

**FACTORS INFLUENCING PENSION FUND MANAGERS' ASSET
ALLOCATION DECISIONS IN KENYA**

BY

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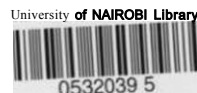
**UNIVERSITY OF NAIROBI
SCHOOL OF ECONOMICS**

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A Research Paper Submitted to the School of Economics in Partial Fulfillment of the
Requirements for the Award of the Degree of Master of Arts in Economics.

September, 2004



DECLARATION

This research paper is my original work and has not been presented for a degree award in any other university

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DEDICATION

This work is dedicated to my mum, Mrs. Shelmith Karegi Kariba who, despite having little or no formal education herself, has constantly and keenly followed my progress throughout my education and offered financial and moral support.

ACKNOWLEDGEMENT

This research work is the end result of a lot of thought, partly invoked by work colleagues, my supervisors Dr. Sichei and Mr. Okelo and a number of industry practitioners whom I have interacted with professionally. At the outset, my study problem was only a vague figuration of what I wanted to achieve. However, as I progressed and discussed my initial ideas, a lot of insights came through culminating in what is contained in this research paper.

I thank God for having got me this far. My mum, my brothers and sisters have played a significant inspirational role over my entire study life. Many thanks to you all. The staff of the Kenya Retirement Benefits Authority (RBA) Research department qualify special mention, particularly Mrs. Salome Chirchir and Mr. Keizi who helped me with some of the data and ideas used in this research paper. I am thankful to my Supervisors Dr. Moses Sichei and Mr. Jasper Okelo for their time to read through the paper and make all necessary comments. I am particularly indebted to Dr. Sichei for not only ensuring that I completed the paper competently but also that I learnt an additional analytical tool/software while at it. Without you. I would never get here.

To my student colleagues Helen Hoka. Jane and Patrick Kilemi, Thank you so much for all the assistance accorded at various stages in the evolution of this paper.

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Abbreviations and acronyms

OECD	Organization for Economic Cooperation and Development
GDP	Gross Domestic Product
HIV/AIDS	Human Immuno-Deficiency Syndrome
CBK	Central Bank of Kenya
CMA	Capital Markets Authority
IRA	Insurance Regulatory Authority
RBA	Retirement Benefits Authority
NBFI	Non Bank Financial Institution
CIS	Collective Investment Scheme
MFI	Micro Finance Institution
NSSF	National Social Security Fund
GOK	Government of Kenya
NSE	Nairobi Stock Exchange
KNBS	Kenya National Bureau of Statistics
S and P	Standard and Poors
IMF	International Monetary Fund

ABSTRACT

Using a panel data regression approach this study analyses the significance of four factors that influence asset allocation decisions of pension fund managers in Kenya. It also isolates the asset class specific features that are important in influencing the share of pensions' assets that are invested in a particular asset class.

The study analyzed the global asset allocation behavior of pension fund managers regulated by the RBA in Kenya over the period 2001 to 2007. The managers had a finite set of investment options namely, government securities, bank deposits, equity or shares, corporate debt, international assets, property, guaranteed funds and other assets. A panel data approach was most appropriate as it solved the problem of a short time series in addition to being able to identify the individual class effects in asset allocation.

GDP growth, inflation, asset returns and legislation had been identified as explanatory variable in the study, on the basis of first principles from literature. An additional factor was added at the analysis point, where it was realized that the previous period asset allocation was a strong influence to subsequent allocations. All the factors were found to have a positive relationship with allocation. The study found that historical asset allocation was a significant factor influencing allocation. Legislation and asset returns were also found to be significant factors influencing pension fund managers' investment decisions in Kenya.

The study found that legislation as structured was a significant factor influencing fund managers' decisions. The impact on asset allocation was however minimal. As such, it concludes that the current regulatory regime is appropriate for the industry as it appears to be guiding diversification, and there is minimal difficulty of compliance.

Government securities, equities, bank deposits and guaranteed funds were found to have positive individual effects. Corporate debt, property and "other assets" had negative effects. The study recommends further work to unearth the reasons behind the negative individual effects that were observed in the above classes.

1.0 CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Retirement issues have continued to gain prominence globally over the years as the demand of providing old age benefits begin to be a more visible strain to countries' economies. It is estimated that public spending on old age pension payments in Organization for Economic Cooperation and Development (OECD) countries stood at 7.5% of GDP in 2006. and is projected to rise to between 10% and 11.5% by 2050 (Dang, Antolin, and Oxley, 2001). According to Mackellar and McGreevey (1999), the elderly population in most developing countries, especially the poorest countries, is low as a proportion of total population. However, owing to the rapid decline in the fertility levels and the increased longevity, population aging will take place more rapidly in these countries than has been witnessed in Europe and America.

In Kenya, public spending on pensions is yet to reach levels that would be of concern. This is due to the fact that there are few retirees relative to the total work force. The fiscal burden is therefore yet to be recognized. However, according to Macharia (2006), in Kenya, as in many other developing countries, the problem of old age dependency is compounded by rising poverty levels, HIV/AIDS and a family based social security system. A secure retirement savings arrangement is therefore a crucial ingredient to overcome this challenge and increase the level of savings in the economy.

A stable and secure retirement benefits system not only tackles the problem of old age poverty but is also an important component of the financial system of a country. This is because retirement savings must be invested in a manner that generates adequate returns to ensure retirees are adequately provided for. Such investments are procured through the capital markets among other avenues. As shown in table 1.1, by December 2007. Kenya pension funds' assets amounted to KSh. 181.5 billion. These funds were invested in a diversified way in Kenya government debt bank deposits, shares/stocks and corporate debt. The pensions sector therefore works hand in hand with the other capital markets players in the mobilization of funds for long term high capital investment projects like infrastructure development. Owing to the crucial role that the sector plays in the economy, the Kenyan

government has undertaken several policy initiatives aimed at ensuring growth of the sector. These interventions have been of a regulatory and incentivisation nature.

Table 1.1: Pension funds investments. December 2007

Investment Category	KSh. Million
Government Securities	71,817
Bank Certificates of Deposits	10,730
Commercial Paper and Corporate bonds	3,710
Quoted stocks	55.991
International Assets	10.541
Other investments	28.705
Total	181,494

Source: Retirement Benefits Authority www.rba.go.ke

1.1.1 The Capital Markets in Kenya

The capital markets in Kenya comprise of the banking sector, the insurance sector, the retirement benefits sector and the stock market with its related entities. All these entities are interrelated as part of a financial system of a country. Banks act as the chief financial intermediaries, insurance companies and retirement benefits schemes play the role of mobilizing savings which are then channeled through banks for on-lending or are invested in the stock markets. The most well developed arms of the capital markets in Kenya are the banking and the insurance sectors, having operated for the longest duration of time. The stock market is relatively nascent but growing rapidly. Each sector is created separately in law and has a regulator. Figure 1.1 illustrates the organization of the capital markets on the basis of the respective regulatory authority under the Ministry of Finance.

The Central Bank of Kenya (CBK) is the ultimate financial institution, charged with the responsibility of overseeing the banking sector. Additionally, it conducts monetary policy on behalf of the government. As the overseer of the banking sector, CBK licenses and supervises banks, Non Bank Financial Institutions (NBFIs), Micro Finance Institutions (MFIs) and forex bureaus. These entities jointly form the banking sector which is the nerve centre of the entire capital markets.

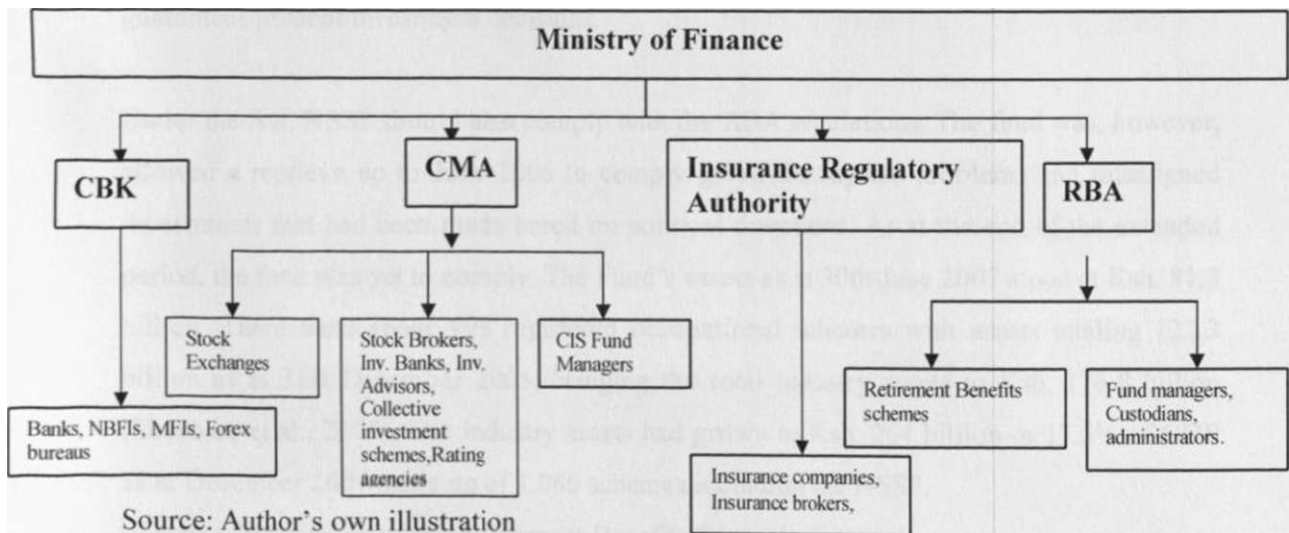
The Capital Markets Authority (CMA), established in 1989 through the Capital Markets Authority Act. Cap 485A (CMA. 1989). has a mission to regulate and oversee the orderly development of Kenya's capital markets. The Authority ensures the development and

maintenance of an appropriate legal and regulatory framework to boost investor confidence, enhance efficiency and to create and maintain a fair and orderly stock market. The Authority also reviews existing policies and makes recommendations to the Government on new policy issues that could promote and enhance stock market development. It also provides guidance to market operators (CMA. 1989). To this end, it licenses and oversees stock exchanges, stock brokers, investment advisors, fund managers, collective investment schemes, credit rating agencies, venture capital funds as well as listed companies and issuers of debt.

To deal with the various problems bedeviling the insurance sector, the government in the 2007 budget speech set in motion a process to create an autonomous office of the insurance regulator (Government of Kenya. 2007). This culminated in the establishment of the Insurance Regulatory Authority (IRA) which began operations in 2008. The authority oversees the operations of insurance companies and insurance brokers.

The Retirements Benefits Authority (RBA) was established under the RBA Act 1997, to oversee the investment of retirement funds within the economy and foster development of the sector. The authority registers and directs the manner of investment of pension and provident funds. It also oversees the various service providers, namely, fund managers, custodians and administrators. In discharging its role, it educates savers on use of retirement vehicles, deals with complaints from members and generally ensures safety of retirement savings with regulated schemes. The diagram below shows the current structure of the capital markets in Kenya.

Figure 1.1: The structure of the Capital Markets in Kenya



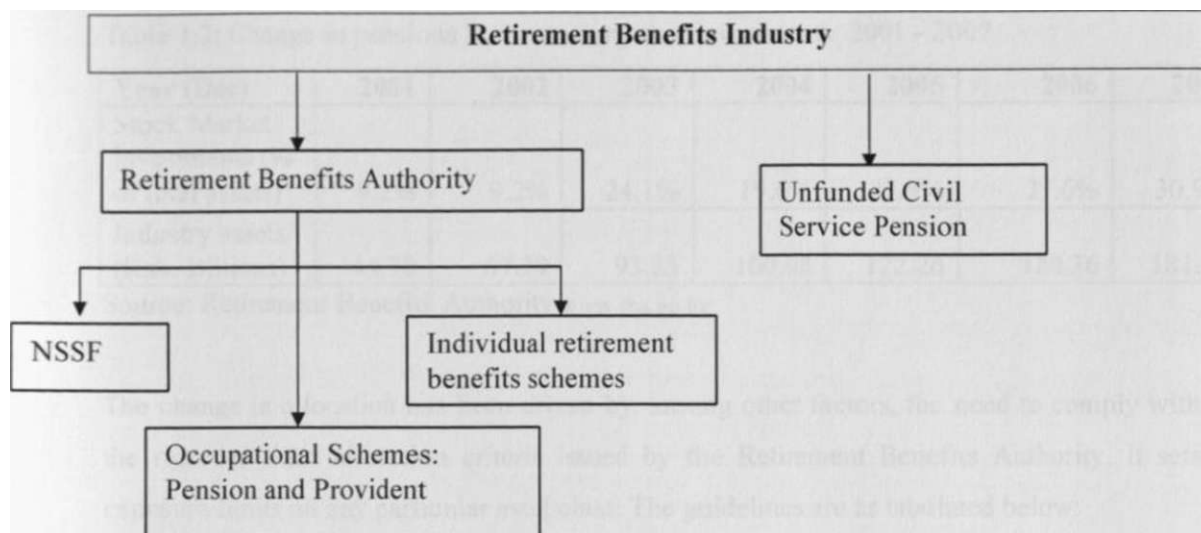
1.1.2 Retirement Benefits Sector

The retirement benefits sector in Kenya is a three tier structure made up of the unfunded civil service pension scheme and the National Social Security Fund (NSSF) as tier 1, occupational pension schemes as tier 2 and the lesser developed individual retirement benefits schemes regulated by the Retirement Benefits Authority (Grosh, 2005). The NSSF was established in 1965 by an Act of Parliament. Cap. 258 Laws of Kenya. The first contributions into the Fund (from men only) were received in July 1966. Female employees first registered in January 1975 but started contributing in 1977. The NSSF Act was amended in 1987, thereby transforming the fund into a State Corporation under the management of a board of trustees.

As shown in Table I.I and 1.2. the retirement benefits sector is an important financial intermediation agent, as a savings mobilizer and active participant in the capital markets. As such, the possible fiscal (budgetary funded old age spending) and social (old age poverty) consequences of a non functional retirement benefits industry could be overwhelming. In recognition of this, there have been initiatives to regulate the sector, world over. In Kenya, the sector's regulation was achieved through the creation of the Retirement Benefits Authority under the Retirement Benefits Act, 1997 and became operational in 2001. The enactment of the Act, and the Retirement Benefits Regulations, 2000. set out a clear legal framework under which retirement benefits are to be managed. The Act requires among other things, registration of every scheme with the Authority, the appointment of a professional fund manager, a custodian and an administrator, all answerable to a Board of Trustees, the ultimate legal owners of a scheme assets. It also sets out an investment guideline which schemes must adhere to. In this way, it has enhanced the security of member benefits and guarantees prudent investment decisions.

Under the Act, NSSF should also comply with the RBA regulations. The fund was, however, allowed a reprieve up to June 2006 to comply given the myriad problems and misaligned investments that had been made based on political directions. As at the end of the extended period, the fund was yet to comply. The Fund's assets as at 30th June 2007 stood at Ksh. 81.3 billion. There were about 998 registered occupational schemes with assets totaling 122.3 billion as at 31st December 2005, bringing the total industry assets to Ksh. 176.8 billion (Sheehan. et al., 2005). The industry assets had grown to Ksh. 264 billion or 17.5% of GDP as at December 2007 made up of 1,066 schemes including the NSSF.

Figure 1.2: Structure of the Retirement Benefits Sector in Kenya



Source: Author's illustration

Following the operationalisation of the Capital Markets Authority (CMA) act and the regulation of the retirement benefits sector under the RBA, there have been greater incentives and safety in participation in stock markets for pension schemes. Fund managers have had to rethink the asset allocations that best meet the investment guidelines issued by the RBA. To this end, there has been a shift away from property and other illiquid assets into the stock markets and other capital market investments (World Bank, 2002). A significant portion of industry's asset base of over Ksh. 264 billion is invested in various capital market instruments such as listed equity, Treasury bills and bonds, corporate bonds and commercial paper and in real estate (Table 1.1 and 1.2). It is therefore a crucial ingredient in the development of the capital markets. Pension schemes are one of the major sources of long term capital. This is because pensions are long term liabilities and as such they are the backbone of the development of capital markets (World Bank, 2002).

In Kenya, following implementation of regulation, there has been a shift towards greater investments in the capital markets, and especially the stock markets. Since 2001, it is evident that as assets in the industry grew, a greater allocation has been channeled to the stock market. As an illustration, table 1.2 shows the changes in the proportion of Pension assets invested in the Nairobi Stock Exchange over the last 6 years to December 2006.

Table 1.2: Change in pensions funds stock market investments, 2001 - 2007

Year (Dec)	2001	2002	2003	2004	2005	2006	2007
Stock Market investments (% of total assets)	9.2%	9.2%	24.1%	19.6%	23.6%	27.6%	30.9%
Industry assets (Ksh. Billions)	44.70	67.39	93.23	100.08	122.26	180.36	181.49

Source: Retirement Benefits Authority www.rha.go.ke

The change in allocation has been driven by. among other factors, the need to comply with the rigorous asset allocation criteria issued by the Retirement Benefits Authority. It sets exposure limits on any particular asset class. The guidelines are as tabulated below:

Table 1.3: RBA Investment guidelines

Asset Category-	Minimum (%)	Maximum (%)
Government Securities	0%	70%
Bank Certificates of Deposits	0%	30%
Commercial Paper and Corporate bonds	0%	30%
Quoted stocks	0%	70%
Unquoted equity	0%	15%
International assets	0%	15%
Property	0%	30%
Guaranteed Funds	0%	100%
Other assets	0%	10%
Investment in securities issued by the sponsor of an occupational scheme	0%	10%

Source: RBA Investment guidelines, 2000 www.rha.go.ke

1.1.3 Asset Allocation Decisions

Asset allocation is generally defined as the distribution of an investment portfolio among a number of "major" asset classes (Sharpe. 1992). It involves the division of the investment choices into broad categories and choosing exposure that the portfolio should take in any one category. As required by law. pension funds assets are under the care of professional money managers who are expected to execute the best asset allocation decision on behalf of their client. The fund managers therefore have to lay extra emphasis on their allocation decision not only to comply with the law but also to generate high returns.

The pensions' managers undertake rigorous research on key determinants of returns from various asset classes to inform the asset allocation decisions. The compliance to legislation.

risk return complexion of each asset category, current and expected inflation, and the liability profiles of the fund beneficiaries are some of the factors these managers have to bear in mind in arriving at their decisions.

The Retirement Benefits Authority investment guidelines only set maximum exposure limits, thereby leaving discretion to the fund manager to decide the distribution of a pension scheme's assets. Asset allocation decisions of fund managers are not static but are changed regularly in response to changes in the investment environment. Table 1.4 shows the change in the RBA registered schemes* asset allocations from 2001 to 2007.

Table 1.4: Pension funds asset allocation. 2001-2007

Asset Category	Dec-01	Dec-02	Dec-03	Dec-04	Dec-05	Dec-06	Dec-07
Government Securities	49.6%	48.7%	41.0%	45.2%	43.0%	38.8%	39.0%
Equity	9.2%	9.2%	24.1%	19.6%	23.6%	31.0%	30.9%
Bank Deposits	13.6%	9.4%	5.2%	7.2%	4.6%	4.2%	6.3%
Corporate Debt	5.2%	6.0%	4.0%	3.9%	4.8%	3.3%	2.5%
International Assets	7.5%	4.3%	5.1%	4.7%	5.6%	5.5%	5.3%
Property	7.3%	7.8%	7.6%	6.1%	5.8%	5.8%	4.1%
Guaranteed Funds	6.4%	13.6%	12.2%	12.8%	12.1%	10.9%	11.8%
Others	1.3%	1.0%	0.8%	0.5%	0.5%	0.4%	0.1%

Source: Retirement Benefits Authority www.rha.go.ke

1.2 STATEMENT OF THE RESEARCH PROBLEM

Asset allocation decisions are a critical input in the management of portfolios. In Kenya, the fund management industry is small and young with the bulk of the investable assets held by retirement benefits schemes regulated by the Retirement Benefits Authority.

From a regulatory view point, retirement benefits assets are required to be invested in a way that delivers good returns to the beneficiaries. At the same time, given their huge size, these assets are also expected to aid the growth of the capital markets and the economic sectors where they are invested. The RBA has in pursuit of its mandate issued investment guidelines to be followed by the managers. However, the Authority has no direct control over the specific fund manager's asset allocation decisions.

As at December 2007, there were 14 registered fund managers servicing the retirement benefits industry. Each had a different asset allocation emanating from its own processes.

However, since they all invest in the same markets, they are expected to be influenced more or less by the same factors. Economic factors namely GDP growth, inflation and returns on assets and the need to comply with legislation are some of the considerations fund managers put into account in arriving at their decisions. This study aims to quantify the importance of each of these factors in explaining the general asset allocation decisions of pension fund managers. The study will also attempt to evaluate whether there are any asset class specific factors that influence fund managers decisions.

1.3 OBJECTIVES OF THE STUDY

The general objective of this study is to quantify the effect of the various factors that influence fund managers' asset allocation decisions. The specific objectives of this study are:

1. To establish the extent to which the identified factors explain asset allocation decisions of pension fund managers.
2. To find out whether there are asset class specific effects/biases or differences that contribute to the asset allocation decisions.
3. To find out whether the current RBA regulations are a significant factor influencing the asset allocation decision of fund managers.
4. To provide policy recommendations for the investment of retirement benefits assets.

1.4 SIGNIFICANCE OF THE STUDY

Pension fund managers are key decision makers in the investment of retirement scheme assets. They are therefore responsible for ensuring the beneficiaries of the schemes get adequate pensions when they retire through good investment returns. They also determine how the funds under their care influence overall economic activity especially through investment in the capital markets. For instance, if their investment decisions were biased against a certain segment of the capital markets it would lead to slow growth in that sector and vice versa. Understanding the factors that inform their asset allocation decisions is therefore important. This study attempts to explain the reasons or factors that influence fund managers investment decisions.

The investment guidelines issued by the Retirement Benefits Authority give limits to investments within certain classes of assets. They give quantitative limits as opposed to letting fund managers decide their optimal investments based on "prudent man" principles. It is yet to be evaluated whether these rules are optimal for the achievement of the authority's

mandate of safeguarding of retirement benefits and growing the capital markets. This study evaluates these guidelines as a factor fund managers have to consider in their asset allocation decisions. Therefore the findings of the study should inform future direction on the review of the guidelines.

The Retirement benefits sector in Kenya was formalized in 2001. While a lot of academic work exists globally, to the best of our knowledge, little work has been done on Kenya. This therefore offers a rich ground for new academic research. This study will be a ground breaking study in this area.

By applying panel data regression, this study demonstrates the strength of this approach as a solution for studies that pose sample size and time frame challenges that make time series analysis inapplicable.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 THEORETICAL LITERATURE REVIEW

Retirement or old age spending is one of the key motivations for saving. According to the Ando-Modigliani Life Cycle Hypothesis, individuals have a tendency to accumulate wealth when they are in their middle working ages, and allocate this wealth to current consumption and saving for future consumption. In these middle years, individuals save more than they consume while in later years they dissave. Ando and Modigliani (1963), assumed that the utility of an individual depends on his/her planned saving and that it is a homogenous function of planned investments and planned consumption out of permanent labour and property incomes as well as transitory incomes. The model implies that in the absence of bequests, no trend in economic growth and a static population, the net aggregate savings is zero. The savings by the middle aged is exactly offset by the dissaving by the young and the aged. If the population is aging with many high earners now, the savings will be positive. An increase in a government retirement benefits may reduce gross private sector savings now, matched by an equal reduction in gross private dissaving when current savers retire. Feldstein (1974) extended the analysis by Ando and Modigliani to include the effect of retirement benefit on consumption. He allowed for borrowing against retirement assets. In the budget speech of 2005, mortgage borrowing on the security of one's retirement benefits was proposed but implementation faced hiccups. The Retirement Benefits Authority is expected to come up with regulations on modalities to allow this to be realized in due course.

A key factor affecting the design and investment practices of retirement benefits assets is the demographic patterns of a country. According to Krueger (2004) as populations age and the ratio of the elderly to the working age population—the dependency ratio—rises, governments face increased budgetary pressures with rising expenditures on the one hand and falling tax revenues on the other. This is especially aggravated in countries which are reliant on an unfunded Pay As You Go retirement system. Provision of old age benefits remains one of the key economic challenges of the 21st Century. She argues that different countries deal with the issue differently. However, with the increased participation of the international financial institutions, there was growing consensus. In a majority of developing countries, the common approach had been to regulate the sector. This not only helped deal with the fiscal problem but also aided growth of the capital markets through increased participation of long term institutional players. Regulation aims to guide investment decisions and guarantee the

achievement of the objective of savings mobilization and promotion of capital markets growth and development. She concludes that where there was regulation of the sector, contribution to the capital markets generally increased. In Kenya, regulation was instituted from 2001. the effects of this are yet to be studied and documented. This study aims to find some of the effects of regulation of the sector.

The demographic patterns in Kenya are such that youth dependency is extremely high compared to old age dependency. As at 2006, the youth - loosely defined as those aged below 25 years, being the normal college graduation age - constituted 73.5% of the population. On the other hand, those aged above 60 years were 4.5% of the population (Kenya National Bureau of Statistics, 2007). As such, the pressure from old age dependency is yet to be felt when compared to youth dependency. However, as the life expectancy rises and birth rates fall, there is likely to be a reversal of this situation in a relatively short period of time. The government has been putting measures into place to ensure that the general populace is informed about the need to save for retirement from their early working years. With greater knowledge of the need to save for retirement, we are likely to see a situation of rapidly growing pension assets in the country. These funds shall be available for investment within the economy to grow the capital markets and aid overall capital formation in the country.

According to Davis (2002), pension funds and other institutional investors have been found to have a great role to play in the development of the capital markets. Both have effects, inter alia, of increasing the role of securities markets, boosting cross border investment, putting pressure on bank profitability, leading to concentration of trading activity and helping to shift corporate governance. Davis and Steil (2000) argue that institutional investors such as pension funds are crucial in the development of the capital markets from the bank oriented phase where banks control almost fully the capital markets, to a market oriented phase where other players such mutual funds emerge to assist in the intermediation activity and finally to a market level where most of intermediation activity is undertaken by other players with banks taking a greater role in trading in derivatives and providing guarantees. The presence of a strong banking sector and a well regulated overall monetary system is crucial.

Deborah (2001) argues that for developing countries, investing pension funds in the stock markets is usually part of a broader reform that tends to expand pension coverage. In some

cases financial markets may be improved by these actions, and the overall savings rate may be increased despite some crowding out of private savings. The pitfall, she notes, is that since many of these markets are small and in the formative stages, pension funds tend to aggravate the problem of low liquidity. They buy large portions of the securities and hold onto them given their long term outlook and thereby reduce the tradeable securities in the market available to individuals and other institutions.

The investment decisions that fund managers make will play a large part in determining how the retirement benefits assets impact the markets. There are several investment options available to a pension fund manager. Broadly, there are two categories of investments in the capital markets. These are the fixed income instruments and equity holding. In the fixed income category are Government securities (Treasury bills and bonds), bank deposits and corporate debt (Commercial paper and bonds). Equity holding constitutes part holding in a company in the form of shares. In terms of return and risk characteristics, government securities are perceived to be risk free and therefore offer lower returns than bank deposits and corporate debt. Equity is more risky but has the potential to deliver very high returns.

- Investors choose their investments according to their risk appetite and return expectations, which are determined by among other things, age, planned investment horizon and amounts available.

A key determinant of the effects that the investment of retirement benefits assets has on capital markets is the nature of regulation in place or its absence. Other equally important factors to the asset allocation decisions are: risk tolerance for the expected return, current inflation and inflation expectations, economic cycles and level of development of a country's capital markets. Each of these factors influences the investments decisions made and hence the contribution that pension funds make to the various segments of the capital markets. The various factors are explained below.

2.1.1 Regulation

Regulation of pension investments takes one of two forms: Quantitative restrictions or 'prudent man' rules. Quantitative restrictions are the basis of oversight where the investors are required to meet certain criteria and quantum levels of investment. In Kenya, like in many other African and Latin American countries, regulation is based on quantitative

restrictions. "Prudent man" rules are the form of regulation where the investors are left to pursue their return requirements unhindered and are expected to act prudently.

Regulation of pension funds investments is a common practice, world over. The OECD council in adopting pension fund management guidelines in 2006 observed that "Pension funds are one of the most important players in the financial markets of the OECD countries, managing more than \$15 trillion of assets in 2003, which represents over 80 percent of the OECD's area GDP. Pension funds also play a key social role in channeling retirement contributions to finance retirement benefits. The investment of pension assets is one of the core functions performed by private pension arrangements. In order to promote both the performance and the financial security of pension plan benefits, it is critical that this function is implemented and managed responsibly. Policymakers have therefore a key role to ensure that regulations encourage prudent management of pension fund assets so as to meet the retirement income objectives of the pension plan" (OECD, 2006). The OECD therefore recognized the immense social burden that can be created out of imprudent investment of pension assets as well as the benefits that guided investment of these assets can bring, especially to the capital markets. The council recommends prudent man investment behavior as a starting point in any pension regulation.

2.1.2 Risk Versus Return

Risk refers to the chance that returns will be different from expectations or that the principal amount invested could be lost. This is the main consideration of most investors since one expects a return on investment and most people are averse to loss. Return and risk are positively related. The higher the risk that an investor is willing to take the higher the expected return, and vice versa. Therefore an investor must consider the risk associated with a particular investment and the return expectation and evaluate whether there is enough compensation. In choosing the assets to invest in, the return of the specific asset as well as the return on alternative asset classes are relevant considerations.

2.1.3 Inflation

Inflation refers to the persistent increase in the general price level. It is important to investors because, over time, the purchasing power of money is eroded. As such, the only reason why an individual would forego current consumption, is the promised return, which should ideally, be above inflation. Investors therefore form inflation expectations which they use to

evaluate the return against. Due to the inflation induced growth in corporate profitability, equities are most effective to beat inflation than fixed income assets.

2.1.4 Economic cycles

Economic cycles refer to the tendency of economies to be in an expansion phase, to peak off and enter into recessions over time. This is a normal occurrence which is brought about by among other things changes in interest rates, inflation or external shocks. When an economy is in an expansionary- phase, corporate earnings are expected to grow rapidly and therefore benefit equity investors. On the contrary, in recessions, equities suffer and fixed income assets benefit.

2.2 EMPIRICAL LITERATURE REVIEW

The association of investment decisions and the growth of the capital markets has been widely studied: Grinblatt and Titman (1992) and Wermers (1999) show that the actual extent of association between market capitalization growth and retirement benefit funds participation is modest. These studies scrutinized trading behavior conditional on the type of stock market, with particular emphasis on trading by mutual funds. Whereas recent literature on institutional investors reports the growing importance of retirement benefit sector (Davis, 1997; and Davis and Steil, 2000), few studies have focused on the investment behavior of pension fund managers.

Blake and Timmermann (2002) studied the UK retirement benefit fund performance and concluded that in the presence of relative performance benchmarks, pension fund managers are likely to invest funds in the stock markets. This is because investments in the stock markets are more likely to outperform the corresponding benchmarks. The fund managers were therefore driven more by returns that the market offered as opposed to guidance from regulators. They also found out that different investment rules affected institutional trading resulting in different patterns of investment behavior amongst pension funds. The "prudent man" rules type of regulations allowed greater participation in the stock markets while the quantitative restrictions imposed by the Latin American type could hinder participation.

Kenya's investments regulations as set out in the RBA Investment guidelines 2000 are structured with quantitative limits and therefore fall into the category of the Latin American type. The main reason that influenced the current structure of regulation was a legacy of bad

investments made on behalf of pensioners leading to very low returns, or in some cases, capital losses. As such capital preservation was ranked more important than investment returns in the formulating the guidelines. The shallow capital markets may also have informed the limit setting because, left to the markets alone, fund managers would have little choice but to overconcentrate their portfolio in a few securities which negates the principle of diversification and could carry with it extra risk to pensioners funds. As markets develop and fund managers become more experienced managing pension funds, these quantitative restrictions may have to be relaxed as safety will cease to be a key driver and returns become more important.

According to Davis and Steil (2001), the rapid growth of capital markets is driven by increased investment from the retirement benefits sector. Pension funds in Latin America and Eastern Europe hold sizable positions in stock markets, in equity and fixed income investments. As of June 2003, stock markets recorded the dominant share of pension funds* portfolios in many countries: 70% in Malaysia and Poland. 80% in Argentina, India, and Mexico, and 90% in Hungary.

In another study, the International Monetary Fund, IMF (2002) found the existence of a crowding out effect by retirement benefit sector on stock markets in countries like Brazil. Domestic investors shunned the domestic stock markets because retirement funds linked to inflation and foreign currency indices offered better risk-adjusted returns to the stock market as well as a currency hedge. This is particularly true for countries with high public financing needs where interest rates are also invariably high. In these countries, pension funds were found to have a limited role in the broad development of local equity markets. Two main factors may explain this limited role. First, pension funds manage relatively large assets compared to the typical equity floatation of local companies. In most stock markets, only few blue-chip companies have equity issues large enough to meet pension funds' regulatory ownership concentration limits on a single issuer. In Poland, for example, 75% of pension funds are concentrated on 15 stock market companies. Second, in some countries such as Mexico, investment regulation requires very limited or minimal exposure to equities or where pension funds cannot invest in equities at all. Low volumes of corporate bond and equity issuance have created a problem for pension funds in Eastern Europe and Latin America: the growth of pension fund assets has outpaced the supply of local private

securities. As a result, pension funds may find difficult to achieve optimal asset diversification and therefore show concentrated risk.

The study that brought the importance of asset allocation decisions to the fore was by Brinson, Hood and Beebower (1986). Through analyses of 91 large corporate pension plans each with at least 40 quarters of performance history over the ten-year period 1974-1983, they found that the investment policy decision (asset allocation) explained, on average, over 93 percent of the variability of the plans' returns. The BHB study did not however conclude that manager selection and changing target allocations were unimportant aspects of investment supervision.

Many other studies have been done to support or disprove the BHB thesis. Ibbotson and Kaplan (2000) conclude that asset allocation explains 40 percent of the variation of returns across funds and that asset allocation explains, on average, virtually 100 percent of the level of fund returns. Brinson, Singer and Beebower (1991) have expressed general agreement with the Ibbotson-Kaplan conclusions. The study of the influence of asset allocation decisions on returns has dominated finance literature for more than 20 years now. However, not much is mentioned on the factors influencing these all important decisions.

Other empirical studies by Holzmann, Macarthur and Sin (2000); Mukul (1999, 2003); and Mukul and Newman (2001) show that Asian provident funds have historically performed poorly. For instance, performance of provident funds in Malaysia and Singapore was just marginally better than bank deposit investment. They also found out that the poor performance of the funds was as a result of excessive political influence over the allocation of pension funds' assets. Pension funds in Korea had been repeatedly asked to contribute to stock market stabilization plans. However, the pressure to increase asset allocation to equities had been mainly guided by efficiency and diversification considerations. Holzmann, et al., (2000), also shows that in Malaysia, provident fund assets had been used to recapitalize stock markets and finance housing construction.

Due to their regular and significant cash inflows. Polish pension funds were expected to trigger an upturn in the domestic stock market. By the end of 2002 open pension funds' investments into stocks listed on the Warsaw Stock Exchange (WSE) amounted to about 30% of the assets under management or US \$ 2.2 billion. Funds' participation in the daily

turnover of the WSE was 17% and surpasses 5% of the capitalization of the Exchange. Funds* holdings were also found to be highly concentrated and limited to the large capitalization stocks that are listed in the blue-chip index. WIG20 (Voronkova and Bohl. 2005). The Pension funds' investments in shares had not reached the 40% limit that was intended by the polish Government. The findings indicated a less than optimal achievement by the pension's sector in growing the stock market in Poland.

2.3 OVERVIEW OF LITERATURE

As demonstrated in the above literature, issues of retirement have been an interesting field of study for decades. However, recent years have witnessed a heightened interest in the area as the baby boomers in the US and Europe near retirement and developing countries struggle with rising deficits occasioned by bloated public service pension funding needs. Capital markets development has also attracted a more than fair share of interest as the world moves to increase levels of capital formation and globalization becomes a reality. The linkage between ability to provide for growing retirement needs and the size, development and returns from the capital markets has also been an issue that has been closely investigated. The subject has both micro and macro implications and has been an issue of policy concern for decades.

From the review of the literature, there seems to be a general consensus that the most important investment decision is the investment policy decision. The extent that this drives the overall returns is contestable and various studies appear to reach conflicting conclusions. Regulation is found to be an important investment consideration and elicited different responses based on type of regulation and nature of enforcement.

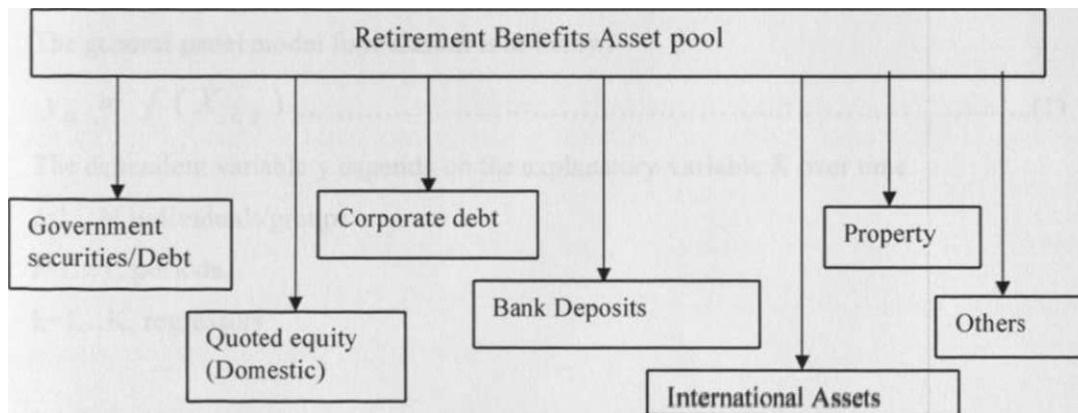
On the importance of the participation of pension funds in the capital markets, there is a consensus that they are an important catalyst to the growth of the markets. The main factors that influence fund managers decisions are widely explored in theory but no empirical work exists.

3.0 CHAPTER THREE: METHODOLOGY

3.1 THEORETICAL FRAMEWORK

The investment of retirement benefits assets in Kenya is regulated under the Retirement Benefits Authority Act and guidelines issued thereunder. The Act entrusts the management of the assets to the scheme trustees. Since it recognizes that trustees may not be experts in asset management, the Act empowers them to appoint professional fund managers. These managers, as experts, try to differentiate themselves through applying various investment strategies to deliver outperformance over benchmarks and competition. However, in general, the range of asset classes available to all of them are finite. They include government debt, shares, corporate debt, bank deposits, real estate/property and international assets. This is diagrammatically represented in figure 3.1 below.

Figure 3.1: Investment options for retirement benefits fund managers



Source: Authors own illustration

investment flow

Most money managers are financial markets players, hardly participating in decisions to invest in real property. What determines the fund managers' decision to invest in any particular asset class? There are different approaches employed by various players in their decision making, but there are common factors that guide all of them. Compliance with the law and the need to minimize risk at the highest possible return are key considerations. These objectives are then married with other asset class specific influences as well as spatial temporal considerations to come up with enduring investment strategies and policies.

3.2 EMPIRICAL MODEL

The asset allocation decisions of fund managers are influenced by a number of economic, social and legal factors. Therefore, the amount of funds allocated for investment in a particular asset class is taken to be a function of all these factors. This study identifies the following as some of the potential influencing factors: economic cycles as measured by GDP growth (g), inflation (π), returns on the asset class (r) and legislation (L). These factors change over time, exerting differing effects on the fund managers' decisions.

This study aims to quantify the effect of each of the identified factors on the assets allocation decision over time. There are 8 asset classes or categories available to investors in Kenya. Each asset class can be considered as a distinct group or cross section. As such, there are 8 cross sections of study observed over a span of six years. Given the cross sectional and time dimensions of the data, coupled with the relatively short period of observation, panel regression emerges as the most suitable method of analysis.

The general panel model formulation is as below:

$$y_{it} = \beta_0 + \beta_1 X_{it} + \epsilon_{it} \quad (1)$$

The dependent variable y depends on the explanatory variable X over time.

$i=1 \dots N$ individuals/groups

$t=1 \dots T$, periods

$k=1 \dots K$. regressors

Applying the general structure to the specific study variables, we get:

$$A_{it} = f(g, \pi, r, L) \quad (2)$$

Where A_{it} is the proportion of assets invested in class i at time t (the asset allocation decision) (y_{it}), g is the GDP growth rate (X_1), π is the inflation rate (X_2), r is the return on class i (X_3), L upper legal limit for investment in class (X_4).

3.2.1 The model specification

Building from equation 2 above which is based on the traditional panel regression model, the specification becomes:

$$A_{it} = \alpha + \beta_1 g_t + \beta_2 \pi_t + \beta_3 r_{it} + \beta_4 L_{it} + \beta_5 a_{it} + \beta_6 \epsilon_{it} \quad (3)$$

Where;

A_{it} is the share or amount allocated to asset class i at time t , g_t is the GDP growth rate. π_t is the inflation rate, r_{it} is the return on class i at time t , L_{it} is the maximum allowable (legal) limit on class i , a_{it} is the individual asset class effect while ϵ_{it} is the remainder. $i = 1, \dots, N$ is the cross-section dimension. $t = 1, \dots, T$ is the time-series dimension.

The model is estimated as a one way error component model. This is because a one way error component model allows for the relaxation of the assumption that the error term is constant across the individual groups. It allows for cross sectional heterogeneity. It is therefore necessary to decompose the error term into the individual effect and the residual.

Thus, the error term ϵ_{it} in equation 3 is broken down into two components:

$$\epsilon_{it} = \mu_i + v_{it} \quad (4)$$

Where μ_i denotes the unobservable asset specific effect and v_{it} represents the idiosyncratic errors or disturbances which change across time and individuals. It includes the error term as well as the time effects.

μ_i is constant across time and accounts for any asset specific effect that is not included in the model. These have been omitted in equation 3 as a result of lack of knowledge on how to specify them or due to lack of data.

Substituting (4) into (3) gives us:

$$A_{it} = \alpha + \beta_1 g_t + \beta_2 \pi_t + \beta_3 r_{it} + \beta_4 L_{it} + \beta_5 \mu_i + \beta_6 v_{it} \quad (5)$$

Equation 5 will be the estimation equation, but logs of the dependent variable are used for ease of analysis and interpretation. We do not use logarithms on the RHS of the equation.

3.2.2 Fixed effects or Random effects model?

The Hausman test is the recommended method for testing suitability of either Fixed effects formulation or the Random effects. The gist of the test is to find out whether the individual effects are correlated with the regressors. Under the null hypothesis that there is no correlation between the individual effects and explanatory variables (i.e random effects

model is correct), both random effects and fixed effects estimators are consistent, but the random effect estimator is efficient, while fixed is not. Under the alternative hypothesis that individual effects are correlated with the regressors. the random effects estimator is inconsistent, while the fixed estimator is both consistent and efficient. The hypothesis may be written as:

Ho: $Cor(X_{it}) = 0$ RE is correct

Ho: $Cor(j, X_{it}) \neq 0$ FE is correct

The Hausman test statistic is asymptotically χ^2 distributed.

Since *E-views 3.1* econometrics software does not perform hausman test, we turn to theory for guidance. From theory, we know that the fixed effects model is the appropriate specification when focusing on a specific set of N individuals or categories and our inference is restricted to the behavior of this set of individuals. Inference is conditional on the particular N cross-section units. On the other hand, the random effects model is an appropriate specification if we are drawing N individuals randomly from a large population. Here, inference pertains to the population from which the sample was randomly drawn.

This study focuses on an exhaustive set of investment categories available to the Kenyan pensions fund managers. As such, inference is specific to this set. From theory we conclude that the fixed effects model is the best specification for this study. Furthermore, the cross sections/categories are not so many thereby the problem of low degrees of freedom wrought by the inclusion of a large number $N-1$ dummies does not arise.

3.2.3 Explanation and definition of variables and expected signs

As illustrated above, the Kenyan investment markets can be categorized into 8 main segments: Government securities/debt, shares or equity holdings, corporate debt, bank deposits, international assets, insurance guaranteed funds, property and other assets which includes unquoted stocks. Asset allocation decisions involve the spreading of the available asset pool into the above classes of assets. Each of the 8 categories is explained in more details below:

1. Government securities

These are promissory notes issued by the government to the bank and non bank public to raise debt for various uses. They are divided into Treasury bills which are short term in nature and Treasury bonds which are long term. Being Government debt, these securities are considered risk free as the Government may not default in repayments. The return on these instruments is usually fixed.

2. Equity

This is part holding in a company. Investors participate in the stock of a company through buying and selling of the company's shares through the stock exchange. As an equity holder, one gets returns in the form of dividends and capital gains due to the appreciation of the price of the shares through the market mechanism. Equity is considered riskier than government securities because the return fluctuates over time.

3. Bank deposits

Part of a bank's business involves deposit mobilization. As financial intermediaries, banks receive deposits from those with surplus and pass this on by lending to those in need of funds. They offer a return to the depositor for allowing them to use their funds. The return on bank deposit is usually fixed for an agreed term but is closely related to the level of interest rates on government securities. Banks usually pay an interest rate lower than the rate on Government debt.

4. Corporate debt

In the same way the Government borrows from the investing public, private and public companies may also raise funds from the investing public for their various working capital needs or for expansion. The returns are pegged to the returns on similar tenor government securities plus a premium. The premium is offered primarily to compensate for the relatively higher credit risk involved when compared to government debt.

§. International assets

These are investments that are domiciled in other countries or denominated in foreign currencies. Fund managers invest in international assets to among other reasons, diversify geographically and in currencies, benefit from faster growth in foreign economies and gain exposure to investment sectors not represented in the local markets.

6. Property

This consists of investments in real estate such as land, buildings, factories etc. This asset category requires heavy initial investment and only large pension funds are able to venture. However, with the possibility of property unit trust becoming common, this hurdle will be overcome. Returns are usually strongly correlated to the rate of economic growth.

7. Guaranteed Funds

Pension funds are allowed by law to invest in insurance companies investment vehicles where an insurance company guarantees a certain minimum return on investment. Any excess return is distributed according to the insurer's discretion.

8. Other assets

This category consists of investment products that are non-conventional or uniquely structured. It includes investments in unquoted equity, private equity transactions and derivatives.

The above investment options form the investment segments among which the fund managers can allocate assets. The various factors which influence the fund managers' decisions are as below:

i. GDP growth

As the size of a country's GDP expands, it could affect investment returns of a number of investment categories. For instance, it affects companies' profitability and this could lead to better returns for equity investors. Similarly in a vibrant economy, interest rates are likely to be low, impacting on the returns on bonds. The rate of GDP growth also affects the country's risk assessment. All these factors, feed into affecting decisions to invest in any particular asset class. GDP growth is expected to have a positive relationship with all the asset classes but more significant for equities.

ii. Returns on various assets

Fund managers and trustees of pension schemes endeavor to deliver the highest returns to their members, at the lowest risk possible. This is a critical determinant of the asset allocation decision. An asset that offers high returns will be favored if it has lower risk than

another asset with similar returns but with higher risk. The returns on the asset classes and their chosen measures are as below:

Government debt	91 day Treasury bill rate
Equity	Return on NSE 20 share index
Bank Deposits	Average interest rate on a 0-3 month bank deposit
Corporate debt	Average yields on commercial paper programs in issue
International assets	Exchange rate adjusted return on S and P 500 index
Property	Actual rental yield on commercial properties
Guaranteed funds	Average annual declared returns of major providers
Other assets	91 day Treasury bill rate

The returns on various asset classes are expected to be positively related to the allocations to the asset classes.

iii. Inflation

Pension assets are long term assets. As such they suffer the effects of value erosion through inflation. In durations of high inflation, equity investments are a better cushion to fund values than bonds. This is a key consideration when choosing the asset allocation structure.

iv. Legislation

Since the investment of pension funds is regulated under law, fund managers' asset allocation decisions must fit within the legal framework. This is measured by the maximum allowable investment limit per asset category as shown in table 1.3.

3.3 HYPOTHESES FORMULATION AND EXPECTED RESULTS

The hypotheses are formulated as follows:

2 GDP Growth

H_0 , = 0: GDP growth is not a significant factor influencing fund managers asset allocation decisions.

H_1 , * 0: GDP growth is a significant factor influencing fund managers asset allocation decisions.

A priori, H_1 , > < 0 Positive GDP growth could impact asset allocation differently depending on the asset class.

3 Returns

$\beta_1 = 0$; Returns on various assets are not a significant factor influencing fund managers asset allocation decisions.

$\beta_1 \neq 0$; Returns on various assets are a significant factor influencing fund managers asset allocation decisions

A priori, $\beta_1 > 0$ Returns are expected to have a positive impact on asset allocation decisions.

4 Inflation

$\beta_2 = 0$; Inflation is not a significant factor influencing fund managers asset allocation decisions.

$\beta_2 \neq 0$; Inflation is a significant factor influencing fund managers asset allocation decisions

A priori, $\beta_2 > 0$ Inflation is expected to impact asset allocation in different ways depending on the category.

5 Legislation

$\beta_3 = 0$; Legislation is not a significant factor influencing fund managers asset allocation decisions.

$\beta_3 \neq 0$; Legislation is a significant factor influencing fund managers asset allocation decisions

A priori, $\beta_3 > 0$ Legislation is asset class specific and therefore the coefficient will vary from category to category.

3.4 ESTIMATION PROCEDURES

Panel regression technique is the main analytical approach used in this study. A panel may be described as a cross section or group of items that are observed over time. In this case, the global investment behavior of fund managers is the subject of observation. By combining cross section and time series elements of analysis, this approach allows a researcher to study the behavioral dynamics for a relatively short time series, like in this study - 6 years. Panel data analysis gives regression a spatial and temporal component.

This study has relatively short time series of data with a cross section dimension. We use the fixed effects model with one way error components estimated using Least Squares Dummy Variable estimation.

Fixed effects are estimated by including N-1 dummy variables. The appropriate method for the estimation is the Least Squares Dummy Variable (LSDV) method which is simply an ordinary least squares (OLS) with dummy variables. The critical problem in LSDV is how to avoid the perfect multicollinearity or the so called "dummy variable trap". By using the WITHIN estimation method individual fixed effects can still be assumed but these are no longer directly estimated, they are recovered. The data is "demeaned" to eliminate the individual effects and then estimate the coefficients alone. This means subtracting the mean for each cross section from each observation. Demeaning the data has no effect on the estimate of the coefficient. An ordinary OLS regression is then run. The regression satisfies all the usual OLS assumptions.

The panel data in this study is a balanced panel. All estimation is carried out in E-views 3.1 econometric software.

3.5 DATA SOURCES, TYPES AND TESTS

This study uses secondary data from various sources. Data on asset allocations by pension fund managers over the study period was obtained from the Retirement Benefits Authority. Pension managers are required to make quarterly returns to the RBA. The Authority then summarizes and compiles the data for use by interested parties. No changes have been made to the data.

Interest rates data, which is taken as the benchmark return on fixed income investments was obtained from the Central Bank of Kenya. This data is available on a weekly basis but for the purpose of this study, the closing quarterly rate is the rate that is used. Returns on commercial paper and bank deposits were derived from this interest rate measure. Similarly, inflation numbers were obtained from the CBK. The rate of inflation used is the quarterly closing overall month on month inflation number as computed by the Kenya National Bureau of Statistics without any adjustment.

Returns on equities were computed from the NSE 20 share index, being the official benchmark of the stock market. The index values were obtained from the Nairobi Stock Exchange. The return is computed as the straight index return. International assets returns are derived from the returns of the Standard and Poors 500 index adjusted for the exchange rate (Kenya Shilling return). Exchange rates were obtained from CBK while the S and P 500 index data was obtained from New York Stock Exchange.

All the data is quarterly for the period 2001-2007. The data is not seasonally adjusted.

4.0 CHAPTER FOUR: ESTIMATION RESULTS AND FINDINGS

4.1 SUMMARY STATISTICS

This section details the tests and analyses that were carried out and the results that were obtained. These are laid out in table 4.1 below:

Table 4.1: Descriptive statistics of asset allocations/shares per category

Measure	Share/Allocation in KSh. Millions							
	Gov't Securities	Equities	Dank Deposits	Corporate Debt	International Assets	Property	Guaranteed Funds	Others
Mean	46,810	24,869	6,940	3,971	5,817	6,274	12,965	813
Median	45,229	20,727	6,581	3,870	4,848	6,004	12,814	720
Maximum	71,817	56,431	11,402	5,905	11,709	10,756	21,530	2,660
Minimum	22,154	3,565	4,357	2,229	2,340	3,273	2,862	56
Std. Deviation	14,120	17,014	2,028	986	2,848	1,667	4,236	539
Skew ness	0.15357	0.43038	0.98669	0.23411	0.59084	0.51352	-0.06406	2.07403
Kurtosis	1.979612	2.014694	2.99377	2.515471	2.11023	3.95708	2.89123	7.61255
Jacque-Bera	1.18284	1.78305	4.05650	0.47291	2.27925	2.05294	0.02943	40.08540
Probability	0.55354	0.41003	0.13157	0.78942	0.31994	0.35827	0.98540	0.0000

We computed the descriptive statistics of our study variables. Table 4.1 shows the results for the dependent variable. These results show that the share or asset allocation by fund managers to the various available assets classes differs over the study period. For instance, share of investment in government securities is the highest with a mean value of KSh. 46.810 million. The standard deviation is KSh. 14.120 million with a maximum value of KSh. 71.817 million and a minimum value of KSh. 22.154 million. This is the largest allocation, taking almost half of the total assets. The reason for the high allocation and low relative deviation is largely legal but also reflects the low risk associated with this asset class. The Jacque Bera test has a probability of 55.35% implying we may not reject the hypothesis that share of investment in government securities is normally distributed. The share of investment in government securities is therefore a normally distributed variable.

The mean allocation to equity stands at KSh. 24,869 million with a standard deviation of KSh. 17.014. While the allocation is relatively large, the deviation is also equally large probably reflecting the easy switching out of this category. The range of allocation is also very wide standing at KSh. 52.866. The share of investment in Equity is a normally distributed variable given its J-B probability of 41%.

The share of investment in bank deposits, corporate debt, property, international assets and guaranteed funds have varying means and ranges as summarized in Table 4.1. The allocations are also normally distributed as shown by the respective J-B probability that are all greater than 5%. The share of investment in the category "other" does not follow a normal distribution given that the J-B test has a probability of zero. However, as it is a small category of the analysis, we ignore its non normal nature to allow the analysis proceed with the normality assumption. The positive skewness in most of the categories justifies logarithmic transformation of the dependent variable.

Table 4.2: Descriptive statistics of Explanatory' variables

Measure	Variables			
	GDP Growth	Returns	Inflation	Legislation
Mean	4.5%	6.2%	8.9%	44.4%
Median	6.0%	7.0%	10.0%	30.0%
Maximum	8.0%	31.0%	15.0%	100.0%
Minimum	-3.0%	-17.0%	1.0%	10.0%
Std. Deviation	3.1%	5.8%	4.1%	29.8%
Skewness	-0.10456	-0.27247	•0.66159	0.62225
Kurtosis	2.896229	7.402416	2.18279	2.032339
Jacque-Bera	36.53029	163.98520	20.15543	20.71991
Probability	0.0000	0.0000	0.0000	0.00003

Table 4.2 shows the descriptive statistics of the explanatory variable. GDP growth has averaged 4.5% over the study period with a standard deviation of 3.1%, a low of negative 3.0% and a high of 8.0%. This shows that over the study period. GDP growth has been quite volatile.

Inflation has averaged 8.9% with a standard deviation of 4.1% and a high of 15.0%. This shows that the inflationary environment has also been quite erratic. Returns on the investment categories considered have a mean of 6.2% with a low of negative 17.0% for

international investments and a high of 31% for equities. The standard deviation is 5.8% again indicating high difference of returns in the various categories.

The burden of quantitative restrictions as measured by legal limit imposed on each asset class has a mean of 44.4% with a standard deviation of 29.8%, again portraying the difference regulatory regimes/quantums among the asset classes. All the explanatory variables have a non normal distribution as demonstrated by the probability of the J-B test which are all below 5%. The negative skewness for GDP growth, inflation and returns implies that taking a logarithmic transformation worsens its distribution

4.2 CORRELATION RESULTS

Correlation analysis was carried out to identify which variables were strongly correlated. The results are as shown in table 4.3.

Table 4.3: Correlation between the dependent variables

Share' Allocations	Gov't Securities	Kquities	Bank Deposits	Corporate Debt	International Assets	Property	Guaranteed Funds	Other
Government Securities	1							
Equit>	0.977948	1						
Bank Deposits	0.688128	0673055	1					
Corporate Debt	0.503257	0.451885	0.054717	1				
International Assets	0.933132	0.956096	0.692544	0.332169	1			
Propett}	0.770672	0.775612	0.339631	0.632207	0.644117	1		
Guaranteed Funds	0.968935	0.941717	0.670053	0.49144	0.904635	0.71127	1	
Others	-0.000563	-0.04363	0 104616	-0.034116	0.000577	-0.294978	-0.006347	1

There are vary ing degrees of correlation among the segments of the dependent variable. Among themselves the segments of the dependent variables are correlated because in practice, the available investment categories have common features and tend to behave in a similar fashion, presenting the fund manager with similar choice questions.

All the categories except "other" show positive correlations among themselves. This may be explained by the fact that over the study period, total pensions assets exhibited growth. As such, all asset classes benefited from this growth to show positive correlations amongst each other. However, if one was to assume a static asset level, there would be an

expectation of negative correlation between the equity-like categories and the fixed income categories. The negative correlation with the "other" category signifies the relative low use of that class of assets even when the entire pie was growing.

4.3 REGRESSION RESULTS

Due to the relatively short period of investigation necessitated by the absence of long term data, a panel analysis was undertaken. As explained in the methodology, a fixed effects model was adopted as the most appropriate model for this analysis.

The results are as presented in Table 4.4 below. The dependent variable is the logarithm of the share of assets invested in a particular category.

Table 4.4: Model Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.227385	0.409409	7.88303	0.0000
Share in l-l	0.614009	0.049929	12.29767	0.0000
GDP Growth	0.001333	0.004018	0.33185	0.7404
Inflation	0.004885	0.00361	1.353136	0.1777
Returns	0.004546	0.00198	2.296007	0.0228
Legislation	2.90E-06	6.35E-07	4.565779	0.0000
Fixed Effects (Cross)				
Government Securities	0.642744			
Equity	0.345768			
Bank Deposits	0.005751			
Corporate Debt	-0.196367			
International Assets	0.006698			
Property	-0.018929			
Guaranteed Funds	0.059584			
Other assets	-0.845249			
Weighted Statistics				
R-squared	0.987476	Mean dependent variance	21.16635	
Adjusted R-squared	0.986637	S.D. dependent variance	20.55605	
S.E. of regression	0.315316	Sum squared residual	17.79696	
F-statistic	1176.151	Durbin-Watson stat	1.986601	
Prob(F-statistic)	0.00000			
Unweighted Statistics				
R-squared	0.925292	Mean dependent variance	8.872509	
Sum squared resid	22.69177	Durbin-Watson stat	2.651025	

The panel results show that the identified variables explain on average 98.7% of the variability in the dependent variable (R^2 is 0.98747).

The estimation equation was reorganized in the analysis by taking the natural logarithm of the share of investment in each category. This was necessary in order to reduce the size of the coefficients. From a Box-Cox transformation perspective, this was justified due to the positive skewness of most of the variables as shown in table 4.1. However, for the explanatory variables, the same was not done because such transformation would worsen the distribution owing to the negative skewness as shown in table 4.2. The analysis ended up with a high constant term C, implying that the variables considered did not explain the asset allocation in full. Some variable results were also counterintuitive. We therefore added the historical asset allocation into the model. This inclusion of the lagged asset allocation solved the problem.

To interpret the results of a model where the LHS is in logarithmic form but the RHS is not, the following formulas are used:

For the variable coefficients: % change in share = $100 * (e^{\beta} - 1)$

For fixed effects: Actual effect = e^{β}

Where: $\hat{\beta}$ is the estimated coefficient.

4.3.1 Interpretation of the Results of the Slope Coefficients

Table 4.5: Variable Coefficients

Variable	Coefficient		Percent change
GDP	0.0499	0.0511965	5.1196
Inflation	0.0040	0.0040261	0.4026
Returns	0.0036	0.0036165	0.3617
Legislation	0.0020	0.0019820	0.1982

Using the interpretation formula provided above, we restate the actual impacts or effects of each of the variables as shown in the table above.

4.3.1.1 Inertia in Asset Allocation

Great inertia in asset allocation changes was observed. This is because when the prior period asset allocation was included as an explanatory variable in the model, it increased the model's explanatory power significantly (R^2 increased from 0.767165 to 0.98747). This shows that share of assets invested in a particular category at time t , is heavily dependent on the category's allocation in the previous period. As such, for every 1% revision of the asset allocation in period t , 61.4% of it will be dictated by the prior period's allocations, with only 38.6% of the change being realised. Therefore, fund managers take $1 / (1 - 0.6140) = 2.6$ quarters, to realize a full move. This was a significant factor explaining asset allocation at the 95% degrees of freedom ($p = 0.0000$). This observation may be explained by the following factors:

1. The shallow nature of Kenya's financial markets

Kenya's financial markets are quite shallow, meaning that, when a fund manager changes the asset allocation, the securities required to achieve the allocation change are not easily available to fulfill the needs to realize that change. The stock market is still quite nascent with few listings. Similarly the government securities market is small and illiquid.

2. Cashflow/liquidity constraints

Closely linked to the shallow markets is cash flow constraints. When a manager changes the asset allocation, cash should be available to buy the new assets to realize the change. A vibrant market also needs to exist to allow quick sale of undesirable assets. With the shallow markets, undesired assets cannot be easily sold to release cash for mobilization into the newly chosen assets. This limits quick action.

3. Trustee control and inertia

Pension fund assets are legally owned by trustees, who direct fund manager actions. While some pension fund managers have full investment discretion, regular feedback to trustees makes them important investment decision drivers. Many trustees view scheme assets as long term investments and therefore discourage fund managers from frequent asset allocation changes.

4. Lack of high conviction among fund managers

There is a high possibility that asset allocation changes by fund managers are not based on concrete research and analysis. As such, the managers take slow moves awaiting clearer indications on direction of markets, as more information becomes available. Most fund managers rely on brokers for research and are therefore usually not fully informed as they make their investment decisions.

5. Lack of skills and information systems for fund managers

A fund manager is able to change asset allocation and implement changes if there is strong reliance on sophisticated information systems and highly specialized and skilled human resources. This lacks among most fund manager companies. There is a possibility that fund managers are not able to view their asset exposure levels on a real time basis, which greatly slows decision making and trading to achieve desired asset allocation changes.

6. The structured asset allocation decision making process

Asset allocation decisions are taken in a structured and organized way usually through an investment committee. Many fund management firms could have committees which meet infrequently, thereby reducing the number of allocation changes that are made in a year. The bureaucracy involved in committee decision process could also explain the slow change process as decisions have to be sanctioned by the committees.

7. Lack of proactivity in the management process

There is likelihood that fund managers are not proactive enough in their management process. As a result, they review allocation infrequently and are not aggressive enough in pursuit of allocation changes.

8. Responsibility to markets

Fund managers know that they are operating in very shallow markets. As such, they could be seeking to manage their activity to avoid price bubbles.

4.3.1.2 Other Factors

Firstly, GDP growth was found to be an insignificant factor influencing asset allocation ($p=0.7404$). This factor is not significant because its effect is captured in other explanatory variables. For instance, asset returns are highly correlated to GDP growth. The factor is also captured in the lagged asset allocation factor due to the fact that GDP growth is a lagging indicator of economic performance.

Secondly, inflation is not a significant factor in explaining asset allocation decision of pension fund managers at 95% level of confidence ($p=0.177$). This factor is insignificant because its effects are also captured in asset returns and the lagged asset allocation factor which captures the expected inflation (forward looking).

Thirdly, a unit (1%) increase in returns was found to increase asset allocation in all categories by 0.36%. This factor is significant at the 95% level of confidence ($p=0.0228$). Fund managers are return seekers. Therefore, higher returns in a particular asset class calls for increased investment in that class. As highlighted on page 24, trustees and fund managers endeavour to deliver the highest returns to their beneficiaries. Fund managers performance is also judged on the overall returns they deliver on the funds under their management. As found in the Blake and Timmermann (2002) study of the UK retirement benefit funds, fund managers were driven more by returns that the markets offered as opposed to guidance from regulators. This shows that asset returns are a great motivator to asset allocation decisions in all jurisdictions.

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Fourthly, a unit (1%) increase in legal limits was found to change the asset allocation in all categories by 0.20%. While this is a significant factor explaining fund managers' decisions ($p=0.0000$), the effect was very small (0.2%). The significance of this factor is based on the fact that compliance to regulations is a legal requirement which can be enforced. Managers therefore have to comply with the set guidelines to avoid reprimand from the authorities. The reason for the very small impact would be the fact that RBA investment guidelines as presented in table 1.3 offer significant headroom to fund managers and are therefore easy to comply with.

The above results in themselves do not offer complete insight into the pension fund manager asset allocation decision process. There must be other individual effects which

shape the allocation decisions. The fixed effects reveal these category or class specific factors. In a similar fashion as above, we compute the actual impacts as presented in the table 4.6 below:

4.3.2 Interpretation of the Individual Asset Class Effects

Table 4.6: Individual Asset Class Effects

Asset class	Coefficient	e^*	Fixed effect (KShs. M)
Go\ eminent Securities	0.642744	1.901692	1.901692
Equity	0.345768	1.413075	1.413075
Bank Deposits	0.005751	1.005768	1.005768
Corporate Debt	-0.196367	0.821711	0.821711
International assets	0.006698	1.006720	1.006720
Property	-0.018929	0.981249	0.981249
Guaranteed Funds	0.059584	1.061395	1.061395
Other Assets	-0.845249	0.429450	0.429450

Firstly. Government securities have the largest fixed effect of KSh. 1.9017 million. This means that at any time, managers would increase investments in government securities by up to KSh. 1.9017 million due to characteristics that are hidden and inherent in that class. These unobserved characteristics of government securities include:

1. Readily available investment. The Government of Kenya issues Treasury bills every week, and bonds every month.
2. Risk free. The government as a sovereign is expected not to default on debt and therefore investing in its debt is risk free.
3. Certainty of returns. As this analyses shows, fund managers are returns seekers. An investment that offers certainty in returns is therefore more preferred than others which have returns which are uncertain.
4. Stability of returns. Returns on government securities are fixed and do not vary over the investment period.
5. Preference in regulation. Government securities are allocated the highest maximum exposure limit in the RBA guidelines. This unique preference is related to the above factors, as well as the government aim of tapping pension assets for national development.

Secondly, the equity asset class has the next highest individual effects of KSh. 1.4131 million. This means that managers tend to increase investments in equities by KSh. 1.4131 million due to factors that are unique to this asset class and have nothing to do with the other external factors. Some of these unique factors include:

1. Stocks are a growth asset class that delivers excellent returns in growth periods. It is therefore a strong hedge to inflation especially since pension funds are long term assets that should beat inflation.
2. Offers a good exposure to a variety of sectors thereby helping managers meet their diversification and risk management needs.
3. Tradability. The Nairobi Stock Exchange offers a daily trading platform where shares can be bought or sold.

The positive individual effects for government securities and equities found in this study are in line with IMF (2002) study that found a similar skew in a number of countries.

Thirdly, the share invested in bank deposits has individual effects of KSh. 1.0057 million. This means that an increase in allocation to this class of KSh. 1.0057 million is explained by characteristics that are specific to bank deposits and have nothing to do with the other external factors. The key unique factor to bank deposits is that fund managers can choose the duration of investment, and are therefore better able to manage liquidity and cash flows.

Fourthly, international assets have individual effects of KSh. 1.006720 million. This means that KSh1.006720 million of the increases in share of investments in this category are explained by characteristics that are unique to international assets. The main unique factor to this class is the diversification benefit, where the fund manager gets exposure to other economies, geographies and currencies, with prospect of higher returns than domestic assets.

Fifthly, guaranteed funds have fixed effects of KSh. 1.061395 million. There is an increase of KSh. 1.061395 million in the share of investments in this category due to characteristics that are unique to guaranteed funds. Guaranteed funds have a unique characteristic that they are insured funds and regardless of market conditions, there is a given assured rate of return. The funds also have the benefit of allowing start up funds accumulate wealth safely and at a reasonable cost.

On the other hand, property', corporate debt and "other assets" had negative individual effects. Firstly, the property asset class has a negative fixed effects of KSh. 0.981249 million. This means that managers reduce investment in this category by KSh. 0.981249 million due to class specific characteristics. Some of the characteristics of property that make it an undesirable asset class include high acquisition costs and low liquidity. Buying a property requires a high initial investment amount which many pension schemes may not afford. Selling properties is also a difficult undertaking.

Secondly, corporate debt has negative individual effects of KSh. 0.821711 million. It means that there are characteristics about this asset category which tend to influence allocations to it negatively. Managers tend to reduce allocations to this class by KSh. 0.821711 million due to some negative attributes unique to this class. Some of these factors include:

1. Credit risk. As debt to companies, this investment class constitutes higher risk when compared to government securities or bank deposits. The borrowing companies could enter into financial difficulties leading to total loss of invested funds.
2. Lack of a functioning market. Corporate debt is often listed and tradable at the Nairobi exchange. However, owing to the small size of issues, trade hardly takes place.
3. Poor structure of instruments. Since corporate debt comes as products packaged by financial engineers, the structures adopted some time are inappropriate for pension funds.
4. Limited availability. There are very few corporate debt instruments in issue. This is a negative factor that affects allocation to the category.
5. Limited allowance by regulators. Compared to other asset classes, corporate debt has a low allocation.

Lastly, "other assets" has a negative individual effect of KSh. 0.429450 million. This means that there are characteristics about this asset category which tend to reduce allocations to it by that extent. As explained earlier, this asset class consists of securities like derivatives, unquoted equity and private equity. This asset category is made up of highly specialized and structured investments, which fund managers may not fully comprehend and are therefore biased against it.

5.0 CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The study analyzed pension fund managers overall asset allocation decisions and the importance of a select set of factors that were analytically important in making investment decisions. Seven investment categories in both the fixed income and equity categories were considered. The factors analyzed were: the level of economic growth as measured by GDP growth; inflation, returns and legislation.

The study found that there was a lot of inertia in asset allocation changes. Fund managers took at least 2.6 quarters to realize a 1% change in asset allocation. This factor was significant in explaining asset allocation of pension assets.

Returns was the other important factor influencing fund managers asset allocation decisions. This factor was found to be strongly significant in explaining pension fund managers' investment decisions. Legislation was the other significant factor in explaining fund managers asset allocation. However, legislation had a very small effect on asset allocation. The effects of these two factors were also less than those of GDP Growth and Inflation, factors which were insignificant. <>-v

Other findings of the study were that there was good diversification of the assets of pension funds across all the investment categories. However, preference was noted towards government securities and equities as shown by the positive individual effects of these classes. As a result of this skew, investments in bank deposits, corporate debt and the "other assets" categories were low. However, there was a relatively high allocation to guaranteed funds.

5.2 POLICY IMPLICATIONS AND RECOMMENDATIONS

The pensions sector is relatively young in Kenya. In spite of that, the sector is picking up pace quickly as a major player in the financial markets. As a consequence, there is a need to incentivise it further and create a more conducive operating environment. This should be

done through making savings for retirement easier so that the sector has an ever growing pool of assets to mobilize.

A key finding of this study is that there is a significant inertia in asset allocation changes. Possible reasons for this inertia have been advanced. Key among them is the shallow nature of markets. Policies that will help to increase the depth and breadth of markets are recommended as a useful measure in breaking this inertia. Tax incentives to boost listings, automation of trading in fixed income securities are some of the quick win measures in this regard. Development of skills, investment in modern analytical tools by fund managers would also help greatly in reducing the turnaround time.

Negative individual effects were noted for corporate debt. This was due to the perceived higher risk and unavailability. Measures that will encourage corporates to raise debt from the public should be pursued. These include high financial information disclosure standards to increase investor comfort, reduction of bank guarantee costs for issuers and training business owners on advantages of tapping the public for development funds.

Property was noted to have negative individual affects. Policies and frameworks that increase the liquidity of property investments such as Property Unit Trusts (PUTS) and Real Estate Investment Trusts (REITS) would eliminate this negative preference for this asset class.

"Other assets" category was also found to have negative effects. Building of skills and expertise in specialist products as well as the setting up of legal frameworks for their issue would help overcome the negative effects.

The pension fund managers have invested the pensions industry assets in a well diversified way. The diversification appears to be well guided by the investment guidelines issued by the regulator. The legislation has played significant role in guiding asset allocation. However, the effect on allocation is not large, implying that there is minimal difficulty to comply. The regulations as structured are conducive for the sector.

5.3 AREAS FOR FURTHER RESEARCH

The study found that there is great inertia in asset allocation changes. The most likely reasons for this would be the shallow investment markets and lack of proactivity among the Kenyan fund managers. It would be a worthy academic exercise to strive to unearth the reasons for this inertia.

The study also finds the presence of asset class specific effects in fund manager investment decisions. Again, a fund manager survey to find out the specific negative effects on a per-asset category basis would be a worthy academic pursuit. This would be important to inform the product developers on areas that would need to be improved on.

This study has adopted a panel approach to investigate the factors influencing investment decisions of pension fund managers due to the relatively short period of data. Once the sector has operated formally for a much longer period, I would recommend a time series study that specifically identifies the role the pensions sector is playing in the stock market.

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