

# **THE RELATIONSHIP BETWEEN ASSET ALLOCATION AND FUND PERFORMANCE OF OCCUPATIONAL PENSION SCHEMES IN KENYA**

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## **ABSTRACT**

In Kenya, pension schemes are set up with an aim of promoting financial independence of retirees and alleviating poverty at old age. To achieve this, pension schemes through trustees are mandated to come up with Investment Policies that determine the asset allocation of their portfolio. The growth of pension scheme funds is attributed to good Investment Policies as it leads to increasing performance and returns of the scheme whereas poor investment policies may lead to negative returns which in the long run have an impact on the principal contribution and hence eroding the scheme's fund value. It is with this in mind that the study sought to establish the relationship between asset allocation and fund performance of occupational pension schemes. Moreover, the study determined the contribution of each asset class to the performance of schemes. The study was carried out to provide insight to the government and all pension stake holders on screening and adoption of the right investment policies and strategies to effectively grow the pensioner's wealth. It employed a descriptive research design with secondary panel data obtained from a sample 20 occupational schemes for a period of four years from 2013 to 2016. The schemes were segregated in nature, with a fund value of over 200 million as at year end 2016 and under the management of the

same fund manager and administrator for the period of study. Secondary data on asset allocation and returns was obtained from the schemes financial statements and filled fund managers reports with the Retirement Benefit Authority. Statistical Analysis tests; Descriptive, Correlation, Regression and Analysis of Variance (ANOVA) were carried out on the data and inferences made. From a population of 242 fully compliant segregated schemes the finding of the study showed that asset allocation accounted for the highest percentage of the fund performance of occupational pension scheme in Kenya. Other factors such as asset class timing, choice of investment manager and security selection were seen to also affect the scheme performances. Further, there existed a relationship between different asset classes and fund performance of occupational pension scheme with offshore investment having the strongest correlation. The study recommended the need for flexibility on the quantitative asset allocation limits on asset classes which limit the fund manager's ability to make investment decision based on risk -return analysis.

**Key Words:** *asset allocation, fund performance, equity investments, fixed income investments, cash and equivalent investments, offshore investments*

## **INTRODUCTION**

Pension funds in Africa have an asset base of over 18 trillion making them one of the most significant social security players (Asebedo & Grable, 2010). The main focus of pension schemes across the world is to alleviate old age poverty by bringing economic and financial

stability to a nation's aging population. The establishment of pension schemes is vital in ensuring pensioners achieves a better quality of life.

Pension schemes across the world are set up under two main arrangements; defined contribution and defined benefits arrangement. The defined contribution schemes have a fixed rate of contribution and the retirement benefit is therefore secured from the accumulation built by the fixed contribution plus interest thereon. They are therefore asset backed investment funds. Defined benefit schemes on the other hand provide members with a retirement benefit that is defined from the onset and is mostly a certain percentage of their salary at retirement, the percentage being determined by the total years of work. They therefore rely on the funding hence a fiscal burden to the sponsor. The trend worldwide has therefore been to move away from the defined benefit to defined contribution arrangements.

Investment arrangements adopted by these schemes fall into two categories; segregated and guaranteed arrangements. A guaranteed/insured arrangement is managed by an insurance company so as to guarantee a minimum return stipulated by the respective country's investment guidelines. The segregated arrangement on the other hand is managed by fund managers appointed by trustees. In this case trustees come up with investment policies within which asset allocation is contained guided by investment guidelines and appoint fund managers to execute the policies. The segregated option does not offer a minimum guaranteed return and therefore returns obtained are mostly determined by asset allocation strategies adopted. Pension schemes in most countries across the world are governed by the respective regulatory bodies and adhere to set regulations. The study focuses on Occupational Pension Schemes, which are under the segregated arrangement as they are highly dependent on asset allocation.

Pension fund models of investment as per the RBA Act are either under a guaranteed/insured arrangement or a segregated arrangement. A guaranteed option is whereby a trustee opt to have their funds insured and managed by an Insurance company so as to guarantee a minimum return of 4%. The segregated arrangement on the other hand is managed by a registered fund manager and offers no guaranteed return. According to the Retirement Benefits Industry Report (2015), the total number of schemes registered under both guaranteed and segregated as at 31<sup>st</sup> December 2015 was at 1218 (442 being segregated schemes and 776 being guaranteed schemes).

Asset allocation refers the process of adjusting the relative proportion of different asset classes in an investment portfolio (Meir, 2015). It determines how an investor's wealth is to be distributed among different asset classes to maximize returns and minimize risks. Asset classes are defined as securities that have similar characteristics, attributes and risk/returns relationships. Key decisions to be made in asset allocation include; nature of asset classes to be invested on, weights and specific securities to purchase under each asset class.

Several studies have been done on asset allocation and pension fund performance as discussed in the literature review. In their study, Ibbotson and Kaplan (2000) concluded that the main determinant of investment performance of retirement benefit funds in the US was asset allocation, rather than the stock selection as it explained about 60% of the variation of returns. Further, in their research, Blake, Lehmann and Timmermann (1999) showed that 96% of the total variation in monthly portfolio returns of pension schemes in the United Kingdom could be explained by the normal asset class holdings across funds on average. In Kenya, a study carried out by Nguthu (2009) showed that the variation in returns over time for pension schemes was explained up to 58% by the investment policy. Further, Kagunda (2011) showed that asset allocation explained a significant amount of the difference in returns across time and hence a primary determinant of performance of unit trusts in Kenya. Finally, a finding of the study carried out Omondi (2013) is that asset allocation explains 28% of the variability of fund returns with the remaining 78% being attributed to other factors.

Based on the studies above we can depict an existing relationship between asset allocation and pension fund performance. The empirical literature on the other hand creates a research gap on the influence of asset allocation on performance of pension funds. Very few local studies have tried to measure the relationship between asset allocation and pension fund performance. In addition to this, very few studies have determined the average percentage contribution of each asset class under the investment guidelines to the overall performance of pension funds in Kenya. Further, the RBA ACT indicates that investment policies should be reviewed every three years. It is therefore prudent to carry out an up to date study showing relationship between asset allocation and fund performance of pension funds.

## **GENERAL OBJECTIVE**

The overall objective of the study was to determine the relationship between asset allocation and fund performance of occupational pension schemes in Kenya.

## **SPECIFIC OBJECTIVES**

1. To determine the relationship between equity investments and fund performance of occupational pension schemes in Kenya.
2. To evaluate the relationship between fixed income investments and fund performance of occupational pension schemes in Kenya.
3. To evaluate the relationship between cash and equivalent investments and fund performance of occupational pension schemes Kenya.
4. To evaluate the relationship between offshore investments and fund performance of occupational pension schemes Kenya.

## **THEORETICAL REVIEW**

### **Modern Portfolio Theory**

The Modern Portfolio Theory (MPT) was pioneered by Markowitz in his paper Portfolio Selection. In his paper, Markowitz found that the correlation between different assets could be utilized to maximize a portfolio return based on a given level of risk. The theory explains the effects of risk, correlation and diversification of assets on expected investment portfolio returns. It emphasizes on the need to construct a portfolio that maximizes returns while minimizing risks that is, creation of a diversified portfolio that generates positive expected returns. Further, the theory states that it is possible to construct an optimal portfolio offering the maximum possible expected returns for a given level of risk that is an efficient frontier. To construct an efficient frontier, four basic steps are involved; security valuation, asset allocation, portfolio optimization and performance measurement.

Despite its theoretical importance, critics question the model upon which the theory is built as it does not reflect the real world. Expected values are the basis upon which risk, return and correlation is measured and uses historical data to predict. This may not take into account new weight of cash and equivalents in the scheme that may not have been in existence when the data was generated. Using traditional MPT techniques most often than not will distort investment reality (Sortino and Satchell, 2001).

Further, this theory is criticized for concentrating in only a handful of assets to achieve optimization. It also assumes that investors have homogeneous expectations and make the same choices given a particular set of weight of cash and equivalents in the scheme. Prior to Markowitz's work, construction of portfolios was done based on risks and rewards of individual assets. It was prudent to identify those assets with the low risk but high returns while constructing a portfolio. The theory is a key contributor to this study as it lays a foundation on asset allocation strategies and their effects on investment performance. It gives investors a mathematical approach to asset allocation through establishing a formal framework of quantifying measures of risk and return for investment decision making.

### **The Black Litterman Theory**

The Black Litterman theory is a mathematical model that was developed by Black and Litterman in 1990 with an aim of improving the Markowitz's Modern Portfolio Theory. It proposes a portfolio construction model that combines the Capital Asset Pricing Model and Mean-Variance Optimization Model. The model upholds an assumption that asset allocation of a representative agent should be proportional to the market values of the available assets, and then modifies that to take into account the specific opinions of the investor on risks and returns of the assets in question to arrive at a bespoke asset allocation (Black and Litterman 1992).

It starts with a benchmark portfolio which is constructed from the equilibrium expected returns that would clear the market, assuming a given risk model. The equilibrium expected returns (market-implied views) are the set of expected returns that would produce the market portfolio if led into an optimizer with the specified risk model. In other words, these are the returns from reverse optimization assuming the market portfolio is efficient (Drobetz, 2001). The investor's subjective views are then assigned to each asset class forming the benchmark portfolio in form of confidence intervals (Jones, Lim and Zangari, 2007). It then uses a Bayesian approach to combine the market-implied with subjective views of an investor to form a new mixed estimate of expected returns. The resulting new vector of returns leads to intuitive portfolios with sensible portfolio weights. Later in his study Litterman (2003), suggests that portfolio managers can divide asset allocation decisions into two; first, an asset allocation decision based on a variety of asset classes i.e. stocks and bonds. Secondly, an asset allocation decision within one asset class but in different environments i.e. sectors, countries and economies. This is with an aim of promoting diversification so as to minimize risks and maximize returns.

Critics of this theory argue that the study is subjected to biasness arising from the investors subjective views on the level of confidence. Most people are seen to be overconfident in finance decision making especially when establishing the confidence intervals which is actually problematic while using this model. Implication from the research does not favor use of confidence levels when weighting portfolios (Mankertand Seiler, 2012). However, this theory builds up knowledge on asset allocation and performance of investment portfolios.

### **Efficient Market (EMT) Theory**

This is a theory used in financial economics and contains a set of arguments that lead to the assertion that asset prices always reflect available information in the market (Wang ,2008). The theory developed by Eugene Fama, is based on the principle that stocks trade at their fair value. It is therefore difficult for a firm to under value or over value stock prices (Fama, 2001). In his study, Kenneth (2012) confirmed Fama's that it was impossible to outperform the overall market through expert stock selection or market timing and instead high returns would be obtained only by chance or by investment in riskier investments. He showed that distribution of abnormal returns of the US mutual funds under study was not attributed to expertise by fund managers.

The theory divides market information into three hypotheses; weak, semi- strong and strong form of efficiency. The weak form of efficiency states that stock prices cannot be predicted from past stock prices and that there is no serial dependency on stock prices. Past information about asset prices cannot be used by investors while estimating future prices. This therefore implies that technical analysis cannot be used in an attempt to outperform the market; it is merely an approach that is used in the hope of predicting future trends (Hobbs, 2001). Semi –strong form of efficiency on the other hand states that stock prices adjust rapidly to publicly available information and therefore give no room for information biasness in favor of stock prices. Strong

form of efficiency on the other hand states that stock prices reflect all the available information in the market whether private or public. This means that no insider information can be used to outperform the market.

Critics argue that Efficient Market Hypothesis does not in totality reflect the stock markets. In response to the proponents of hypothesis, Desai, Nimalendran, and Venkataraman (1994) stated that market efficiency does not mean not having any uncertainty about the future, that market efficiency is a simplification of the world which may not always hold true, and that the market is practically efficient for investment purposes for most individuals. The theory and its hypothesis are relevant to the study in relation to how the investment portfolios are managed by different stakeholders.

## **EMPIRICAL REVIEW**

### **Equity Investment and Fund Performance**

Dimmson, Marsh and Staunton (2002), sought to show the correlation that existed between expected returns and risk of equities in companies across 16 countries. Research was carried out over a period of 103 years from 1900 -2002. Regression analysis techniques were then applied on the secondary data and findings made. It was evident that in competitive capital markets, additional risk was compensated by additional expected returns Equity risk premiums. Further, equities gave the highest return in every country, but were the riskiest. The study in turn shows a possible relationship between equity and performance of investment funds. Doeswijk and Swinkel (2011) also carried out a study with an aim of estimating the market values of asset classes within a portfolio equity being one of them. Asset classes under investigation included; equity, fixed income/ bonds and cash and equivalents. The study obtained data from the invested global market portfolio for the period 1959 to 2011. Theoretical and estimation techniques were used in analyzing the data i.e. comparing the weight of each asset class as a percentage of the total market value for the set period of time. The total market capitalization of the global multi – asset market portfolio was at USD 83.5 trillion as at year end 2011 with equities representing the largest asset class with a market value of USD 29.0 trillion or 34.7 % of the total market capitalization. This shows the importance of equity as an asset class in influencing the performance of a portfolio.

### **Fixed Income Securities and Fund Performance**

Doeswijk and Swinkel (2011), carried out a study that focused on invested global multi asset market portfolio representative for investors for the period 1990 to 2011. They sought to determine the market capitalization of ten asset classes among them being fixed income securities which included government and non-government bonds. The total market capitalization of all ten asset classes as per the study was at USD 83.5 trillion. Government and

non-government bonds accounted for 30% and 18.4 % respectively of returns and were cumulatively the largest asset class in the portfolio under study with a market portfolio weight of 21.2% and 37.1% respectively. This showed that this asset class was restrictive and though it offered sure returns the returns were low.

Bikker and Dreu (2009) also carried out a study on strategic asset allocation with an aim of determining an optimal portfolio. This study focused on ten asset classes one of which is fixed income securities. A sample of 60 pension schemes under the segregated arrangement in the United States (US) market was used. Data collected was subjected to Mean-Variance analysis techniques and conclusions made. The study's findings were that asset allocation is mostly backed by the risk appetite of the investor. Risk averse investors were seen to lean more on the least risky asset classes that is fixed income securities with an aggregate allocation of over 77.7% of their funds towards fixed income asset classes while risk taking investors were focused on having a mix of both traditional and non-traditional asset classes.

Mwikali (2014) also sought to show the effect of investment guidelines on performance of pension schemes in Kenya. She carried out a descriptive survey study and utilizes secondary data obtained from the RBA website. Her study focused on a sample of 50 segregated schemes that were in existence for a period of ten years with fund values of Kshs 200Million as at 31<sup>st</sup> December 2014. Regression and variance analysis was carried out on data collected from the sample and findings made. The findings of the study were that there was a strong correlation between investment in government securities and financial performance of pension schemes. Holding other factors constant a unit increase in weight of fixed income securities such as government securities would lead to a 1.732 decrease in financial performance. Results noted were in contrast with investments by most pension schemes in Kenya and there was need for further studies to affirm Mwikali's findings.

Mwenda (2014) also carried out a research on the relationship between retirement benefits authority investment guidelines and financial performance of pension schemes in Kenya. A random sample of 28 schemes was selected from a population of 1188 registered pension schemes by the Retirement Benefit Authority. Data from the sample was collected for the period 2003 to 2009. Multiple regression model techniques were adopted to show the relationship between the dependent and independent variables. The study's findings were that there is a high positive correlation between financial performance Commercial Paper and Corporate Bonds (0.755) and between government Securities and financial performance (0.938 which constitute of fixed income securities. Further, the study showed that an investment increase in fixed income securities such as government securities will lead to an increase in the profitability of financial performance.

Maya Fisher – Frend (2015) focuses on volatility of assets Vis a Vis returnsso as to determine an optimal portfolio. She observes that assets with low volatility such as fixed income securities

were always associated with low returns while assets with high volatility such as equities were associated with high returns. Her research advocates for asset diversification to achieve an optimal performance by reducing risk and increasing returns through maintaining a medium risk portfolio.

### **Cash and Equivalents and Fund Performance**

Mikkelson and Partch (2003) sought to determine if persistent large cash reserves hindered performance. The study focused on a sample of 89 firms in the US with assets worth more than \$5 million and held more than 0.25% of these assets in cash and equivalents. The study excluded financial firms (restricted to nonfinancial firms) and was carried out for a period of five years from 1986 to 1991. The 89 firms were compared with two groups of firms selected using the following techniques. The first group consisted of a sample 68 firms that had high cash ratios in the first year of study (1986 -1987) but experienced a significant decline in cash holdings between 1987 and 1997. The second group consisted of a sample of 47 samples that matched the study sample firms by size and industry classification and had operating assets that were within 70% -130% of the study sample firm's operating assets as at the year-end 1991. Regression analysis was then carried out on the firm's median cash ratios and conclusions made.

Following the five-year period, operating performance of high cash firms was comparable to or greater than the performance of firms matched by size and industry or by a measure of proclivity to hold substantial cash. The findings were that a high cash holding was accompanied by greater investment, particularly Rand expenditures, and by greater growth in assets. The study concluded that for firms that persistently hold large cash reserves, such policies support investment without hindering corporate performance. Mercedes, A. and Brendan, M. (2015) sought to carry out a study of asset allocation in Fortune 1,000 pension plans from both OECD and Non- OECD countries. A sample of 274 pension schemes was picked from a population of 1,000 companies and data collected for the period of 6 years. The data was then broken down to two levels. Level a focused on aggregate asset allocation 0weighted by pension sponsor size that is as measured by the value of total pension assets which was USD. 1.7 trillion as at year end 31 December 2015. Whereas level two was based on average asset allocation not weighted by the pensions assets.

### **Offshore Investments and Fund Performance**

Graciela, Richard and Sergio (2001) carried out a study on the dynamics underlying mutual fund investment in offshore markets. They sought to determine investment allocation strategies adopted in foreign markets by local mutual funds by describing the size, asset allocation, country allocation and behavior during crises in emerging markets in the 1990s. A sample of 1,400 emerging market mutual funds from the U.S., Luxembourg, the United Kingdom, Ireland, Cayman Islands, Canada, and Switzerland was studied. The sample mutual funds had an average

net cash flow of about \$120 billion in 1996. Data analyzed was at both the fund manager and fund investor level. Several findings emerged from the study; first most mutual funds were seen to focus on offshore equity investments rather than bonds. International global funds were also seen to invest mainly in developed nations with just 10 percent of their investment devoted to developing nations such as to Asia and Latin America. Investment in offshore assets was seen as a crises mitigation strategy as most mutual funds were very responsive during the crises of the 1990s

Omondi (2013) carried out a research on the relationship between asset allocation strategies and financial performance of pension schemes in Kenya as discussed above. As part of her study she sought to determine the effect of each asset class on the financial performance of the 245 schemes under study. Data collected was subjected through test of significance and a paired sample T- test. The finding of the study was that the correlation index on the relationship between portfolio returns and offshore investment was  $-0.244$  which was below  $-0.4$ . This can be interpreted as a weak and negative correlation between offshore investment and financial performance of pension schemes. Finding the beta weights on the regression results offshore investments are seen to make a relatively large contribution to the prediction model with a beta value of  $-0.123$  as compared to other asset classes i.e. equities, properties and fixed income securities. Results from the T-test showed that offshore investments were of relative importance in determining the overall fund performance as compared to all other asset classes at  $64.721$  with the exception of cash which was at  $77.7$ .

## **RESEARCH METHODOLOGY**

### **Research Design**

A research design is a set of methods used in collecting and analyzing the determined measure of variables in a study with an aim of comprehensively addressing the research problem (Mugenda and Mugenda, 2003). The type of research adopted by this study was a descriptive survey which involves the use of descriptive designs and statistics. Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual or a group (Gakure, 2015). According to Gakure (2015), descriptive survey is a process of collecting data in order to test hypothesis or to answer questions concerning the current status of the subject in the study. Use of descriptive designs enabled us to collect in depth information about the target population. According to Denscombe (1998), descriptive statistics involves a process of transforming a mass of raw data into tables, charts, with frequency distribution and percentages which are a vital part of making sense of the data. The descriptive survey will be adopted as it will provide a means of collecting, analyzing and interpreting data to show the relationship between asset allocation and performances of pension schemes in Kenya.

## **Population**

The target population of this study was 108 schemes out of the 242 schemes. The study focused on schemes under a similar fund manager and administrator for the period of study. This ensured consistency in returns as different fund managers and administrators use different portfolio valuation strategies hence generating different returns. The above criteria the target population consisted of 20 schemes out of the 108 schemes.

## **Sample and Sampling Technique**

A sample is a portion of the target population from which data is collected, summarized, analyzed and inferences about the target population from which the sample is drawn is done (Kumar, 2005). According to Kumar (2005), good sample should be logical, practicable and have regard for time, costs, validity and accuracy of the data. The study used a census of all the twenty segregated schemes selected as the target population. The use of census is highly recommended since it eliminates errors associated with sampling (Saunders et al. 2009). In this study, reliable secondary data from the 20 schemes was available and hence justifying the use of census.

## **Data Collection Procedure**

The study used secondary data obtained from audited financial statements and annual fund manager's reports of individual pension schemes during the four years period (2013-2016). The data was collected through a visit to the Retirement Benefits Authority offices and request for the documents with the aid of a letter of transmittal obtained from the university. This was a cost friendly and reliable source of data as all fund managers and administrators are mandated by the RBA Act to fill returns with the regulator. Data collected for all variables in each pension scheme was organized in panels. According to Baltagi, Bratberg, and Holmås (2005), panel data is suitable for longitudinal analysis because it provides both the time and cross-sections dimensions.

## **Data Processing and Analysis**

Upon extracting the relevant data from the financial statements and fund manager's reports, input of data was done on an excel sheet and STATA package used for statistical analysis. Descriptive statistics such as measure of central tendency and measure of dispersion was used to summarize and profile the pattern in each scheme. A panel data regression model was adopted for the study. Equation 1 represents the analytical regression model used for this study. Equation 1;

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \varepsilon_{it}$$

Where:  $Y_{it}$  is the dependent variable (Pension scheme fund performance)  $B$  is the regression coefficient;  $X_{1it}$  is the weight of cash and equivalents in the scheme;  $X_{2it}$  is the weight of fixed income securities in the scheme;  $X_{3it}$  is the weight of equity in the scheme;  $X_{4it}$  is the weight of offshore investments in the scheme;  $\varepsilon_{it}$  is the error term;  $\beta_0$  is the intercept term;  $\beta_1 - \beta_4$  represents the coefficients of explanatory variables;  $i = 1, \dots, 20$ ;  $t =$  time in years from 2013 – 2016

## RESEARCH RESULTS

To determine the degree of relationship between the independent variables; equity, fixed income securities, cash and equivalents and offshore investments and dependent variable; fund performance of occupational pension schemes, Pearson correlation coefficient was used. Pearson correlation coefficients range from -1 to +1. Negative values indicate negative correlation and positive values indicates positive correlation where Pearson coefficient  $<0.3$  indicates weak correlation, Pearson coefficient  $>0.3 < 0.5$  indicates moderate correlation and Pearson coefficient  $>0.5$  indicates strong correlation.

The analysis on Table 1 indicates that there was a positive correlation between each independent variable and the dependent variable as the correlation coefficient (Pearson correlation coefficients of all variable = 0.3852, 0.1168, 0.0139 and 0.5648) for the equity, fixed income securities, cash and equivalents and offshore investments respectively, to the fund performance. Further, the variable offshore investment in the scheme had the strongest positive correlation (Pearson correlation coefficient = .5648) to the pension schemes fund performance. Whereas equity had a moderate positive correlation (Pearson correlation coefficient = .3852) to pension schemes fund performance. Fixed income securities and Cash and Equivalents had a weak positive correlation of (Pearson correlation coefficient = .1168) and (Pearson correlation coefficient = .0139) to pension scheme fund performance.

**Table 1: Correlation Coefficient**

	<b>Equity</b>	<b>Fixed Income Securities</b>	<b>Cash and Equivalents</b>	<b>Offshore Investments</b>
Equity	1			
Fixed Income Securities	-	1		
Cash and Equivalents	0.6270	0.1062	1	
Offshore Investments	-	-	-	1
Fund Performance	0.0372	0.6826	0.0232	0.5648
	0.3852	0.1168	0.0139	0.5648

\*. Correlation is significant at the 0.05 level (1-tailed)

Upon conducting the above diagnostic test on the panel data we conclude that the best model for use is the fixed effect model. This model will be used in estimating the change in the dependent variables as a result of change in independent variables that change in fund performance of pension schemes as a result of change in asset class allocation. To test the effect of asset allocation on fund performance the long run and the short run version of panel regression model were estimated. The first long run specification of panel regression model was the fixed effects model whose findings are shown in table 2.

The model summary on Table 2 indicates that on overall, the variables considered in the model (equity, fixed income securities, cash and equivalents in the scheme and offshore investments in the scheme) account for about 57.35 percent change in the fund performance. Based on coefficients under Table 3, a unit increase in equity will led to an increase in fund performance by 0.189, a unit increase in fixed income securities will led to an increase in fund performance by 0.146, a unit increase in cash and equivalents in the scheme will led to an increase in fund performance by 0.835 and a unit increase in offshore investments in the scheme will led to an increase in fund performance by 0.916.

**Table 2: Panel regression model Fixed Effects Estimates (Model Summary)**

<b>Item</b>	<b>Value</b>	<b>Rows</b>	<b>Values</b>
Dependant Variable	Fund Performance	Rows processed	20
Number Independent Variables	4	Rows Filtered out	0
Weight Value	None	Rows with X's missing	0
R-squared	0.5735	Rows with Weight missing	0
Adjusted R squared	0.3289	Rows with Y missing	0
Coefficient of Variation	-3.467	Rows used in estimation	20
Mean Square Error	6.1115	Sum of weights	20
Square root of MSE	2.4721		
Ave Abs Pct error	133.375		
Completion Status	Normal Completion		

Table 2 shows that the F statistic is 102.33 and is greater than the critical value at one per cent level of significance. Therefore, the variables (asset allocation components) are jointly significant in explaining the variations in fund performance. The interclass correlation (rho) is 66.83 per cent implying that 66.83 per cent of the variations in fund performance are due to differences across the occupational pension schemes in Kenya. The within and between R-square is 56.51 per cent and 60.52 per cent respectively. Thus, 56.51 per cent of variations in the fund performance are due to differences within individual occupational pension schemes and 60.52 per cent of the variations are due to differences between the occupational pension schemes. The overall  $R^2$  is 57.35 percent, indicating that the variables considered in the model account for

about 57.35 percent change in the dependent variables, while about 42.65 percent change may be as a result of other variables not addressed by this model.

**Table 3: Panel regression model Fixed Effects Estimates (Coefficients)**

<b>Independent Variable</b>	<b>Regression Coefficient b(i)</b>	<b>Standard Error Sb(i)</b>	<b>Standard Zed Coefficient</b>	<b>T - statistic to test</b>	<b>Prob Level</b>
Intercept	-3.467	0.451	0.142	-7.6874	0.0000
Equity	0.189	0.041	0.146	4.6098	0.0000
Fixed income securities	0.146	0.049	0.126	2.9796	0.0049
Cash and equivalents in the scheme	0.835	0.073	0.045	11.4384	0.0000
Offshore investments in the scheme	0.916	0.073	0.142	12.548	0.0000

The chow test statistic is 16.31 and is greater than the critical value at one per cent level of significance. Therefore, the null hypothesis that the fixed effects are equal to zero is rejected at one per cent level of significance. Thus the option of specifying the model as a pooled OLS model over the fixed effects specification is rejected at one per cent level of significance. Based on the panel data analysis, the regression model becomes:

$$Y_{it} = -3.467 + 0.189X_{1it} + 0.146X_{2it} + 0.835X_{3it} + 0.916X_{4it} + \varepsilon_{it}$$

This implies that while holding equity, fixed income securities, cash and equivalents in the scheme and offshore investments in the scheme constant, the fund performance will be -3.467.

## **DISCUSSION**

The first hypothesis of the study was, there existed no significant relationship between equity investments and fund performance of occupational pension schemes in Kenya. The result of the study showed the existence of a positive significant relationship between equities and fund performance with a coefficient of 0.189. This is an implication that a unit increase in equity will increase fund performance by 0.189. Similar to the study findings, Dimnson, Marsh and Staunton (2002) noted that in competitive capital markets, additional risk was compensated by additional expected returns Equity risk premiums. Further, equities gave the highest return in every country, but were the riskiest. The study in turn shows a possible relationship between equity and performance of investment funds.

The second hypothesis of the study was, there existed no significant relationship between fixed income securities and fund performance of occupational pension schemes in Kenya. The result of

the study showed the existence of a positive significant relationship between weight of fixed income securities and fund performance with a coefficient of 0.146. This implies that a unit increase in fixed income securities will increase fund performance by 0.146. In tandem with the study findings, Puttonen (2005) empirically examined the strategic asset allocation and the asset/liability issues in the Finnish defined benefit pension funds. The results indicated that there is a relationship between the Fixed Income and the fund performance. While pension funds with younger participants have more equity exposure, more mature pension funds have more fixed income investments.

Further, the third hypothesis of the study was that there existed no significant relationship between cash and equivalent investments and fund performance of occupational pension schemes in Kenya. A coefficient of 0.835 indicated a positive significant relationship between weight of cash and equivalents in the scheme and fund performance. This implies that a unit increase of cash and equivalents in the scheme will lead to a 0.835 increase fund performance. Based on a research done by Isbitts (2010), on asset allocation and fund performance, an aggregate fraction of the pension fund performance variation was attributable to strategic asset allocation at 37.5%. Some of the key variables under study included cash and equivalents whose coefficient was 0.556. Therefore, it was summarized that cash and equivalents affects performance of funds positively.

The fourth hypothesis indicated that there existed no significant relationship between offshore investments and fund performance of occupational pension schemes in Kenya. The result of the study showed the existence of a positive significant relationship between weight of offshore investment and fund performance with a coefficient of 0.9161. This indicates a positive significant relationship between weight of offshore investments in the scheme and fund performance. This is an implication that a unit increase of offshore investments in the scheme will increase fund performance by 0.916. The previous study by Nguthu (2013) found that 62% of the return difference was explained by offshore investments policy differences. The increase could be attributed to increased awareness of the pensioners on the need for the Trustees to increase value for their offshore investments. Omondi (2013) carried out a research on the relationship between asset allocation strategies and financial performance of pension schemes in Kenya as discussed above.

## **CONCLUSIONS**

The study established the existence of a relatively significant relationship between asset allocation and fund performance of occupation pension schemes in Kenya and therefore rejected the null hypothesis. This relationship accounted for 57.35 % of the fund performance whereas 42.65 % was accounted for by other factors such as asset class timing, choice of investment manager and security selection. Based on the above finding, there existed a relationship between the different asset classes and fund performance with offshore investments having the strongest

relationship followed by weight of cash and equivalents in the scheme, weight of equity and then weight of fixed income securities. From the findings, it was prudent for schemes to not only focus on asset allocation strategies as a vehicle for better scheme performance but also on other factors such as choice of investment manager and asset class timing. Further, it was noted that the most liquid assets; cash and equivalents had lower returns and influence on the fund performance than illiquid assets such as offshore investments, equity and fixed income securities. Fund managers should therefore strike a balance between liquidity and desired returns by establishing the minimum level of liquid assets they wish to hold in the investment portfolio.

## **RECOMMENDATIONS**

Based on the above conclusion, the study recommends regular review of the investment guidelines so as to accommodate up to date asset classes and percentage allocations that reflect the investment market. Review of the investment guidelines will allow maximization of pensioners return as the fund managers will have an array of asset classes to invest on. This recommendation is driven by the fact that 57.35 % of fund performance of occupational pension schemes in Kenya is attributed to asset allocation while other factors account for 42.65 %.

Secondly, from the findings, offshore investments and cash and equivalents are seen to have the strongest impact on scheme performance. The study therefore recommends that trustees and fund managers should aim at having an investment portfolio that has a balanced asset mix that constitute of both risky and conservative assets so as to maximizing the returns of the pensioners. All asset classes were also seen to have a positive contribution to the fund performance of the pension schemes under study. The study therefore recommends investing in all asset classes driven by risk and returns as opposed to aiming at conserving the pensioners fund through conservative asset classes only.

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