23	OCTAGON PENSION SCHEME		

Source: RBA, 2012, http://www.rba.go.ke

APPENDIX III

Risk-Return Analysis of the 45 Pension Schemes Sampled

TABLE 10

Pension Scheme Number 1 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.53%	1.00%	2.36%	1.43%
Mean	1.39%	1.07%	1.95%	1.39%
Maximum	7.16%	7.33%	19.50%	9.67%
Minimum	-4.61%	-4.61%	-29.22%	-6.25%
Variance	0.05%	0.04%	0.48%	0.12%
Standard Deviation	7.75%	6.86%	23.96%	12.09%

TABLE 11

Pension Scheme Number 2 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.19%	1.19%	2.68%	1.43%
Mean	1.25%	1.32%	1.79%	1.36%
Maximum	7.78%	10.12%	18.90%	9.44%
Minimum	-5.03%	-2.86%	-22.53%	-7.03%
Variance	0.05%	0.05%	0.41%	0.13%
Standard Deviation	8.09%	7.61%	22.27%	12.27%

TABLE 12

Pension Scheme Number 3 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.26%	0.98%	2.59%	1.43%
Mean	1.31%	1.08%	1.69%	1.35%
Maximum	8.59%	6.67%	17.30%	8.07%
Minimum	-5.68%	-7.17%	-22.01%	-7.00%
Variance	0.07%	0.06%	0.39%	0.12%
Standard Deviation	9.16%	8.69%	21.75%	11.96%

TABLE 13

Pension Scheme Number 4 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.43%	1.11%	2.38%	1.43%
Mean	1.27%	1.04%	1.59%	1.38%
Maximum	6.86%	13.22%	16.32%	8.67%
Minimum	-5.38%	-7.99%	-21.88%	-6.25%
Variance	0.06%	0.22%	0.39%	0.12%
Standard Deviation	8.49%	16.23%	21.50%	11.98%

TABLE 14

Pension Scheme Number 5 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.31%	0.90%	2.56%	1.43%
Mean	1.17%	0.83%	1.48%	1.43%
Maximum	8.39%	9.37%	16.98%	9.67%
Minimum	-6.48%	-8.54%	-21.11%	-6.25%
Variance	0.07%	0.07%	0.38%	0.12%
Standard Deviation	9.19%	9.43%	21.36%	12.04%

TABLE 15

Pension Scheme Number 6 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.74%	0.90%	2.87%	1.43%
Mean	1.49%	0.83%	1.81%	1.41%
Maximum	5.04%	9.37%	9.97%	9.67%
Minimum	-4.63%	-8.54%	-13.45%	-6.25%
Variance	0.05%	0.07%	0.25%	0.12%
Standard Deviation	7.56%	9.43%	17.40%	12.05%

TABLE 16

Pension Scheme Number 7 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.11%	0.98%	2.38%	1.43%
Mean	1.17%	1.12%	1.51%	1.36%
Maximum	8.24%	5.70%	16.53%	9.67%
Minimum	-5.14%	-4.96%	-21.51%	-6.25%
Variance	0.06%	0.05%	0.36%	0.12%
Standard Deviation	8.49%	7.63%	20.67%	12.02%

TABLE 17

Pension Scheme Number 8 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.31%	0.90%	2.56%	1.59%
Mean	1.17%	0.83%	1.48%	1.46%
Maximum	8.39%	9.37%	16.98%	9.67%
Minimum	-6.48%	-8.54%	-21.11%	-6.25%
Variance	0.07%	0.07%	0.38%	0.12%
Standard Deviation	9.19%	9.43%	21.36%	12.06%

TABLE 18

Pension Scheme Number 9 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.53%	0.90%	2.83%	1.59%
Mean	1.21%	0.97%	1.74%	1.52%
Maximum	8.24%	9.48%	17.59%	9.67%
Minimum	-6.49%	-8.78%	-22.05%	-6.25%
Variance	0.08%	0.08%	0.40%	0.12%
Standard Deviation	10.07%	9.96%	22.01%	11.81%

TABLE 19

Pension Scheme Number 10 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.21%	0.97%	2.58%	1.43%
Mean	1.24%	1.02%	1.76%	1.39%
Maximum	6.13%	9.33%	18.87%	8.86%
Minimum	-4.59%	-6.23%	-23.26%	-6.25%
Variance	0.05%	0.07%	0.42%	0.12%
Standard Deviation	7.47%	9.01%	22.47%	11.94%

TABLE 20

Pension Scheme Number 11 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.21%	0.97%	2.58%	1.43%
Mean	1.24%	1.02%	1.76%	1.37%

Maximum	6.13%	9.33%	18.87%	8.67%
Minimum	-4.59%	-6.23%	-23.26%	-6.25%
Variance	0.05%	0.07%	0.42%	0.12%
Standard Deviation	7.47%	9.01%	22.47%	11.96%

TABLE 21

Pension Scheme Number 12 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.20%	1.34%	2.52%	1.43%
Mean	1.23%	1.04%	1.56%	1.60%
Maximum	7.49%	7.67%	17.75%	9.27%
Minimum	-5.61%	-6.47%	-22.84%	-4.58%
Variance	0.05%	0.08%	0.40%	0.10%
Standard Deviation	7.87%	9.82%	21.79%	11.01%

TABLE 22

Pension Scheme Number 13 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.19%	1.19%	2.68%	1.43%
Mean	1.25%	1.32%	1.79%	1.49%
Maximum	7.78%	10.12%	18.90%	8.89%
Minimum	-5.03%	-2.86%	-22.53%	-6.05%
Variance	0.05%	0.05%	0.41%	0.11%
Standard Deviation	8.09%	7.61%	22.27%	11.46%

TABLE 23

Pension Scheme Number 14 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.19%	1.19%	2.68%	1.43%
Mean	1.25%	1.32%	1.79%	1.57%
Maximum	7.78%	10.12%	18.90%	8.74%
Minimum	-5.03%	-2.86%	-22.53%	-4.58%
Variance	0.05%	0.05%	0.41%	0.10%
Standard Deviation	8.09%	7.61%	22.27%	10.92%

TABLE 24

Pension Scheme Number 15 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.20%	0.94%	2.73%	1.43%
Mean	1.17%	1.13%	1.46%	1.50%
Maximum	6.07%	26.36%	16.61%	7.99%
Minimum	-7.15%	-18.79%	-21.31%	-4.58%
Variance	0.07%	0.23%	0.36%	0.10%
Standard Deviation	9.01%	16.53%	20.91%	11.04%

TABLE 25

Pension Scheme Number 16 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.22%	1.15%	2.47%	1.43%
Mean	1.20%	1.15%	1.50%	1.42%
Maximum	8.78%	7.00%	16.57%	9.07%
Minimum	-6.04%	-6.48%	-21.26%	-6.00%
Variance	0.07%	0.06%	0.37%	0.12%
Standard Deviation	9.40%	8.61%	21.03%	11.87%

TABLE 26

Pension Scheme Number 17 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.24%	0.92%	2.47%	1.43%
Mean	1.24%	1.01%	1.50%	1.37%
Maximum	8.11%	5.94%	16.57%	8.22%
Minimum	-5.34%	-5.20%	-21.26%	-6.25%
Variance	0.06%	0.05%	0.37%	0.12%
Standard Deviation	8.82%	7.70%	21.03%	11.88%

TABLE 27

Pension Scheme Number 18 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.27%	0.92%	2.49%	1.43%
Mean	1.23%	1.01%	1.66%	1.41%

Maximum	6.66%	5.94%	17.51%	7.90%
Minimum	-5.53%	-5.20%	-22.40%	-4.89%
Variance	0.06%	0.05%	0.40%	0.11%
Standard Deviation	8.76%	7.70%	21.80%	11.51%

TABLE 28

Pension Scheme Number 19 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.27%	0.96%	2.67%	1.43%
Mean	1.20%	1.09%	1.60%	1.45%
Maximum	6.76%	8.50%	17.41%	9.67%
Minimum	-7.45%	-7.69%	-22.83%	-4.58%
Variance	0.07%	0.09%	0.42%	0.11%
Standard Deviation	9.24%	10.65%	22.44%	11.69%

TABLE 29

Pension Scheme Number 20 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.31%	0.90%	2.56%	1.43%
Mean	1.17%	0.83%	1.48%	1.37%
Maximum	8.39%	9.37%	16.98%	8.22%
Minimum	-6.48%	-8.54%	-21.11%	-6.58%
Variance	0.07%	0.07%	0.38%	0.12%
Standard Deviation	9.19%	9.43%	21.36%	11.92%

TABLE 30

Pension Scheme Number 21 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.30%	1.19%	1.95%	1.43%
Mean	1.24%	1.04%	1.81%	1.32%
Maximum	8.13%	13.42%	19.50%	7.71%
Minimum	-12.60%	-14.07%	-29.22%	-7.05%
Variance	0.11%	0.16%	0.49%	0.12%
Standard Deviation	11.36%	13.64%	24.31%	11.99%

TABLE 31

Pension Scheme Number 22 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.45%	1.07%	2.49%	1.43%
Mean	1.22%	1.08%	1.65%	1.40%
Maximum	5.74%	11.31%	16.07%	9.67%
Minimum	-7.60%	-9.10%	-20.72%	-6.05%
Variance	0.07%	0.11%	0.36%	0.12%
Standard Deviation	9.19%	11.28%	20.90%	12.04%

TABLE 32

Pension Scheme Number 23 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.41%	0.89%	2.50%	1.43%
Mean	1.20%	1.01%	1.56%	1.32%
Maximum	6.85%	5.54%	16.27%	7.71%
Minimum	-6.34%	-7.61%	-20.76%	-7.13%
Variance	0.07%	0.05%	0.39%	0.12%
Standard Deviation	9.25%	7.94%	21.56%	12.05%

TABLE 33

Pension Scheme Number 24 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.74%	0.90%	2.87%	1.43%
Mean	1.49%	0.83%	1.81%	1.37%
Maximum	5.04%	9.37%	9.97%	9.17%
Minimum	-4.63%	-8.54%	-13.45%	-7.03%
Variance	0.05%	0.07%	0.25%	0.12%
Standard Deviation	7.56%	9.43%	17.40%	12.13%

TABLE 34

Pension Scheme Number 25 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.43%	1.11%	2.38%	1.43%
Mean	1.27%	1.04%	1.59%	1.36%
Maximum	6.86%	13.22%	16.32%	9.70%
Minimum	-5.38%	-7.99%	-21.88%	-8.05%
Variance	0.06%	0.22%	0.39%	0.13%
Standard Deviation	8.49%	16.23%	21.50%	12.35%

TABLE 35

Pension Scheme Number 26 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.26%	0.98%	2.59%	1.43%
Mean	1.31%	1.08%	1.69%	1.38%
Maximum	8.59%	6.67%	17.30%	7.71%
Minimum	-5.68%	-7.17%	-22.01%	-5.13%
Variance	0.07%	0.06%	0.39%	0.11%
Standard Deviation	9.16%	8.69%	21.75%	11.48%

TABLE 36

Pension Scheme Number 27 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.26%	0.98%	2.59%	1.43%
Mean	1.31%	1.08%	1.69%	1.38%
Maximum	8.59%	6.67%	17.30%	7.94%
Minimum	-5.68%	-7.17%	-22.01%	-6.25%
Variance	0.07%	0.06%	0.39%	0.11%
Standard Deviation	9.16%	8.69%	21.75%	11.72%

TABLE 37

Pension Scheme Number 28 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.56%	0.98%	2.97%	1.43%
Mean	1.25%	1.08%	1.90%	1.35%
Maximum	8.41%	6.67%	18.02%	9.11%
Minimum	-6.19%	-7.17%	-22.33%	-7.20%
Variance	0.08%	0.06%	0.43%	0.13%
Standard Deviation	9.92%	8.69%	22.76%	12.27%

TABLE 38

Pension Scheme Number 29 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.31%	0.90%	2.56%	1.43%
Mean	1.17%	0.83%	1.48%	1.35%

Maximum	8.39%	9.37%	16.98%	8.97%
Minimum	-6.48%	-8.54%	-21.11%	-7.05%
Variance	0.07%	0.07%	0.38%	0.12%
Standard Deviation	9.19%	9.43%	21.36%	12.21%

TABLE 39

Pension Scheme Number 30 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.11%	0.98%	2.38%	1.43%
Mean	1.17%	1.12%	1.51%	1.46%
Maximum	8.24%	5.70%	16.53%	9.74%
Minimum	-5.14%	-4.96%	-21.51%	-4.58%
Variance	0.06%	0.05%	0.36%	0.11%
Standard Deviation	8.49%	7.63%	20.67%	11.62%

TABLE 40

Pension Scheme Number 31 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.26%	0.98%	2.59%	1.43%
Mean	1.31%	1.08%	1.69%	1.36%
Maximum	8.59%	6.67%	17.30%	7.95%
Minimum	-5.68%	-7.17%	-22.01%	-6.16%
Variance	0.07%	0.06%	0.39%	0.12%
Standard Deviation	9.16%	8.69%	21.75%	11.85%

TABLE 41

Pension Scheme Number 32 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.34%	0.85%	2.29%	1.43%
Mean	1.17%	1.02%	1.57%	1.36%
Maximum	8.25%	6.43%	15.39%	9.67%
Minimum	-4.97%	-5.48%	-20.38%	-7.03%
Variance	0.06%	0.06%	0.36%	0.13%
Standard Deviation	8.50%	8.26%	20.86%	12.30%

TABLE 42

Pension Scheme Number 33 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.75%	0.85%	2.56%	1.43%
Mean	1.30%	1.02%	1.63%	1.32%
Maximum	5.41%	6.43%	19.86%	7.71%
Minimum	-5.80%	-5.48%	-20.38%	-7.20%
Variance	0.06%	0.06%	0.43%	0.12%
Standard Deviation	8.74%	8.26%	22.81%	12.07%

TABLE 43

Pension Scheme Number 34 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.79%	0.85%	2.56%	1.43%
Mean	1.36%	1.02%	1.63%	1.33%
Maximum	7.64%	6.43%	19.86%	7.77%
Minimum	-6.17%	-5.48%	-20.38%	-7.22%
Variance	0.08%	0.06%	0.43%	0.12%
Standard Deviation	9.76%	8.26%	22.81%	12.12%

TABLE 44

Pension Scheme Number 35 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.75%	0.85%	2.56%	1.43%
Mean	1.30%	1.02%	1.63%	1.22%
Maximum	5.41%	6.43%	19.86%	7.71%
Minimum	-5.80%	-5.48%	-20.38%	-9.07%
Variance	0.06%	0.06%	0.43%	0.13%
Standard Deviation	8.74%	8.26%	22.81%	12.48%

TABLE 45

Pension Scheme Number 36 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.21%	0.97%	2.58%	1.43%

Mean	1.24%	1.02%	1.76%	1.47%
Maximum	6.13%	9.33%	18.87%	7.71%
Minimum	-4.59%	-6.23%	-23.26%	-4.58%
Variance	0.05%	0.07%	0.42%	0.10%
Standard Deviation	7.47%	9.01%	22.47%	10.99%

TABLE 46

Pension Scheme Number 37 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.84%	0.98%	2.31%	0.72%
Mean	1.55%	0.99%	1.59%	1.10%
Maximum	5.97%	5.87%	17.03%	8.75%
Minimum	-7.19%	-6.24%	-22.08%	-13.29%
Variance	0.06%	0.05%	0.39%	0.12%
Standard Deviation	8.52%	7.85%	21.59%	11.83%

TABLE 47

Pension Scheme Number 38 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.31%	0.90%	2.56%	1.43%
Mean	1.17%	0.83%	1.48%	1.39%
Maximum	8.39%	9.37%	16.98%	8.74%
Minimum	-6.48%	-8.54%	-21.11%	-5.76%
Variance	0.07%	0.07%	0.38%	0.12%
Standard Deviation	9.19%	9.43%	21.36%	11.85%

TABLE 48

Pension Scheme Number 39 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.74%	0.90%	2.87%	1.43%
Mean	1.49%	0.83%	1.81%	1.37%
Maximum	5.04%	9.37%	9.97%	10.07%
Minimum	-4.63%	-8.54%	-13.45%	-7.13%
Variance	0.05%	0.07%	0.25%	0.13%
Standard Deviation	7.56%	9.43%	17.40%	12.38%

TABLE 49

Pension Scheme Number 40 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.11%	0.98%	2.38%	1.43%
Mean	1.17%	1.12%	1.51%	1.47%
Maximum	8.24%	5.70%	16.53%	7.71%
Minimum	-5.14%	-4.96%	-21.51%	-4.77%
Variance	0.06%	0.05%	0.36%	0.11%
Standard Deviation	8.49%	7.63%	20.67%	11.09%

TABLE 50

Pension Scheme Number 41 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.74%	0.90%	2.87%	1.43%
Mean	1.49%	0.83%	1.81%	1.37%
Maximum	5.04%	9.37%	9.97%	9.17%
Minimum	-4.63%	-8.54%	-13.45%	-7.03%
Variance	0.05%	0.07%	0.25%	0.12%
Standard Deviation	7.56%	9.43%	17.40%	12.13%

TABLE 51

Pension Scheme Number 42 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.43%	1.11%	2.38%	1.43%
Mean	1.27%	1.04%	1.59%	1.36%
Maximum	6.86%	13.22%	16.32%	9.70%
Minimum	-5.38%	-7.99%	-21.88%	-8.05%
Variance	0.06%	0.22%	0.39%	0.13%
Standard Deviation	8.49%	16.23%	21.50%	12.35%

TABLE 52

Pension Scheme Number 43 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.43%	1.11%	2.38%	1.43%
Mean	1.27%	1.04%	1.59%	1.38%
Maximum	6.86%	13.22%	16.32%	8.67%
Minimum	-5.38%	-7.99%	-21.88%	-6.25%

Variance	0.06%	0.22%	0.39%	0.12%
Standard Deviation	8.49%	16.23%	21.50%	11.98%

TABLE 53

Pension Scheme Number 44 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.31%	0.90%	2.56%	1.43%
Mean	1.17%	0.83%	1.48%	1.43%
Maximum	8.39%	9.37%	16.98%	9.67%
Minimum	-6.48%	-8.54%	-21.11%	-6.25%
Variance	0.07%	0.07%	0.38%	0.12%
Standard Deviation	9.19%	9.43%	21.36%	12.04%

TABLE 54

Pension Scheme Number 45 Analysis

	Total Fund	Fixed Income	Equities	Offshore
Median	1.79%	0.85%	2.56%	1.43%
Mean	1.36%	1.02%	1.63%	1.33%
Maximum	7.64%	6.43%	19.86%	7.77%
Minimum	-6.17%	-5.48%	-20.38%	-7.22%
Variance	0.08%	0.06%	0.43%	0.12%
Standard Deviation	9.76%	8.26%	22.81%	12.12%