A Survey Into Framework for Immunisation by Retirement Schemes in Kenya

By:

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DECLARATION

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

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

Signed .....

Date ..... 11th June 2005 .....

MRS ANGELA KITHINJI

LECTURER, DEPARTMENT OF ACCOUNTING

DEDICATION

To God:

In his heart a man plans his course, but the Lord determines his steps. Proverbs 16:9

To my Family:

A special dedication to my mother who believes in me and for her unceasing prayers and my father who encouraged me to dream and be all I can be. To my brothers, Fred and Jerry for their patience and love. To my grandmother, Wairimu, a sincere inspiration and encouragement in my pursuit for education and knowledge.

Last but not least, to my friends, Anna for her unwavering support and Francis for believing in our future.

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LIST OF ABBREVIATIONS

D_{mod}	Modified Duration
IRR	Internal Rate of Return
KShs	Kenya Shillings
NPV	Net Present Value
PV	Present Value
PVCF	Present Value of Cash flows
RBA	Retirement Benefits Authority
t	Time period t

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ABSTRACT

Pension immunisation provides an attractive option to the trustees of retirement benefit schemes as it provides them with a tool to control their financial risk as well as allows trustees to target a given value of assets at the end of the investment horizon. An immunisation strategy allows the trustees the peace of mind that they have locked in interest rates hence maximising returns in a volatile market as well as providing them with the flexibility to take advantage of market movements. .

Immunisation has been applied successfully in America and Europe in the late 1970s and is currently being considered in South Africa. This study therefore sought to determine whether the framework to support pension immunisation exists in Kenya and the potential challenges trustees would face if they were to adopt the strategy in Kenya.

This study shows that to a large extent the framework to support immunisation exists in Kenya since fund managers and actuarial consultants estimate the present values of the investment assets and present values of the liabilities of retirement schemes. The study reveals a number of potential challenges that would need to be addressed prior to the implementation of the strategy, which include the lack of depth in the Kenyan capital market, turbulent economic fundamentals, extent of under-funding of many retirement benefit schemes in the country as well as the limited actuarial consulting role prescribed in existing legislation. The study further reveals that fund managers and actuarial consultants work independently and only consult on rare occasions. This calls for changes in policy to establish a formalised link between the fund managers and the actuarial consultants on an on-going basis for successfully implementation of pension immunisation.

From the findings of the study, it is recommended that further studies be carried out into the trustees appreciation of the concepts of immunisation. Separate studies on the potential challenges identified in this study with a view of recommending possible solutions to them for an immunisation strategy is to be deemed viable by the trustees may also be carried out as an extension to this study.

CHAPTER ONE: INTRODUCTION

1.1 Background

The term immunisation is usually used in medical science to refer to the process by which medicine (vaccine) is given to a person (or organism) in advance to help the body (or organ) protect itself or build immunity against a given disease. In investment terms, Fabozzi (1993) defines immunisation as the locking up of a fixed rate of interest over a pre-specified time horizon. Fabozzi (1993) and Redington (1952) further observe that immunisation involves investment of assets in such a way that the existing business is immune (protected) from a general change in rate of interest. It may be infered from the medical description and the definitions by Fabozzi that immunisation refers to exempting or protecting the asset portfolio from interest rates movements to ensure the portfolio gives a 'guaranteed' return or pre-specified value at the end of the time horizon.

Fabozzi (1993), Fissler and Weil (1971) observe that a portfolio of assets is immunised for a holding period (investment horizon) if its value at the end of the holding period must be at least as large as it would have been had interest rates been constant. If the realised return on the investment in bonds is sure to be at least as large as appropriately computed yield to horizon, then the investment is immunised. This implies that to immunise a portfolio the value of the assets at the end of the investment period must exceed the value of the immunised portfolio or liabilities.

Immunisation has been used as a bond portfolio technique in America and Europe in the late 1970s and the use of this technique is currently being considered in South Africa although its application is still limited (Andrews and Michael, 1997; Affleck-Graves, 2002). The concept of immunisation was developed with the intention of locking up interest rates of bond portfolios over a pre-specified period of time that is bond immunisation. The application of this concept has been extended to many areas where asset liability matching is desired including the retirement benefits industry (Redington, 1952).

Pension immunisation is therefore an approach to creating an immunised portfolio of assets to satisfy the funding requirements of a pension scheme. The funding requirements of a pension scheme arise out of its liabilities which usually consist of multiple benefit and expenses, if any payments. For pension schemes, the pension immunisation strategy may be viewed as an alternative to investing in guaranteed investment schemes because both investment options lock in the prevailing interest rates over a fixed planning horizon. In Kenya, guaranteed investment schemes are provided mainly by insurance companies under their deposit administration class of business. The Retirement Benefit Authority recognises these guaranteed investment schemes as an available asset class for retirement fund with a maximum allowable investment of 100% of the individual scheme portfolio (RBA Act, 1997).

The main distinction between the two arises from the fact that the trustees or investor can actively manage their investment portfolio with an immunised portfolio while in a deposit administration scheme the investor has no asset allocation choice. This allows the investor with an immunised portfolio to take advantage of market opportunities and rebalance the portfolio to ensure the initial objective of locking prevailing interest rates is still met but with less opportunity cost than that provided by the deposit administration scheme.

The deposit administration scheme although considered an investment option is provided as an insurance policy thus is not marketable. In addition, the insurance company may put in place certain restrictions on the movement in and out of the product. In Kenya, there are very hefty penalties for withdrawal of funds from a deposit administration policy before five years. This tying up and lack of marketability of guaranteed investment schemes are a big disadvantage when compared to the immunised portfolio.

1.2 Statement of the problem

Kenya as a developing country needs to learn from other countries ways of spurring economic growth. One of these ways is through management of available resources including retirement funds to ensure continued growth. Immunisation is one way of ensuring that these resources (retirement funds/assets) are growing at the same pace or even greater than the underlying liabilities.

The key objective of pension immunisation as a portfolio management strategy is to optimise the returns on retirement funds without taking on undue risks. The retirement benefits sector in Kenya currently comprises of over 1,400 registered schemes and assets that amount to approximately KShs 140bn, which represents over 21% of the country's GDP (RBA Newsletter, 2002).

The reinvestment of these resources in the economy would promote economic growth and in particular promote growth of the capital market to respond to growing investment demands. In Singapore, for example, the retirement funds were used as collateral for a housing project, which aimed to provide housing for all citizens, and this lead to development of mortgage backed products (Blasky, 2004).

Retirement schemes in Kenya would be able to benefit if they were able to match their assets and liabilities as this would enable the schemes to estimate the required cash flows for meeting the pension liabilities in form of benefits and expenses as and when they fall due.

This study is therefore a survey to determine the existence of the framework for immunisation of retirement schemes and the potential challenges trustees would face if they were to immunise their portfolio.

1.3 Objectives

1. To determine whether retirement schemes estimate the maturity value of their assets and liabilities;

2. To determine whether retirement schemes estimate the present value of their assets and liabilities;

3. To identify the challenges associated with portfolio immunisation of retirement schemes in Kenya.

1.4 Importance of the study

1.4.1 Retirement schemes

Immunisation provides retirement schemes in Kenya with an alternative means to portfolio management. Pension immunisation is a hybrid portfolio management strategy, which has proved effective in America, Europe and South Africa (Affleck-Graves, 2002). The adequacy and security of retirement benefits is a huge concern to the residents of a country who seek reassurance that their sunset years will be secure as well as the government in terms of its social responsibility to its citizens.

1.4.2 Trustees of retirement schemes

All retirement benefits schemes are subject to Trust Laws, which require schemes to be established under the control of a trustee who acts in the best interest of the beneficiaries. The trustees have control over the trust property and this includes any assets held by the scheme (RBA Regulations, 2000). Trustees are therefore required at all times to make sound and prudent investment decisions on behalf of the scheme.

Fabozzi (1993) presents immunisation as a structured portfolio strategy for liability funding. He shows that the objective of any structured portfolio strategy is to design a portfolio that will achieve the performance of some predetermined benchmark, which may be a single liability, or multiple liabilities. Pension immunisation therefore provides an attractive option to trustees of pension schemes as it provides them with a tool to control their financial risk as well as allows trustees to target a given value of assets at the end of the investment horizon.

In particular, a pension immunisation strategy allows the trustees the peace of mind that they have locked in interest rates hence maximising returns in a volatile market. If invested in marketable assets such as bonds, the immunisation strategy also allows the trustees to take advantage of market opportunities to increase the value of their assets without losing sight of the immunisation objectives.

1.4.3 fund managers and actuarial consultants

Successful immunisation relies on the fund managers and actuarial consultants' interaction with the trustees as well as amongst themselves. As an asset liability matching strategy the fund managers need to consult with the actuarial consultants to develop an understanding of the expected liability profile of the retirement scheme. On the other hand, the actuarial consultants need to consult with the fund manager when developing their actuarial bases and assumptions during the actuarial valuations of the retirement schemes.

Since the final responsibility of the investment decisions lies with the trustees, they need to understand the investment proposals made by the fund managers and ensure that the proposals are in line with their investment objectives which should take the liability profile as determined by the actuarial consultant into consideration.

1.4.4 Retirement Benefits Authority

The primary objective of the Retirement Benefits Authority as the regulator of retirement benefits schemes in Kenya is to safeguard members' benefits. The trustees of retirement benefits schemes have two fundamental obligations to members in managing their retirement benefit schemes (or trust assets). The first one being to ensure sufficient assets are available to meet the liabilities as they fall due; and secondly to maximise the return on funds subject to an acceptable degree of risk. Immunisation provides the trustees with a portfolio management strategy by which to ensure that they are able to meet their obligations to members and in so doing ensure that members benefits are safe as required by the regulator.

CHAPTER TWO: LITERATURE REVIEW

2.1 Portfolio management

Portfolio management provides the framework against which investments are made. It is an integral part of any investment. The investment or portfolio management process focuses on three key areas, setting objectives and policy, portfolio analysis and asset analysis, which are discussed broadly below.

2.1.1 Setting objectives and policy

The objectives of any portfolio management strategy are to achieve the goals set by the investor. These goals may take the form of specific return requirements for an acceptable risk tolerance level. The goals therefore need to be measured or evaluated against a predetermined benchmark. The general objective for trustees of retirement benefit schemes is to maximise returns on financial resources without exceeding their acceptable level of risk (Fabozzi, 1993).

The investment policy provides a sound institutional framework against which investment decisions are made. Graham (2000) observes that to invest successfully over a lifetime does not require a stratospheric IQ, unusual business insights, or inside information. What's needed is a sound intellectual framework for making decisions and the ability to keep emotions from corroding that framework. The long-term perspective to investments is necessary for retirement benefit schemes whose pension obligations (or liabilities) are long term in nature. This has to be considered in preparing an investment policy statement for a pension scheme.

Preparation of a written investment policy statement is a legal requirement for all registered retirement benefit schemes under the Retirement Benefits Rules and Regulations (RBA Regulations, 2000) The key decisions the investor or trustees need to make when preparing an investment policy statement include the strategic and tactical asset allocation, actual stock selection criteria and the investment style preference for fund managers. The level of involvement of the investor in each of these areas vary (Fabozzi, 1993).

Strategic asset allocation focuses on the long-term apportionment of assets in the various asset classes. The available asset classes in Kenya include: equity, treasury bonds and bills, commercial paper, cash and bank deposits, corporate bonds and unit trusts. Derivatives are currently not traded in Kenya's financial markets (Blasky, 2004). The strategic asset allocation decision depends on the liability profile of the scheme and the acceptable level of risk the trustees (and members) are willing to accept. Any constraints facing the investors (trustees or members) should be taken into account when making these decisions. The level of investor (trustees or members) involvement is very high (Fabozzi, 1993).

The second decision trustees need to take in preparing their investment policy statement is the tactical asset allocation decision. Fabozzi (1993) indicates that tactical asset allocation refers to the acceptable range of variance between actual asset allocation and strategic asset allocation. It allows for short-term movements from the desired strategic allocation to take advantage of relative price movements. This is the acceptable variance range determined by the trustees with input from the fund manager and the fund actuary (Blasky, 2004).

The trustees' decision with regard to stock selection focuses on the allocation of investments with the specific asset group, for example, which shares to buy? Research has shown that 90% of the variation in investment returns is achieved from the strategic asset allocation and not the stock selection decisions (Blasky, 2004). Hence, the level of trustee involvement in this decision should be limited and at best zero as it adds very little value to the overall return (Asset Consultants, 2004). In addition, as Blasky (2004) observes it is the portfolio manager not the trustees with the expert knowledge on the characteristics of different investments within the main asset classes. For example, the portfolio manager is better placed to advise on whether funds should be invested in Barclays Bank shares or Athi River Mining Shares.

The fourth and final decision the trustees need to take is with respect to the investment style of the fund manager. This decision aims to deal with the questions regarding the in-house management policy of the appointed fund manager. There are two main investments styles that may be adopted. These are: top-down' or 'bottom-up' investment styles (Fabozzi, 1993).. This should be considered during the selection of the portfolio manager as it is part of the corporate culture of the portfolio manager and not an aspect a portfolio manager will vary to suit needs of one client.

2.1.2 Portfolio analysis

This is an activity performed by the portfolio manager to determine the optimal/efficient portfolio for a given investment. The efficient portfolio is one which gives the investor the greatest expected return for a given or acceptable level of risk (Blasky, 2004). The challenge therefore for trustees is to check whether the portfolio manager has adequate information, expertise and investment software which allows them to determine the efficient portfolio.

It is important to appreciate for a long time in Kenya, portfolio management was the domain of stockbrokers and dealers. The stockbrokers were predominantly bank employees who had previous exposure or a personal interest and not necessarily expert training on portfolio management. As a result, majority of the investment decisions were not based on sound investment practices but behavioral practices (Blasky, 2004).

One of the greatest challenges facing the capital market in Kenya is determination of the efficient portfolio. Portfolio theory shows the efficient portfolio is located on the security market line and hence depends on the β-factor. Currently in Kenya, there is no market determined β-factor of the capital market and hence none for the investments/assets in the market.

Progress has been made by Capital Markets Authority, Nairobi Stock Exchange, Central Bank of Kenya and other players in the industry to develop a market yield curve to be used as a basis for asset valuation. Once this is finalised, the development of a market beta will be a reality. Currently, most portfolio managers and stockbrokers use their own in-house yield curves but these are not accepted by all players due to the underlying biases of the authoring house. This makes portfolio analysis in Kenya a very difficult and at times subjective exercise.

2.1.3 Asset analysis

This now focuses on the individual investments that constitute the optimal portfolio. It is also the domain of the portfolio manager and relies heavily on the research capabilities of the manager. Asset analysis aims to deal with the question, *"What portfolio management strategy is being applied by the fund manager"*?

2.2 portfolio management strategies

There are two different types of portfolio management strategies namely active and passive portfolio management strategies. These are two extreme portfolio management strategies and they are distinguished mainly by the different treatment of expectational inputs from the portfolio manager. Hybrid strategies such as immunisation and dedicated portfolio strategies seek to combine features of the active and passive strategies.

2.2.1 Active management strategies

The returns from this strategy are obtained by managing the expectational inputs and the strategies can be viewed in the three broad categories of bond valuation, rate anticipation and sensitivity analysis (Fabozzi, 1993; Asset Consultants, 2004). The first category, bond valuation, is a valuation approach to bond analysis which seeks to maximise returns by managing or taking advantage of temporary price disequilibrium. The strategy allows investors to switch from one bond to another to achieve capital gains though price appreciation or higher yield returns. It also focuses on evaluating the normal spread relationship with aim of capital appreciation. The success of a bond valuation strategy is based on premise that the 'correction' in price/yields will occur before overall market conditions change the underlying relationship. This implies one can only earn superior returns before correction occurs.

Rate anticipation is the second category and this strategy focuses on the effect of overall changes in market environment in form of interest rate changes. This approach argues the investor or portfolio manager should anticipate changes in direction of interest rates such that if rates are projected to decline in future, longer maturities bonds are sought to achieve capital appreciation and vice versa. This to a large extent seems like a gambling approach to investment because forecasting interest rate movements consistently is very difficult. This is true in Kenya, where behavioral characteristics of the investor have a big role to play in capital market that is largely inefficient.

Sensitivity analysis is an approach to portfolio management which focuses on managing all expectational inputs including price, interest rates and other bond characteristics which affect returns. The main objective of the analysis being to determine the level of impact changes to each expectational input would have on returns from the portfolio. A sensitivity analysis relies to a large extent on computerised simulation and models such as. Monte Carlo simulation techniques.

2.2.2 Passive management strategies

These strategies emphasis on risk control such that minimum management of expectational inputs is required. The basic principal of the strategies is minimal expectation input in the management process to allow the portfolio manager to focus on meeting the clients' other needs (Asset Consultants, 2004). Active management strategies assume the investor only needs to obtain the highest return for an acceptable level of risk. In reality however, investors often have other needs. For example, one of the objectives of the Kenya Revenue Authority as a key government body and regulator may be to invest in government securities despite their low returns. This is a non-expectational input that may be met by the passive and not an active management strategy. It is however important to appreciate with time clients' needs change thus the passive strategies need to be reviewed to meet the changing client needs.

There are two approaches to passive management; the buy and hold approach and indexing. As the name suggests, in the buy and hold approach the portfolio manager or investor buys and holds the securities to maturity. In the case of bonds, the main considerations are therefore the default risk of the issuer and maximising yield to maturity when choosing the investment. The key of disadvantage to this process is the investor does not take advantage of price or market movements for capital appreciation and the only expectational input needed is a credit analysis of the issuer to manage default risk. The advantages of the approach include the low transaction costs, and the easy of future planning or projections as the returns are known in advance.

On the other hand, the objective of an indexing strategy is to replicate the performance of the market using a designated index. It is based on the capital market theory which suggests an index portfolio will be the optimal or efficient portfolio as it contains all the outstanding issues in proportion to their market values. It is therefore argued, by holding an indexed portfolio one expects a favorable risk and return trade off (Fabozzi, 1993).

The challenge facing an indexing strategy is identifying the index portfolio that adequately represents the market. In Kenya, there is currently one available bond index, the African Alliance Performance Index. The use of the index as a performance benchmark is however not very wide spread amongst portfolio managers as it bears the brand name of one of the market players and hence competitor. Most managers rely on the treasury bills and bonds in establishing performance benchmarks (Blasky, 2004).

2.2.3 Hybrid portfolio management strategies

Passive and active management strategies are distinguished mainly by the degree of management of expectation inputs. In particular, passive strategies focus on risk control by use of non-expectational inputs while active strategies focus on return maximisation by use of expectational inputs (Fabozzi, 1993). Hybrid strategies may then be pursued with emphasis on risk control and return maximisation thus combining passive and hybrid strategies (Asset Consultants, 2004). Fabozzi (1993) identifies some of the hybrid portfolio management strategies including immunisation and dedicated portfolio strategy.

Pension immunisation is the process of creating fixed income portfolio having an assured return for a specified time horizon irrespective of interest rate changes. The assured return is usually one that maximises returns at acceptable levels of risk. Also due to the nature of the immunisation strategy, the investor is allowed a degree of flexibility to take advantage of price movements for capital appreciation and to achieve other non-expectational objectives. Immunisation is thus viewed as a hybrid portfolio management strategy (Fabozzi, 1993).

In the dedicated portfolio strategy, the portfolio is constructed to fund pre-determined liabilities over a given time horizon. These liabilities usually represent a schedule of liabilities that need to be met from the returns and capital appreciation of the portfolio. The value of the portfolio keeps declining as the liabilities are met. The two approaches considered under this strategy are multi-period immunisation and cash flow matching. Both these approaches are variations of immunisation strategy (Fabozzi, 1993).

It is important to note, no single strategy is appropriate across the board thus the portfolio manager despite adopting a passive strategy needs to be responsive to the clients changing needs. It is suggested that adopting a hybrid strategy like immunisation may be more appropriate as it allows the portfolio management to manage both the expectational inputs as well as meet the clients' other needs while optimising the risk return trade off.

2.3 Portfolio constraints

In determining the investment objectives and policy the investor needs to take into consideration any values, beliefs or practices that may influence investment decisions. These values, beliefs and practices are known as portfolio or investment constraints (Fabozzi, 1993). These constraints need to be effectively managed as they influence the return objectives and risk tolerance levels of the investor.

The perfect market assumptions of a rational investor who relies on the risk return trade off to make investment decisions is negated by the behavioral tendencies of investors. It is therefore inappropriate to ignore these behavioral characteristics when making any investment decisions.

2.3.1 Liquidity needs

Liquidity refers to the need for cash or near cash investments. Bonds are viewed as highly marketable assets and are seen primarily as a means for providing a regular stream of income (that is coupons) for a fixed maturity period.

Pension fund liquidity needs depend on the liability profile of the scheme. For example, the age profile of future beneficiaries affects the scheme's liquidity needs. If the age profile is young in a pension scheme fewer retiring beneficiaries are expected in the near future thus lower liquidity needs as level of benefit payments in the near future is low. Liquidity may be achieved in two ways. One way is limiting the investment portfolio to readily marketable assets. Marketable issues are assets that can be sold quickly with little or no price difference from current price difference. An actively managed portfolio requires highly liquid assets in form of reserves to allow the fund manager to take advantage of price and market movements. The second way is to attain liquidity by managing the cash flows from the assets such as by spacing the schedule of maturity obligations over the time horizon.

Fabozzi (1993) sets out the different characteristics of bonds and their effect on bond liquidity. These characteristics have been summarised in the table below:

Table 1: Characteristics of bonds and effects of liquidity

Characteristic	Effect on bond liquidity
Amount outstanding	The higher the amount the higher the liquidity
Amount closely held	The lower the amount the higher the liquidity
Coupon level	The higher the coupon amount the higher the liquidity
Age of issue	The more recent the issue the higher the liquidity
Quality of issue	The higher the quality the higher the liquidity
Terms/provisions	The attaching provisions may lower the liquidity. However a call feature provides additional liquidity if it is exercised
Maturity	The shorter the maturity period the higher the liquidity

Source: Fabozzi, 1993.

2.3.2 Tax considerations

The impact of taxes on different asset classes needs to be considered when analysing returns from investments. For example, if capital gains tax was to be levied on capital gains from bonds it may be more prudent to adopt a buy-hold strategy where bond issues are concerned. Retirement benefit schemes may or may not be registered as a tax-exempt scheme. Many countries provide attractive tax benefits to registered tax-exempt to promote the level of saving for retirement as this lowers the overall social security cost for the government in the future. An unregistered scheme on the other hand does not enjoy the tax benefits (Income Tax Rules, 1994).

In Kenya, retirement benefits schemes may register for tax exemption through the Income Tax Retirement Benefits Rules, 1994. Registration with the Commissioner of Income Tax is not compulsory. With regard to investments, the law provides for tax-free investment income. This implies there is no constraint arising from tax treatment in respect of making asset allocation decisions with view of optimising the risk return trade off.

2.3.3 Time horizon

Time horizon refers to the duration available to make investments. The lifecycle of an investor determines their portfolio's time horizon. Fixed income securities such as bonds have a definite maturity hence their investment life (or maturity) may be matched to the time horizon of the investor (Fabozzi, 1993).

For retirement schemes, the scheme's time horizon is determined by its liability profile. The liability profile of a scheme is a function of the normal retirement age, current age profile of members, issues affecting the turn over rate of the scheme such as a major restructuring exercise being considered, etc. All these factors affect the time period available for the trustees to make investments as they result in liquidity needs.

For example, if a scheme has a normal retirement age of 65 and the current average age of the members' is 35 years. If all other factors are held constant, the time horizon of the scheme is said to be approximately 30 years. This is the difference between the normal retirement age and the current average age of the members (that is 65 – 35). It reflects the period before which the scheme will experience high liquidity needs to meet benefit payments. However, if a major restructuring exercise were being considered within the next year, the time horizon of the scheme would be one year and not 30 years. This is because the trustees would need cash to pay out benefits during the year (Raichura, 2004).

Although time horizon is important, for active strategies the focus is not entirely on the time horizon but the planning horizons in order to maximise returns. The planning horizon refers to the period of time during which investors take stock of investments. In Kenya, the planning horizon of most retirement scheme trustees is a quarter year (or three months). This coincides with the period when they receive the statutory investment reports from their fund manager. This suggests if a scheme has a one-year time horizon and a planning horizon of three months they will have a total of four planning horizons in the year.

2.3.4 Regulatory/legal considerations

The regulations may impose limits on asset allocation decisions. Retirement scheme funds are usually regulated in respect to eligible asset classes, maximum and minimum allowable investment amounts in a given asset class or even amounts invested in a particular security in a given asset class. The rationale for this is not financial repression but to encourage diversification of the retirement scheme's portfolio. This is necessary to ensure minimal investor protection for scheme members

There may also be restrictions on the types of investment vehicles available in determining the efficient portfolio. In Kenya, there are no derivative securities available in the capital market for investments by retirement schemes. For a long time, regulators around the world viewed derivative assets as speculative investments rather than as a means to control risk. It was therefore difficult to get derivatives approved as investments available for retirement schemes. However, as the regulators, receive more education and exposure and with continued demand for investment products it is expected these asset classes will be approved for investment by retirement benefit scheme regulators. In Kenya, the Retirement Benefits Rules and Regulations, 2000 provides the following maximum limits on retirement scheme investments in the available asset classes:

Table 2: **RBA maximum guidelines on asset classes**

Asset Classes	**RBA maximum % limit**
Property	30%
Treasury bills and bonds	70%
Quoted equities, preference shares and collective investment schemes	70%
Commercial paper, corporate bonds and approved loan stocks	15%
Unquoted equities in Kenya	5%
Cash and demand deposits	5%
Fixed deposits	30%
Off shore investments	15%
Other approved assets	5%
Guaranteed funds	100%

Source: RBA Rules, 2000

This means all schemes in Kenya need to have an asset allocation that adhere to these maximum limits. The Generally Acceptable Accounting Principles (GAAP) also have to be considered when making investment decisions. GAAP provide for investments to be recorded at historical costs and any losses to be recognised immediately in the books of accounts. These principles may prohibit a portfolio manager from divesting from an asset and taking a loss yet the corresponding opportunity cost of the foregone investment may be higher. It is therefore important for trustees to give the portfolio manager adequate mandate when developing the investment policy to make certain decisions with a view to optimise returns (Raichura, 2004).

2.3.5 Unique characteristics of investors

This focuses on the special requirements of an individual investor. They cover issues of social responsibility, objectionable products or services, business practices, countries of investment etc. For example, a church based organisation may object to investments in share assets of British American Tobacco Kenya Limited or East African Breweries Limited as they manufacture questionable products in form of cigarettes and beer respectively. A government regulator such as Kenya Revenue Authority may have a pre-defined portfolio where the amount and maturity ranges in government securities are specified. Another example, is by its nature as the regulator of the financial markets, the Central Bank of Kenya Staff Pension Scheme may have difficulty investing in equities as any trading activities by the scheme trustees may send the wrong market signals (Blasky, 2004; Raichura, 2004).

Thus portfolio constraints need to be considered when setting investment objectives and policies as they affect the investors return objectives and risk tolerances. They may also influence other decisions such as the strategic asset allocation decisions of the investor.

2.4 Pension scheme assets and liabilities

The principle of setting aside resources for retirement or earlier exit from formal employment is not new in Kenya or in the World. Early global developments can be traced to 1686 in the UK HM Customs and Excise Department where formal pension arrangements were made for employees. In 1770 a trust fund was set up by the Central Bank of England for relief to military personnel and their dependants in event of their demise. The UK Civil Service Scheme was then set up in 1810 and other private and public sector firms then followed suit (Raichura, 2004).

In Kenya, the trend of providing pensions for employees was to a large extent borrowed from the British during the colonial era. The civil service scheme was set up in 1940s followed by private sector companies which were largely multinational and foreign owned firms. Over time other parastatals schemes were then set up as they broke off from the main civil service scheme. The National Social Security Fund was set up in 1965 with a view of providing a basic social security benefit to members on retirement (Raichura, 2004).

It is important to note the early developments were largely favor and grace driven. There were very little regulatory requirements on the management of retirement benefit schemes. In Kenya, until the late 1990s with the introduction of the Retirement Benefits Act, 1997 only the Income Tax (Retirement Benefits) Rules and Regulations, 1994 were applicable to retirement benefit schemes (Raichura, 2004).

With the setting up of the Retirement Benefits Authority through the Retirement Benefits Act, 1997 and subsequent introduction of the Retirement Benefits Rules and Regulations in 2000, the level of regulation of the pension industry in Kenya has increased. The provisions of the Retirement Benefits Rules and Regulations have had an impact on the way in which retirement schemes are managed and administered. In particular, the regulations have placed onerous requirements on trustees of retirement benefits schemes and particularly in the area of investments and funding of retirement benefit schemes. To appreciate the funding needs of a retirement benefit scheme there is need to look at the characteristics of both the assets and liabilities of the different schemes (Raichura, 2004; Blasky, 2004).

2.4.1 Pension liabilities

Pension liabilities are the debts arising out of the financial commitments of the scheme in respect to members' retirement benefits. Retirement scheme liabilities are therefore a function of scheme design and structure. Schemes and hence the nature of pension liabilities vary widely by structure, design and type of benefits they provide (Raichura, 2004).

If retirement schemes are categorised by the type of benefits paid then where benefits are paid as cash lump sum payments the arrangement is referred to as a provident fund. On the other hand, if benefits are paid as regular annuity payments then the arrangements is referred to as a pension scheme (ActEd, 2004; Raichura, 2004). Provident fund liabilities are one-off lump sum payments to a member on exit. Hence, this type of arrangement is also referred to as a money-back arrangement. Members tend to prefer provident funds due to the attraction of receiving a lump sum payment. The associated risks of squandering or mismanaging the retirement benefits however make this type of arrangement unattractive to governments and employers. In fact, most governments have very punitive tax treatment for provident funds to discourage payment of cash lump sum benefits. In Kenya, lump sum benefits above the tax-free limits are taxed at the PAYE scales (Raichura, 2004).

Pension schemes provide a regular income at retirement and are more common or preferred. It is argued that members of a pension scheme are better able to plan for their retirement as they are already used to planning with a regular income in terms of their salaries and wages. In addition, pension schemes provide greater flexibility in payment of benefits as a member may opt to take part of their benefits as a cash lump sum and use the remaining amount as a residual pension. This therefore allows for reduced risk of squandering benefits and better financial planning. However, this flexibility in payment also makes the liabilities of a pension scheme more complex than those of a provident fund (Raichura, 2004).

In Kenya, there are more pension schemes than provident funds however the number of provident funds is increasing as members opt for the lump sum benefit payouts and employers seek to reduce administration costs by paying off benefits to leavers in lump sum. In addition, it is important to note in Kenya, most pension schemes allow members early access to benefits on withdrawal hence blurring distinction between provident funds and pension schemes (Raichura, 2004; RBA Newsletter, 2004).

In determining the structure of a retirement benefit scheme the two key design objectives considered are to ensure security in retirement; and to provide protection to members whilst working. Security in retirement focuses on providing the members with a reasonable and secure income in retirement. The 'rule of thumb' for actuaries is for the post retirement income to equal 2/3rd or 3/4ths of the pre retirement income in order to achieve this objective. Protection whilst working refers to the provision of adequate compensation to employees in the unfortunate event of ill-health retirement or to their dependants in event of death (Raichura, 2004).

In order to achieve these design objectives, a number of benefit designs have been developed. These include final salary schemes, career average schemes, retirement balance schemes, cash balance schemes and money purchase schemes. The main difference between the various arrangements with respect to the management of the associated risks that is risks due to investment, salary growth, and duration of service and mortality experience of members.

It is important for trustees and fund managers to understand the risks associated with each retirement arrangement in order to make proper investment decisions and particularly when determining an investment strategy. There are two extreme design types – the final salary (defined benefit) schemes and the defined contribution schemes. All other scheme designs may be viewed as hybrid schemes formed by merging in certain proportions the characteristics of the defined benefit or defined contribution schemes (Raichura, 2004, Sherer, 2004).

A member's benefits in a defined benefit scheme are defined using a formula. This formula is typically a fraction of final salary for each year of service accrued by the member. The employer guarantees the benefits in this arrangement as the members' benefits and hence reasonable expectations are clearly defined by the formulae (Sherer, 2004; Blake, 2000). By the nature of the formulae, explicit targeting of benefits to meet the design objective of providing a reasonable and secure income in retirement is easier. For example, if a member is entitled to 1/60ths of final salary for each year of service and the target pension is set at 2/3rds of salary, the member can determine that they need to work for 40 years to get to meet this target.

The funding of a defined benefit scheme is such that the risks are borne by the employer. Member's contributions (if any) are at a fixed rate. The employer then meets the balance of the cost of providing the guaranteed benefits. The employer is therefore exposed to risks arising out of inflation and salary escalation, investment risks and other risks inherent in the defined benefit scheme (Raichura, 2004).

Unlike in defined benefit schemes, the level of benefits from a defined contribution scheme is not guaranteed instead the levels of contributions to the scheme are pre-determined. The defined contribution scheme operates similar to a bank account into which fixed amount of contributions are accumulated and used to purchase a benefit on exit from service. This type of scheme is also referred to as a money purchase scheme (Raichura, 2004; Asset Consultants, 2004).

As indicated by Raichura (2004) and Sherer (2004), the level of benefits and hence the scheme liabilities are therefore dependent on the level of contributions made, the investment income or interest credited to the individual member's account and the investment conditions available at retirement particularly if member intends to purchase and annuity with their accumulated contributions. The level of benefits has no direct relationship to the employees' salary or length of service at retirement hence explicit targeting of post retirement benefit is not easy. In addition, given the level of contributions (both member and employer) to the scheme are fixed, the member bears all the risks inherent by this arrangement.

In Kenya, most 'new' schemes are set up as defined contributions schemes and the number is increasing as more defined benefit schemes convert to defined contribution arrangements (RBA Newsletter, 2004). This trend is largely due to the fact that most employers are no longer 'grace or favor' driven but instead are focusing on improving their profit margins hence prefer the predictability of costs offered by defined contribution schemes. Further, quite perversely though, members are pushing for the conversions to defined contribution schemes which they believe provides them with better benefits thus totally ignoring the fact that in a defined contribution scheme they bear all the risks (Raichura, 2004; Asset Consultants, 2004).

As we have seen, there are a number of risks thus associated with pension liabilities and the choice of scheme design depends on how the risks are managed. As with other hybrid arrangements, hybrid schemes aim to combine the attractive features of the two extreme arrangements. In particular, they aim to provide predictability of costs for the employer by controlling risks while at same time protecting members from investment risks by proving a minimum 'guaranteed' benefit.

2.4.2 Pension assets

Pension scheme assets are defined as the scheme's property or resources. They are accumulated from the cash flows in and out of the scheme. The cash inflows include member contributions (if any), employer contributions, transfer values and insurance proceeds (if any). These inflows are then invested as an investment portfolio and hence earn returns either in form of dividends, interest, rents, or capital gains. The cash outflows are in form of benefits and expense payments (Blasky, 2004; Brigham, 2004).

The asset classes available for investments may be categorised in four main categories. These are equity, fixed income securities, cash and property and alternatives such as jewelry, artwork. It is necessary for investors to understand the features of these asset classes to enable them make prudent and informed investment strategic asset allocation decisions. The key features to consider when evaluating the asset classes are risk, returns and marketability of the assets (Blasky, 2004).

The first category would be the cash and cash equivalents which refers to very liquid assets such as cash on hand and bank and fixed deposits. These are assets that are either cash or are easily converted to cash at a fair price at short notice. Cash and cash equivalent assets have very low risks if invested in a credit worth institution and have correspondingly low returns (Blasky, 2004; Brigham, 2004).

In most African societies, property investments have sentimental values. This is common in Kenya with majority of people investing in land, building, and other property assets. Prior to the introduction and enforcement of the Retirement Benefit Rules and Regulations, most retirement benefit schemes held a larger proportion of their asset portfolio in property investments. A good example of this is the National Social Security Fund whose property portfolio accounted for over 80% of the total portfolio (NSSF, 1999).

Property assets are usually very hard to sell and also since not listed on an exchange are very difficult to price. The returns on property are from rental income and capital gains (or losses) on sale. These returns can have very high volatility depending on the political, economic and social factors at play at the time. For example, a residential building in Donholm may have been raising very good returns prior to the introduction of slum dwellings in the area (Blasky, 2004).

Alternative investments such as antiques, jewellery, artwork, rugs, mats and other similar assets have the same features as property and are more common abroad. These are items which are deemed to be of value by those trading. However, such assets are very difficult to sell and also very difficult to price. This is because their pricing is very subjective and the need to find a willing buyer who appreciates the item is also difficult.

Equity investments are the main method adopted for the financing of most companies. The holders of ordinary shares are entitled to whatever profit is left over after other providers of finance have received their interest payments and after any retained earning decisions have been made by the directors. Equity represents an investor's ownership in a firm (Brigham, 2004).

Equity securities may be listed on an exchange or over the counter market or traded as private listings. The marketability of equity varies according to the size of the company but is usually better than that of loan capital because the issue of shares is usually larger. The marketability of an equity security is deemed higher if listed on an exchange (Fabozzi, 1993; Brigham, 2004). However, this may not be the case in Kenya, where the market is very small in terms of trades (Blasky, 2004).

In terms of characteristics, equity as an asset class is deemed to be very risk especially due to capital losses, winding up and uncertainty and volatility of future income streams. Correspondingly and in tandem with the risk return trade off concept, equity usually give high returns to compensate for the high risk. However, the returns on equity are such that the initial running yield is usually low but dividends are expected to increase with inflation and real growth in company's earnings thus expected to give high returns (Fabozzi, 1993; Solnik, 2003; Levine, 1998).

There are a number of variations in the equity market such as deferred shares where dividends are paid once profits reach a certain level or dividends are paid at a certain date, redeemable ordinary shares, shares with varied voting rights and golden" shares in a newly privatised company. These variations have an effect on the marketability, return and risk levels of the equity (ActEd, 2002, Levine, 1998).

The returns from fixed income securities is a fixed level of income (whether dividends or coupon payments) over a stipulated period of time and capital gains (losses) if sold prior to maturity. Fixed income securities include: bonds, money market (short term) instruments, preferred stock, convertible issues, mutual funds, interest rate futures and put or call options on fixed income securities (Fabozzi, 1993).

Fixed income securities may be traded on an exchange, and if so, their marketability is increased. Government issues are considered to be risk free while commercial issues carry normal business risks. Fixed income securities are usually categorised on the basis of their markets where short-term instruments are referred to as money market instruments and the long-term securities are referred to as capital market instruments. They are usually unsecured IOUs and are issued in large denominations. The main challenge is to manage default risk of the insurer (Fabozzi, 1993, Techne, 2004; Fabozzi, 2004).

Money market instruments are short-term instruments which are low risk and highly liquid. These instruments include treasury bills, commercial paper and money market certificates. The money market is a useful tool for controlling economic development and in particular for adjusting economy liquidity needs (Fabozzi, 1993). The trading of money market instruments is influenced to a large extent by the monetary policies of the government. They usually have less than one-year maturities. In Kenya, the 91-day Treasury bill is a popular issue with investors.

Bodle, Kane and Marcus (1993), note that money market instruments are rarely traded on organised exchanges but instead rely on market makers (dealers) to create the secondary market. The securities are therefore low risk, short maturity and highly marketable. They include treasury bills and commercial paper. Treasury bills are considered to be low risk investments and hence correspondingly low returns in an efficient market environment. They are issued by governments which are seen to have a low default risk (Fabozzi, 2004).

Commercial paper on the other hand represents a form of short term borrowing for large companies. The paper is issued at a discount and redeemable at face value. By buying the commercial paper, the investor is lending money to the company to be paid at a rate of interest slightly higher than that of risk free investments. The size of the margin depends on the company's credit rating and is used to finance short-term working capital deficiencies (Techne, 2004).

Capital market instruments are financial claims with more than one-year maturities. They are long term in nature and their main purpose is to transfer funds from savers to borrowers. These instruments include bonds, preferred stocks and convertibles. The securities have higher risks, longer maturity and are less marketable than the money market instruments (Fabozzi, 1993; Bodle, 1993). Government/Treasury bonds are formed when the government issues loan capital to raise money from investors and in return the government pays the investor a string of interest payments plus a return of capital eventually. The amounts of interest and capital payments are specified at the outset (ActEd, 2002; Fabozzi, 2004).

For government or treasury bonds, there is no security provided to the investor and issues do not place restrictions on the government's future borrowing powers. The government is seen to be the ultimate guarantor of all investments in the country and therefore deemed to have low or zero risk. More so, the government has the ability to print money to meet its obligations thus default risk is considered to be low. It is important to note the Government of Argentina has defaulted in its payments on a government issue. This resulted in very high inflation and investors are still paying for this high interest high inflation era. Thus investors should not assume there is no default risk associated with government issues (Blasky, 2004).

Returns on government securities depend on the duration and the issue size which affects its marketability. The marketability of the bond is good as the issues are readily available in both the primary and secondary markets. Also, government policies may promote the level of investment in treasury bonds and bills hence promoting marketability. In Kenya the maximum allowable investment for retirement schemes at 70% is set to promote investments in government securities (RBA 2000). Inflation also affects the returns achieved especially since the overall returns from bonds are relatively low.

Corporate bonds are like government bonds but less secure as they bear the normal business risks of the issuing company. Corporate bonds usually vary in maturity from few days to 30 or 40 years. They may be secured or unsecured by the assets of the issuing company (ActEd, 2002). In Kenya, corporate bonds are slowly becoming a preferred means of investment for institutional investors. This is primarily due to the fact that these bonds tend to have longer maturities than the government issues and hence allow the firms to lock in the prevailing rates for longer durations (Blasky, 2004).

The level of risk associated with corporate bonds is higher than that of government bonds primarily because companies issue them. There is no security provided to investor and issues do not place restrictions on the issuing company's future borrowing powers thus even more risky than unsecured loan capital. The corresponding return on the corporate bonds is relatively higher than that of the government bonds in line with the risk return trade off concept (Myers, 2000). Marketability of corporate bonds is better than debentures and unsecured loan stock but not as good as government stock. Corporate bonds are less marketable than government securities mainly because they are smaller in size as compared to government issues (Fabozzi, 1993; Bodle, 1993).

Preferred stock are less common than ordinary shares. Preference shares are a hybrid security as they have both the features of ordinary shares and debentures or loan stock. Assuming the company makes sufficient profits, they offer a fixed stream of franked investment income. Their investment characteristics are more similar to those of unsecured loan stocks/bonds than ordinary shares (ActEd, 2003; Bodle, 1993; Myres, 2000).

Bodle (1993) and Myres (2000) show that the similarity between preference stock and ordinary shares arise from the fact that non-payment of dividends to preference shareholders does not force company to insolvency, dividends are not tax deductible and in some cases, the maturity date on the stock may not be fixed. On the other hand, they are similar to debentures/bonds in that the dividend rate is fixed, preference shares do not share in residual earnings and preference shareholders have claim to income and assets prior to ordinary shareholders but have no voting rights. They are therefore considered to be less risky than equity but are more risky than bonds. Similarly their features in respect to return and marketability lie between those of bonds and equity.

Convertibles are almost always invariably unsecured loan stocks or preference shares that convert to ordinary shares of the issuing company. This additional prospective return means the issuer does not have to offer very high rates of interest on loans to attract lenders. There are very many types of convertibles because of the different variables available on loans. These variables include the annual rate of interest, conversion date, conversion terms, and basis if no conversion takes place, conversion premium among others (ActEd, 2003; Bodle, 1993; Myres, 2000).

The principle features of convertibles as summarised by Myres (2000) include lower risk than that of the underlying share because there is less volatility in the price of the convertible than in the share price of the underlying equity because the dividend payment is fixed and does not depend on the short-term profits of the company. The option to convert an ordinary share to a fixed interest security allows investor to be sure of a certain minimum return.

The return on convertibles are also relatively higher than ordinary shares to compensate for lack of dividend growth but have lower return than loan stock or preference shares. The marketability of the convertibles on the other hand varies according to the size of the company but is usually better than that of loan capital because the issue of shares is usually larger, usually only one type of ordinary shares are issue and investors prefer this mode of investments (Bodle, 1993).

The different asset classes have different risk, return and marketability considerations. It is therefore necessary to determine which of the different asset classes may be applied in developing a pension immunisation strategy.

2.5 Pension assets and immunisation

The concept of immunisation was developed with the intention of locking up interest rates of investment portfolios over a pre-specified period of time. Cash and cash equivalents provide very low returns and due to their liquid position that usually represent a small portion of the overall pension portfolio. Property assets although more popular in retirement scheme investment portfolios in Kenya, have very low liquidity and very volatile returns. Thus it is difficult to develop an immunised strategy on the basis of property assets or cash and cash equivalents.

With respect to equity, Fabozzi (1993) identifies a number of challenges an equity investor faces which make it difficult to use equity as an underlying asset for pension immunisation. The first challenge being that equity by nature provides a stream of income through dividends but this income is not guaranteed as it depends on the overall performance of the company. Secondly, equity offer returns through capital appreciation on sale of the securities. Thus immunising a portfolio based on equity returns is therefore difficult, as the returns cannot be estimated with any certainty.

Other challenges include the low choice of equity vehicles within the equity class. This means an equity investor has very few options for diversification of the portfolio. The available options include common stock, mutual funds, convertibles (in some cases) and derivatives such as futures and options. However, these vehicles are not available in most countries including Kenya and where available their pricing mechanisms are still very subjective. Fixed income securities by comparison offer more variability for purposes of diversification and their pricing is relatively straightforward hence objective as it involves discounting of defined cash flows.

Equity investors also require a detailed analysis and selection process before making a stock selection investment decision. This process is usually complex with high degrees of uncertainty in respect of stock prices and dividend payments. On the other hand, fixed income securities are influenced primarily by interest rate movements. This reduces the degree of variability and the uncertainty associated with default risk can be mitigated by carrying out a credit analysis of the issuer (Fabozzi, 1993).

Equity investors seek a larger proportion of their portfolio returns from capital gains. Fixed income securities seek returns from three main sources, coupon payments, reinvestment returns and capital gains. Usually fixed income securities are held to maturity and capital gains are not a big concern.

Fixed income securities are better suited for locking in interests over fixed period of time which is the main purpose of immunisation (Fabozzi (1993). Redington (1952) therefore developed immunisation as an investment strategy which relies on a bond portfolio as the underlying asset as these provide a regular level of income (coupon/dividend rate) over a stipulated period of time.

2.6 Bonds

Bonds are a type of fixed income security and in fact from its onset the concept of immunisation has been studied with an underlying bond portfolio. It is therefore necessary to understand the different features of bonds and to relate this to the concept of immunisation (Fabozzi, 1993). Bonds are categorised depending on the issuer and include treasury bonds, corporate bonds and international/euro bonds. Other bond securities, not available in Kenya, include municipal bonds and mortgage-backed securities. An application has been made by Barclays Bank of Kenya to finance their mortgage product through a bond issue. It is therefore anticipated that mortgage-backed securities will be introduced in the Kenya capital market in the near future (Blasky, 2004).

Bonds are fixed income securities with determined level of income or coupon rate over a stipulated period of time. The trading of bonds is relatively easy and the secondary market provides for liquidity to capital markets as it allows investors to alter their liquidity needs and risk composition to adjust for market or price changes (Fabozzi, 1993). It is therefore necessary to analyse the principle features of bonds including: bond markets, marketability, type of issuer, maturity, coupon and principal, bond yield, volatility, duration, convexity and dispersion.

2.6.1 Bond markets

The bond market is an institutional market that is one where institutions like pension funds, insurance companies, financial institutions and other institutions that have issued debt instruments trade in large volumes with little publicity. Usually large corporate bonds are traded on an organised exchange. However, recent developments and particularly with need for less publicity, the focus has shifted to over the counter markets for bond trading (Fabozzi, (1993; Bodle, 1993).

Fabozzi (1993) indicates that the over the counter market relies on dealers to 'make the market'. The dealers usually trade their own accounts by quoting a bond continuously in the market. The bid offer spread then determines the profit margin made by the dealer on a trade. Brokers play a key role in bond trading as they execute orders from customer account and are paid a commission for their services.

2.6.2 Marketability

The marketability or quality of a bond is determined principally by the size of spread. Fabozzi (1993) and Bodle (1993) define the spread of a bond as the difference between the bid and ask price for the bond. A bond with a narrow spread of 1/8% - ½% is viewed to be highly marketable while one with a wide spread of 2% - 3% is said to have poor marketability. A highly marketable bond is one that is quoted continuously by dealers as there is a market for it.

The price of a marketable bond is higher than that of a bond which is less marketable due to higher demand. This represents a cost as the higher price results in correspondingly lower yields on the bond. However, most investors do not incur initial costs of issuing the bond and also aim at making capital gains thus their margin of loss is less with a marketable bond.

2.6.3 Type of issuer

The largest issues are usually government issues, domestic corporations and municipal governments in the United States of America. The different issuers have over time developed different practices and cultures with regards to their borrowing practices. These differences result in differences among the bonds with respect to yield, denomination, safety or security, maturity, tax status and other provisions (Fabozzi, 1993). This therefore suggests that an element of diversification can be achieved in the bond portfolio.

2.6.4 Maturity

Bond maturity is determined as the date on which the debt will cease to exist or issuing firm may redeem the issue by paying its face value or principal. Term to maturity on the other hand, is defined as the number of years during which the borrower has promised to meet the conditions of the debt.

The concept of maturity is very important as it indicates the expected life of the debt instrument and hence the expected cash flows from the bond. Further, the yield of bond depends on its maturity with long term bonds giving higher maturity to compensate for the correspondingly higher risks associated with refinancing by the issuer (Fabozzi, 1993).

2.6.5 Coupon and principal

Bond coupon refers to the fixed/floating interest payments made to the investors during the life of the bonds. The frequency of payments of coupons may be made annually, semi-annually or other arrangement as agreed. Different variations may arise depending on the treatment of coupons such bearer bonds, registered issues, income bonds and zero coupon bonds (Fabozzi, 1993; Bodle, 1993).

Principal is the amount to be repaid at maturity of the bond or if the bond is called prior to maturity. It is important as it forms basis for defining coupon payments. The principal is also referred to as the face value of the bond (Birgham, 2004).

2.6.6 Bond yield

There are three sources of returns from bonds and these are: coupon payments, interest from reinvestment of coupon payments and the capital gain (loss) from the disposal of the bond. A number of bond yield measures have been developed to try and quantify the rate of return from the bond. Fabozzi (1993) identifies four different yield measures each of which has advantages and disadvantages. Current/coupon yield is the ratio of the coupon payment over the bond price. It is very simple to determine but does not take into account the principal amount paid at maturity. The yield to maturity measure is the rate of return the investor would earn from an investment that would give the same cash flows as the bond at the same price. It is a reflection of the internal rate of return on an investment and hence can be viewed as the discount rate that makes the present value of cash flows equal to the price (Birgham, 2004; Reilley, 2003.

The price of the bond is inversely proportional to its yield to maturity. This measure takes into account all cash flows from the bond however it assumes the coupons are reinvested at the same yield to maturity which may not be true in practice. The yield to maturity ('YTM') affects bond volatility, in that; a bond with a higher YTM will display lower price volatility than one with a lower YTM (Investopaedia.com, 2004; Techne, 2004).

The third yield measure is the yield to call which applies only to bonds with a call provision. The yield to call is determined similar to the yield to maturity but assumes the term of the bond expires at the time the call applies. It therefore has the same advantages and disadvantages as yield to maturity as a measure however an added limitation is it ignores events after the call period (Fabozzi (2004). The final measure is the realised compound yield which allows for the interest on interest component which has not been accounted for by the other measures. Bonds selling at a premium are more dependent on the interest on interest component of the total return. For a zero coupon bond the yield to maturity measure is the same as the realised computed yield. The main disadvantage of this measure is it is difficult to compute. (Fabozzi (2004); Fabozzi (1993).

2.6.7 Impact of time on bond price

It is important to note that even if yields are held constant, the price of a bond will change with passage of time. This is because the outstanding cash flows reduce with time and so does the discounting period for the future cash flows when determining the present value and hence the price of the bond.

2.6.8 Bond price volatility

Volatility is the change resulting from an instantaneous change in market yields. Bonds prices have an inverse relationship with interest rate movements. Volatility is therefore a measure of the degree of price change as a result of interest rate changes (Investopaedia.com, 2004). The volatility of bond prices increases as coupon rates decrease for a given maturity and bond yield. Discount bonds are usually more responsive to changes in market yield (all other factors held constant) and the larger discounts resulting from differences between coupon and market yield the greater the responsiveness of bond price to changes in market yield (Fabozzi, 1993; San-Raquejo, 1997).

Volatility increases with increased term to maturity (assuming all other factors are held constant) this is because in practice if interest rates are expected to increase then bond prices will decrease by a larger proportion particularly for long term bonds. This increased risk is reflected in the increased volatility. From a capital appreciation perspective, investors would typically avoid long-term bonds if interest is expected to rise as this will not provide opportunity for capital gains (Fabozzi, 2004).

The degree of volatility of a bond and hence the associated degree of risk of the bond is determined by its bond duration. Generally, bonds with higher duration will have higher price fluctuation than those with lower duration (Blench, 2002).

2.6.9 Bond duration

The concept of bond duration was introduced by F Macaulay in 1938 and is commonly used by portfolio managers and investment analysts. Redington, a British Actuary, used the concept of bond duration to develop the technique of immunisation (Blench and Affleck-Graves, 2002).

Fabozzi (2004) indicates that duration is defined as a measure of responsiveness of a bond's price to changes in market yields. It allows an investor to quantify the trade off resulting as interest rates change over the investment horizon. Effective determination and understanding of the duration measure results in correctly weighted trades and proper estimation of portfolio volatility.

The term duration in the context of bonds is therefore a measure of how long in years it takes for the price of a bond to be repaid by its internal cash flows (Investopaedia.com, 2004). Fabozzi (2004) however indicates that the definition of duration as a measure of time without reference to it as a measure of responsiveness of bond's price to changes in market yield may lead to confusion.

Fabozzi (1993) identifies three different measures of duration. The first one, the Macaulay Duration is actually a weighted average term to maturity, which allows for the present value of all cash flows from an investment. In essence unlike maturity, duration considers all cash flows and their timings and not just the date the final payment is made.

$$Duration = \sum_{t=1}^{n} \frac{PVCF_t * t}{\sum PVCFt}$$, where $PVCF_t$= present value of cash flows at time t.

The second measure is the Modified Duration which was developed by Hicks in 1939. This is statistically a better measure for volatility and it is used to estimate the percentage volatility of fixed income securities in practice.

$$\frac{\Delta \Pr ice}{\Pr ice} * 100 = -D_{\mathrm{mod}} * \Delta Yield; D \bmod = \frac{Duration}{1 + \frac{yieldtomaturity}{Disountingperiodperyear}}$$

The third measure identified by Fabozzi (1993) is the Portfolio Duration which is determined as the weighted average of durations of individual securities. The weights applies are the present values of the securities in the portfolio. It is therefore referred to as market weighted duration.

$$PortfolioDuration = \sum_{t=1}^{n} \frac{(price(PV))* duration}{\sum fullprice(PV)}$$

In application, duration is used to measure the degree of risk of a portfolio (though more accurate is the modified duration measure) and also to construct hedges and weight arbitrage trades (Babic and Aljinovic, 2001).

2.6.10 Bond convexity

This refers to the convex curve that results on plotting a graph of yield to maturity (x-axis) and price change per basis point of yield. The convexity of bonds arises because the % increase in price when rates decline is greater than the % decrease when rates increase hence a convex graph. This property of bonds causes the associated error in the estimate of price changes as a result of duration/maturity to increase as the change in yield increases (Fabozzi, 1993).

Convexity is as a result of the spread of cash flows from the duration point. The further away the cash flows the higher the degree of convexity due to changes in yield. This is due to the dispersion of present values of cash flows about the duration point (Fabozzi, 2004).

2.6.11 Bond Dispersion

Dispersion is a measure to control the degree of barbelling arising as a resulting from the spread of cash flows during the time period until maturity. This is particularly useful when considering the Macaulay measure of duration where the discount rate is the yield to maturity or the internal rate of return of the bond (Blench, 2002; San-Requejo, 1997).

Techne (2004) indicate that in calculating yield to maturity or internal rate of return, we assume a flat yield curve at all times. In reality, the actual yield curve is inverted and depending on the degree of barbeling of cash flows the degree of inversion is more evident. It is therefore necessary to allow for the impact of dispersion when looking at different maturity structures of bonds or investments when determining an investment strategy.

Fabozzi (1993) identifies three different maturity structures. The first being the barbell structure, which has two almost equal payments at extreme points on the time horizon. This represents a volatile 'flat' curve assumption when plotting the yield curve due to the averaging effect over the time horizon. In reality though, this 'flat' curve is not representative. The second one is the even ladder structure where the cash flows are almost even and equally spaced during the time horizon. An example of this is the pension annuity payments. The flat curve resulting on plotting the yield curve is representative of the actual yields to maturity since the cash flows are evenly spaced.

The third maturity structure is known as the bullet structure. This structure concentrates cash flows at a single point and usually at maturity such as zero-coupon bond. The associated degree of risk exposure is correspondingly higher due to the time period to actual payment. Fabozzi (1993) further defines dispersion as the degree of barbeling or volatility of the assets and/or liabilities subject to the maturity structures.

2.7 Pension immunisation

This is an asset liability optimisation strategy which is most effective when actively monitored to take advantage of return enhancement. As mentioned earlier, immunisation is the locking up of a fixed rate of return over a pre-specified period of time or time horizon. It can also be looked at as the generating of a minimum future value that meets a predefined objective at the end of a specified horizon.

The key therefore is to manage the structured programme such that the investor takes advantage of return enhancements while minimising opportunity cost and still benefit from lower risk that is optimise the portfolio. The interaction of the key factors that is duration, coupon rate, term to maturity and price volatility are all important in adopting an immunisation strategy (Investopaedia.com, 2004).

Immunisation may be viewed from two perspectives: single period immunisation and multi-period immunisation. Single period immunisation focuses on locking up the returns for a given period while multi-period immunisation allows us to apply the principles applied in single period immunisation for multiple periods of time.

2.7.1 Single period immunisation for zero coupon bonds

This is the simplest form of immunisation strategy and it focuses on actively managing a single time/planning horizon. Single period immunisation is a very straightforward approach to portfolio management and more so when you consider a zero coupon bond and a single liability payout. Asset Consultants (2004) use this form of immunisation to introduce trustees and investors into the concept of pension immunisation before extending it to more complex forms.

By definition, a zero coupon bond, is one that allows the investor to lock in a fixed rate of interest for a fixed period after which they receive a single payment equal to the maturity value. Assuming a single payout liability, it is therefore possible to guarantee the fixed payment at the end of the period and hence immunise the liability. Conceptually, this would entail ensuring the payment at maturity is equal to or exceeds the required liability payout at the time (Fabozzi, 1993).

Fabozzi (1993) identifies three conditions that have been established as being imperative for effective immunisation. In order for an effective pension immunisation strategy to be implemented it is necessary for the fund manager and the actuarial consultants to liaise to ensure these conditions are met. These conditions are that the duration of assets should equal duration of liabilities, present value of assets equal liabilities and dispersion of liabilities equal to assets.

The concept of duration, which is the first condition, was applied by Redington in the 1950s to develop the technique of immunisation. Redington argued the average duration of the assets must equal the average duration (or time horizon) of the liabilities in order to effectively immunise the portfolio of the effects of small interest rate changes. He felt by matching duration, assets and liabilities would be equally structured to price changes due to interest movements and hence liabilities would be immunised. However, this condition is not sufficient because the value of the assets and liabilities would also need to be matched for this equal structuring to have an immunisation effect (Techne, 2004).

Consider a five year zero coupon bond of KShs 100,000 and a single period provident fund liability of KShs 1,000,000 payable in five years. Assume the prevailing rate of interest in the market is 9% per annum. The duration of the assets and the liabilities is the same at 5 years hence the first condition for immunisation is met. However, the value of the assets and liabilities are too disproportionate for the value of assets to match or exceed the value of the liabilities and hence the liabilities are not immunised.

The second condition deals with the present value of both the assets and liabilities should be determined using the internal rate of return of the assets. This is necessary to ensure comparison and structuring of the investments to equally match the liabilities. From the example above, in order to immunise the provident fund liability of one million, one would need to purchase a five-year, zero coupon bond with a present value of KShs 643,937 and invest it at the market interest rate of 9% (the internal rate of return).

2.7.2 Dispersion of liabilities = Dispersion of assets

From the definition given by Fabozzi (1993), immunisation is the investment of assets in such a way that the existing business is immune (protected) from a general change in rate of interest. In order to do this on a continued basis, it would be important to a large extent to match the cash flows from the assets with the required liability cash flows.

Assume in the example above that the first two immunisation conditions are met. Further, assume analysis of the provident fund liabilities reveals that benefits are due for payment every quarter over the five-year period. Immunising the portfolio using a five-year zero coupon bond would not work. This is because the cash flows from the bonds are payable at maturity and hence the scheme would suffer a liquidity crunch which would force them to sell the bond (Fabozzi, 1993; San-Requejo, 1997).

Matching the dispersion of the assets and liabilities, allows the investor to match the cash flow variations of the assets and liabilities to ensure the movements as a result of barbeling are reflected in the immunisation portfolio. For zero coupon bonds, it is possible to ensure all three conditions are met. In addition, regardless of the future fluctuations in interest rates the zero coupon bond portfolio is price insensitive as the issue of reinvestment and hence interest on interest element is not relevant. Further, zero coupon bonds can be cash matched and duration matched to the liabilities. The objective or challenge in this case, therefore is to match the single period liabilities to the single period cash flow from the zero coupon bond (Asset Consultants, 2004).

2.7.3 Single period immunisation for coupon bonds

Investment returns from coupon bonds arise from three sources. These are the coupon payments, returns on reinvestment of the coupon payments and from capital appreciation on sale of the bonds. This presents an added challenge not present in zero coupon bond immunisation.

This is the reinvestment problem arising due to the interest on interest component of the returns. This is particularly important for long term bonds due to the impact of compounding. The challenge therefore for immunisation is to manage this problem while determining the duration of the assets/bonds (Fabozzi, 1993; Andrews, 1997).

Reinvestment risks arise because it may be difficult to find an investment security that provides a larger or equal yield as the yield to maturity of the bond for reinvestment. This is further compounded by the fact that coupon proceeds could be consumed through taxation or expenses before reinvestment. Reinvestment risk can be managed or even reduced but not eliminated. This can be done by investing in low coupon bonds hence the interest on interest component of return is minimal or by buying zero coupon bonds. The main disadvantage of using zero coupon bonds is the opportunity cost of not reinvesting coupons (Fabozzi, 2004; Reilley, 2003).

For coupon bonds, according to Babic and Aljinovic (2001), the duration of the bond is said to be the point when the impact of the capital gains and interest on interest returns equally offset each other. Capital gains are made when the market rates rise and hence price falls on the other hand the interest on interest component increases with time. This suggests that regardless on one-time interest movements an investor may still be able to earn the yield to maturity if the holding period is equal to the duration of the bond.

2.7.4 Multi-period immunisation

This allows an investor to extend the principles of single period immunisation to create an immunised portfolio that satisfies the requirements of multi-period liabilities such as pension scheme liabilities.

This is done by creating different single period immunisation portfolios to match each of the multi-period liability requirements. For example, if the liability comprises of 30 annual payments then the investor creates 30 single period immunised portfolios to match the 30 liability payouts. This therefore implies the three conditions identified would need to hold for effective multi period immunisation (Fabozzi, 1993).

The challenge however is determining the duration in respect of multi period liabilities. For single period liabilities, duration is given as the remaining time in the planning horizon to the next payment obligation. For multi-periods, the duration may be determined using the internal rate of return of the assets (bond portfolio) created to immunise the liabilities. However the internal rate of return is not known in advance because the asset portfolio needed for immunisation depends on the satisfactory meeting of the three immunisation conditions (Fabozzi, 1993; and Asset Consultants, 2004).

To address this constraint, the construction of the immunised portfolio is an iterative process where the internal rate of return ('IRR') for the portfolio is advanced as a guestimate, the duration and dispersion of the liabilities are then calculated on the basis of the IRR guess and compared to the asset estimate. The process is repeated until a match is determined. This is done to ensure all the three conditions hold for the multi-period portfolio to offer reasonable protection or immunisation from shifts in future yield curves.

2.7.5 Portfolio rebalancing

San-Raquejo (1997) indicates that the rebalancing of an investment portfolio is crucial and this applies for the immunisation strategy. Rebalancing is required to ensure at all times the three conditions are not violated. This is particularly so for the duration condition which is affected by the movement of time and also when payments become due. Also, rebalancing is necessary to offset the effects of capital gains or losses with reinvestment return (Blench and Affleck-Graves, 2002).

For effective rebalancing of the immunisation portfolio, the investor requires coupon income, matured principal and proceeds obtained from liquidation of bonds to be reinvested in securities that maintain the overall portfolio duration equal to the remaining planning horizon of the liabilities (Fabozzi, 2004). This is necessary to ensure the portfolio achieves the target return despite of periodic movements in rates.

2.7.6 Limitations of the immunisation strategy

Fabozzi (1993) and Blench (2002) identified the following three main limitations to adopting an immunisation strategy. The first limitation is that it may not be possible to immunise beyond a certain number of years using coupon-bearing instruments only. This is due to the inverse relationship between duration and prevailing yields and coupon rates. This is mitigated to a large extent by the use of longer-term zero coupon bonds which can match the longer planning periods.

Secondly, the target return for an immunised portfolio is determined on the basis of prevailing market rates at the time of initiation. The market rates are not constant over the planning period thus the rebalancing of the portfolio may involve reviewing the target return and hence the reviewing the portfolio in its entirety (Fabozzi, 1993; Blench, 2002).

Thirdly, using the normal risk return trade off relationship, the return from an immunised portfolio may be lower than that of a non-immunised portfolio since its standard deviation (or risk) is lower since the return is more or less guaranteed in advance. This is largely due to the opportunity cost of not investing the resources in higher risk and higher yielding assets such as equity securities (Fabozzi, 1993; Blench, 2002).

2.7.7 Variations to immunisation

In order to deal with the above limitations to effective implementation of an immunisation strategy, a number of variations have been developed (Fabozzi, 1993). One of the variations is referred to as combination/horizon matching which aims to provide a duration-matched portfolio with the added condition that it is also cash matched in the first few years of the planning horizon. This added liquidity condition is deemed necessary to ensure cash flow needs in the initial period are met without requirement for rebalancing of the entire portfolio. This allows for the flat yield curve assumption to apply as the initial period which is usually the one with the highest descent is catered for and hence it reduced risk of non-parallel shifts in the sloped yield curve. The combination/horizon matching variation however has very high opportunity costs due to the liquidity requirement and also reduced the swapping ability of the investor.

Contingent immunisation is another variation identified by Fabozzi (1993) which involves blending active management strategies and immunisation to provide a portfolio that is 'actively managed' with lower guaranteed return over the horizon. The floor or safety net return is usually set below the immunised rate thus giving the portfolio manager room to take advantage of market movements. The challenge of this portfolio is it adds yet another element to be managed by the portfolio manager. This is the floor or minimum guarantee. The portfolio manager would need to rebalance the portfolio if this floor or minimum guarantee is violated even though all other factors are held constant.

The use of derivative instruments may also act as a variation to immunisation. Derivative instruments are a useful tool for controlling and managing risk. These derivatives include options and futures which may be used to replicate yields that are sensitive to the immunised portfolio. They may also be used to take advantage of market movements and hence enhance returns on the immunised portfolio. The use of derivative instruments and particularly in relation to pension scheme funds is still under debate (Fabozzi, 1993; Chance, 2003).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research design

The research study is a survey. In a bona fide survey, the sample is not selected haphazardly or only from persons who volunteer to participate. It is scientifically chosen so that each person in the population has a measurable chance of selection. This way, the results can be reliably projected from the sample to the larger population (ASA, 2004).

Information is collected by means of standardised procedures so that every individual is asked the same questions in more or less the same way. The survey's intent is not to describe the particular individuals who, by chance, are part of the sample but to obtain a composite profile of the population. The standard applicable for all reputable survey organisations is that individual respondents should never be identified in reporting survey findings. All of the survey's results should be presented in completely anonymous summaries, such as statistical tables and charts.

Given that the research study was to determine whether the framework exists for immunisation and the potential challenges that the implementation of this strategy would encounter, it was deemed prudent to carry out a survey.

3.2 Population

The population of the study constituted all fund managers approved and registered by the Retirement Benefits Authority as well as all actuarial consulting firms approved under the Retirement Benefits Act, 1997 and subsequent Regulations. As per the RBA Newsletter of September 2004 there are thirteen registered fund managers and seven approved actuarial consulting firms (see Appendix 1).

3.3 Data collection

A semi-structured questionnaire was distributed to fund managers and actuarial consulting firms with a view to determining the future potential of having pension immunisation as an investment management strategy available to retirement scheme trustees.

The questionnaire was administered through "drop and pick later" method. This involved the distribution of a mail questionnaire to all respondents by either electronic mail. Follow up telephone calls were made to ensure respondents had received the mail and that they were willing and ready to respond.

The empirical findings of the views presented by the respondents were presented and any divergent views between the respondents reported and particularly in cases where the respondents gave additional relevant information. The results were analysed using statistical methods.

3.4 Data analysis

Data was analysed by use of descriptive statistics including mean, mode and median measures. The primary use of descriptive statistics was to describe information or data through the use of numbers (create number pictures of the information). Descriptive statistics were used to describe groups of numerical data such as test scores, number or hours of instruction, or the number of students enrolled in a particular course (Defusco, 2004). Descriptive statistics such as mean, mode and percentages were used to analyse the data and graphs and charts used to present the results. In particular, frequency graphs, histograms, and scatter graphs have been used.

Comparative analysis was used to identify the differences in views between the fund managers and the actuarial consultants regarding the concept of portfolio immunisation and the potential challenges that would be faced in applying the strategy to retirement funds in Kenya.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATIONS

The population of the study comprised of all thirteen fund managers and the seven actuarial consultants approved and/or registered with the Retirement Benefits Authority under the Retirement Benefits Act 1997 and subsequent Regulations as set out above.

4.1 Actuarial consulting firms

There are currently seven (7) actuarial consulting firms registered with the Retirement Benefits Authority to practice in Kenya. Of the seven, only four, which represents 57% of the total population, have physical presence in Kenya.

Questionnaires were distributed to all seven actuarial consulting firms by email and follow up using telephone calls made to the respondents in Kenya with follow up emails sent to respondents abroad. Confirmation of receipt of questionnaires was received from all respondents. Responses were received from three out of the four of the actuarial consulting firms with presence in Kenya.

Respondents from the three actuarial consulting firms located outside Kenya indicated they felt the level of sophistication of the Kenyan retirement benefits industry was still too low to engage in a portfolio immunisation strategy. It is also important to note that these firms have not carried out actuarial work in Kenya for an extended period of time thus may not have an existing client (schemes) portfolio to enable them respond to the questionnaire.

The questionnaire was also forwarded to four of the largest insurance companies in Kenya, as determined in the report from the Commissioner of Insurance, which have established actuarial departments to expand target population size. Of these insurance companies, only one responded to the questionnaire. It is important to note that this particular firm also has a subsidiary that acts as fund manager to a number of schemes in the market.

Follow up telephone conversations with the remaining three insurance companies revealed that they are fully reliant on the guaranteed schemes arrangement through their deposit administration product and hence have not given any consideration to portfolio immunisation as a strategy.

4.2 Fund managers

Questionnaires were distributed to the thirteen fund managers approved and registered with the Retirement Benefits Authority. Of the thirteen firms, five of them are affiliated companies or subsidiaries of insurance companies with one having been registered at the end of the year 2004.

Only one (20%) of the firms affiliated to insurance companies was able to fill the questionnaire with the rest indicating that they have yet to rollout portfolio management services to retirement schemes in Kenya. This is largely explained by the fact that the core business of these subsidiaries currently is to manage the investments of the insurance companies including the deposit administration (guaranteed schemes) portfolio.

One of the registered fund manager firms is a subsidiary of a major bank/financial institution in Kenya and thus is largely involved in the portfolio management of the banks assets and not portfolio management of retirement schemes. This firm did not fill the questionnaire.

Of the remaining seven registered fund managers five responded to the questionnaire. Thus in total of all the fund manager respondents in the population only six filled the questionnaire. This represents approximately 50% of the total population.

Table 3: Response rate of fund manager respondents

	Number of Respondents Approached	Number of Responses Received	Response Rate
Affiliated or subsidiaries to insurance companies	5	1	20%
Affiliated or subsidiaries to bank	1	0	0%
Other registered fund managers	7	5	71.4%
Total	**13**	**6**	**46.2%**

Source: Research Data

4.3 Empirical findings and analysis

The views presented by respondents are presented and analysed under three areas based on the research objectives and covered in the questionnaire. The first area was to determine whether a framework to support immunisation of retirement benefits schemes exists in Kenya. The second is to determine if the trustees (through the fund manager and actuarial consultants) estimate the maturity value and present values of the assets and liabilities prior to making investment decisions. The final aspect as to identify the potential challenges foreseen by the fund managers and the actuarial consultants should immunisation of retirement benefits schemes be practiced in Kenya.

Further the results are viewed based on the two categories: fund managers and actuarial consultants. Descriptive statistical analysis were undertaken in order to review the relationship amongst the respondents within each category as well as between the two categories.

Preliminary analysis reveals that the responses of the respondents within the same category differ slightly with the differences arising largely from minor technical details or interpretations. Given that the respondents in each category interact with each other and operate in the same economic environment, consensus is predictable.

It is important to note, that the preliminary analysis reveals divergence in views between the two categories. This divergence arises from basic principles such as the level of involvement of the parties in investment decisions making to more technical aspects of immunisation. This divergence is revealed by the statistical analysis.

4.3.1 Existence of framework to support immunisation of retirement benefits schemes in Kenya?

Respondents from both categories agree that a framework for immunisation of retirement benefits schemes exists in Kenya. This is supported by the statistics below that indicate that the respondents were able to categories retirement schemes by their liability profile, have the technical capacity to support the strategy, manage a significant volume of business (or assets) and there is reasonable level of trustee involvement in investment decision making.

The first two questions in the questionnaire aimed to determine whether the respondents are able to categories schemes by their design and structure of the scheme (also referred to as the scheme's liability profile).

All the actuarial consultants respondents provided this breakdown and only one of the fund managers declined to complete this section citing that they felt this was proprietary information that could not be divulged to third parties.

The accuracy of the responses provided by the respondents has not however been independently verified. It is possible from the level of detail provided by some of the respondents in the questionnaire to infer accuracy and completeness of the responses. For example, some of the responses given by respondents included "For the purposes of this questionnaire we are focusing on segregated funds (and not guaranteed schemes", "All provident funds are defined contribution schemes" and "Defined benefits schemes (including hybrid schemes)".

The responses given to the questions regarding the presence or absence of adequate technical ability are summarised in the table below.

Table 4: Presence of required technical ability

	Actuarial Consultants		Fund Managers	
	No.	%	No.	%
Average number of employees per firm	9	100%	9	100%
Averages (weighted by total number of employees per firm)				
- Number of employees with/pursuing first degree	7	78%	7	78%
- Number of employees with/pursuing second degree	2	22%	2	22%
- Number of employees with/pursuing professional exams	4	44%	4	44%

Source: Research Data

The analysis above reveals that approximately 78% of the technical employees hired by both the actuarial consulting and fund manager firms are graduate employees. This indicates the level of importance placed on education.

The average number of two employees with second degrees is lower than the average number of four employees undertaking or having professional examinations in both categories. The reliance of professional examinations to attain designations such as Fellow of the Institute of Actuaries (FIA) or Chartered Financial Analyst (CFA®) is common in highly specialised fields such as actuarial consulting and portfolio management.

The shift in focus to professional knowledge and qualifications is essential if the level of sophistication of the market is to be increased. It is anticipated in subsequent years an increasing number of employees will attain the relevant professional qualifications and provide this added resource base to the retirement benefits sector in Kenya.

Immunisation is a portfolio management strategy that aims to match assets and liabilities. This strategy can only be applied therefore to assets managed by fund managers who have some degree of discretion by which to actively manage the portfolio. This section aims to identify the level of investments held by Fund managers in Kenya in order to determine the scope for immunisation.

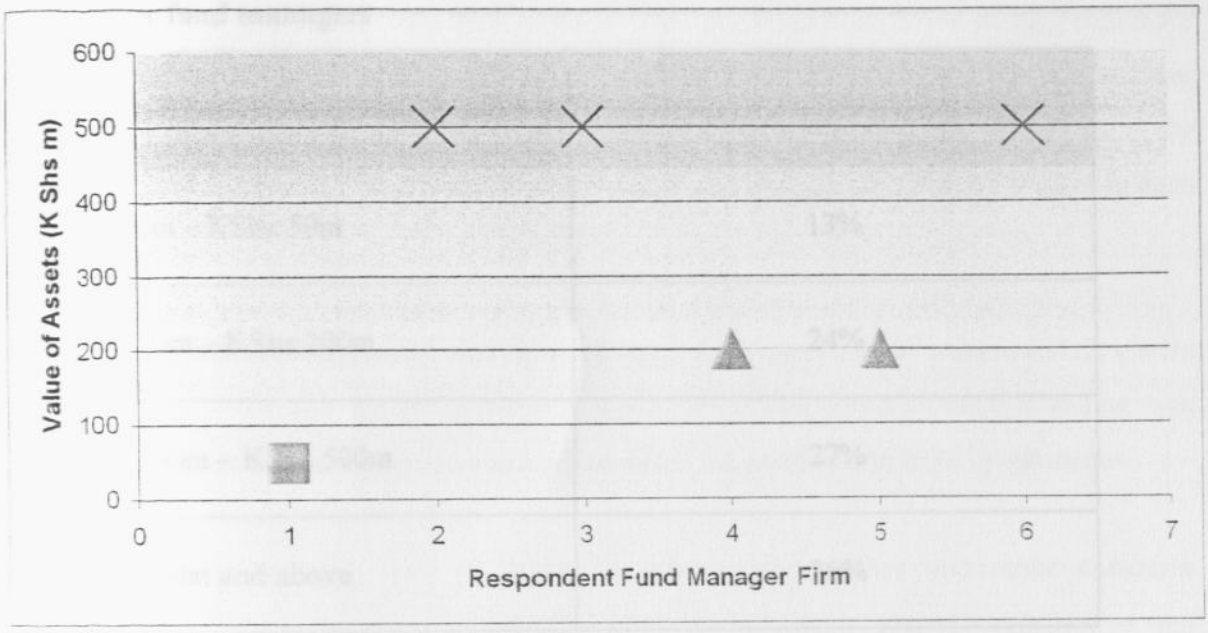
Table 5: Amount of retirement scheme investments managed by fund managers

Current Aggregate Portfolio Range for Fund managers	Number of Firms	Percentage (%)
KShs 0m – KShs 50m	-	-
KShs 50m – KShs 200m	1	16.7%
KShs 200m – KShs 500m	2	33.3%
KShs 500m and above	3	50.0%
Total	6	**100.0%**

Source: Research Data

50% of the respondents indicated that their current aggregate portfolio in respect of retirement benefits schemes are valued at over KShs 500m. 33.3% of the firms indicated that the value of the aggregate portfolio lies between KShs 200m and KShs 500m with 16.7% of the firms indicating that the value of its aggregate portfolio if between KShs 50m and KShs 200m. The firm with the lowest aggregate portfolio is the insurance company affiliate that has only recently began to provide the fund management service to retirement benefit schemes.

Graph 1: Distribution of aggregate retirement fund portfolio with fund managers



Source: Research Data

It is therefore reasonable to assume that with time the level of assets managed by professional fund managers will increase. This will give Fund managers greater responsibility and influence over the investment decisions of schemes and to some extent the capital market in Kenya in which retirement funds form a large part of the institutional investors.

The respondents in the fund manager category have indicated the following breakdown in the average weighted breakdown of their current aggregate asset portfolio in respect of retirement benefits scheme assets that they manage.

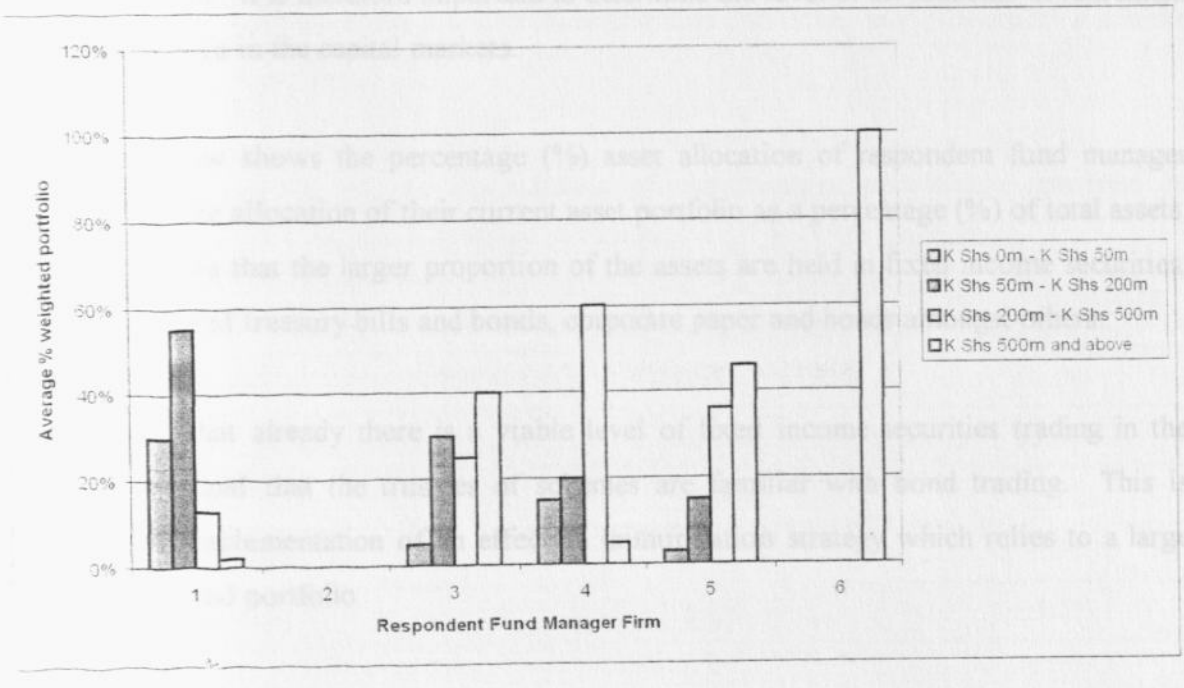
Table 6: Breakdown of weighted average current aggregate portfolio of retirement funds under fund managers

	Average % of total portfolio For fund managers
KShs 0m – KShs 50m	13%
KShs 50m – KShs 200m	24%
KShs 200m – KShs 500m	27%
KShs 500m and above	36%

Source: Research Data

The graph below provides an indication of the distribution of the total aggregate asset portfolios of retirement benefit schemes assets managed by the fund manager respondents.

Graph 2: Distribution of total aggregate asset portfolios of retirement funds



Source: Research Data

One of the respondents in the fund manager category (indicated in our analysis as firm number two), did not provide any indication of their portfolio breakdown citing proprietary information not available to third parties. This one firm represents 16.7% of the total number of fund manager respondents who participated in the survey. For purposes of determining the averages it is assumed that the second responded had an equal distribution of schemes in each category of asset value of 25% of total portfolio.

The above analysis indicates that each firm manages a diverse range of schemes if they were to be categorised by assets. Immunisation as a portfolio management strategy would be most suitable for schemes with larger asset bases that allow for diversification of investments.

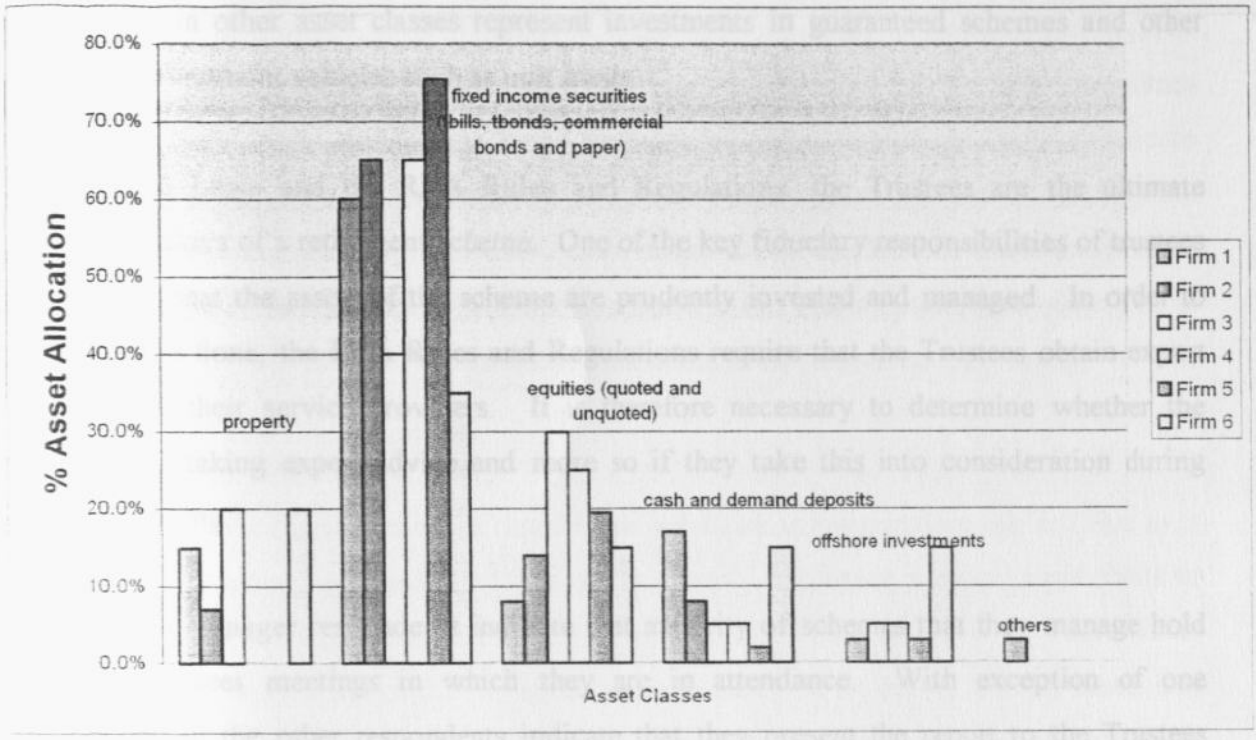
Smaller schemes typically tend to invest in guaranteed schemes and other collective investment schemes to enjoy economies of scale particularly with regard to expenses as well as greater diversification from the pool of investments. Immunisation would therefore be difficult to implement for schemes with small asset bases.

Retirement schemes are one of the largest institutional investors in the capital markets. The retirement scheme funds provide a large source of investment revenue for the capital markets around the world. It is therefore important to determine the level of investments of retirement schemes in Kenya in the capital markets.

The graph below shows the percentage (%) asset allocation of respondent fund manager firms. This is the allocation of their current asset portfolio as a percentage (%) of total assets. The graph shows that the larger proportion of the assets are held in fixed income securities, which comprise of treasury bills and bonds, corporate paper and bonds amongst others.

This suggests that already there is a viable level of fixed income securities trading in the capital market and that the trustees of schemes are familiar with bond trading. This is necessary for implementation of an effective immunisation strategy which relies to a large extent on the bond portfolio.

Graph 3: Proportion of asset allocation of retirement funds with the fund manager



Source: Research Data

The Retirement Benefits Authority has provided guidelines for investments of retirement funds. This guidelines were prepared with reference to modern portfolio theory which suggests that returns are achieved though diversification and hence has allowed for a scheme to hold a diversified portfolio.

Table 7: Comparison of the distribution of the average percentage portfolio of retirement assets with respondent firms as compared to the RBA guidelines

Asset Class	Average % of portfolio for respondent firms	RBA Guidelines (Maximum)
Property	10.3%	30.0%
Fixed income securities	56.8%	85.0%
Equities	18.6%	75.0%
Cash and demand deposits	8.7%	5.0%
Offshore investments	5.2%	15.0%
Others	0.5%	5.0%

Source: Resource Data

With exception of the cash and demand deposits, all the other asset classes are held within the RBA guidelines with over 50% being invested in fixed income securities. The 0.5% investments in other asset classes represent investments in guaranteed schemes and other collective investment vehicles such as unit trusts.

Under Trust Laws and the RBA Rules and Regulations, the Trustees are the ultimate decisions makers of a retirement scheme. One of the key fiduciary responsibilities of trustees is to ensure that the assets of the scheme are prudently invested and managed. In order to ensure this is done, the RBA Rules and Regulations require that the Trustees obtain expert advice from their service providers. It is therefore necessary to determine whether the Trustees are taking expert advice and more so if they take this into consideration during decision-making.

All the fund manager respondents indicate that majority of schemes that they manage hold quarterly trustees meetings in which they are in attendance. With exception of one respondent, all the other respondents indicate that they present the report to the Trustees themselves during the meeting. Further, all the respondents indicated that the Trustees make adequate use of the information provided in the investment reports.

We can infer from the above that adequate attention is paid to the asset side of management of retirement funds when making investment decisions. With respect to immunisation as an asset liability matching strategy it is necessary to determine if similar or more attention is paid to the liability profile of the scheme when taking investment decisions.

The responses from actuarial consultants are very varied and this is probably an indication that the level of involvement of the actuarial consultants is uncertain. This is probably due to the fact that the RBA Rules and Regulations require that the fund manager submit and present a quarterly investment report to the Trustees, this is however not so for the actuarial consultant.

70% of the actuarial consultant respondents indicated that the Trustees and/or sponsoring employers raise important issues affecting Scheme liabilities prior to decision-making. In addition, all the respondents indicate that 100% of the schemes fail to raise the issues immediately they occur, with 40% of the respondents indicating that issues affecting Scheme liabilities are raised at subsequent actuarial valuations whilst another 40% of the respondents indicate that these issues are never raised. This suggests that the level of attention given to the management of the liability profile of the scheme when making investment decisions is low. This makes it difficult to effectively implement an immunisation strategy for the retirement scheme.

Further, the effective management of the scheme liabilities is hampered by the fact that over 60% of the respondents also indicated that the Trustees do not attach adequate importance to the actuarial report and recommendations. Some of the opinions given by respondents include: "Given they (trustees) fail to understand the nature of the report in most cases, it is difficult for them to implement the recommendations made."; "The (actuarial) reports fulfill regulatory role only for most trustees. They assume the administrator will implement recommendations made." and "In most cases they (trustees) do not understand the issues raised.".

These detailed responses suggests that there is a knowledge gap that needs to be addressed if trustees are to make adequate use of information regarding the schemes' liability profiles. 60% of the respondents indicated that in most cases the scheme administrator and not the actuarial consultant present the actuarial report. This is an additional hurdle that would need to be addressed in resolving challenge of knowledge gap with respect to actuarial considerations.

The level of involvement of the actuarial consultants is further illustrated by the fact that 60% of the respondents indicated that they attend quarterly meetings as and when needed. This lack of continued involvement of the actuarial consultants means the Trustees do not have needed input on the liability profile of the scheme when making investment decisions.

Further, the actuarial consultant is not in the picture as to the nature of discussions taking place with regard to the asset allocation and investment strategy of the scheme, which form a useful basis for evaluating actuarial assumptions, used in evaluating the liability profile of the scheme.

4.3.2 Determine if the trustees (through the fund manager and actuarial consultants) estimate the maturity value and present values of the assets and liabilities prior to making investment decisions

The second part of the questionnaire and the analysis focused on the technical aspects of immunisation that involve the determination of the present and maturity values of the assets and liabilities prior to decisions making.

Table 8: Descriptions of asset liability matching by the fund manager respondents

Respondent	Description
Firm 1	"It is the ability to ensure the scheme meets its obligations as and when they fall due and at the same time, maximising returns on assets of the scheme."
Firm 2	"Trying to ensure that the income stream from a portfolio of assets provides/matches the liability requirements on a timing basis."
Firm 3	"Taking into account investments and investment income values and ensuring these match liabilities."
Firm 4	"Ensuring assets equal liabilities at all times."
Firm 5	"Attempting to have the value of total assets equal to total accrued liabilities in a pension scheme such that if the scheme was to wind up at any particular time all beneficiaries would get their promised benefit in full."
Firm 6	"To structure portfolio to mature on the intended investment horizon. We match he investment assets/income with expected liability/expense."

Source: Research Data

Table 9: Descriptions of asset liability matching by actuarial consultant respondents

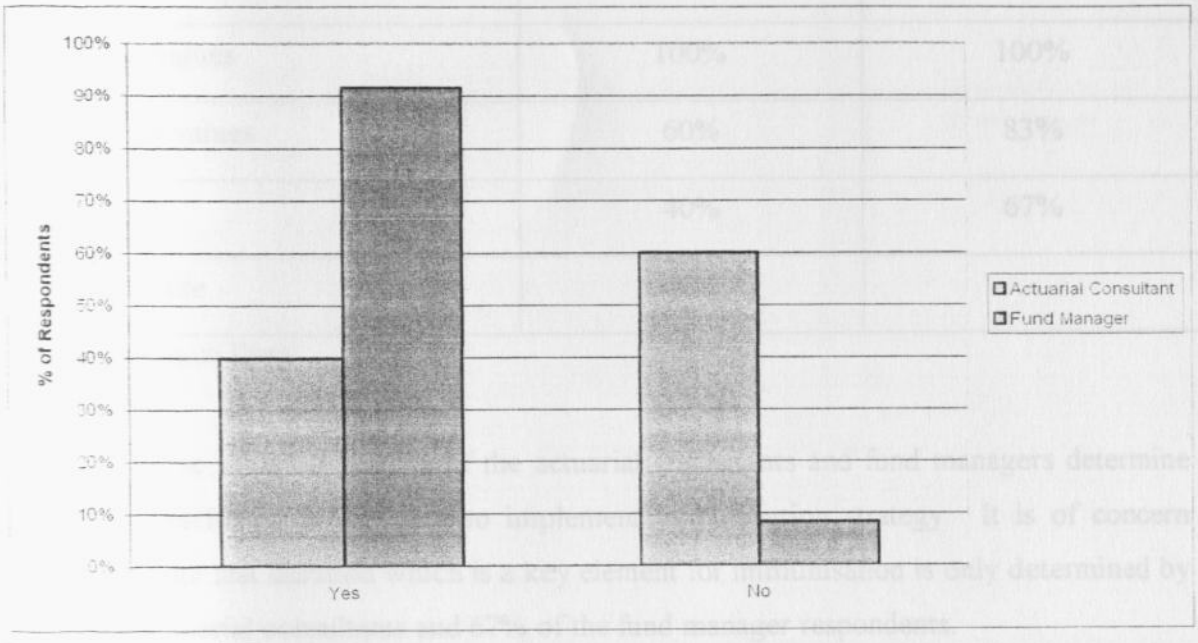
Respondent	Description
Firm 1	"Promises to pay certain liabilities in future are backed by equivalent assets. The asset value requires to be higher than the liabilities to ensure a return on investments."
Firm 2	"A process of ensuring that assets/liabilities are evenly matched at all times bearing in mind the classes of assets that would assist cover the liabilities better."
Firm 3	"It is an ongoing process of trying to ensure that the liabilities of a scheme are adequately funded by its assets."
Firm 4	"Ensuring that the value of assets equal the value of the liabilities at all times"
Firm 5	"It involves making sure the timing of asset proceeds matches the timing of liabilities outgo"

Source: Research Data

It is clear from the above descriptions that the fund manager and actuarial consultant respondents are familiar with the concept of asset liability matching. This is supported by the statistical analysis that reveals that 80% of the actuarial consultants as compared to 100% of the fund managers indicate that they are familiar with the concept of bond immunisation. In addition, approximately 80% of the actuarial consultants and fund managers are also of the opinion that immunisation is an asset liability matching strategy.

With respect to available technical ability, 92% of the fund manager respondents indicated that they currently have the technical capability to support asset liability matching. This compares to 40% affirmation from the actuarial consultants.

Graph 4: Presence of technical capability in fund manager and actuarial consultant respondent firms



Source: Research Data

With regard to determining the technical aspects of the asset and liability profiles of a retirement scheme prior to taking a decision, 100% of both the actuarial consultants and fund manager respondents indicate they value the present values of the liabilities and assets respectively.

Table 10: Level of determination of the other technical aspects of immunisation

Technical Aspect Required for Effective Immunisation	Actuarial Consultant	Fund Manager
Time horizon	0%	83%
Present values	100%	100%
Maturity values	60%	83%
Duration	40%	67%
Risk profile	60%	-

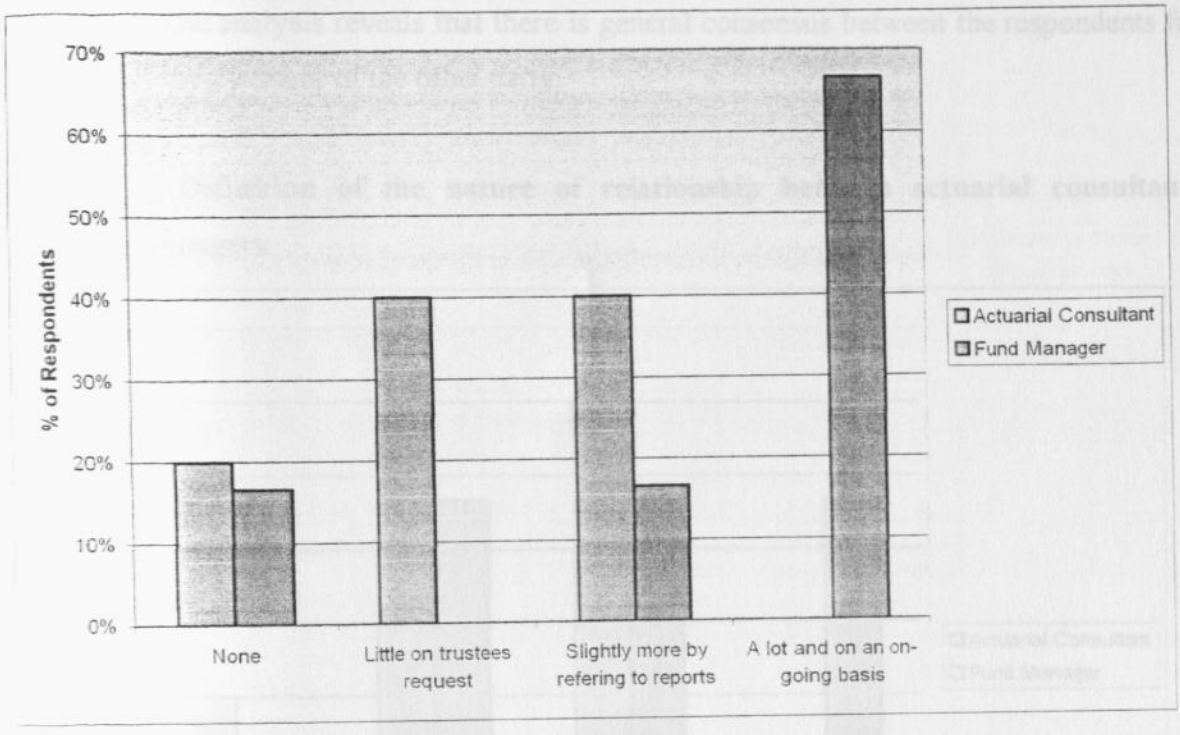
Source: Research Data

The table above shows that some of the actuarial consultants and fund managers determine the required technical information to implement immunisation strategy. It is of concern however to note that duration which is a key element for immunisation is only determined by 40% of the actuarial consultants and 67% of the fund manager respondents.

For effective implementation of an immunisation strategy there needs to be continuous and effective level of interaction between the fund manager and the actuarial consultant. This is essential to ensure fund managers are informed about the liability profile of the scheme and the actuarial consultant is aware about movements in the value of assets and associated risks profile of the assets.

The analysis below shows that there is at least some level of consultation between the fund manager and the actuarial consultants. In particular, the graph below shows that 67% of the fund manager respondents consider the liability profile of the scheme and consult with the actuarial consultants on an on-going basis.

Graph 5: Level of consideration of investment/liability profile by the actuarial consultant and fund manager respectively for decision making

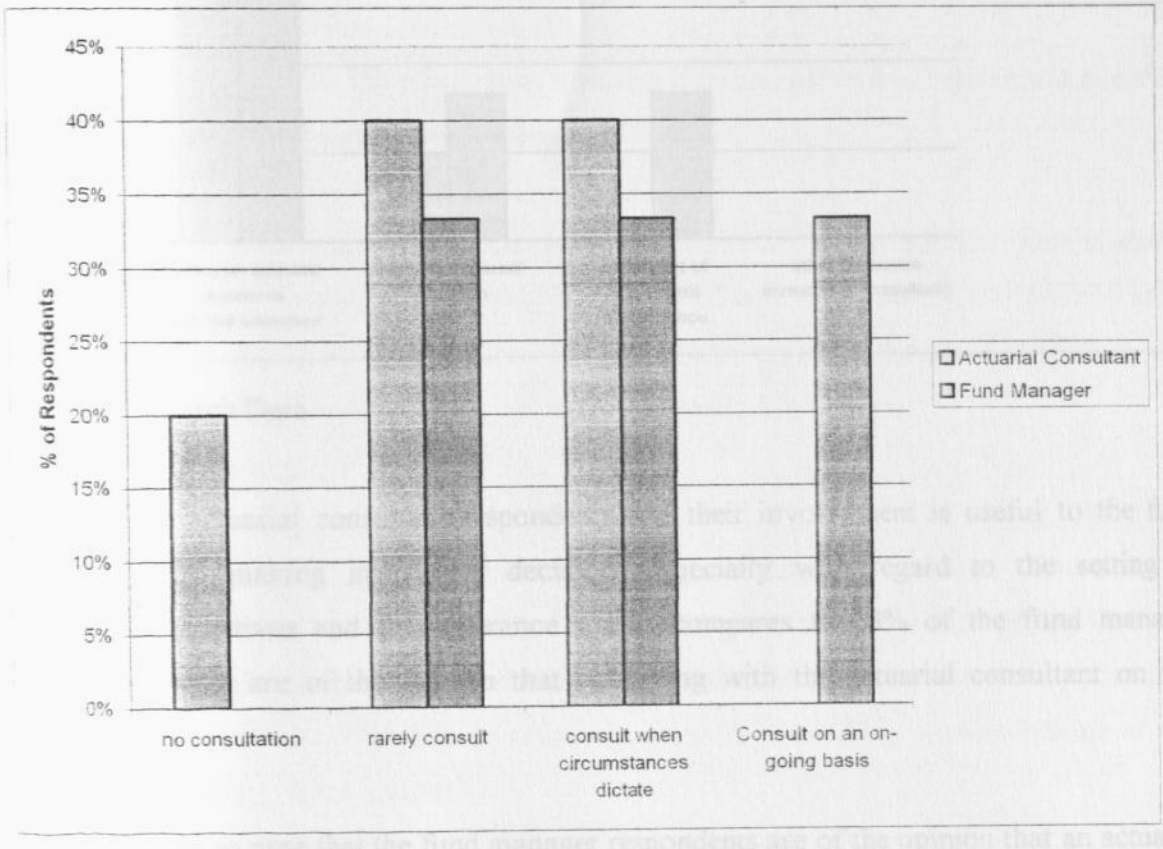


Source: Research Data

The analysis shows that none of the fund manager respondents indicated that they only consider the liability profile on the request of trustees while none of the actuarial consultants have indicated an on-going consulting basis with the fund manager. The zero response by actuarial consultants on the on-going consultation is negated by the fact that almost 70% of the fund managers indicated that they have a lot and on-going consultation with the actuary on the liability profile of the scheme. There is a mis-match of communication and information sharing between the two parties, which limit the effective implementation of an immunisation strategy.

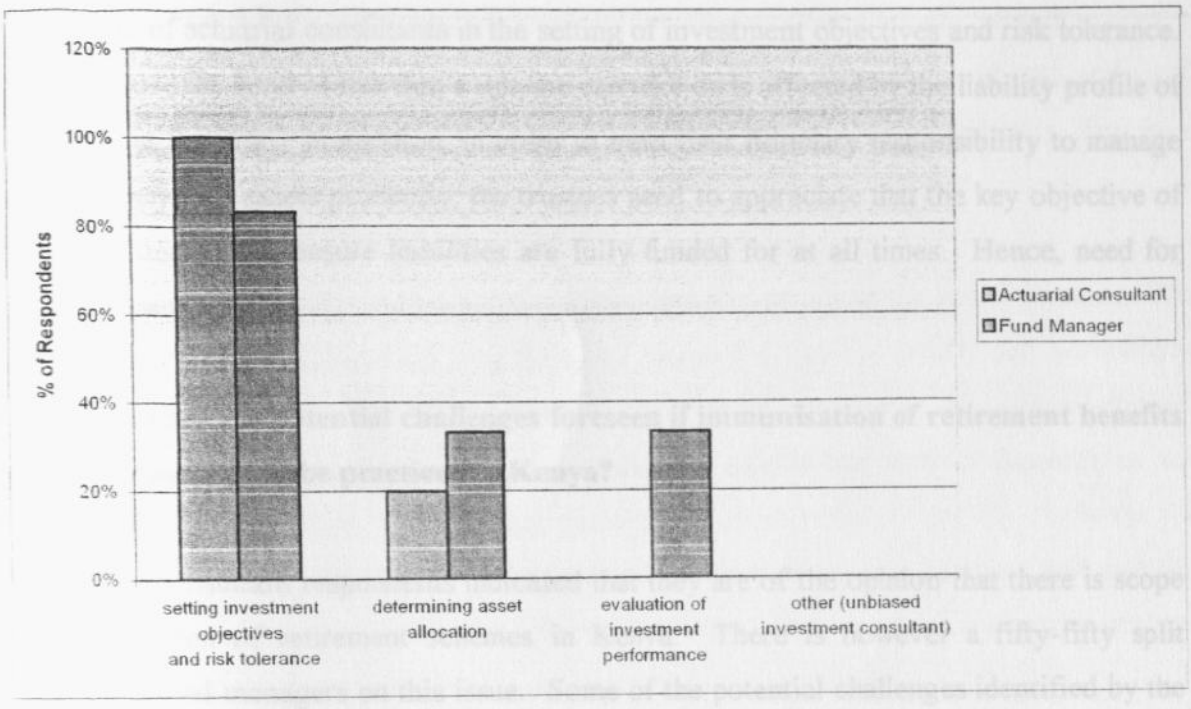
The graph below shows that the extent of consultation varies between the different firms and categories. The analysis reveals that there is general consensus between the respondents for the need for involvement of the other party.

Graph 6: Definition of the nature of relationship between actuarial consultants and fund managers



Source: Research Data

Graph 7: Areas of actuarial consultant involvement in investments



Source: Research Data

100% of the actuarial consultant respondents feel their involvement is useful to the fund manager when making investment decisions especially with regard to the setting of investment objectives and risk tolerance. This compares to 83% of the fund manager respondents who are of the opinion that consulting with the actuarial consultant on this aspects.

It is interesting to note that the fund manager respondents are of the opinion that an actuarial consultant should be involved in the evaluation of investment performance, which is an area, not raised by the actuarial consultants in the survey but which is essential for effective immunisation. This is because as a unbiased third party such as the actuarial consultant may assist the trustees evaluate the investment performance of the fund manager versus the investment objectives set with reference to the liability profile.

The analysis shows there is general consensus that there is need for increased level of involvement of actuarial consultants in the setting of investment objectives and risk tolerance. This is because the level of risk that a scheme can take on is affected by the liability profile of the scheme at the time. In addition, in order to meet their fiduciary responsibility to manage and invest schemes assets prudently, the trustees need to appreciate that the key objective of their investments is to ensure liabilities are fully funded for at all times. Hence, need for actuarial expertise.

4.3.3 What are the potential challenges foreseen if immunisation of retirement benefits schemes was to be practiced in Kenya?

All actuarial consultant respondents indicated that they are of the opinion that there is scope for immunisation of retirement schemes in Kenya. There is however a fifty-fifty split amongst the fund managers on this issue. Some of the potential challenges identified by the actuarial consultants and fund manager respondents are discussed below.

The need for trustees to continually manage their portfolios particularly in cases where the fund manager has limited or no discretion in making investment decisions. The zero or limited discretion given by trustees to fund managers in Kenya make it difficult for them to actively manage portfolios forcing them to adopt buy and hold passive strategies for portfolio immunisation. This would need to be addressed prior to considering implementation of an immunisation strategy for a scheme.

The level of technical expertise and resources in terms of technical personnel and specialised software to carry out asset liability matching is also doubtful. The need for sophisticated systems and specialists to undertake the highly involving active management strategies required as part of immunisation are currently lacking. Majority of the firms although encouraging employees to undertake professional exams have very few (if any) already qualified staff. In addition, in most cases the level of employment, seen at an average 9 employees per firm, may be too small to effectively manage an immunisation strategy which requires combination of active management with passive management strategies.

The need for communicating and disseminating information to the trustees as well as to other service providers has been identified as a possible challenge. The analysis has indicated that although both the fund manager and actuarial consultants are familiar with the technical aspects, the trustees fail to effectively use this information in making decisions. This is a challenge that would need to be managed.

Lack of depth in the capital market has also been identified as one of the key challenges. The need for long term fixed income securities that match the liability profile and particularly long-term nature of retirement scheme liabilities need to be introduced. The limited number of assets available in the Kenya capital market also affects the level of liquidity of the markets. Limited liquidity in the capital markets in Kenya poses a very big challenge for active portfolio management, which requires the investor to be able to enter and exit the market with reasonable ease without making undue losses. Immunisation is a hybrid strategy that would require liquidity for effective rebalancing of the portfolio.

Economic fundamentals in Kenya as an emerging market are still undefined and volatile. This makes asset liability matching a subjective process that relies largely on the assumptions made by the actuarial consultant and fund manager. The technical ability to develop, interpret and even review models to allow for the peculiar nature of economic fundamentals in Kenya has been identified as a limitation. This is further accentuated by the lack of reliable historical economic data from which to develop reasonable assumptions and models for asset liability matching.

Extent of under-funding of most retirement benefits schemes in Kenya, and in particular defined benefit schemes, makes it difficult to introduce an asset-liability matching strategy such as immunisation because already there is a pre-existing mis-match of the value of assets and liabilities. It is therefore suggested, by one respondent, that portfolio immunisation would be more appropriate for frozen or very mature plans.

The role of the fund manager has been prescribed by the existing legislation. This has ensured that the asset/investment profile of retirement schemes in Kenya are constantly being monitored and managed. This is however not the case for the actuarial consultants, whose role has been diluted over time. This paper provides a useful basis by which the Retirement Benefits Authority may be approached to review their position on the role of the actuary and more so for defined contribution schemes.

CHAPTER FIVE: SUMMARY OF FINDINGS AND CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS OF STUDY AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 Summary of findings and conclusions

The survey of the actuarial consultants and fund managers has revealed that the concept of immunisation is not new in Kenya with both the fund managers and actuarial consultants being familiar with the concepts. The analysis further shows that although the concept is familiar, very little if any, effort has been made to make this strategy a reality. This may largely be due to the fact that the level of investor sophistication is still very low in Kenya.

It is anticipated that as trustees become more familiar with their fiduciary duties, they will demand for added value from their service providers. One of the areas that the trustees may consider is immunisation because of its perceived benefits in managing risks whilst maximising returns. This will force players in the market to redefine their service offering to take into account the increased sophistication of the investors and trustees.

The analysis has also shown that the fund managers and actuarial consultants are able to evaluate the technical aspects required for immunisation namely; present values, maturity values, duration and time horizon measures of their assets and liabilities. Although the technical expertise in respect of asset liability modeling and need for specialised software have been identified as potential challenges, the analysis has shown that the basic know-how is present among the technical employees in the sector.

This study therefore shows that to a large extent the framework to support immunisation exists in Kenya. This framework is provided by the professional expertise available to trustees through the actuarial consultants and fund managers, the availability of diversified assets for investments in the capital market and a vibrant fixed income securities market with a bias for government securities which have relatively lower associated risks which trustees already have exposure to.

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The study has however highlighted that despite general consensus from the fund managers and actuarial consultant respondents, there is scope to practice immunisation strategy in Kenya. However, there are a number of challenges or limitations that would need to be addressed prior to implementation.

The results of the survey have shown that there exists a framework for immunisation of retirement benefits schemes. In particular, that fund managers and actuarial consultants determine the present values of the assets and liabilities of retirement benefit schemes prior to making recommendations. Further, the survey has shown that the fund managers and actuarial consultants, in most cases, determine the maturity values of the retirement benefits schemes assets and liabilities as part of their service offering. The survey however identifies that although the fund managers and actuarial consultants determine this information they rarely cooperate in making use of the information. This is but one of the challenges identified in this study that hinders the implementation of pension immunisation in Kenya.

5.2 Limitations of the study

Though all thirteen registered fund manager firms and seven actuarial consulting firms were approached only six of the registered fund manager firms and five of the actuarial consulting firms responded. The small number of actuarial consulting and fund manager firms based in Kenya makes it difficult to carry out detailed analysis such as tests of hypothesis as part of this study.

Secondly the study targeted fund managers and actuarial consultants who are appointed by scheme trustees as service providers. It has been assumed that the service providers are allowed some discretion in making decisions with respect to the management of the retirement fund assets. This may not always be the case since the final decision making authority and responsibility lies with the trustees.

The study covers only a proportion of the registered retirement benefits funds in the country. Funds administered under the deposit administration arrangements and collective investment schemes such as unit trusts with players other than the respondent fund managers have not been included. The population is therefore not representative of all the retirement benefit schemes in the country.

5.3 Recommendations

The concept of immunisation is attractive and should be explored further. Steps need to be taken by the trustees through their appointed fund managers and actuarial consultants to develop the framework for implementing an immunisation strategy. For example, during the quarterly meetings the actuarial consultant should be requested to give the trustees a brief overview of their opinion on the proposed investment strategy and investment performance reported by the fund manager. This opinion should take into consideration the liability profile and the prevailing investment objectives.

The Retirement Benefits Authority should lobby the Capital Markets Authority for the introduction of long term maturity securities for investment of retirement fund assets which are generally long term in nature. The lack of depth in the capital market challenge would be partly addressed by this measure. The Retirement Benefits Authority should also work with the Nairobi Stock Exchange and other players in the market to educate trustees on the need to diversify their portfolios. As trustees diversify their portfolios and allow their fund managers increased discretion in making investment decisions the liquidity in the market should improve. This is expected because the retirement fund assets form a large proportion of the institutional investors in capital markets worldwide.

5.4 Suggestions for further research

There are a number of conceptual issues that have arisen from this study that would be suitable for further research. It would be important to investigate the appreciation of the trustees, as the final decision makers in retirement benefits schemes, of the concept of asset liability matching and in particular immunisation.

Secondly, research on the possible causes for the lack of interaction between the fund managers and the actuarial consultants would also be useful as a basis by which to resolve the challenge of communication. Thirdly, the implementation of the immunisation strategy in other countries should be investigated and comparisons between funds that have adopted the immunisation strategy and those that have not be made. This would form a useful basis for retirement fund trustees in Kenya to carry out a cost benefit analysis of implementing this strategy. It would also provide evidence to the Capital Market Authority and the Retirement Benefits Authority of the potential economic benefits of an immunisation strategy.

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Appendix 1 – Population of study

Fund managers

1. African Alliance Kenya Limited
2. AIG Global Investment Company (EA) Limited
3. CFC Financial Services Limited
4. Coop Trust Investment Services Limited
5. Genesis Kenya Investment Management Limited
6. ICEA Investment Services Limited
7. Jubilee Financial Services Limited
8. Kenindia Asset Management Services Limited
9. Madison Asset Management Services
10. Old Mutual Asset Managers (EA) Limited
11. Old Mutual Asset Managers (K) Limited (duplication with previous only one considered)
12. Stanbic Investment Management Services Limited
13. Royal Insurance Asset Management Services (registered in December 2004)

Actuarial consultants

1. Actuarial and Benefits Consultants Limited
2. Alexander Forbes Financial Services (EA) Limited
3. Aon Consulting and Actuarial Services
4. Nauman Associates Consulting Actuaries
5. NBC Africa Limited
6. Watson Wyatt Limited
7. William M Mercer Limited

Appendix 2 – Questionnaire distributed to fund managers and actuarial consultants

Questionnaire for fund managers

Part A – Background

Name of Company .....
Name of Respondent .....
Designation .....
Date .....

1 How many retirement benefit schemes do you manage?
- Defined Benefit .....
- Defined Contribution .....
- Others, specify .....

2 Please indicate the proportion of defined benefit schemes that are provident funds
- 0 – 30 schemes .....
- 30 – 60 schemes .....
- 60 – 90 schemes .....
- 90 schemes or more .....

3 Please indicate the number of technical employees that you have .....

4 Of these employees, please indicate how many have the following professional qualifications or are currently pursuing these qualifications?
- First degree .....
- Second degree .....
- Chartered Financial Analyst® .....
- Others, specify .....

5 Please indicate the range in which the size of your current aggregate asset portfolio lies
- KShs 0 – KShs 50m .....
- KShs 50m – KShs 200m .....
- KShs 200m – KShs 500m .....
- Over KShs 500m .....

6 Please provide as a % of the total portfolio the weighted breakdown of the current aggregate asset portfolio?
- KShs 0 – KShs 50m .....%
- KShs 50m – KShs 200m .....%
- KShs 200m – KShs 500m .....%
- Over KShs 500m .....%

7 What is the breakdown of your current asset allocation as a % of the total assets?
- Property .....%
- Fixed income securities .....%
- Equities (quoted and unquoted) .....%
- Cash and demand deposits .....%
- Offshore investments .....%
- Others, specify .....%

8 What proportion of retirement benefit schemes that you manage hold regular (quarterly or more frequent) meetings?

- 0 – 30% .....
- 30% – 60% .....
- 60% – 100% .....

9 In most cases, is your investment report presented to the Trustees by:

- Yourself as the fund manager .....
- Scheme administrator .....
- Advisory committee set by Trustees .....
- Other (specify)

10 Do you feel the trustees make adequate use of the information you provide in your quarterly report?

- Yes .....
- No .....

11 If No, kindly suggest why you feel this is the case?

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.....
.....

Part B – Study

12 In your own words, kindly describe asset liability matching and what it entails.

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.....
.....

13 Do you have the technical capability required for asset liability matching?

- Yes .....
- No .....

14 Of the technical aspects, for each scheme, do you determine the following before making investment decisions

- Time/investment horizon .....
- Present value of assets .....
- Maturity value of assets .....
- Duration of assets .....

15 Are you familiar with the concept of bond immunisation?

- Yes .....
- No .....

16 If yes, is immunisation in your opinion an asset liability matching strategy?

- Yes .....
- No .....

17 If No, kindly explain why you feel this way?

.....

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18 To what extent do you consider the liability profile of the Scheme in making investment decisions

- None, your role is to invest assets .....
- Little depending on trustees request .....
- Slightly more by referring to actuarial report .....
- A lot and on-going basis by working closely with the Scheme Actuary and Trustees .....

19 Which of the following defines your relationship with the Scheme Actuary?

- No consultation .....
- Rarely consult and usually know the actuarial findings during the Trustees meeting .....
- Consult when circumstances dictate need for actuarial input such as on conversion .....
- Consult on an on-going basis .....

20 Do you feel it is useful to consult with the Scheme Actuary?

- Yes .....
- No .....

21 If yes, which of these areas do you feel their involvement would be useful

- Setting investment objectives and risk tolerance .....
- Determining strategic asset allocation .....
- Evaluation of investment performance .....
- Other (specify) .....

22 In your opinion, is there scope for asset liability matching for retirement benefit schemes in Kenya?

- Yes .....
- No .....

23 What challenges do you foresee in arising if asset liability matching or (immunisation) was to be practiced in Kenya?

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24 Please provide any other comments you find relevant to the study.

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Questionnaire for actuarial consultants

Part A – Background

Name of Company .....
Name of Respondent .....
Designation .....
Date .....

1 How many retirement benefit schemes do you advise?
- Defined Benefit .....
- Defined Contribution .....
- Others, specify .....

2 Please indicate the proportion of defined benefit schemes that are provident funds
- 0 – 30 schemes .....
- 30 – 60 schemes .....
- 60 – 90 schemes .....
- 90 schemes or more .....

3 Please indicate the proportion of defined contribution schemes that are pension schemes
- 0 – 30 schemes .....
- 30 – 60 schemes .....
- 60 – 90 schemes .....
- 90 schemes or more .....

4 Please indicate the number of technical employees that you have? .....

5 Of these employees, please indicate how many have the following professional qualifications or are currently pursuing these qualifications?
- First degree .....
- Second degree .....
- Fellow of Institute of Actuaries .....
- Others, specify .....

6 In your opinion, do the Trustees and/or sponsoring employers raise important issues affecting the Scheme liabilities with you before making decisions?
- Yes .....
- No .....

7 How and how do they raise these issues?
- Immediately they arise .....
- During the quarterly meetings .....
- At subsequent actuarial valuations .....
- When things go bad .....

8 How often are you present at the quarterly trustees meetings?
- Every quarter .....
- Rarely when there is need .....
- Never .....

9 In most cases, is your investment report presented to the Trustees by:
- Yourself as the Scheme Actuary .....
- Scheme administrator .....
- Advisory committee set by Trustees .....
- Other (specify)

10 Do you feel the trustees attach adequate importance to the actuarial report and recommendations you make?
- Yes .....
- No .....

11 If No, kindly suggest why you feel this is the case?
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.....
.....

Part B – Study

12 In your own words, kindly describe asset liability matching and what it entails?
.....
.....
.....

13 Do you have the technical capability required for asset liability matching?
- Yes .....
- No .....

14 Of the technical aspects, for each scheme, do you determine the following before making investment decisions
- Time/planning horizon .....
- Present value of liabilities .....
- Maturity value of liabilities .....
- Duration of liabilities .....
- Risk profile of the scheme

15 Are you familiar with the concept of bond immunisation?
- Yes .....
- No .....

16 If yes, is immunisation in your opinion an asset liability matching strategy?
- Yes .....
- No .....

17 If No, kindly explain why you feel this way?

.....

.....

.....

18 To what extent do you consider the investment profile of the Scheme in carrying out actuarial investigations

- None, your role is to value the liabilities based on assumptions .....
- Little depending on trustees request .....
- Slightly more by referring to quarterly reports .....
- A lot and on-going basis by working closely with the fund manager and Trustees .....

19 Which of the following defines your relationship with the fund manager?

- No consultation .....
- Rarely consult and usually know the investment performance and issues during the Trustees meeting .....
- Consult when circumstances dictate need for fund manager's input such as on conversion .....
- Consult on an on-going basis .....

20 Do you feel it is useful to consult with the fund managers?

- Yes .....
- No .....

21 If yes, which of these areas do you feel your involvement would be useful? Please explain?

.....

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.....

.....

22 In your opinion, is there scope for asset liability matching for retirement benefit schemes in Kenya?

- Yes .....
- No .....

23 What challenges do you foresee in arising if asset liability matching or (immunisation) was to be practiced in Kenya?

.....

.....

.....

24 Please provide any other comments you find relevant to the study.

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.....

Appendix 3 – Summary of data obtained from survey

AVERAGES NUMBER OF EMPLOYEES PER FIRM

	Fund Manager Respondent Firm						Total Average	Total Average
	1	2	3	4	5	6		
first degree	7	0	5	7	4	7	5.00	5.00
second degree	1	0	1	0	4	2	1.33	2.00
professional exam	2	0	0	2	1	7	2.00	2.00
totals	10	0	6	9	9	16		

Average number employees per firm 9

	Actuarial Consultant Respondent Firm						Total Average	Total Average
	1	2	3	4	5			
first degree	4	2	3	3	11		4.60	5.00
second degree	1	0	0	0	3		0.80	1.00
professional exam	4	5	1	1	3		2.80	3.00
	9	7	4	4	17			

Average number employees per firm 9

AVERAGES WEIGHTED BY TOTAL NUMBER OF EMPLOYEES PER FIRM

	Fund Manager Respondent Firm						Total Average	Total Average
	1	2	3	4	5	6		
first degree	70	0	30	63	36	112	6.22	7.00
second degree	10	0	6	0	36	32	1.68	2.00
professional exam	20	0	0	18	9	112	3.18	4.00
	100	0	36	81	81	256		

	Actuarial Consultant Respondent Firm						Total Average	Total Average
	1	2	3	4	5			
first degree	36	14	12	12	187		6.37	7.00
second degree	9	0	0	0	51		1.46	2.00
professional exam	36	35	4	4	51		3.17	4.00
	81	49	16	16	289			

AVERAGES TOTAL PORTFOLIO DISTRIBUTION

% total portfolio as weighted breakdown of current assets	Fund Manager Respondent Firm					
	1	2	3	4	5	6
K Shs 0m - K Shs 50m	30%	0%	5%	15%	3%	0%
K Shs 50m - K Shs 200m	55%	0%	30%	20%	15%	0%
K Shs 200m - K Shs 500m	13%	0%	25%	60%	36%	0%
K Shs 500m and above	2%	0%	40%	5%	46%	100%
	100%	0%	100%	100%	100%	100%

AVERAGES TOTAL PORTFOLIO DISTRIBUTION (HAVING ADJUSTED FOR FIRM 2)

% total portfolio as weighted breakdown of current assets	Fund Manager Respondent Firm					
	1	2	3	4	5	6
K Shs 0m - K Shs 50m	30%	25%	5%	15%	3%	0%
K Shs 50m - K Shs 200m	55%	25%	30%	20%	15%	0%
K Shs 200m - K Shs 500m	13%	25%	25%	60%	36%	0%
K Shs 500m and above	2%	25%	40%	5%	46%	100%
	100%	100%	100%	100%	100%	100%

Size of Aggregate Porfolio

Size of aggregate asset portfolio	Fund Manager Respondent Firm					
	1	2	3	4	5	6
K Shs 0m - K Shs 50m						
K Shs 50m - K Shs 200m	50.00					
K Shs 200m - K Shs 500m				200.00	200.00	
K Shs 500m and above		500.00	500.00			500.00

% average asset allocation

	Fund Manager Respondent Firm						Total	RBA
	1	2	3	4	5	6	Average	Guidelines
property	15.0%	7.0%	20.0%	0.0%	0.0%	20.0%	10.3%	30.0%
fixed income securities (bills, bonds, commercial bonds and paper)	60.0%	65.0%	40.0%	65.0%	75.5%	35.0%	56.8%	85.0%
equities (quoted and unquoted)	8.0%	14.0%	30.0%	25.0%	19.5%	15.0%	18.6%	75.0%
cash and demand deposits	17.0%	8.0%	5.0%	5.0%	2.0%	15.0%	8.7%	5.0%
offshore investments	0.0%	3.0%	5.0%	5.0%	3.0%	15.0%	5.2%	15.0%
others	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.5%	5.0%
totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Average number employees per firm 1

	Actuarial Consultant Respondent Firm					Total	
	1	2	3	4	5	Average	
first degree	4	2	3	3	11	4.60	
second degree	1	0	0	0	3	0.80	
professional exam	4	5	1	1	3	2.80	
	9	7	4	4	17		

Average number employees per firm 9

AVERAGES WEIGHTED BY TOTAL NUMBER OF EMPLOYEES PER FIRM

	Fund Manager Respondent Firm						Total	
	1	2	3	4	5	6	Average	
first degree	0.15	0.07	0.2	0	0	0.2	0.10	
second degree	0.17	0.08	0.05	0.05	0.02	0.15	0.09	
professional exam	0	0.03	0.05	0.05	0.03	0.15	0.05	
	0.32	0.18	0.3	0.1	0.05	0.5		

	Actuarial Consultant Respondent Firm					Total	
	1	2	3	4	5	Average	
first degree	36	14	12	12	187	6.37	
second degree	9	0	0	0	51	1.46	
professional exam	36	35	4	4	51	3.17	
	81	49	16	16	289		

frequency of trustees meetings

	Fund Manager Respondent Firm						Total
	1	2	3	4	5	6	Average
0 -30%	0%	0%	0%	0%	0%	0%	-
30% - 60%	0%	0%	0%	0%	0%	0%	-
60% - 100%	100%	100%	100%	100%	100%	95%	99%
totals	1	1	1	1	1	0.95	

Attendance by Fund Manager

	Fund Manager Respondent Firm						Total
Report is presented by	1	2	3	4	5	6	Average
Yourself as Fund Manager	100%	100%	100%	100%	100%	100%	100%
Scheme Administrator	0%	0%	0%	0%	0%	0%	0%
Advisory Committee	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%
totals	1	1	1	1	1	1	

Do Trustees make adequate use of the information provided?

	Fund Manager Respondent Firm						Total
	1	2	3	4	5	6	Average
Yes	100%	100%	100%	100%	100%	100%	100%
No	0%	0%	0%	0%	0%	0%	0%
totals	1	1	1	1	1	1	

Do trustees raise important issues affecting liabilities with the Scheme Actuary prior to making decisions

	Actuarial Consultant Respondent Firm						Total
	1	2	3	4	5	6	Average
Yes	1	1	0	1	1		70%
No	0	1	1	0	0		30%
totals	1	1	1	1	1	0	100%

When are the issues raised?

	Actuarial Consultant Respondent Firm						Total
	1	2	3	4	5		Average
Immediately they arise	0	0	0	0	0		0%
During the quarterly meeting	1	0	0	0	0		20%
At subsequent actuarial valuations	0	1	0	1	0		40%
When things go bad	0	0	1	0	1		40%
totals	1	1	1	1	1	0	100%

How often do you attend the quarterly meetings?

	Actuarial Consultant Respondent Firm						Total
	1	2	3	4	5		Average
Every quarter	1	0	0	0	0		20%
Rarely, when there is need	0	1	0	1	1		60%
Never	0	0	1	0	0		20%
totals	1	1	1	1	1	0	100%

Presentation of report

	Actuarial Consultant Respondent Firm						Total
Report is presented by	1	2	3	4	5		Average
Yourself as Actuarial Consultant	0	1	0	0	0		20%
Scheme Administrator	0	0	1	1	1		60%
Advisory Committee	0	0	0	0	0		0%
Other	1	0	0	0	0		20%
totals	1	1	1	1	1	0	100%

Do Trustees attach adequare importance to the information provided in actuarial report?

	Actuarial Consultant Respondent Firm						Total
	1	2	3	4	5		Average
Yes	1	1	0	0	0		40%
No	0	0	1	1	1		60%

Presence of Technical capability

	Fund ManagerRespondent Firm						Total
	1	2	3	4	5	6	Average
Yes	1.00	0.50	1.00	1	1	1	92%
No		0.50					8%
totals	1	1	1	1	1	1	100%

Technical aspects of asset profile analysed prior to decision making

	Fund ManagerRespondent Firm						Total
	1	2	3	4	5	6	Average
time/investment horizon	1	1	1		1	1	83%
present value of assets	1	1	1	1	1	1	100%
maturity value of assets	1	1	1	1		1	83%
duration of assets	1	1			1	1	67%

Familiar with concept of bond immunisation

	Fund ManagerRespondent Firm						Total
	1	2	3	4	5	6	Average
Yes	1.00	1.00	1.00	1	1	1	100%
No							0%

Is immmunisation an asset liability matching strategy?

	Fund ManagerRespondent Firm						Total
	1	2	3	4	5	6	Average
Yes	1.00	1.00	1.00	1		1	83%
No					1		17%

Presence of Technical capability

	Actuarial ConsultantRespondent Firm						Total	fund manager Total
	1	2	3	4	5	6	Average	Average
Yes	1.00		1.00				40%	92%
No		1.00		1	1		60%	8%

Technical aspects of asset profile analysed prior to decision making

	Actuarial ConsultantRespondent Firm						Total	Total
	1	2	3	4	5	6	Average	Average
time/investment horizon							0%	83%
present value of liabilities	1	1	1	1	1		100%	100%
maturity value of liabilities	1		1	1			60%	83%
duration of liabilities	1	1					40%	67%
risk profile		1		1	1		60%	

Familiar with concept of bond immunisation

	Actuarial ConsultantRespondent Firm						Total	
	1	2	3	4	5	6	Average	
Yes		1.00	1.00	1	1		80%	100%
No	1.00						20%	0%

Is immmunisation an asset liablity matching strategy?

	Actuarial ConsultantRespondent Firm						Total	
	1	2	3	4	5	6	Average	
Yes		1.00	1.00	1	1		80%	83%
No	1.00						20%	17%

Level of consideration of investment/liability profile in making decisions or recommendations

	Actuarial ConsultantRespondent Firm						Total
	1	2	3	4	5	6	Average
None	1						20%
Little on trustees request		1	1				40%
Slightly more by refering to reports				1	1		40%
A lot and on an on-going basis							0%

	Fund ManagerRespondent Firm						Total
1	2	3	4	5	6	Average
			1			17%
						0%
		1				17%
1	1			1	1	67%

Define relationship with other party(i.e. Actuarial Consultant with Fund Manager and vice versa)

	Actuarial ConsultantRespondent Firm						Total
	1	2	3	4	5	6	Average
no consultation					1		20%
rarely consult			1	1			40%
consult when circumstances dictate	1	1					40%
Consult on an on-going basis							0%

	Fund ManagerRespondent Firm						Total
1	2	3	4	5	6	Average
						0%
		1	1			33%
1					1	33%
	1			1		33%

Is consultation necessry (i.e. Actuarial Consultant with Fund Manager and vice versa)

	Actuarial ConsultantRespondent Firm						Total
	1	2	3	4	5	6	Average
Yes	1	1	1	1	1		100%
No							0%

	Fund ManagerRespondent Firm						Total
1	2	3	4	5	6	Average
1	1	1		1	1	83%
			1			17%

Is there scope for Immunisation in Kenya

	Actuarial ConsultantRespondent Firm						Total
	1	2	3	4	5	6	Average
Yes	1	1	1	1	1		100%
No							0%

	Fund ManagerRespondent Firm						Total
1	2	3	4	5	6	Average
1	1			1		50%
		1	1		1	50%

	Actuarial ConsultantRespondent Firm						Total
	1	2	3	4	5	6	Average
setting investment objectives and risk tolerance	1	1	1	1	1		100%
determining asset allocation				1			20%
evaluation of investment performance							0%
other (unbiased investment consultant)							0%

	Fund ManagerRespondent Firm						Total
1	2	3	4	5	6	Average
1	1	1		1	1	83%
	1			1		33%
	1			1		33%
						0%

areas of involvement

	Actuarial ConsultantRespondent Firm						Total
	1	2	3	4	5	6	Average
setting investment objectives and risk tolerance	1	1	1		1	1	83%
determining asset allocation		1			1		33%
evaluation of investment performance		1			1		33%
other							0%