CHAPTER ONE
INTRODUCTION

1.1 Background of the study

Evaluation of portfolio performance is one of the most difficult tasks to any portfolio manager. Generally composite measures combine both risk and return into a single index. The original composite measures of portfolio performance include the Sharpes measure, Treynors measure, Jensen's measure, and the informational appraisal ratio measures. However many other such measures have also been discussed in finance literature. Since the introduction of the Sharpe ratio in 1966, many different measures of portfolio performance have been introduced in the scientific as well as practitioners literature. The following are the common composite measures of portfolio performance.

1.1.1 Portfolio Performance Measures

1.1.1.1 The Treynor's model

Treynor considers risk as systematic and unsystematic risk. The unsystematic risk can be eliminated through diversification whereas systematic risk is the market risk which cannot be diversified away and all investors have to bear it. This can be calculated through "beta" and portfolios expected return depends upon its beta. Treynor model is used to measure the performance of a managed portfolio in respect of return per

unit of risk (systemic) risk

$$\text{Treynor Ratio} = \frac{Rp - Rf)}{\beta}$$

Rp = the observed average fund return;

Rf = the average risk free return;

β = coefficient as a measure of systematic risk.

The numerator of this ratio is the risk premium and the denominator is beta (a measure of risk), the total expression indicates the portfolio's risk premium return per unit of risk. Every risk averse investor would prefer to maximize this value. It is important to note that beta is a systematic risk measure and does not discuss diversification of the portfolio. It is implicitly assumes that the portfolio is completely diversified and it is only the systematic risk which is a relevant risk measure.

1.1.1.2 Sharpe's ratio

William F. Sharpe (1966) introduced the concept of risk free asset and return on such asset as risk free rate in his portfolio theory. The risk free rate is used to determine the required rate of return on risky assets. The required rate of return has a great significance for the valuation of securities, by discounting its cash flows with the required rate of return. This led to the development of CAPM. Shortly after that Sharpe conceived a composite measure to evaluate the performance of mutual funds. The Sharpe measure of portfolio performance (designated *S*) is stated as follows;

$$S_i = \frac{\overline{R}_i - \overline{RFR}}{\sigma_i}$$

where:

$\overline{R}_i$ = the average rate of return for portfolio *i* during a specified time period
$\overline{RFR}$ = the average rate of return on risk-free assets during the same time period
σ_i = the standard deviation of the rate of return for portfolio *i* during the time period

$$\text{Sharpe Ratio} = \frac{(R_p - R_f)}{\delta_p}$$

Where:
Rp = the observed average fund return;
Rf = the average risk free return;

δp = the standard deviation of fund returns.

This composite measure of portfolio performance is similar to the Treynor measure; however, it seeks to measure the total risk of the portfolio by including the standard deviation of returns rather than considering beta (systematic risk) only. Since portfolio's risk premium is divided by standard deviation of the portfolio, this measure indicates the risk premium return earned per unit of total risk. This measure uses total risk to compare portfolios performance. The Sharpe measure, therefore, evaluates the portfolio manager on the basis of both rate of return performance and diversification.

(Mahdavi, 2004) introduced an adjusted Sharpe ratio (ASR) to evaluate assets whose return distribution is not normal. The approach is to transform the payoff so that its distribution will match that of the benchmark: once the return is transformed, the resulting Sharpe ratio of the asset can be directly compared to that of the benchmark, knowing the total payoffs from both instruments have exactly the same distributions.

(Lo ,2002) showed that standard deviations at the denominators present serial correlations for hedge funds and that leads to results till 70% too high. He suggested a Sharpe ratio adapted to autocorrelation whose formula included a bias corrector. The measure is more a bias corrector than a true new measure. Even, the idea to multiply a performance measure by a bias corrector can be extended to every other performance measure. The reference value in Sharpe ratio is the risk free rate. An interesting variation is proposed by Roy in 1952, so fourteen years before Sharpe. He proposed to compare the return to a reserve return that is specific for the investor. So, Roy's measure permits to consider

different utility functions. In general, the greater the reserve returns, the more the portfolios return. However it faces all other drawbacks of Sharpe ratio. Indeed, in many measures, authors use both the risk-free and the reserve return in the numerator. Despite all these statistical adaptations, most issues of the Sharpe ratio remain. This explains why many variations of the Sharpe ratio were introduced.

1.1.1.3 Jensen's portfolio performance measure

According to Jensen, assuming that the capital markets are efficient and CAPM is accurate in estimating the returns of a portfolio then it is possible to calculate Alpha values as follows:

$$\text{Alpha Value } (\alpha) = E(R_P) - R_p$$

$$R_p = R_F + (E(R_m) - R_{RF})\,\beta_P$$

$$= \text{alpha value } (\alpha) = E(R_p) - (R_F + (E(R_m) - R_F)\,\beta_P)$$

According to the ratio if the alpha value is positive, then the portfolio performance is satisfactory.

1.1.1.4 Information / Appraisal ratio measure

The idea underlying the information ratio (or IR) also called the appraisal ratio proposed by Grinold, (1989) is to get the performance relative to a given reference portfolio. It measures the excess return of the fund over a given benchmark, divided by the standard deviation of the excess return or more concretely, the degree of regularity in outperforming the benchmark.

The following formula is used:

$$IR \text{ or } AR = \frac{E(R_P) - E(R_B)}{\delta_{ER}}$$

Where δ_{ER} = standard deviation of excess return = $\delta_P - \delta_B$

$E(R_B)$ = Expected return of bench mark portfolio

$E(R_P)$ = Expected return of portfolio

1.2 Research Problem

According to legal notice No.123 (Retirement Benefit Act), Portfolio managers face many challenges when trying to manage their portfolios. In Kenya portfolio managers face various regulations from Retirement Benefits Authority (RBA) ranging from regulations on investment in categories of assets, valuation of assets, financial provisions and statements and retirement benefits levy.

The legal requirement is such that fund managers should evaluate the performance of their investment portfolios. The various portfolio performance measures available to fund managers include Sharpe Measure, Treynor Measure, Jensen Measure (alpha), Information Ratio, Modigliani and Modigliani (M2) Measure and Fama Net Selectivity Measure. (Reilly and Brown, 2000)

Roll (1981) noted that all equity portfolio performance measures are derived from the Capital Asset Pricing Model (CAPM) which assumes existence of a market portfolio,

consisting of all risky assets in the economy. Such a portfolio is assumed to be completely diversified. This is a theoretical portfolio which may not exist in real world because it does not constitute all firms in the market. It only has a sample of quoted firms. The problem arises in finding a realistic proxy for this theoretical portfolio. This lack of completeness has implications for measuring portfolio performance. When evaluating portfolio performance, the performance measures largely use the market portfolio as the benchmark to determine the risk measures. This beta could differ from that computed using true and not proxy market portfolio. Brown and Brown (1987), in an empirical test, documented a considerable amount of "ranking reversal" when the definition of market portfolio was changed in a Jensen's alpha analysis of a sample of well-established mutual funds.

Radcliffe (1997) explained the serious questions that have arisen about the validity of the CAPM-based performance statistics. No empirical test to date has been able to show that expected and realized returns are closely tied to beta estimates employed in the tests. This, he suggests, could be due to inadequate beta estimates or inadequacy of the CAPM. Fama and French found no relationship between future returns and prior beta estimates. There is also a serious problem with the proxy one uses to estimate aggregate market returns since it does not constitute all firms in the market.

In an effort to address this problem, Grinblatt et.al (1993) attempted to avoid the conflict altogether by introducing a performance measurement process that did not require benchmarks, based on the characteristics of the stock held such as size of the firm and

book-to-market ratios. Given the problem with benchmarks in market portfolio, the beta factor as a measure of systematic risk and use of total risk of market returns yet unsystematic risk is largely reduced through diversification, this study sets to find out the portfolio performance measures used by fund managers, why they use the measures, and how they identify the suitable benchmarks.

Ngene (2004), conducted a study on the challenges faced by pension funds in evaluating portfolio performance. He concluded that measuring the risk of portfolio return as the main challenge facing investment managers. Other challenges included unstable economic environment, lack of a common method of computing portfolio return, corporate governance considerations, need for management transparency, political risk and uncertainty and liquidity of the stock market.

From the above discussion, it is clear that there is no consensus as to which composite measure of portfolio performance is used by pension funds where others prefer the traditional measures namely the Sharpes measure, Treynors measure, information appraisal measure and Jensens measure to evaluate portfolio performance. However other surrogate measures have also emerged from the main measures. Studies that have been conducted in Kenya have also have also not adequately established the composite portfolio performance measures used by fund managers in managing portfolio performance. This begs the question, what composite measures of portfolio performance are used by investment managers in Kenya to evaluate portfolio performance?

1.3 Objective of the study

To determine the composite measures of portfolio performance used by pension fund managers in evaluating portfolio performance.

1.4 Value of the study

This study is beneficial in a number of ways to different interest groups;

The government will find this research valuable for policy, legal and stock market development.

The study will also educate the public about the composite measures of portfolio performance hence open up their understanding of portfolio management.

The study will also benefit the academic community by providing a body of knowledge regarding portfolio performance measures and benchmarks in Kenya. It will also provide a basis for further research in the area.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter will present a review of existing literature on the composite measures of portfolio performance and seek to establish which are most popularly used by fund and portfolio managers in evaluation of portfolio performance.

2.2 Theoretical Review

This section explains the motivation behind the need to use composite measures of portfolio performance in evaluation of portfolio performance. It gives a theoretical justification for portfolio managers to engage in portfolio management using the composite measures of portfolio performance.

2.2.1 Product life cycle theory

The product life-cycle theory is an economic theory that was developed by Raymond Vernon (1966) in response to the failure of the Heckscher-Ohlin model to explain the observed pattern of international trade. The theory suggests that early in a product's life-cycle all the parts and labor associated with that product come from the area in which it was invented. After the product becomes adopted and used in the world markets, production gradually moves away from the point of origin. In some situations, the product becomes an item that is imported by its original country of invention. The model

applies to labor-saving and capital using products that (at least at first) cater to high-income groups. The model demonstrates dynamic comparative advantage. According to Vernon most products pass through three stages. The first is known as the "innovation stage". In order to compete with other firms and to make a lead in the market a firm innovates a product through research and development.

The second stage is known as the "maturing stage". At this stage demand for the new product in other developed countries grows substantially and becomes price elastic. At the final stage the products are standardized and production techniques are no longer the exclusive possession for the innovating firm. Investment managers are expected to introduce the composite measures of portfolio performance in phases. Initially they may introduce the common measures such as the Sharpes measures and Treynors measure. However as time goes by they are expected to introduce many other measures including variations of the original composite measures in compliance with the life cycle theory.

2.2.2 Arbitrage pricing theory

Arbitrage Pricing Theory is an asset pricing theory originally developed by Stephen A. Ross and Richard Roll in 1976. It is founded on the notion that investors are rewarded for assuming non diversifiable (systematic) risk. Its development was as a result of weaknesses in the Capital Asset Pricing Model (CAPM) inability to account for the difference in assets' returns using their betas.

APT holds that the expected return of a financial asset can be modeled as a linear function of various macro-economic factors or theoretical market indices (i.e. industrial production, growth in gross domestic product, interest rate, inflation, default premium and the real rate

of return) where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. The model-derived rate of return will then be used to price the asset correctly the asset price should equal the expected end of period price discounted at the rate implied by model. If the price diverges, arbitrage should bring it back into line. The theory is based on the idea that in competitive financial markets arbitrage will assure equilibrium pricing according to risk and return.

The multi factor models such as the Henrikson in 1984 use the concept of arbitrage pricing model by introducing more factors in the model to introduce the excess return of an equally weighted portfolio of the funds.

2.3 Empirical Literature

2.3.1 Original Measures

The first two measures were based on Jensen's alpha and intended to determine whether its value is due to a good market timing strategy. Treynor and Mazuy (1966) produced a single factor model derived from the CAPM in which a quadratic term is added to reflect the market timing. Its coefficient is Treynor and Mazuy's coefficient. If it is positive, the portfolio has good market timing because return of the portfolio is as higher as the risk premium is higher. This coefficient indeed measures the co-skewness with the benchmark portfolio. A positive value for the independent term of the regression, is considered as a sign of superior stock selection , but one has to be conscious that is has no same meaning as Jensen's alpha.

Henriksson and Merton (1981) started from a similar idea, but provided a different interpretation of market timing ability. Adding a term in the CAPM model that contains a dummy variable based on the difference between market return and the risk-free rate, they permit managers to choose between two levels of market risk , an up-market and a down-market beta. The difference between them is Henriksson and Merton's coefficient. Compared to Treynor and Mazuy's model, it presents the drawback that beta can only have two values, while intuitively the exposure to the market is higher as the risk premium is higher. Furthermore, Goetzmann et al. (2000) showed that this model gives weak results if it is applied to monthly results of a daily timer. Chen and Stockum (1986), among others, showed that the error term in both of these models is often heteroscedastic, while Drew et al. (2002) also detected a problem of multicolinearity. These two issues have to be resolved by ad hoc methods, before using the ordinary least squares regression. Weigel (1991) extends Henriksson and Merton's analysis, supposing that a fund can be invested in three assets: risk-free, bonds and stocks. Weigel's coefficient has a value of 1 if the manager has a perfect forecast of the markets; it is between 0 and 1 if he foresees more or less the evolution. If the coefficient is negative, then his forecasts are bad.

2.3.2 Extension of Original Measures

Coming back to funds invested in stocks only, Jagannathan and Korajczyk (1986) added a cubic term in the original Treynor and Mazuy model. Their Treynor and Mazuy extended timing measure permits to detect when the cubic term is negative, corresponding to cases of artificial market timing as measured by the original model.

2.3.3 Multi-factor Versions

Bello and Janjigian (1997) proposed an extended Treynor and Mazuy's measure to cover assets that are not in the main index used to encompass the case of funds that includes bonds. For more general hybrid funds, Comer (2006) suggested a multi-factor timing measure to consider systematic risks of the funds to the market, to small stocks, to growing stocks, to long maturity bonds, to short maturity bonds, to high quality bonds and to low quality bonds. Henriksson (1984) tried to solve problems that might happen due to both the omission of relevant factors and issues concerning the choice of the benchmark portfolio in the Henriksson and Merton model. His Henriksson and Merton extended measure of market timing includes two more factors and a second dummy variable to introduce the excess return of an equally weighted portfolio of the funds.

Finally, Chan et al. (2002) proposed a Henriksson and Merton timing measure in a three-factor context, which is computed with the same three factor model than Fama and French. Ferson and Schadt (1996) proposed a conditional model that produces conditional betas. By extension, they proposed to consider a conditional Treynor and Mazuy's coefficient and a conditional Henriksson and Merton's coefficient. In general, a typical mutual fund increases its market exposure when stock returns are low. Using the conditional market timing models, evidence of perverse market timing for the typical fund can be reduced.

2.3.4 Period based Measures

Grinblatt and Titman (1989) suggested a method that gets portfolio returns over several periods and attribute a positive weighting to each of them. The Grinblatt and Titman index is the weighted average of the excess returns. To attribute a null performance to uninformed investors, the weighted average of the reference portfolio in excess of the risk-free rate must be null. A positive measure indicates that the manager accurately foresaw the evolution of the market, while an uninformed one has zero performance. This approach is not very intuitive, and the computations to determine the weights can be complex, built data requirements are simple. This measure generalizes other measures, as Jensen's alpha equal to this measure when all investors' utility functions are quadratic and the Treynor and Mazuy measure.

Cornell (1979) proposed a measure to evaluate the ability of a manager to pick stocks when they have higher returns than usual. The Cornell measure is the average difference between the return of the considered portfolio during the period in which the portfolio is held, and the return on a benchmark portfolio with the same weightings, but considered over a different period. It does not use the market portfolio: asset returns are the direct references used. Like Jensen's measure, it attributes a null performance to a portfolio that has no particular timing or selection skills. Unfortunately, it requires a large amount of calculations. There is also a possibility that certain securities disappear during the period. Finally, it requires knowledge of the weightings of the assets that make up the portfolio.

Grinblatt and Titman (1993) proposed the performance change measure, based on the study of changes in the portfolio. It relies on the principle that an informed investor changes the weightings in his portfolio according to his forecast on the evolution of the returns. His portfolio will thus display a nonnull covariance between the weightings on the assets of the portfolio and the returns on the same assets. The measure is put together by aggregating the covariances. Unlike the Cornell measure, it does not use any benchmark portfolio. However, it requires the knowledge of asset returns and of their weightings within the portfolio. It is limited by the significant number of calculations and data requirement

The measure of performance based on pure market timing introduced by Sweeney (1988) gives the abnormal return during a defined period. It considers transactions costs as well as changes in the portfolio. It is however limited to two assets, one risky and the other riskless, and supposes that the portfolio is always fully invested on one of them.

Bhattacharya and Pfleiderer (1983) suggested a quadratic model with the same origin as Treynor- Mazuy's model. In the Bhattacharya and Pfleiderer measure of market timing, timing ability is defined as the correlation between the manager's forecasts and the excess market return. The latter can be estimated directly from the returns of the benchmark excess returns, while the first one is estimated from a quadratic model Stevenson (2004).

By using standard deviation of returns, the Sharpe measure puts both positive and negative variations from the average on the same level. But most investors are only afraid of negative variations. The Sharpe ratio does not make any distinction between upside risk and downside risk. In the reward to half-variance index, introduced by Ang and Chua (1979), the standard deviation is replaced by the half-variance which considers only the returns lower than the mean. Pure downside-risk, i.e. only pure losses with a return lower than zero, is considered in the downside-risk Sharpe ratio Ziemba (2005). Within this category, the most widely used measure is the Sortino ratio because of its flexibility. It combines previous measures, subtracting like Roy a reserve return in the numerator, and considering the same reserve return in the computation of the semi-variance at the denominator. Watanabe (2006) improved it in the same direction as the Sharpe ratio, with his Sortino skewness/kurtosis ratio. A refined variation is the Sortino-Satchell ratio Sortino(2000) and the Sortino and Satchell (2001), in which the semi-variance related to a reserve return is replaced by lower partial moment of order q, it coincides with Sortino ratio when q = 2. The introduction of a power index permits the consideration of the investor's degree of risk aversion: in practice, a value of q = 0.8 is used to describe an aggressive investor and 2.5 for a conservative investor.

Another idea is to consider the Value at Risk (VaR) as a risk indicator. Value at Risk is the measure selected by the investor who is mostly concerned by disasters, i.e. rare events. For instance, if we consider a threshold α of 5%, VaR_α will give the maximum loss that will happen in the worst 5% of the cases. Dividing the VaR_α by the initial value of the portfolio, we obtain a percentage of loss which is a risk indicator and can be used as denominator in the Sharpe ratio. Dowd (1999, 2000) calls it logically Sharpe ratio

based on the Value at Risk. This measure also tackles one important drawback of the Sharpe ratio, its inability to distinguish between upside and downside risks. It also discriminates the irregular losses as opposed to repeated losses. It is particularly useful when making hedge decisions, as it permits to avoid the excessive use of micro hedges against individual risk exposures.

2.4 Conclusions

According to Boidie et all (2002) , the simplest and most popular way to adjust for return for portfolio risk is to compare rates of returns with those of other investment funds with similar risk factors. This was also described by Reiley and Brown (2000) as peer group comparison. However it has the limitation that it does not make an implicit adjustment for the risk level of portfolios in the universe.

Sharpe et al (1997), noted that the idea behind evaluation of portfolio performance is to compare the return obtained by the manager through active management with returns that could have been obtained from the client if one or more appropriate alternative portfolios had been chosen for investment.

Jack (1965), noted that when assessing the performance of a portfolio it is necessary to consider both risk and return. Ranking of portfolios average returns ignores the skill with which managers minimize the risk of the portfolio through diversification.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This section highlights the type of research design that was used in the study, the population, sample size, sampling procedure, the data collection procedure and data analysis and presentation.

3.2 Research Design

A survey research design was used. According to Mbwesa (2006) ,a survey research involves collection of data from a population in order to determine the current status of that population with respect to one or more variables. A survey study seeks to identify some aspects of the population such as opinions, attitudes, believes or even knowledge of a particular phenomena. This research design was chosen because a similar studies have always used the design such as that conducted by Ngene (2004) to study the challenges faced by pension funds managers in evaluating portfolio performance. The respondents were the investment fund managers of pension funds in Kenya.

3.3 Population

The population of the study was all the registered administrators of pension funds in Kenya as per appendix three attached. A census survey was conducted where all the twenty six registered administrators were considered.

3.4 Data Collection

Primary data was collected using a questionnaire designed to gather the relevant information from the pension fund managers. The questionnaires were delivered personally to the specific respondent's physical locations and picked later for analysis.

3.5 Validity and Reliability

3.5.1 Validity

According to Nachmias & Nachmias (1996), validity of an instrument is the degree to which an instrument measures what it is supposed to measure and consequently permits appropriate interpretation of scores. Before the research instrument is administered to the population members, there will be a need to validate it. To ensure validity of the questionnaire, the questionnaire was pre tested on five pension firms one week before the date of administering the questionnaire. The results were then compared and consistency observed hence testing for validity of the instrument.

3.5.2 Reliability

According to Mugenda and Mugenda (2003), reliability is a measure of the degree to which a research instrument yields consistent result or data after repeated trials. The result of the pre test showed validity which then showed that the questionnaire was reliable.

3.6 Data Analysis

Data analysis involves data preparation where data is checked for accuracy, entered into a computer, examined critically and making inferences, Kombo and Tromp (2006). Immediately the questionnaires were received, they were checked for accuracy. This was

done by checking whether the responses were legible, whether all important questions had been answered and whether the responses were complete.

A coding system was used to find a quick and easy way to organize the data so that it could be analyzed. Codes are symbols which are used to identify particular responses, Robson (1993). Using the standard statistical package for social sciences (SPSS), Factor analysis was used to test the degree of relationship between familiarity with a portfolio performance measure and the importance of the same to the investment manager. Data was then presented using frequency distribution tables and graphs.

CHAPTER FOUR
DATA ANALYSIS, FINDINGS AND DICUSSION

4.1 Introduction

The findings of the research were analysed in accordance with the objective of the study set out in section 1.3. A total of 26 questionnaires were delivered to the physical locations of the respondents. 21 responses were received an 81% response rate. This was considered adequate for data analysis.

The analysis was divided into two sections namely frequency analysis and factor analysis. Frequency analysis was used to establish the frequencies of the variables and factor analysis used to establish the level of correlation between the factors surveyed.

4.2 Frequency Analysis

This was to verify the frequency of the respondent as per the obtained data from the questionnaire. All the 13 factors surveyed and the response rates obtained are shown below.

4.2.1 Treynors Measure

Table 4.1 Treynors Measure

Treynors measurer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	14.3	14.3	14.3
	Disagree	2	9.52	9.52	23.82
	Neither Agree nor Disagree	2	9.52	9.52	33.34
	Agree	4	19.06	19.06	52.4
	Strongly Agree	10	47.6	47.6	100.0
	Total	21	100.0	100.0	

Source; research findings

The response from the questionnaire regarding Treynors measure of portfolio performance showed that 14.3% strongly disagreed that they used the measure, 9.52%

disagreed, the same percentage was neutral, 19.06% agreed on using the measure and 47.6% strongly agreed that they used the measure to evaluate portfolio performance.

4.2.2 Sharpes Measure

Table 4.2 Sharpes Measure

Sharpes Measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neither Agree or Disagree	4	19.0	19.0	19.0
	Agree	8	38.1	38.1	57.1
	Strongly Agree	9	42.9	42.9	100.0
	Total	21	100.0	100.0	

Source; research findings

The study findings revealed that about (38.1%) agreed that they used Sharpe's measure to evaluate portfolio performance and 42.9% strongly agreed on the same. However 19% were neutral.

4.2.3 Jensens Measure

Table 4.3 Jensens Measure

Jensens Measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	9.5	9.5	9.5
	Disagree	2	9.5	9.5	19.0
	Neither Agree nor Disagree	1	4.8	4.8	23.8
	Agree	6	28..6	28.6	52.4
	Strongly Agree	10	47.6	47.6	100.0
	Total	21	100.0	100.0	

Source; research findings

From the table above, 47.6% of the respondents strongly agreed and another 28.6% agreed that they use the measure in evaluating portfolio performance. However 19% disagreed and 4.8% were neutral.

4.2.4 Information or Appraisal ratio Measure

Table 4.4 Information or Appraisal ratio Measure

Information or appraisal ratio Measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	4.8	4.8	4.8
	Disagree	3	14.3	14.3	19.1
	Neither Agree nor Disagree	4	19.0	19.0	38.1
	Agree	10	47.6	47.6	85.7
	Strongly Agree	3	14.3	14.3	100.0
	Total	21	100.0	100.0	

Source; research findings

47.6% of respondents strongly agreed that they used the information appraisal measure to evaluate portfolio performance and another 14.3% agreed. However, 19% of the respondents were neutral, 14.3% disagreed and 4.8% strongly agreed.

4.2.5 Bhattacharya and Pfleiderer Quadratic model

Table 4.5 Bhattacharya and Pfleiderer Quadratic model

Bhattacharya and Pfleiderer Quadratic Model

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	4.8	4.8	4.8
	Disagree	2	9.5	9.5	14.3
	Neither Agree nor Disagree	1	4.8	4.8	19.1
	Agree	8	38.1	38.1	57.2
	Strongly Agree	9	42..8	42.8	100.0
	Total	21	100.0	100.0	

Source; research findings

From the data above, 4.8% of the respondents strongly disagreed on using the measure to evaluate portfolio performance, 9.5% disagreed, 4.8% were neutral, 38.1% agreed on using the measure and another 42.8% of the respondents strongly agreed to using the measure.

4.2.6 Sweeney Grinblatt and Titman performance change Measure

Table 4.6 Sweeney Grinblatt and Titman performance change measure

Sweeney Grinblatt and Titman Performance change Measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	4.8	4.8	4.8
	Disagree	1	4.8	4..8	9.6
	Neither Agree nor Disagree	1	4.8	4.8	14.4
	Agree	10	47.6	47.6	62
	Strongly Agree	8	38.0	38.0	100.0
	Total	21	100.0	100.0	

Source; research findings

The data above shows that 47.6% of the respondents agreed that they used the measure to measure portfolio performance, 38% strongly agreed and 4.8% were neutral , the same percentage disagreed and strongly agreed that they used the measure to evaluate portfolio performance.

4.2.7 The Cornell Measure

Table 4.7 The Cornell Measure

The Cornell Measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	23.8	23.8	23.8
	Disagree	4	19.0	19.0	42.8
	Neither Agree nor Disagree	5	23.8	23.8	66.6
	Agree	7	33.4	33.4	100.0
	Total	21	100.0	100.0	

Source; research findings

From the data above, 23.8% of the respondents disagreed on using the measure to evaluate portfolio performance, 19% disagreed, 23.8% were neutral, and 33.4% agreed to using the measure.

4.2.8 The Grinblatt and Titman Index

Table 4.8 The Grinblatt and Titman Index

The Grinblatt and Titman index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12	57.1	57.1	57.1
	Disagree	6	28.6	28.6	85.7
	Neither Agree nor Disagree	1	4.8	4.8	90.5
	Agree	1	4.8	4.8	95.3
	Strongly Agree	1	4.7	4.7	100.0
	Total	21	100.0	100.0	

Source; research findings

57.1% of the respondents strongly disagreed that they used the Grinblatt and Titman index in evaluating portfolio performance while 28.6% disagreed. However 4.8% were neutral, the same percentage agreed and the same percentage strongly agreed.

4.2.9 Henriksson and Merton timing Measure

Table 4.9 Henriksson and Merton timing Measure

Henriksson and Merton timing Measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	4.8	4.8	4.8
	Disagree	5	23.8	23.8	28.6
	Neither Agree nor Disagree	0	0	0	28.6
	Agree	6	28.6	28.6	57..2
	Strongly Agree	9	42.8	42.8	100.0
	Total	21	100.0	100.0	

Source; research findings

From the above table it is clear that 42.8% of the respondents strongly agreed on using the measure to evaluate portfolio performance, 23.8% agreed, 28.6% disagreed and 4.8% strongly disagreed on using the measure.

4.2.10 Sortino Ratio

Table 4.10 Sortino Ratio

Sortino ratio

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	71.4	71.4	71.4
	Disagree	4	19	19	90.4
	Agree	2	9.6	9.6	100.0
	Total	21	100.0	100.0	

Source; research findings

From the data above most respondents disagreed on using the measure to evaluate portfolio performance. The percentage that strongly disagreed was 71.4%, while 19% disagreed. Only 9.6% acknowledged using the measure to evaluate portfolio performance.

4.2.11 Sortino + skewness/kurtosis ratio

Table 4.11 Sortino + skewness/kurtosis ratio

Sortino + skewness/kurtosis ratio

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	28.6	28.6	28.6
	Disagree	6	28.6	28.6	57.2
	Neither Agree nor Disagree	7	33.3	33.3	90.5
	Agree	1	4.8	4.8	95.3
	Strongly Agree	1	4.8	4.8	100.0
	Total	21	100.0	100.0	

Source; research findings

From the table above about 28.6% of the respondents strongly disagreed and the same percentage disagreed that they did not use the measure to evaluate portfolio performance. 33.3% were neutral, and 4.8% agreed and strongly agreed on using the measure to evaluate portfolio performance.

4.2.12 Sortino-Satchell Ratio

Table 4.12 Sortino-Satchell ratio

Sortino-Satchell ratio

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	14.3	14.3	14.3
	Disagree	5	23.8	23.8	38.1
	Neither Agree nor Disagree	5	23.8	23.8	61.9
	Agree	4	19	19	80.9
	Strongly Agree	4	19	19	100.0
	Total	21	100.0	100.0	

Source; research findings

14.3% of the respondents strongly disagreed that they never used the measure to evaluate portfolio performance, 23.8% disagreed, the same percentage were neutral and 19% agreed and strongly agreed using the measure to evaluate portfolio performance.

4.2.13 Value at risk portfolio performance Measure

Table 4.13 Value at risk portfolio performance measure

Value at risk portfolio performance measure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	4.8	4.8	4.8
	Disagree	1	4.8	4.8	9.6
	Neither Agree nor Disagree	1	4.8	4.8	14.4
	Agree	12	57.1	57.1	71.5
	Strongly Agree	6	28.5	28.5	100.0
	Total	21	100.0	100.0	

Source; research findings

From the above table 57.1% of the respondents agreed that they used the measure to evaluate portfolio performance, another 28.5% strongly agreed on using the measure, while 4.8% disagreed, were neutral and strongly disagreed on using the measure to evaluate portfolio performance.

4.3 Factor Analysis

The study used confirmatory factor analysis to confirm the degree and extent to which the tested variable correlate with each other.

4.3.1 Correlation Matrix

Table 4.14 Correlation Matrix

Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13
Correlation	1	1.000	.833	.905	.866	.844	.914	.895	.885	.884	.762	.842	.835	.894
	2	.833	1.000	.946	.948	.792	.924	.927	.917	.917	.911	.952	.941	.915
	3	.905	.946	1.000	.957	.868	.960	.966	.944	.920	.836	.936	.921	.923
	4	.866	.948	.957	1.000	.831	.963	.925	.948	.923	.880	.933	.922	.937
	5	.844	.792	.868	.831	1.000	.853	.813	.890	.780	.688	.787	.846	.811
	6	.914	.924	.960	.963	.853	1.000	.959	.979	.937	.841	.936	.921	.951
	7	.895	.927	.966	.925	.813	.959	1.000	.933	.947	.839	.960	.933	.922
	8	.885	.917	.944	.948	.890	.979	.933	1.000	.905	.826	.940	.925	.969
	9	.884	.917	.920	.923	.780	.937	.947	.905	1.000	.926	.960	.952	.901
	10	.762	.911	.836	.880	.688	.841	.839	.826	.926	1.000	.932	.924	.849
	11	.842	.952	.936	.933	.787	.936	.960	.940	.960	.932	1.000	.967	.943
	12	.835	.941	.921	.922	.846	.921	.933	.925	.952	.924	.967	1.000	.911
	13	.894	.915	.923	.937	.811	.951	.922	.969	.901	.849	.943	.911	1.000

a. Determinant

= 5.85E-017

Source; research findings

The data in the above correlation matrix table indicates that almost all the factors under study have a strong positive correlation with each other. Hence the methods of evaluating portfolio performance are strongly positively correlated.

4.3.2 Rotated Factor Analysis Component Matrix

Table 4.15 Rotated Factor Analysis Component Matrix

Rotated Factor Analysis Component Matrix

	Component												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	.661	.380	.363	.286	.277	.140	.329	.014	.004	.013	.001	.002	.000
2	.498	.483	.353	.395	.392	.194	.171	-.005	-.003	-.008	.130	.000	-5.498E-5
3	.574	.430	.431	.331	.240	.344	.121	.013	.018	.011	.000	.002	.001
4	.330	.834	.251	.307	.169	.074	.062	.003	.013	.005	.001	-.001	-.004
5	.495	.447	.468	.419	.312	.174	.072	.160	.047	.012	-.003	-.004	.000
6	.533	.388	.364	.412	.497	.085	.083	.015	.012	.023	-.028	-.009	.000
7	.479	.527	.546	.326	.251	.093	.073	.071	.052	-.003	.004	.038	.037
8	.696	.343	.279	.430	.305	.103	.006	.039	.171	.025	-.002	.002	.001
9	.874	.270	.248	.269	.111	.098	.058	.029	-.029	-.034	.023	-.014	.002
10	.698	.358	.411	.296	.344	.042	.061	-.030	.012	-.009	-.002	.066	.002
11	.703	.480	.311	.261	.278	.045	.061	.010	.028	.164	-.005	-.001	.000
12	.522	.385	.603	.400	.196	.067	.082	-.053	-.005	.034	.017	-.027	-.023
13	.390	.455	.302	.707	.192	.078	.078	.005	.002	.013	.005	.007	.003

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

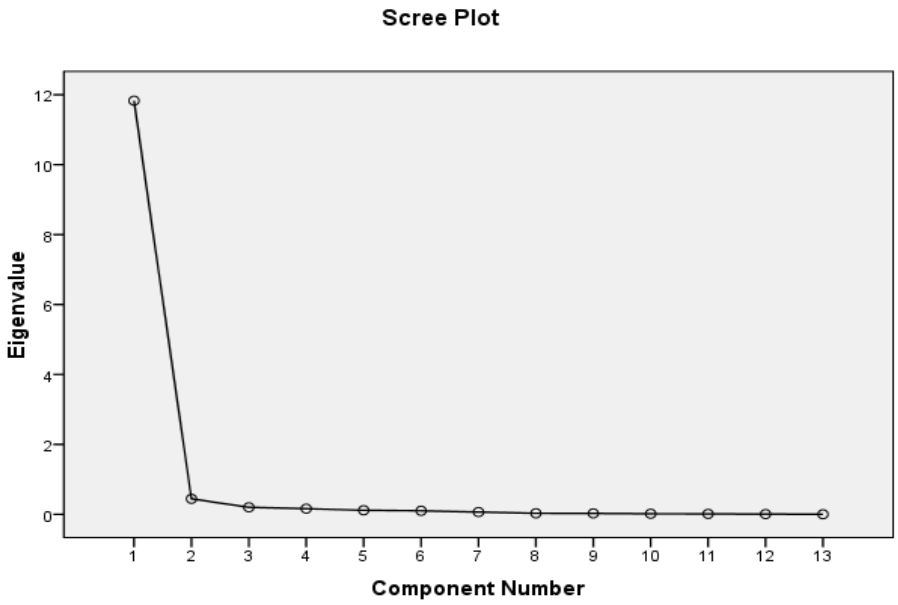
a. Rotation converged in 10 iterations.

Source; research findings

This is the rotated version of correlation matrix that has just confirmed that there still exist very strong positive correlation between the observed variable and that the effect on one variable strongly affects the behavior of the other variables.

4.3.3 Scree Plot of Eigenvalue

Table 4.16 Scree Plot of Eigenvalue



4.3.4 Extracting Principal Components though Variance test

Table 4.15 Principal Components Extracting

Component Matrix

	Component							
	1	2	3	4	5	6	7	8
Treynors measure *	.639	.693	.233	.201	.090	-.077	.048	.001
Sharpes measure *	.830	-.413	.269	.161	.101	.119	-.115	.064
Jensens measure *	.876	-.194	-.264	.333	-.054	.030	.096	.020
Information ratio*	.971	-.010	-.014	-.054	.102	.119	-.051	-.139
Bhattacharya and Pfeiderer quadratic model *	.859	.394	-.054	-.042	-.228	.216	-.035	.041
Sweeney Grinbalt and Titman performance change measure *	.979	.084	-.100	-.003	.096	-.014	-.038	-.063
The Cornel measure measure	.966	-.005	-.132	.026	-.035	-.156	-.134	.015
The Grinblatt and Titman index	.969	.154	-.081	-.118	.089	.023	.002	.055
Henrikson and Merton timing measure *	.971	-.119	.024	.063	-.090	-.102	.001	-.066
Sortino ratio	.915	-.273	.201	-.072	-.097	.010	.166	-.033
Sortino + skewness /kurtosis measure	.976	-.094	.032	-.106	-.024	-.120	-.009	.071
Sortino Sachell ratio	.966	-.014	.090	-.127	-.161	-.060	-.014	-.002
Value at risk performance measure *	.948	-.016	-.108	-.149	.224	.031	.100	.053

Extraction Method: Principal Component Analysis.
8 components extracted.

Source; research findings

4.4 Interpretation of the findings

The main techniques used by investment managers to evaluate portfolio performance were Treynors measure, Sharpes measure, Jensens measure, Bhattacharya and Pfeiderer quadratic model ,Information ratio, Sweeney Grinbalt and Titman performance change measure , Henrikson and Merton timing measure ratio and Value at risk performance measure.

Jensen's measure was the most popular measure with 47.6% and 28.6% of the respondents strongly agreeing and agreeing respectively that they used the measure to evaluate portfolio performance. The Treynors measure was the next most popular measure with 47.6% of the respondents strongly agreeing on the using the measure and 19.06% agreeing that they use the measure to evaluate portfolio performance. Sharpe's measure was the third most popular measure of evaluating portfolio performance with 42.9% and 38.1% of respondents strongly agreeing and agreeing respectively that they use the measure to evaluate portfolio performance.

The Bhattacharya and Pfeiderer quadratic model equally had a large support with 42.8% of the respondents strongly agreeing that they use the measure and 38.1% agreeing that they use the measure to evaluate portfolio performance. Next was the Henrikson and Merton timing measure ratio which was also quoted as one of the popular measures of portfolio performance with 42.8% of respondents stating that they strongly agree that they use the measure and 28.6% stating that they agree that they use the measure to evaluate portfolio performance.

From component analysis, it was observed that there are only eight (8) principal techniques that are used by portfolio managers to manage portfolio performance. These include Treynors measure, Sharpe's measure, Jensen's measure, Bhattacharya and Pfeiderer quadratic model, Information ratio, Sweeney Grinbalt and Titman performance change measure, Henrikson and Merton timing measure ratio and Value at risk performance measure. The remaining measures are rarely used by portfolio managers to evaluate portfolio performance.

CHAPTER FIVE

5.1 Introduction

This chapter presents the research findings, conclusions, recommendations and suggestions for further research.

5.2 Summary of Findings

The study established that the main techniques used by investment managers to evaluate portfolio performance were Treynors measure, Sharpes measure, Jensens measure, Bhattacharya and Pfeiderer quadratic model ,Information ratio, Sweeney Grinbalt and Titman performance change measure , Henrikson and Merton timing measure ratio and Value at risk performance measure.

It was established that Jensen's measure was the most popular measure with 47.6% and 28.6% of the respondents strongly agreeing and agreeing respectively that they used the measure to evaluate portfolio performance. The Treynors measure was the next most popular measure with 47.6% of the respondents strongly agreeing on the using the measure and 19.06% agreeing that they use the measure to evaluate portfolio performance. Sharpe's measure was the third most popular measure of evaluating portfolio performance with 42.9% and 38.1% of respondents strongly agreeing and agreeing respectively that they use the measure to evaluate portfolio performance. The Bhattacharya and Pfeiderer quadratic model equally had a large support with 42.8% of the respondents strongly agreeing that they use the measure and 38.1% agreeing that they use the measure to evaluate portfolio performance. Next was the Henrikson and Merton timing measure ratio which was also quoted as one of the popular measures of portfolio performance with 42.8% of respondents stating that they strongly agree that they use the measure and 28.6% stating that they agree that they use the measure to evaluate portfolio performance.

The Sweeney Grinbalt and Titman performance change measure equally had a reasonable support with 38% of the respondents strongly agreeing on using the measure to evaluate portfolio performance and 47.6% agreeing on the same. Value at risk performance

measure on the other hand had 28.5% of the respondents who strongly agreed on using the measure and 57.1% who agreed on the same. Last but not least was the information appraisal ratio measure was also supported 14.3% of respondents who strongly agreed on using the measure and 47.6% who agreed on using the measure to evaluate portfolio performance.

5.3 Conclusions

It can be concluded that no single firm used only one measure to evaluate portfolio performance. The firms used a combination of measures to evaluate portfolio performance. Among the most common measures used included the Jensen's Measure, Treynors Measure, and Sharpe's Measure, Bhattacharya and Pfeiderer quadratic Model, Value at risk Measure and the Information Appraisal ratio Measure.

5.4 Policy Recommendations

It is recommended that investment managers use the Jensen's measure, Treynors measure and Sharpe's measure. This is because most investment managers used these measures to evaluate portfolio performance. Furthermore, these are the common composite measures of portfolio performance that have been used to evaluate portfolio performance since the 1960s.

Also investment managers are advised to use a combination of measures to evaluate portfolio performance. This is because it was noted no firm used a single measure to evaluate portfolio performance but a combination of a number of measures depending on the circumstances prevailing and the nature of investment involved.

Next, though the value at risk measure was moderately supported by investment managers as a measure of portfolio performance with 14.% strongly agreeing on using the measure and 47.6% agreeing on using it to measure portfolio performance, it should be embraced by investment managers to evaluate portfolio performance. This is because value at risk is an emerging issue that involves attempting to provide a single measure

summarizing the total risk in a portfolio of financial assets for senior management. It has become widely used by corporate treasurers and fund managers as well as financial institutions in most developed countries. It's therefore necessary for local fund and investment managers to embrace it as well.

Finally, fund managers should not ignore the other measures such as the Sortino measure, the Cornel measure and the Grinblatt and Titman measures. They should investigate how the measures are used and try to determine when they need to use them to evaluate portfolio performance. Otherwise the measures have been used in developed countries and proved to be satisfactory.

5.5 Limitations of the Study

Firstly, some fund manager's seemed not aware of some measures of evaluation of portfolio performance such as the Sortino measures. This raises the question whether the information they provided in the questionnaire about these measures was accurate or not.

Next, some members did not bother to fill the questionnaires (five firms) despite several attempts to get them to fill the questionnaire.

Lastly, the research relied on primary data through the administration of the questionnaire. This may have led to the questionnaire bias problem. It is likely that some respondents misunderstood some questions or gave biased opinions.

5.5 Suggestions for further Study

A study could be conducted to identify the level of public awareness about evaluation of portfolio performance without necessarily focusing on pension funds.

It is argued that a case study approach is vastly superior to the general questionnaire based study. A case study can be undertaken by picking a few large pension funds and carrying out a comprehensive in depth study on the measures used by those firms to evaluate portfolio performance.

A further study may focus on other portfolio or asset management firms in Kenya apart from those managed by the retirement benefit authority. This will address the question on whether the same problems, challenges and extent of usage or portfolio performance measures are also prevalent with asset management firms not registered under RBA.

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APPENDIX I: LETTER TO RESPONDENT

Dear Sir/Madam,

I am an MBA student at the University of Nairobi. I am conducting a study on the composite measures of portfolio performance used by pension funds in Kenya in evaluating portfolio performance. The questionnaire attached is intended to assist in the collection of data purely for academic research. As a respondent you are requested to provide the data as honestly and as objectively as possible.

Your cooperation will be highly appreciated. Any information given here will be treated in utmost confidentiality.

Thank you.

APPENDIX II: QUESTIONNAIRE

SECTION ONE.

Indicate the composite measures of portfolio performance used by your firm in managing portfolio performance by ticking against the technique and adding any other technique missing from the list.

Composite measure		Tick
1.	Treynors measure	
2.	Sharpes measure	
3.	Jensens measure	
4.	Information or appraisal ratio measure	
5.	Bhattacharya and Pfleiderer] quadratic model	
6.	Sweeney Grinblatt and Titman performance change measure	
7.	The Cornell measure	
8.	The Grinblatt and Titman index	
9	Henriksson and Merton timing measure	
10	Sortino ratio	

11	Sortino + skewness/kurtosis ratio	
12.	Sortino-Satchell ratio	
13	Value at risk portfolio performance measure	

SECTION TWO.

Kindly indicate the extent of application of the following composite measure of portfolio performance in your firm on a scale of one to five;
Where:-

Greatest extent=5, Great extent=4, Not sure=3, Little extent=2

Very little extent =1

Composite measure		**Rating**				
		5	**4**	**3**	**2**	**1**
1.	Treynors measure					
2.	Sharpes measure					
3.	Jensens measure					
4.	Information or appraisal ratio measure					
5.	Bhattacharya and Pfleiderer quadratic model					
6.	Sweeney Grinblatt and Titman performance change measure					

7.	The Cornell measure					
8.	The Grinblatt and Titman index					
9	Henriksson and Merton timing measure					
10	Sortino ratio					
11	Sortino + skewness/kurtosis ratio					
12	Sortino-Satchell ratio					
13	Value at risk portfolio performance measure					

APPENDIX III: LIST OF PENSION FUNDS IN KENYA

Registered Administrators - 2012

In accordance with Section 22 (3) of the Retirement Benefits Act, 1997 the Authority brings the following list of registered administrators, custodians and fund managers for the year 2012 to the attention of trustees of retirement benefits schemes and other interested parties:

	NAME	CONTACT PERSON	PHONE	PHYSICAL LOCATION
1	Alexander Forbes Financial Services (EA) Limited	Sundeep Raichura	4969000	Landmark Plaza, Argwings Kodhek Road
2	Aon Kenya Insurance Brokers Limited	Nebert Amasa	4975000	Aon House, off Nyerere Road
3	Apollo Life Assurance Limited	Piyush N Shah	3641000	Apollo Centre, Ring Road, Westlands
4	British-American Insurance Company (K) Limited	Titus Ndeti	2722157	British American Centre, Upper Hill
5	CFC Life Assurance Limited	Gladys Musembi	2866000	CFC House, Mamlaka Road
6	Chancery Wright Insurance Brokers Limited	Robert Mugo	2721555	ACK Garden House, 1st Ngong Avenue
7	Eagle Africa Insurance Brokers Kenya Limited	Sam N Ncheeri	4946000	Longonot Road, Upper Hill

8	ICEA Trustee Services Limited	Jane Juma	2221652	ICEA Building, Kenyatta Avenue
9	Kenindia Assurance Company Limited	Jaspal Nagi	2214662	Kenindia Assurance, Loita Street
10	Kingsland Court Benefits Services Limited	Roger Urion	4343137	Old Mutual Building, Mara/Hospital Road
11	LAPTRUST Administration Services Limited	Hosea Kili		Laptrust House, Haile Selassie Avenue
12	Liaison Financial Services Limited	James Mwangi	2710181	Liaison House, Statehouse Avenue
13	Liberty Pension Services Ltd.	Simon Wafubwa	8160312	1st Floor, Visions Plaza, Suite 24, Mombasa Road
14	Madison Insurance Company Kenya Limited	Mathias G Sabala	2721970	Madison Insurance House, Upper Hill Road
15	Mercantile Insurance Company Limited	Supriyo Sen	2215244	Fedha Towers, Muindi Mbingu Street
16	Octagon Pension Services Limited	Fred Waswa	6001949	Plaza 2000, Mombasa Road
17	Pacific Insurance Brokers (EA) Limited	Caesar Kagwe	2717187	Rose Avenue, off Denis Pritt
18	Pan Africa Life Assurance Limited	Gibson Obanda	2781000	Pan Africa House, Kenyatta Avenue

19	Roberts Insurance Brokers Limited	Alfred Odongo	2710494	Bishops Garden Towers, Bishops Road
20	Sapon Insurance Brokers Limited	Esther Maindi	6007324	2nd Floor, West End Place, Off Langata/Mbagathi Round About
21	Sedgwick Kenya Insurance Brokers Limited	Abdallah Bekah	2723088	ZEP Re Place, Longonot Rd, Upper Hill
22	The Heritage Insurance Company Limited	Gerardus Otiti	2783000	CFC House, Mamlaka Road
23	The Jubilee Insurance Company of Kenya Limited	Ashwini Bandari	3281000	Jubilee Insurance House, Mama Ngina Street
24	The Kenyan Alliance Insurance Company Limited	Simon M Waweru	2227723	Chester House, Koinange Street
25	The Monarch Insurance Company		310032	Prudential Assurance Building, Wabera Street
26	Zimele Asset Management Company Limited	Wilson Kamau	2246273	Fedha Towers, Muindi Mbingu Street

Source yellow pages