RISK AND RETURNS OF REAL ESTATE HELD IN PENSION FUNDS INVESTMENT PORTFOLIOS IN KENYA

SUBMITTED BY:

WILLIAM K KINYANJUI
D/61/P/8548/99

A project submitted in partial fulfillment of the requirement for the award of a Masters in Business Administration (MBA) Degree, Faculty of Commerce University of Nairobi

NOVEMBER 2004

DECLARATION

I, **William Kungu Kinyanjui**, hereby certify that:

1 Except where due acknowledgement has been made, this project work is mine alone.

2 The project has not been previously submitted in whole or in part, to qualify for any other academic award.

Signed: _____ Date: 07/02/2005

William Kungu Kinyanjui

(D61/P/8548/99)

I, **Mr Mirie Mwangi**, hereby certify that this project has been presented for examination with my approval as the University of Nairobi supervisor.

Signed: _____ Date: 02/02/2005

Mr Mirie Mwangi

Lecturer, Faculty of Commerce,

University of Nairobi

DEDICATION

This project is dedicated to my twin daughters Olivia Wangui and Elaine Ngendo for the inspiration their adulation gave me and their unfailing faith in my efforts; and my dear wife Agnes Wanjiku for the unspoken but invaluable behind the scenes support all through the programme. I hope my efforts in this struggle will have served, in however small measure, to show that life's long journey can be fulfilling; no matter the effort necessary to prevail.

ACKNOWLEDGEMENTS

The list of people who have contributed in one way or another in this project is long; while grateful to each one it would not be possible to name everyone individually in a short note such as this.

Deep and enduring gratitude goes firstly to my family for their unwavering moral and spiritual support in their encouragement, patience and understanding all through.

The Faculty of Commerce, University of Nairobi; teaching staff, library staff and my MBA 2003 class have each one shown me encouragement and warmth whenever I turned to any one of them : they deserve warm words of thank you one and all. My hand in especially warm thank yous goes to my supervisor, Mr Mirie Mwangi for his patience, guidance, breadth of ideas and depth of insight in moulding the pot of ideas and financial theory into some semblance of good sense; in a review of a key sector still largely unexplored and little understood.

My business associates at YMR deserve my appreciation for their tolerance and understanding and the invaluable support from the office : Patrose especially for her enduring patience on the computer and the endless drafts.

Few are those of us, in times of need, who are able to count on the never failing encouragement, comfort and good cheer that my old and very dear friend Wanjuki Muchemi gave me. I will always be richer in life, for having known him. Pete my go-getter sibling for reminding me of life's endless possibilities; Sandr- Pea and Dan for stoking my fires of inquisition and valued friendships.

ABSTRACT

In the determination of the optimal investment asset mix, recent research has focused on the contribution of real estate; and what constitutes an efficiently diversified portfolio in which real estate is featured. But while several investment studies analysis of the developed countries markets have shown investment grade real estate assets performance as comparable to that of the other major competing classes, and recommended higher proportions of real estate in investment portfolios than that observed, practice has not matched the theory.

This study looks at the performance of real estate compared to quoted stocks and government securities, the other key investment media in the portfolios of pension funds in Kenya. Using data from the pensions sector, one of the two major institutional investors in the Kenyan economy, the study analysis shows risk/returns performance for real estate compares favourably with that on quoted stocks and government securities, over the study period 1998 – 2003. With risk and returns rated, from the research results, as the two leading factors in the choice of investment avenues the study seeks to allay these investors concerns on real estate assets. However the financial risk more commonly associated with real estate, that of illiquidity and flexibility, is not adequately addressed in the direct form of investment that is practised in the local market. Indirect investment in real estate through securitization and secondary mortgage markets has helped overcome the problem of liquidity and flexibility in the developed countries markets.

The realization of securitization and listing which would help with the financial deepening of the markets, will however require further studies particularly related to improving this relatively informationally inefficient sectors price discovery framework.

TABLE OF CONTENTS

RISK AND RETURNS OF REAL ESTATE HELD IN PENSION FUNDS INVESTMENT PORTFOLIOS IN KENYA

PART I

INTRODUCTION

1.1 Background

Most institutional investors portfolios feature real estate as an asset class; in varying proportions to their total investments portfolios. Most institutional investment portfolios lean more to stocks, bonds, government securities and even foreign stocks; in preference to real estate. But because of its high correlation with consumer price index, real estate in a portfolio context serves the useful purpose of a hedge against inflation. Moreover evidence from several past studies recommending inclusion of real estate in investment portfolios, shows returns comparable to those on bonds and stocks (Goeztmann W.N, and Ibboston R.G, 1990).

The pensions sub-sector in Kenya has assumed an increasingly significant role in the national economy. With an estimated asset holding of over Kshs 130 billion, amounting in relative terms to approximately 20% of the gross national product, and covering a substantial proportion of the formal retirement benefit sector, the management of this sector assumes considerable significance in the promotion of the nation's economic growth (Pricewaterhouse Coopers, 2002).

As an asset class in the investment portfolios of one of Kenya's two major institutional investor's the pensions sector, the other being the insurance sector, the real estate component, on average, dominate all other asset classes; with the exception of government securities. Out of the pension funds investment portfolios holding worth Kshs113.4 billion in September 2002, the real estate asset class component was Kshs.41.4 billion (36.5%). The real estate component of the total assets under management by the 10

fund managers licensed by the Retirement Benefit Authority (RBA) is however an average of 8.6%; well below the RBA recommended ceiling of 30%. Three of the ten fund managers have zero investment in real estate; another three have less than 4% of their respective total assets in real estate. The 11th fund manager, the NSSF has a, real estate component of 72% of total assets (RBA, 2002).

In the world economy real estate accounts for more than half of the aggregate wealth, when domestic residential real estate and farm land are included. Corporations are the single biggest repositories of real estate assets. In the US, estimates put the corporate ownership at 75% of all commercial property. On book value basis, one third of the total assets of the "Fortune 500" is in real estate (Ennis R.M. and Burik, P, 1991).

Most of this global investment in real estate is in the form of direct investment. Active equity trading of real estate stocks in the US amounted to 2.7% of the real estate capital markets ; the biggest share of real estate assets was in mortgage debt and unlisted privately held equity. These proportions were mirrored in the investment portfolios of the major institutional investors. U.S. Pension funds with an investment holding of US$ 1.50 trillion reflected the real estate component at only 3.5% of total assets (Ennis R M and Burik P., 1991).

Direct investment here refers to the purchase of investment assets where the investor is directly involved in the selection; the asset is registered in his name and he is therefore directly responsible for its management. Indirect investment on the other hand refers to a pool of assets, a portfolio, managed on behalf of investors by professional managers; and where the investors own units (parts) or shares of the portfolio of asset(s). Much like owning financial securities like stocks and shares traded on the stock exchange. (Cowdell

J., 2002) Securitization is one such process of indirect investment by pooling mortgages into securities tradeable in financial markets.

Studies conducted to compare the historical return/risk combinations for direct investment in real estate relative to the more commonly traded stocks, bonds, government securities and the alternative investment (metals and commodities) for both the US and other developed markets in Europe and Asia over the period 1960 to 1984, shows the returns on real estate as comparable to or slightly higher than that on stocks and bonds. Further, real estate showed standard deviations (risk levels) relatively lower than both stocks and bonds. Empirical evidence therefore shows real estate assets, have over the years achieved risk and returns comparable to stocks and bonds. (Ibbotson, R.G et al, 1985)

While most institutional investors accept real estate as a necessary component of efficiently diversified investment portfolios, the tendency has been to treat it as supplementary; real estate playing a minor role in portfolios dominated by equity stocks, fixed income securities, guaranteed funds and even foreign stocks in some of the markets. The high yield returns realized from prime grade real estate investment and its widely acknowledged role as a hedge against inflation not withstanding. (Ennis, R.M and Burik, P. 1991).

Here in Kenya, the pension schemes skewed investment portfolios towards "safe haven governments securities" were previously explained on the basis of the relatively poor performance of the alternative investment avenues of equity stocks, corporate bonds and the property market. With the new government's change in monetary policy and a resurgent stock market, the roles were reversed over the last half year in 2003; government securities yields sinking to alltime lows and most blue chip equity stocks reaching unprecedented highs. Political transitions present opportunities for entrepreneuring investors that can pay dividends if cleverly exploited.

The Retirement Benefits Authority (RBA) on its establishment in 1997, undertook the restructuring several pension funds and their schemes to realize more balanced portfolios. This entailed offloading considerable proportions of non-performing real estate assets from some portfolios with huge reserves of undeveloped land; while a few others featured low or no real estate in their portfolios. A clear break with the RBA's proposed investment guidelines.

In the depressed real estate late 1990's market the pursuit of recruiting these investment portfolios would have entailed considerable losses of the investors involved; and so the problem of unbalanced investment portfolios therefore persisted. Clearly therefore the Kenyan pension funds institutional investors have the task, and may be the opportunity, to tackle the long standing question of what constitutes an efficiently diversified mixed asset portfolio and the role of the real estate component in this portfolio.

To command a bigger role in institutional investors portfolios, real estate assets would require to be reconstituted to overcome the widely acknowledged problems of liquidity and flexibility. Most of the developed markets have achieved this through securitization of real estate stocks and operations of the secondary mortgage markets. The basic principles behind these concepts are covered briefly in the later part of this study. Further research in this area specifically related to its practical application, will contribute considerably to the resolution of the role of real estate assets in an efficiently diversified portfolio; in respect of pension funds investment portfolios.

1.2 Statement of the Problem

Pension funds in Kenya, considered together with insurance companies as the two major institutional investors, have as one of their primary objectives the investment of funds in

portfolios of assets that realize the maximum returns with minimal risks. The investment opportunities open to them include government securities, guaranteed funds, quoted and unquoted equity both local and foreign, corporate bonds, immovable property, units trusts, fixed deposits and cash. An examination of these pension funds investment portfolios over the last few years, shows portfolios that suggest that investment in real estate is a much lower preference than government securities and guaranteed funds. Real estates' share of total assets is only slightly higher than that of quoted equity, fixed incomes securities. Since risk and returns is one of the primary considerations in asset allocation of investment portfolios, it would be useful to determine the comparative risk and returns of real estate as this can serve as a useful guide to pension funds better allocation of resources. The risk and returns determined for real estate should be compared to that on quoted equity/ordinary shares and government securities, the two major competing investment media, as a reference benchmark.

The Retirement Benefit Authority (RBA) reviews in 2001/2 notes that some of the pension schemes hold property that does not feature in the fund managers statistics: capital assets held under the category of "others" in the balance sheet. This refers to assets held speculatively for capital appreciation and security of capital as a hedge against inflation. Still others have real estate assets held for personal factors like physical ownership or personal use as owner/investor-occupier. It would be useful to determine what proportion of the total assets fall into this category of property that is not seen as being actively involved in trading or investment. And further, its capital yield contribution to the returns of the scheme.

While a comprehensive study of the risk and returns on all the pension funds asset classes would be useful in this respect, reliable statistical data is not available for non-listed securities and asset classes. Trading in corporate bonds on the Nairobi Stock Exchange

(NSE) is still considered as relatively low and cannot be expected to yield reliable data. Fixed deposits on the other hand were a relatively low proportion of the total assets. Such a study can therefore provide verifiable comparable risk and returns data for only government securities and ordinary shares or quoted equity.

It therefore seemed useful to determine, as a pointer to the need for further research, whether pension funds would alter the portfolio asset allocation to their existing asset mix if the risk and returns data realized for real estate assets proved its competitiveness relative to the other two competing asset classes. Particularly under the scenario in late 2003 where yields on government securities, their leading investment medium, were at an all time low and recovery to their former yield levels seemed uncertain in the short term. Equity stocks for the five or six major blue-chip companies meanwhile, were trading at record prices at the Nairobi Stock Exchange (NSE).

1.3 Objectives of the Study

The objectives of the study were to:

1 Determine the risk and returns of real estate assets held by pension funds in Kenya.

2 Compare the risk and returns of the real estate asset class with those realized from quoted ordinary shares and government securities in the investment portfolios of pension funds in Kenya.

1.4 Hypothesis

The study set the following hypothesis, to be confirmed or rejected by our research and investigation:

H_O : Risk and Returns of Real Estate do NOT differ significantly from that realised from quoted ordinary shares and government securities; in the investment portfolios of pension funds in Kenya.

H_A : Risk and Returns of Real Estate are not comparable to those realized from quoted ordinary shares and government securities; in the investment portfolios of pension funds in Kenya.

1.5 Importance of the Study

The study will serve the useful purpose of:

1 Assisting pension fund Trustees/managers to determine the actual risk and returns on their real estate assets class and their larger investment portfolio : and hence assist them optimize on their asset mix allocation for the portfolio.

2 Assisting the Retirement Benefit Authority in redefining policy guidelines for the schemes portfolio structure (asset mix) relating to the real estate asset class.

3 Challenging both the Retirement Benefit Authority (RBA) and the Capital Markets Authority (CMA) to review the prospect of and accelerate research into the securitization of the largely dormant but sizable, real estate assets component of pension funds portfolios. This will help overcome the primary limitations and constraints associated with direct investment in real estate : liquidity and flexibility.

4 Pointing out for further research the prospects offered by a properly functioning real estate securities market, in respect of attracting the potentially large retail investor class; and the resulting financial deepening of the local stock market.

PART II

LITERATURE REVIEW

2.1 Risk and Return

2.1.1 Investment Returns

Rational risk averse investors aim to optimize their returns : the trade-off being the risk acceptable to the individual. Financial economics theory has as its central proposition that risk-averse investors must be compensated with returns at levels commensurate with the risk undertaken.

Investment by individuals or businesses is the application of funds, not for immediate consumption, to an undertaking with the expectation of earning even more money in the future. The concept of return is the investors measure of the financial performance of the investment. The basic measure of investment return is the dollar return in absolute terms:

Dollar return = Amount received – Amount invested.

The rate of return, expressed in percentage, is a more commonly used measure as it overcomes the scale and timing problem associated with the dollar return. For a one term period, the rate of return on a stock would be expressed as:

$$\text{Rate of Return} = \frac{\text{Amount received} - \text{Amount invested}}{\text{Amount invested}}$$

Modigliani F and Pogue G A (1974) in their paper on the measurement of historical returns define return on an investors portfolio during a given period as "the change in value of the portfolio plus any distributions received from the portfolio expressed as a fraction of the initial portfolio value". The return of the portfolio designated as R_p is expressed as:

$$R_p = \frac{V_1 - V_0 + D}{V_0}$$

Where: V_1 = Market value at end of interval

V_0 = Market value at beginning of interval

D_1 = Cash distribution to the investor during interval

The expression assumes that any receipts not distributed to the investor is reinvested; and further that all distributions occur at end of period or are held in the form of cash until end of period. For a series of such measurement intervals, the Arithmetic average return (ARR) is an unweighted average of the returns expressed as:

$$R_A = \frac{R_{P1} + R_{P2} + \ldots\ldots R_{PN}}{N}$$

Where: R_A = The arithmetic average return

$R_{P1,2,N}$ = Portfolio return during the periods 1, 2 ..... N

N = Number of intervals in the performance evaluation period.

The geometric rate of return (GRR) is a time weighted return measure that reflects the compound rate of growth of the initial portfolio over the performance evaluation period and expressed as:

$$R_T = \sqrt[N]{(1 + R_{P1})\,(1 + R_{P2}) \ldots\ldots (1 + R_{PN})} - 1$$

Where: R_T = The time weighted rate of return

$R_{P1,2,N}$ = Portfolio return during the periods 1, 2 ..... N

N = Number of intervals in the performance evaluation period.

Where the period returns in a time series differ, the two methods will give varying results; with the GRR providing more accurate results where the averages distribution is wide or varied. Johnson, R E (1995).

2.1.2 Risk Types and Measurement

Modigliani F and Pogue GA (1974) describe as a "measure of risk the extent to which future portfolio values are likely to diverge from the expected or predicted value". One popular and practical definition of risk calls it "the chance or probability that the investor will not receive the expected or required rate of return on the investment". (Pyhrr, SA et al 1988). This last definition shows the relationship between risk and return ; risk being the variance of expected return. If an investment is risk free, ie certain, it has no variance.

Risk can be characterised in several ways. Single assets cashflows analysed in isolation are said to be on stand alone risk basis. When the assets are combined, a collection of investment securities, this is said to be a portfolio. Assets are held in portfolios for purposes of diversifying their risks ; an asset with high stand alone risk will dissipate some of that risk if it forms part of a larger portfolio. In a portfolio context risk is further divided into two categories (a) Systematic (market or undiversifiable) risk and (b) unsystematic (diversifiable) risk. Unsystematic risk can be eliminated through diversification (management efforts or insurance) as it is predictable over the long run ; and is therefore excluded from the basic risk for which the investor should be compensated. Systematic or undiversifiable risk on the other hand relates to the macro-economic environment over which the investor has no control : general stock market performance, inflation, interest rates, production levels, technology, etc. Consequently investors expect compensation for this type of risk. (Brigham E.F. et al , 1999).

For real assets it is also useful to think of risk under the two major categories of business and financial risk. Business risk is the underlying asset risk ; the probability that the expected level and pattern of productivity returns will not be achieved. Business risk is then further divided into the two categories of systematic (dynamic) risk and unsystematic (static) risk as noted earlier. Financial risk refers to risk arising from debt financing and is essentially a cash

liquidity or solvency problem. Financial risk is therefore considered as additional to the underlying business risk : and varies with leveraging (Pyhrr S.A. et al, 1988).

Risk can be measured in a variety of ways. One common measure of risk is standard deviation (δ) which measures the variance of return from the mean or expected return. Portfolio standard deviation, is given by :

$$\text{Standard deviation} = \delta = \sqrt{\sum_{i=1}^{N} (K_i - \hat{K})^2 P_i}$$

In situations where the choice in project ranking is complicated by the risk – return combinations variability, the co-efficient of variation (CV) given by $(\delta/\hat{k})$ is the better measure of risk. The co-efficient of variation shows the risk per unit of return.

In the portfolio context, combinations of assets appropriately matched will achieve the purpose of diversification; if a fall in returns in one are countered by a rise in returns of the other. Co-variance measures the way in which the returns of two assets move in relation to each other. The tendency of two assets to move together, co-variance, is standardized and referred to as correlation measured using a term called correlation co-efficient (r) ; whose value ranges from r = +1.0, for perfectly positive correlation to r = - 1.0, for perfectly negative correlation. A co-efficient of zero signifying that the two assets are independent. In the ideal setting where two assets are perfectly negatively correlated (r = -1.0) all risk can be diversified away. In the real world however average correlation co-efficients for two randomly selected stocks are about 0.6 ; r for most pairs of stocks being in the range +0.5 to +0.7. (Brigham, EF et al, 1999).

Correlation co-efficient (corr. coeff.) of returns of assets A and B (r_{AB}) is given by:

$$r_{AB} = \text{Corr. Coeff} \quad (AB) = \frac{\text{Cov}(R_A R_B)}{\delta_A \quad \delta_B}$$

The portfolio standard deviation (δ_p) will be smaller than the weighted average of the individual assets; that of a two asset pairing being given by:

$$\delta p = \sqrt{W_A^2 \, \delta^2_A + W_B^2 \, \delta^2_B + 2 W_A W_B \, COV (R_A \, R_B)}$$

2.1.3 Portfolio Theory : Diversification

The portfolio approach emphasizes the synergistic effects of a single investment on the total package of assets held by the investor. Markowitz, H. (1952) in his article "Portfolio Selection" developed the basic concepts of modern portfolio theory. Arguing that the essence of "efficient diversification" lies in the trade off between investment risk and returns, Markowitz developed a computational procedure for determining the efficient frontier from an efficient set of portfolios. Using the efficient frontier and the individual investors known attitude towards risk aversion, reflected in their utility or indifference curve, Markowitz was able to determine their optimal portfolio. The Markowitz mean -variance concept thus derives that efficient portfolios should either maximize expected return for a given portfolio variance; or minimize portfolio variance for a given expected return. (Johnson R E, 1995). Markowitz's theory of portfolio choice was based on the premise of degree of covariance between pairings of assets.

For portfolio investors, there is need to know the risk for the additional (marginal) asset. Sharpe W F and Markowitz H (1964) extended Markowitz's portfolio theory to develop the Capital Asset Pricing Method (CAPM) framework ; an important tool used to analyze the relationship between risk and rates of return. Total investors required rate of return was said to comprise partly of : compensation for opportunity cost of time, a risk free component (K_{RF}); and an additional premium for market (systematic) risk $(K_M - K_{RF})\beta$.

The CAPM formulae was derived from this framework; with Beta (β) being the quantity of risk and $(K_M - K_{RF})$ the price of risk.

The CAPM model (Required Rate of Return) : $K_i = K_{RF} + (K_M - K_{RF})\ \beta$

The Beta (β) coefficient here measures the tendency (sensitivity) of a stock to vary with the market (average) portfolio. This Beta (β) coefficient for deriving the required rate of return of an asset in equilibrium was derived as:

$$\beta_i = \frac{\text{Covariance between stock}_i \text{ and the market}}{\text{Variance of market returns}} = \frac{CoV(K_i, K_m)}{\delta_m^2}$$

The CAPM although widely used in financial theory and practice has been widely criticized for being a one factor model, and further for the limitations of its market conditions assumptions. Ross S.A , (1976) developed an alternative multi-factor model the Arbitrage Pricing Theory (APT) where the market realized return K_m is determined by a number of other factors besides market risk viz : level of productivity, inflation, interest rates, tax, etc. But the APT models practical usage todate is still limited. (Brigham EF et al, 1999).

2.1.4 Application of Portfolio Theory in Real Estate

In the US the increasing demand by institutional investors for investment grade real estate assets of sufficient magnitude, and revised legislation and fiscal measures in the 1960/70s aimed at promoting pension funds investment in real assets following the poor performance of stocks after the recession in the mid 70s and the market crash of 87, have been key factors in promoting real estate portfolio analysis (Pyhrr S.A. et al, 1988). And perhaps equally important has been the securitisation of real estate and its introduction into the US stock market.

However the usage in the securities markets of modern portfolio theory, has not been matched in the property markets where the impediments have been: a) lower incidence of transactions and hence poor performance data; there are no widely accepted price indices. b) markets tend to be highly localized and reliable information on transactions pricing lacking or of low quality and c) real estate transfers have complex financing structures, usually highly leveraged, but lack the sophistication of securities trading. Lack of widely accepted/applicable price indices has been a particularly difficult handicap ; in view of the need for comparative analysis of all available alternative assets. The need to develop credible measures of the expected returns and variances, has led to development of stochastic models adapted from known financial theory formulations, to measure risk : from the basic stand alone risk to the more complex portfolio risk levels (Pyhrr, S.A et al, 1988).

2.1.4 (1) Investment Return Measures

Real estate investment decision approaches range from the personal formulas, the rule of thumb used by the school of hard-knocks entrepreneurs; to the traditional simple financial approaches, and the modern capital budgeting approaches. Both the traditional financial and modern capital budgeting approaches require risk and return analysis which form the backbone of competitive financial analysis decision making : a combination of two or more approaches being used for cross-checking the results. But use of popular preliminary financial feasibility tests and formulae, to first check out the basic financial economics data before further detailed reviews, is quite common even among modern day entrepreneurs.

Among the more commonly used traditional financial methods that require determining and use of the rate of return are:

(a) the investment value (V) or present worth approach where the investment value is contrasted with investment cost (C), ie, (V>C); the profitability index (V/C) being the variation of the investment value decision rule for ranking several projects.

(b) Rate of Return Approach : which compares the expected rate of return (ROI) to the investors required rate of return (RROI) to determine the go/no-go decision, ie, (ROI > RROI).

The pay-back period and best-fit approaches while not directly requiring use of rates of return, imply comparative benchmarking to return performance measures.

The more sophisticated capital budgeting approaches all require use of risk-return analysis and range from : the deterministic Present Value (PV) and Internal Rate of Return (IRR) methods; the probabilistic (stochastic) approaches using ratios, sensitivity analysis and simulation models; and the H. Markowitz portfolio theory derived capital asset pricing model (CAPM) and arbitrage pricing theory (APT) formulas. Pyhrr, S A et al (1988).

2.1.4 (2) Rates of Return Computations

The two most important rate of return measures for the basic evaluation of the capital structure (debt/equity ratios) of a project and its performance are: the rate of return on total capital (ROI); and the rate of return on owners equity investment (ROE).

The ROI "the overall rate", shows the productivity of the total capital invested including both equity capital and debt; used in conjunction with a one year cash flow proforma and shown thus:

- Rate of Return on Total Capital (ROI) = $\frac{\text{Net operating Income (NOI)}}{\text{Total Capital Investment}}$

The ROE the "equity dividend rate", is a measure of the rate of return on the investors equity investment; and is the more commonly used to evaluate property income in the early years.

- Rate of Return on Equity (ROE) = $\frac{\text{Cash Flow}}{\text{Equity Investment}}$

Both rates of return measures require preparation of an accurate project cash flow statement for the first year; which for the basic appraisals does not consider such factors as tax shelter, equity build-up or property appreciation. These factors would be considered in discounted cash flow (DCF) models used in the more sophisticated capital budgeting methods, for each year of the expected period of the investment.

The one-year cashflow statement, an estimate of the most likely outcome, for illustration purposes here-under is for a 16 units middle income apartment block intended for purchase:

Cash flow Statement (Pro-forma) : 16 Units Apartment Block:

	(Kshs)
Gross Rental Income (16 units @ 35,000/- x 12 months)	6,720,000
Add Fax/e-mail vending services (16 units @ 1,500/- x 12 months)	288,000
Gross Possible income (GPI)	7,008,000
Less Vacancy/Credit losses (7.5% of GPI)	(525,600)
Gross effective income (GEI)	6,482,400
Less Operating expenses (30% of GPI)	(2,102,400)
Net Operating Income (NOI)	4,380,000
Less Debt service (10% of loan 32,000,000/-)	(3,200,000)
Cash-Flow Kshs	1,180,000

Projects that pass the preliminary financial feasibility test for the basic financial economics data requirements are then subjected to the more detailed DCF methods, using the Net Present Value (NPV) and Internal Rate of Return (IRR) models. These cover not only the tax

shelter impact on the cash flows, but analyse the project over its holding period. Financial ratios are used in addition, more as a general sanity check on the results from the financial analyses. Pyhrr, S.A. et al (1988).

2.1.4 (3) Stand-alone Risk Measures

The Basic Financial Feasibility Model (BFFM) is widely used in property appraisals as a quick analysis of the basic economics of an investment. Using the first years Net Operating Income (NoI); and disregarding taxes, start up costs and equity build-up through loan amortization, the BFFM is used as a quick check on the loan amount and debt services; using debt cover ratio (DCR), annual debt service and a mortgage constant:

- Debt Cover Ratio (DCR) = $\frac{\text{NoI}}{\text{Debt Service}}$

The BFF Model can be used in a combination of ways. For example if the property price is known, the investor can work back to determine intermediate values like rents and expenses affordable with the financing structure.

The Break-even-ratio (Default Point) is used to evaluate loan proposals ; relating gross income to the major outgoings, ie operating expenses and debt service. The lower the numerator (total outgoings) the lower the risk level

Sensitivity analysis for evaluating stand-alone risk, by deriving elasticities for certain measures of performance, has seen the development of several models for use in real estate analysis

At the next advanced (middle) level of risk analysis is a DCF measure called Risk Absorption (RA) ratio developed by Wofford LE and Gitman LJ (1978) that measures the amount of risk a project can absorb while still remaining acceptable to the investor; by converting the NPV value to an Annualised NPV. The ANPV shows the amount by which the cash flow each year could be reduced without reducing the NPV to below zero. (Pyhrr, S.A et al, 1988).

2.1.4 (4) Portfolio Risk Measures

The use of sensitivity analysis while advanced has the shortcoming of not indicating the probability of the returns. The Monte Carlo Risk simulation model developed by Pyhrr SA (1973) measures the possibility that various rates of return will be achieved, if the probability distributions for uncertain variables can be measured. In developing this risk model, the first step comprises the designation of the control variables (single-value estimates) and the state variables (probability distributions) whose combinations randomly selected will be used to compute the output returns distributions. The probability distributions can be estimated by the analyst; or otherwise be determined from field study interviews. The Monte Carlo simulation procedure can be used to generate cash flows, DCF rates of return, and other statistical data. Liquidity measures, for example, can be worked out from the yearly cash flow generated from the simulations. The measure of liquidity could, for example, be assessed from the probability of receiving negative equity cashflows (after debt service, but before tax) of say Kshs 1,500,000/- from the example P.16, in two or more consecutive years. The degree of sophistication of the required computer software and the requirement for extensive use of design data are probably this methods main disadvantage. (Pyhrr, S.A et al, 1988)

The simplified probability approach model integrates some of the concepts in the Monte Carlo simulations method and others from sensitivity analysis : and can provide useful risk analysis without the extensive use of data and computer software. By for example assigning probabilities to the states of the optimistic, most likely, and pessimistic forecasts used in the sensitivity analysis, expected returns, variance and standard deviations can be computed.

2.1.4 (5) Multiple N-asset Risk Problem

In real estate, the two-asset portfolio models require adapting to the more practical situation of the N-asset problem ; requiring use of linear programming to maximize the difference between

expected portfolio return (E_P) and variance (V_P). This is done using the calculus maximization function (Pyhrr, S.A. et al, 1988):

- Maximize $Z = \lambda E_P - V_P$

  Where:

  $$E_P = \sum_{i=1}^{N} E(R_i)W_i$$

  $$V_P = \sum_{i=1}^{N} \sum_{j=1}^{N} W_i W_j \sigma_{ij}$$

  Subject to: $$\sum_{i=1}^{N} W_i = 1.0$$

Further even this calculus model has had to be adapted to overcome and provide for the constraints noted for real estate investment. Pellats M (1969) model structure based on the calculus maximization function above was designed to accommodate these limitations of discreet units, financing decision and with a multi-period variable; for use in real estate. Designed to generate an efficient frontier it generates Net Present values (NPVs) and variance of NPV. The general structure (summarized) of the model:

- Max $E(NPV) = \sum_{i=1}^{N} (PVAL_i)\, W_i + \sum_{i=1}^{N} (MVAL_i)\, Y_i/P_i$

  Where:

  - $E(NPV)$ = expected NPV
    N = No of properties in portfolio
    $PVAL_i$ = expected NPV of Property i
    $MVAL_i$ = mortgage maximum NPV on property i
    Y_i = Proportion of total cost provided by mortgage funds
    P_i = maximum of total costs provided by mortgage funds.

Pellats model has computer programs that provide the means to generate efficient frontiers for up to four properties portfolios : allowing for accommodating the noted real estate restrictive

factors. (Pyhrr S.A. et al, 1988)

Sharpe W F (1963) proposed the Diagonal and Single Index model based on an alternative formulation of the Markowitz model which eliminated the need for generating the covariance matrix for all project pairs in the set of projects. Sharpes models simplified computations makes the generation of an efficient frontier therefore less difficult, with lower data requirements, since it requires only periodic return data on each security and on the market index.

Portfolio analysis however requires use of expected returns and variance to develop efficient portfolios/frontiers; and consequently use of risk simulation models like Pyhrrs and Pellats are more commonly used. It is to be noted that these varied risk models can produce very different results ; depending on the data input and experience of the analyst in the particular case of the probabilitistic models. The simulation (determistic) models in particular are still considered as being under development ; and are recommended for use with a lot of caution. (Pyhrr SA et al, 1989).

Recent research has focused on the role of real estate in a mixed asset portfolio, questioning what constitutes an efficiently diversified mixed-asset portfolio of which real estate is a component. This is the theme in this paper.

2.2 Investments Risk and Returns History

2.2.1 Financial Securities Returns and Risk

To assist in investment policy formulation and further guide investors composing the asset mix of their investment portfolios; and further ascertain the range of proportions to allocate each asset, many studies have been carried out to determine historical rates of return and risk performance records for the various investment media.

Among the major studies are those carried out by Ibbotson RG and Sinquefield RA (1976, updated 1996) in the US for the period 1925 – 95 which covered the major classes of assets traded: large company assets; small capitalisation stocks; long term US government bonds; long term corporate bonds; US treasury bills and consumer goods as a measure of inflation, the CPI index. The results are tabulated to show average (geometric and arithmetic) mean returns and their standard deviations. These results are now compiled into the Stocks, Bonds, Bills and Inflation 1997 Year Book (Ibbotson Associates, 1997).

Ibbotson RG et al (1985) in a subsequent study expanded to cover the major world markets (including US stocks); and including the alternative investments in real estate and commodities over the period 1960 – 84 points up some interesting observations on stocks and real assets. And with the further measure of risk the co-efficient of variation, to assist in ranking the different media, shows how real assets compare with the alternatives.

Ibbotson R G and Brinson G P (1993) cover extensive analysis of risk and returns for alternative asset classes in a discussion of global investing. And essentially confirm the risk averse investors theory of relationship between rates of risk and return : a positive historical relationship between rates of return and the variability of return. And provide further proof of the relatively low correlations between financial assets (stocks and bonds) and real assets (real estate, metals, art, antiques) ; an affirmation of the benefits of diversification. (Reilly, F.K and Brown K.C, 2000)

2.2.2 Real Estate Assets

Several studies have been carried out related to the various property sub-sectors: commercial, residential, farming and investment trusts. Goetzmann WN and Ibbotson RG (1990) have carried out one such study on commercial real estate assets over the period 1969 – 87; and which also covered residential assets from a previous indices study by Case C and Shiller R

(1970). This study also covered the recent interest in real estate through such investment vehicles as Real Estate Investment Trusts (REITs) and the syndication groupings Commingled Real Estate Funds (CREFs). Goetzmann and Ibbotson also conducted another longer term study over the period 1947 – 87 that used real estate data largely from government departments and professional associations. This study largely shows real estates assets performance : relative to that of stocks, bonds and government securities. This study shows the average (geometric and arithmetic mean) returns and the standard deviation as a measure of volatility; and further the correlations of the different assets returns. (See Tables 4/5 : Appendix P. 79, 80). The results imply that returns on real estate are equal to or slightly lower than common stocks, but real estate possesses very favourable risk results. Specifically, real estate had much lower standard deviations as unique assets and either low positive or negative correlations with other asset classes in a portfolio context. (Reilly F.K and Brown K.C 2000).

Ross S A and Zisler R C (1991), in their study report on returns and risk for un-leveraged equity real estate compared to stocks and bonds over the period 1978 – 85; and using data from the widely accepted US indices of Frank Russel Company Index (FRC), Evaluation Associates Index and the Goldman Sachs equity real estate investment trust index. Their findings are that aggregate returns for the publicly traded equity real estate investment trust index is more than twice that of the Standard and Poor (S&P) index. And further that "real estate risk lies plausibly midway between that of stocks and bonds". But advise caution in the use and interpretation of such real estate data in view of the "significant impact of the lack of a continuous auction market and the necessary use of appraisals" and the smoothing effect resulting from the infrequent (annual) nature of the evaluation data derived there-from. On risk reduction for real estate data from REITs, the authors point out that because the index had only a maximum of 20 REITs in the portfolio it was not possible to achieve the level of diversification noted for an index of 500 stocks on the S&P 500.

Hudson – Wilson S and Elbaum B L (1995) in their article supporting the findings in both the Goeztmann/Ibbotson and Ross/Zisler studies argue that inclusion of real estate permits the investor to reduce risk at every level of return ; noting that "the mathematics are compelling and the literature is persuasive". Further they are able to show from their study that the addition of debt and public equity to a portfolio of private equity raises the efficient frontier; and hence realizing substantial diversification benefits. This is based on the reasoning that combining debt with equity reduces the risk of a real estate portfolio, as the returns to the two assets classes are known to display a relatively low correlation with one another.

To examine the relationship between investment trusts and common stocks further studies conducted include : Martin and Cook (1991); Sanders et al (1990), Kuhle (1987) and Titman and Warga (1986). More recent US studies that focus on comparatives between unsecuritised real estate and securitized REITs returns include: Gilberto (1990); Firstenberg et al (1988); and the comparative study on equity REITs, common stock and commercial real estate over the period 1978 – 1990 : (Neil-Myer F.C and Webb J.R 1993).

2.2.3 Quoted Ordinary Shares and Government Securities : General Performance History

The history on emerging markets is rather short ; reliable data on these markets is available only from the early 1980s based extensively on the IFC widely accepted data base. The level of reliability (or comparability) of domestic to international data being dependent on the openness or liberalization of the economy ; and hence access to equity market(s). Closed economies, where external investors access is restricted being referred to as having market segmentation ; while open liberalized markets are referred to as having achieved market integration. Goetzmann and Jorrion (1999) survey of emerging markets, finds that returns

soon after emergence are greater than before emergence and after emergence. (Solnik, B. 1999)

The Nairobi Stock Exchange (NSE) is of relatively recent origins in 1954, and has only realized growth to its current status largely following the setting up of the regulatory authority, the Capital Markets Authority (CMA) in 1989; and the subsequent liberalization of the economy in the early 1990s. But performance data on the limited number of companies, 53 No currently traded on the NSE, is still scarce. Wagakuyu E M (1999) study reports that "a good number of the institutional investors are not in a position to quantify the amount of risk inherent in the investment on ordinary shares... most retirement benefit schemes expected rates of return below 10%". At a time when Treasury Bill rates were standing at 17%, this defies any rational reasoning. And is a clear pointer to the quality of performance records to expect from the even better managed and informed institutional investors.

Thumbi, M. P. (July 1996) Study of pension and provident funds portfolios over the period 1992 – 94, when treasury bills showed high yields, records average returns of : 12.45 – 15.20% for public schemes; 10.00 – 25.50% for self administered schemes; 25.00 – 65.65% for insurance companies and 32.75 – 72.50% for Investment Fund Managers. The study shows Treasury bond coupon (average) returns for a sample of eight schemes, for the same period, with a range from a low of 16.10% to a high of 153.2%. The study provides no further detail on returns for the other asset classes.

Wahome, M. (2003) article states that the "highest yield offered by insurance firms controlling a pension scheme or a provident fund last year stood at 10.75% ; well above the underlying inflation rate of under 4%". Retirement Benefit Authority numbers show that the lowest returns stood at 5% per year.

2.3 Pension Funds Portfolios

2.3.1 Pension Funds in Kenya

Pension plans/provident funds whose primary objective is to provide income to the contributor upon retirement, trace their early beginnings in the welfare state in the 18th Century in the United Kingdom; but only achieved their large–scale status with the labour unions action in the US in the early 1950s. Today, the pensions sector is an important contributor in most modern economies by virtue of the role pension plans play in the national financial system through : their considerable investment portfolios assets holding viz a viz the national economy aggregate wealth; their large corporate stocks control and influence on corporate policy; their providing workers with a large proportion of retirement income and the consequent influence on labour; and through pension plans assets considerable income impact on corporate performance and pension schemes overall earnings. (Brigham, E.F. 1999).

In Kenya the pensions sector had its origin after World War II as private plans started by multinational corporations to match their employees' benefits to those of the mother companies. Pension plans thereafter developed along the three avenues of : a public pension scheme operated for government employees; a mandatory contribution public scheme for all employers/employees under the National Social Security Fund (NSSF); and several optional private plans. These pension plans and provident funds were operated and regulated under various acts of parliament that included : The Trustree Act, cap 167 of 1929; The Pensions Act, cap 189 of 1952; The Provident Fund Act, cap 191 of 1951; and the National Social Security Fund Act, cap 258 of 1965 and revised in 1987. To harmonise the various Acts and to bring order to the industry, the Retirement Benefits Act (RBA) was enacted in 1997; principally to create the Retirement Benefits Authority (RBA) the regulatory authority now mandated with the supervision and promotion of all retirement benefit schemes. RBA News (2000).

Today, pensions plans are one of the two major institutional investors in Kenya, the other being insurances. Pension plans controlled asset holdings worth an estimated Kshs 130 billion going by the RBA records in 2000. Of their total investment portfolio holdings, a considerable 36.5% was invested in real/immovable property; the bulk of it by one fund manager, the NSSF. The average holding for the immovable asset class of the other ten funds registered by the RBA was however a low 8.6% of total assets : relative to the ceiling limit of 30% set by the RBA for this asset class (RBA 2002).

Goetzmann W N and Ibbotson R G (1990) in their study argue that there is Compelling evidence to recommend including a significant proportion of real estate in institutional investors portfolios. "Not only does real estate provide returns comparable to those on bonds and stocks, but the low correlation of real estate with other assets makes it valuable for purposes of diversification". And further because real estate returns fluctuate with changes in Consumer Price Index, they also provide a hedge against inflation.

Ennis R M and Burik P (1990) in their paper make the same point in more precise terms about the US market stating that many studies contend that pension funds should optimally allocate at least 20% of their total assets to real estate. "But actual pension funds aggregate investment in equity real estate constitutes approximately 4% of total assets." This begs the question why practice has failed to match portfolio construction models.

2.3.2 Investment Policies and Objectives

The prime determinant of a pension funds objectives and constraints is whether it is a) a defined benefit plan or b) a defined contribution plan. The former is formulated such that retirees are promised a specific income stream after retirement, based on actuarial estimates of future pension obligations. The illiquidity constraint here is a factor of the average age of the employees. In the case of the defined contribution pension plan, the benefit received by

the retiree is dependent on their contributions and the returns of the investments earned thereof. Ideally therefore the allocation of funds among different asset classes should be made by the employee. Studies have shown that defined contribution plans under employees control have conservative investment polices since the employee carries the risk. (Reilly F K and Brown K C, 1990).

The old pension plans oversimplistic rule of maximizing returns consistent with appropriate risk level is therefore over-ridden by the objective to "match the pension sponsors needs with what the money manager can reasonably attain in the expected investment environment, balancing risk against return". (Cottle, S 1977). Goals set must therefore establish long term strategy and objectives with an optimal match of the plan sponsors needs with what is attainable in the expected investment environment of the future.

In Kenya, for purposes of investment of scheme funds, the RBA issues investment guidelines stipulating limits for the different asset classes required for optimal diversification; only requiring that the scheme should have a "prudent investment policy" in this respect. The guidelines stipulated limits provide maximum levels; but without requiring schemes to invest in a given asset class.

2.3.3 Portfolio Asset Mix : Real Estate Asset Class Component

By setting asset allocation ranges rather than precise percentages, investment policies leave the investment manager the discretion of determining the actual weights of the assets mix depending on their reading of the market. While the investors objectives and constraints will largely determine the allocation among asset classes the wide disparities in portfolio mixes even among the developed economies of say US, UK, Germany and Japan is also partially a factor of these countries political/cultural and economic environment. A survey in 1990-91 by Investing Worldwide III seminar (1992) of institutional investors portfolio asset mixes in these

countries show substantial equity proportions in US (45%) and UK (72%) : reflecting the relatively young average age of the investor populations in both countries. And for the UK a large retail investor group, the result of the Thatcher government privatization programmes in the 1980s and the inflationary bias. By contrast both Germany and Japan with 11% and 24% in equity holdings respectively, have higher proportions of ageing populations; strong banking sectors with heavy representation on corporate boards; and further, for Germany, regulations that limit say insurance firms to no more than 20% of their assets in equities.

This survey showed the real estate component of these countries institutional investors portfolio mixes thus : US pension funds 8%; UK pension funds 9%; Germany Insurance and Mutual Funds 5%; and Japan Life Insurance 6% (Solnik, B. 1999). These levels are comparable for the four countries surveyed; but again confirming the world wide trend of relatively low levels of real estate asset class in the portfolios mix of institutional investors. A study for the US Pension Fund market finds that most efficiently diversified balanced portfolios have real estate investments in the range of 10 to 15% of total assets. (Ennis R.M. and Burik P. 1991).

The RBA News December 2002 shows the statistics on the investment portfolios asset mix of the 765 schemes registered, under 11 fund managers. The RBA Investment Guidelines recommend a limit of 30% of the total asset mix for the immovable property and unit trusts schemes asset class. A limit all, but one of these fund managers, are nowhere near achieving.

2.3.4 Alternative Approaches to Investing in Real Estate

Pyhrr S.A. et al (1988) in noting the evolving developments in the property market points out that investment in real estate in most markets, up until recently, has been largely through the direct approach whose main advantages include : estate building where small properties are

used to pyramid into larger ones through use of leveraging and tax planning; security of capital through the physical assets that are permanent, indestructible and relatively scarce because of uniqueness of each property; and high degrees of leverage which offers the investor control of a large asset with only a small amount of equity capital and where debt ratios on mortgages for both residential and commercial developments of 70-90% are quite common.

High operating yield with historical returns on prime grade real estate investments showing yield before tax of a relatively high 8 – 15% and speculative investment grade real estate with yields of up to 25% is another major attraction of real estate; together with tax Shelter factors deriving to investors from tax relief to owner occupiers, pass-through benefit of tax losses and waived or deferred capital gains.

Also significant is capital appreciation and hedging against inflation in which good quality properties in prime locations have historically generally out performed financial securities and where a large part of the nominal return on leveraged real estate comes from property appreciation due to inflation. No less important are personal factors relating to the physical ownership, "the bricks and mortar concept" in the direct control over the asset unlike for bonds and stocks; and personal use and occupancy as in the case of residential owner-occupier or investment – occupier of the industrialists' factory. (Pyhrr S. A. etal 1988)

Real estate investment however also has some disadvantages that include : the highly significant illiquidity problem that relates to the difficult and time consuming nature of real estate transactions that can lead to insolvency or even bankruptcy for the investor. The units are non standard and are quite often unique and not traded on a national exchange; and thus have high transaction costs and information is not readily available.

No less important is the management burden relating to property maintenance, financial accounting and reinvestment roles that are beyond the capacity of most retail investors, lack of which inter disciplinary education for the investor compels the use of costly management hire services.

Other disadvantages include : depreciation of value where inflation enhances the property capital appreciation but other factors like physical, functional and locational depreciation counter this or lead to increased operating costs; government controls relating to monetary and fiscal measures, physical planning and environmental issues that add to development costs with the combined effect of limiting development and restricting growth; real estate cycles and poor reading of economic indicators like inflationary pressures and real estate cycles (eg overbuilding) that can be disastrous to any real estate investor; and legal and fiscal complexities from contracts between parties or changes in tax law that can quite often be crucial to project success. (Pyhrr S.A. et al 1988).

These disadvantages result in constraints that are commonly associated with direct investments in real estate viz limited information availability translating to a market less informationally efficient than the financial securities markets and leading to price discovery problems; and no less important a market where insider information trading is commonly accepted; limited trading liquidity in the absence of a national exchange or continuous auction market; and largely indivisible ownership interests; each property consequently being unique and the trading units being incomparable. The result is high transaction costs. (Ennis R.M. and Burik P. 1991).

2.3.4 (1) Overcoming the Constraints

Pyhrr S.A. et al, (1988) argues that "direct investment in real estate is not a realistic alternative for many of the new players in the real estate investment game. This is particularly true for many institutional investors such as pension plans, that have a need for flexibility and liquidity". Investing in real estate securities or a portfolio of these securities – as opposed to investing in the properties themselves or a commingled pool of properties – provides these investors with a significant advantage not previously available.

Real estate securities are defined as stocks and bonds issued by income producing property owning companies. The more common securities in the developed markets now being shares of Real Estate Investment Trusts (REITs) that pool investor funds to buy various types of real estate. Securitization in the REITS context is essentially therefore a financial intermediation process where the REIT manager converts (securitizes) properties into financial assets; by issuing freely tradeable ownership shares. The proceeds are used to purchase properties, ranging from 30 to 40, whose rental income and capital yield is the returns to the REIT shareholders.

REITs are a relatively successful securitization medium in the US that was created by an act of congress in 1960 as a real estate mutual fund for small investors to pool funds; and invest in large scale income producing real estate. Their main advantages to the small investor were that they offered a) greater diversification through investing in a portfolio of properties b) management by experienced real estate professionals c) high dividend yield from the legal requirement that 90% of net income be disbursed to shareholders within one year and d) single-level taxation at the share-holder dividend level with no corporate level tax. Several other types of special purpose vehicles (SPVs) each with its own particular attributes, have been formed as investment media in real estate.

The first and only attempt to launch an Initial Public Offering (IPO) of real estate securities on the NSE was the abortive Anglo African Property Holdings Limited issue in November 2000.

Securitization, the primary concept on which the secondary market concept is based is defined broadly as the process whereby loans and other accounts receivable are packaged, underwritten and sold. The secondary mortgage market is defined as a mechanism whereby mortgage originators like housing companies sell the mortgages that they hold as assets on their books of accounts as trade/accounts receivables to a third party in return for cash. The third party raises the funds to purchase the mortgages through the issuance of bonds, or mortgage backed securities (MBS); normally sold to institutional long-term investors using the morgages as underlying collateral or security. The institutional investors in return receive the periodic payments of principal and interest, passed through from the originator, the financial intermediary. The refinancing arises from converting the dormant accounts receivables items on the originators books of accounts into additional cash for further lending to home-owners. The originators mortgage receivables forms the underlying asset against which the MBS are secured; while the mortgages themselves are secured on the property. (Corporate Capital Advisors Limited et al 1999).

Several studies have been conducted in Kenya on the secondary mortgage market. A widely acknowledged conceptual paper prepared for the Kenya Association of Building Societies and Housing Finance institutions (1999) made a comprehensive report on the need for a secondary mortgages market (Corporate Capital Advisors Ltd et al, 1999).

2.4 Conclusion

Most institutional investors it appears accept real estate as an imperative component of their diversified investment portfolios. However, the tendency has been to relegate it to a minor role in portfolios dominated by equity stocks, fixed income securities, guaranteed funds and

even foreign stocks. The high yield returns realized from prime grade real estate investment and its widely acknowledged role as a hedge against inflation not withstanding.

With yields on government securities diminished to below 1% as of Sept 2003; and a still limited number of blue chip equity stocks on the NSE, pension funds and other institutional investors have had to scout for other investment opportunities and alternatives. This study will shed some light on the considerable potential and investment opportunities offered by a choice selection of prime grade real estate. And further point out ways to alleviate, if not eliminate, the traditional constraints of liquidity and flexibility in real estate investment. Some of Kenya's pension funds, with resources already committed in sizeable but non-performing real estate reserves, will in any case be forced by increasing contributor activism to seek better investment alternatives for these assets. Offloading in the late 1990's and early 2000 depressed property market was not an option for them.

This study aims to show that real estates contribution to the pension plans portfolio performance can be considerably enhanced by planning portfolios to only include a choice selection of high yielding prime grade properties that is professionally managed. Preferably packaged into pools, unit trusts or mutual funds portfolios which should aim to achieve listing on the NSE to realize better liquidity and flexibility that is so vital for any institutional investor in real estate.

PART III

RESEARCH METHODOLOGY

3.1 Population

The focus of the study was the Pension Funds subs-sector under the umbrella of the regulatory authority, the RBA comprising 765 pension schemes and 11 Fund/Investment managers. The population however was be 764 pension schemes and 10 Fund managers; the only pension scheme/Fund manager excluded being the NSSF whose investment portfolio was evidently heavily skewed in favour of the real estate asset component. Its inclusion in the study would have biased the results.

3.2 Sampling

Only the seven Fund managers who have real estate assets in their portfolio were to be included in the survey. Hence only 589 of the pension schemes qualified for sampling; these being under 7 Fund Managers. The portfolios ranged from a low of six schemes (Old Mutual) to a high of 211 schemes Insurance Company of East Africa (ICEA). Sampling was therefore by way of stratification of the relevant seven fund managers; and by picking a random sample of trustees from each strata in direct proportion to the strata size.

These clusters (strata) size ranged from a low of the six schemes to a high of 211 schemes; with an arithmetic average (mean) of 85 schemes per cluster (strata).

On the basis of the proposed target of total 45 sample schemes (to realize a minimum 30 study sample schemes), each fund with an average of 20 (or lower) schemes was to produce one sample. Larger than the average 20 schemes clusters (strata) would provide samples on a pro-rata basis; so that all the fund managers were represented with at least one sample each.

The period of study was 1998 to 2002. Reliable statistical data on pension funds investments could only be realized for the period subsequent to the establishment of the Retirement Benefits Authority (The RBA) in 1997. Since its establishment the RBA issues investment guidelines : and further requires of each registered scheme annual financial reports.

3.3 Data Collection

Secondary data was collected as follows:

3.3.1 Secondary Data

Secondary data was collected from the fund manager of the sample scheme and the data cross checked for consistency; using a comprehensive questionnaire. Data was be collected through personal contact; with brief explanatory interviews of the fund/investment managers and Trustees. Where this proved impractical the fund manager were requested to send their responses to the questionaire by mail. The secondary data was basically of a quantitative financial nature.

The portfolio allocations among the different asset classes and the recorded annual returns of each class for each of the 5 years under review was sought from financial statements, the fund managers and partially verified with the RBA's own records for 2001 for accuracy and authenticity.

Attempts were made with little success, to record real estate assets held separately and not forming part of the statistics to the fund manager. This was intended to help to determine its value, proportion of total portfolio worth; its known or estimated rental income and capital yield (growth) over the period of study.

3.4 Data Analysis

The statistical data collected using the questionnaire was evaluated to show:

- The real estate asset class average annual returns in comparison with those on ordinary shares (equity) and government securities.
- The standard deviation (volatility) of real estate asset class returns compared to that on ordinary shares (equity) and government securities.
- The co-efficient of variation (C.V.) for real estate assets risk and returns compared to that on ordinary shares (equity) and government securities.

The average (arithmetic mean) annual returns and the related standard deviations for the seven fund managers was then presented in tabulated form and illustrated in graphical form, for ease of simple comparative analysis.

Because of the variability of the risk (standard deviation) and returns realised, ranking of the performance of the four asset classes was adjudged further using the coefficient of variation (C.V.) where:

$$C.V. = \frac{\delta}{\acute{R}} \quad \text{(ie, standard deviation} \div \text{Mean Return)}$$

Statistical Tests:

Hypothesis

$$H_O : R_{RE} = R_{TB} = R_{EQ}$$

Risk and Returns of Real Estate do NOT differ significantly from that realised from quoted ordinary shares and government securities; in the investment portfolios of pension funds in Kenya.

$$H_A : R_{RE} \neq R_{TB} \neq R_{EQ}$$

Risk and Returns of Real Estate are not comparable to that realised from Government Securities and quoted ordinary shares; in the investment portfolios of pension funds in Kenya.

The results were tested for error at (5%) 0.05 level of significance. The results, that the performance statistics agree with the probability of the distribution being outside the (mean) return, has this level of error which is not significant for a social survey.

As the number of samples collected is small (n<30); and further because there is no established population mean (μ) the statistical test of choice was the "t" distribution (the student t-distribution) test; with the hypothesis advocating a two-tail test.

- In the t-test:

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}, \text{ where:}$$

μ : population mean $= \frac{\Sigma x}{N}$

$\bar{x}$: sample mean $= \frac{\Sigma x}{n}$

S : Sample standard deviation $= \sqrt{\frac{\Sigma (x - \bar{x})^2}{n - 1}}$

n : No of samples

α : significance level (Alpha) $\alpha = 0.05$

- The t-tests null hypothesis is considered as accepted; (ie no significant difference exists between the sample statistic (x) and the parameter (μ) where the :

computed t < critical t.

PART IV

DATA ANALYSIS AND FINDINGS

4.1 General Background

Of the 12 fund managers registered with the RBA in 2002 and with available data on pension funds investment portfolios only 8 featured real estate equity on their portfolios. The eighth, the NSSF, was deliberately left out of the study to avoid the probable bias resulting from its high component of real estate as a proportion of its total investment portfolio. In 2002/2003 Barclays investment services was acquired by Old Mutual (K). The remaining 6 fund managers controlled 589 of the 764 registered schemes. The six's total investment worth, as of September 2002, was an estimated Kshs 60.65 billion out of the total Kshs 63.426 billion for the 11 registered fund managers excluding the NSSF. Further these six fund managers investment in the four major asset Classes Fixed income/government securities; quoted equity; real estate property and guaranteed funds accounted for Kshs 53.49 billion (88.20%) of their total investment portfolio. The six are therefore a fair representation of the pension funds investment portfolio composition, with regard to the four major asset classes target of this study.

The collection of data from the six fund managers proved to be the main challenge of this study. There was one non-response. Further, data was largely unavailable for the early years 1998/1999; the period just after the establishment of the RBA as the regulatory authority in 1997. The study has therefore been extended to cover year 2003 to partly compensate for 1998.

The RBA's deadline for all registered schemes to submit their returns by 2000 has realised a measure of success for the period since. But while these schemes data on the performance of fixed income securities, quoted equity stocks and guaranteed funds was largely available, this was not the case for real estate equity. Most fund managers

largely available, this was not the case for real estate equity. Most fund managers explained that individual schemes either retained management and did in house financial returns for their property; or had these managed by independent estate agents. To overcome this last hurdle in data collection; the study was extended to cover a sample four large pension funds/schemes with sizeable portfolios that featured real estate : the co-operative Bank, University of Nairobi, KPLC and Unilever East Africa. The direct sources in this case being the administrators and Trustees of the schemes.

The RBA as the pension funds data repository of last resort, early this year (2004) commenced what is intended to be a comprehensive financial analysis of all their registered schemes : the analysis showing the investment spread and the related investment income of each asset class in the scheme for each year. RBA were kind enough to avail, for this study, the analysed data for 40 of their large schemes for their first year of study, 2001. This should serve as a useful background reference for our own analysed data. Once RBA concludes the rest of the analysis for the remaining period, which could be a while longer than this study, this could be an invaluable source of information for all future studies on the subject. Particularly in an area like real estate investment where there is clearly a dearth of reliable performance data.

Major Pension funds invested in guaranteed funds appear concentrated to the point of almost total exclusion of all other assets classes. This perhaps explains the scarcity of guaranteed funds data from the pension fund managers schemes studied here : they are more focused on the other four asset classes as noted. It is in this respect that the RBA analysis data has been particularly helpful in providing investment data for schemes invested in guaranteed funds.

While the RBA analysed data is limited to 2001, for now, the returns and risk data derived serves as a good reference point for the market. And serves as a useful comparative to the

four other asset classes in this study. Guaranteed funds, it is worth repeating, is among the top three net worth asset classes in pension funds investment portfolios. Government securities and quoted equity being the other two; with immovable property in fourth position in this ranking.

The data herein from both the pension fund managers and the administrators/trustees sources has, as far as practically possible, been kept anonymous, in the interest of confidentiality to the sources who requested it.

4.2 Risk and Returns Summary : Fund Managers

4.2.1 Investment Portfolio : Fund Manager "A"

Background:

Manager 'A' with a portfolio of over 130 schemes provided data on the 4No sample schemes from their portfolio with a real estate asset component for the period 1998 - 2003 (inclusive); the other asset classes covered being T-bills, T-Bonds and quoted stocks. The four asset classes accounted for an average 77 – 94% of total portfolio, for the four schemes for the period of study.

This particular managers total investment portfolio worth was in excess of Kshs 26 billion (Sept 2002); and the four schemes under study were among the portfolios largest. Real estate was one of the four dominant asset classes in all four schemes with a proportional weight in the range of 17 – 56% of total weight, through out the period of study.

Table A here-under summarises the average returns, standard deviation and the co-efficient of variation (CV) for the four sample schemes.

The detailed risk and returns; the proportionate weight of each asset class in the portfolio over the period of study; and the t-test results on each scheme returns are included under the appendix P68 - 73.

Fund Manager 'A'

Risk - Returns 1998 - 2003

(Summary : Table A)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
Scheme 1523 Av Return pa (%)	37.63		13.61		13.47		1.26			16.49
Variance = δ²		**4876.6424**		**36.6674**		**42.5701**		**82.6906**		
Standard Deviation (Risk) = δ		**69.8330**		**6.0554**		**6.5246**		**9.0934**		
C.V		1.8558		0.4450		0.4844		7.2266		
Scheme 1782 Av Return pa (%)	31.55		13.97		12.54		5.30			15.84
Variance = δ²		**6508.4962**		**52.6127**		**43.0704**		**434.3215**		
Standard Deviation (Risk) = δ		**80.6753**		**7.2535**		**6.5628**		**20.8404**		
C.V		2.5575		0.5192		0.5236		3.9297		
Scheme 1786 Av Return pa (%)	32.72		13.48		13.73		3.75			15.92
Variance = δ²		**4558.3350**		**30.5074**		**25.8300**		**11.0252**		
Standard Deviation (Risk) = δ		**67.5154**		**5.5234**		**5.0823**		**3.3204**		
C.V		2.0635		0.4097		0.3701		0.8866		
Scheme 1853 Av Return pa (%)	39.05		13.96		14.48		9.91			19.35
Variance = δ²		**5266.0743**		**34.0457**		**30.9652**		**27.8285**		
Standard Deviation (Risk) = δ		**72.5677**		**5.8349**		**5.5646**		**5.2753**		
C.V		1.8583		0.4180		0.3844		0.5326		
Weights (AV)									0.8380	

The average returns p.a. for the four asset clases, range from 15.8 - 19.4%; with quoted stocks showing the highest average returns 35.2%. Real estate whose returns exclude capital yield, there are no revaluations over the six year period, has the lowest average return 5.1% p.a.

The deviation, more correctly the squared mean deviation $(R - \acute{R})^2$, and the standard deviation derived therefrom reflect the assets risk; ie, the volatility of the returns(R) from the mean (average return $\acute{R}$).

The standard deviation (δ) results show a highly volatile quoted stock asset class; followed by real estate; and with government securities at a relatively lower level. This clearly confirming the classic theory of risk/return trade off : that investors demand higher returns for higher risk investment.

The co-efficient of variation (C.V.) as a further performance ranking measure shows real estate, in two of this group of four schemes, as the higher risk compared to quoted stock : but government securities maintain their low risk rank with the lowest risk per unit of return.

The two-tail t-tests results, comparing real estate returns with quoted stock, T-bills and T-bonds at 5% significance level show the computed t being less than the critical t (P70 & 73). And therefore fails to reject the null hypothesis. Therefore confirming the earlier findings on return; that real estate returns are comparable to those on quoted stock, T-bills and bonds.

4.2.2 Investment Portfolio : Fund Manager 'B'

Background:

Fund Manager 'B' with a portfolio of over 30 schemes availed data for the 4No schemes with a real asset component; going back to year 2001 when they commenced supervision of the schemes. These four schemes also featured T-Bills, T-Bonds and equity stocks; which together with real estate accounted for an average 63 - 92% of total portfolio for the four schemes for the period of study.

Fund Manager B's total investment portfolio was worth over KShs. 7.5 Billion (June 2003); with the four schemes featuring real estate considered as the medium to small size in the cluster. Real estates weight in the four schemes varied with a range average 32 - 63% of total portfolio worth, during the period of study.

Table B here-under summarises the average returns, standard deviation and the co-efficient of variation (CV) for the four sample schemes.

The detailed risk and returns, the proportionate weight of each asset class in the portfolio over the period of study; and the t-test results on each scheme returns are included under the appendix P74 – 79.

Fund Manager 'B'

Risk - Returns 2001 - 2003

Summary : Table B

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
Scheme No 1 Av Return pa (%)	19.30		8.00		8.00		1.07			9.09
Variance = δ^2		**403.8349**		**12.9377**		**12.9549**		**0.0430**		
Standard Deviation (Risk) = δ		**20.0956**		**3.5969**		**3.5993**		**0.2074**		
C.V.		1.0412		0.4498		0.4499		0.1932		
Scheme No 2 Av Return pa (%)	40.41		10.74		10.74		6.32			17.05
Variance = δ^2		**2049.6691**		**14.4309**		**14.4309**		**1.0658**		
Standard Deviation (Risk) = δ		**45.2733**		**3.7988**		**3.7988**		**1.0324**		
C.V.		1.1203		0.3537		0.3537		0.1634		
Scheme No 3 Av Return pa (%)	57.05		10.22		10.22		5.44			27.72
Variance = δ^2		**2521.3913**		**0.6000**		**0.6000**		**0.3528**		
Standard Deviation (Risk) = δ		**50.2135**		**0.7746**		**0.7746**		**0.5940**		
C.V.		0.8802		0.0758		0.0758		0.1092		
Scheme No 4 Av Return pa (%)	26.54		6.10		6.10		3.80			10.64
Variance = δ^2		**652.9067**		**7.4304**		**7.4304**		**2.5262**		
Standard Deviation (Risk) = δ		**25.5520**		**2.7259**		**2.7259**		**1.5894**		
C.V.		0.9627		0.4466		0.4466		0.4179		
Weights (AV)									0.7923	

The four schemes portfolio average return (ARR) for the period was 16.1%. In this group of four schemes, real estate has the lowest average return over the period, a low 4.15% p.a. A more detailed review of this portfolio shows the property values at the same level for the three years. Real estates low average return is on account of excluding the capital growth/ appreciation value in the returns.

The results on returns show relatively more stable outcome for the fixed income securities component of the portfolio; even though it is for the short three year period of study. Conversely, the returns for quoted equity appear relatively more volatile; dropping to a low of in 2001 and reviving during 2003 stocks bull market to achieve modest returns.

The standard deviation ranks quoted stocks as the highest risk; but curiously rates real estate as a lower risk than T-bills and bonds.

The C.V. ranking confirms that of the standard deviation; except in scheme No 3.

The two-tail t-test results, at 5% level of significance fails to reject the null hypothesis (see P76 & 79). And therefore effectively confirm the hypothesis that real estate returns are comparable to that on quoted stocks, T-bonds and bills.

4.2.3 Investment Portfolio : Fund Manager "C"

Background :

Manager 'C' with a portfolio of over 100 schemes provided "own analysed" data on the 4No sample schemes from their portfolio with a real estate asset component for the period 2001 – 2003 (inclusive); the other asset classes covered being T-bills, T-Bonds and quoted stocks. These four asset classes accounted for an average 99% of total portfolio for the four schemes for the period of study.

This particular managers total investment portfolio worth was in excess of KShs. 17 Billion (2003). The four portfolios noted here were dominated by fixed income securities which accounted for average 60.9% of total portfolio for the three year period. Real estate was a lower weight asses class with an average of 24.9% of total weight through out the period of study. By and large this was a well balanced portfolio; though the weight of the quoted equity appears low particularly for the bull market season of 2002/2003; when the trend with the other fund managers was higher quoted stocks in the asset mix.

Table C here-under summarises the average returns, the standard deviation and the co-efficient of variation (CV) for the sample schemes.

The detailed risk and returns, the proportionate weight of each asset class in the portfolios over the period of study, and the t-test results on the schemes returns are included under the appendix P80 – 81.

Fund Manager 'C'

Risk - Returns 2001 - 2003

Summary : Table C

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
Av Return pa (%)	82.22		9.97		10.48		7.13			27.45
Variance = δ^2		8199.4165		1.7089		4.2393		19.2413		
Standard Deviation (Risk) = δ		90.5506		1.3072		2.0589		4.3865		
C.V		1.1013		0.1311		0.1965		0.6152		
Weights (AV)									0.9887	

The four assets portfolio average return (ARR) for the period was a considerably high 27.45% : a result significantly buoyed by exceedingly high returns for quoted equity in the 2002/2003 years. In this group of four asset classes, real estate has the lowest average return over the period, but still a respectable 7.13% p.a. The low proportion of quoted stocks in the portfolio lowers the weighted average return. A more detailed review of this portfolio shows the property values revalued over the three years. Total returns for property therefore include the capital growth/appreciation factor.

The returns appear more stable for the fixed income securities component of the portfolio; even for the short three year period of study. Conversely, the returns for quoted equity are more volatile; dropping to a low of 8.56% in 2001 and reviving during 2003 stocks bull market to achieve a high 205.8% return.

The standard deviation ranks quoted stocks as the highest risk; real estate is slightly higher risk than T-bills and bonds.

The C.V. ranking for the four asset classes also conforms to the classic theory ranking of risk and returns on assets; and that also noted in previous studies.

The two-tail t-test results, at 5% level of significance fails to reject the null hypothesis (see P81). And therefore effectively confirm the hypothesis that real estate returns are comparable to that on quoted stocks, T-bonds and bills.

4.2.4 Investment Portfolio : Fund Manager "D"

Background :

Fund Manager 'D' with a portfolio of over 210 schemes generally broken down into the two categories of guaranteed (largely) pension schemes and a super-annuation (provident) funds scheme provided data for only the two samples; going back to 2000 and 2002 respectively for the fund assets under review. The four asset classes accounted for average 88% and 98% respectively, of total portfolio worth in the two categories.

With a total investment portfolio worth in excess of Kshs 7.4 Billion (2003), this managers investment portfolio is dominated by real estate which accounts for average 43% and 90% respectively of the two categories total worth, over the periods data is provided for. However the portfolio inclusion of a choice selection of several prime/investment grade real estate with high and reasonably stable rental incomes had ensured a respectable average return for the portfolio. In spite of low quoted equity weight in the portfolio that could not take full advantage of the bull market in 2002/2003.

This manager conceded the skewed nature of their portfolio in favour of real estate; on account of their recent acquisition of the schemes. And explained that they have plans to redress this situation to conform with RBA guidelines.

Table D hereunder summarises the average returns, standard deviation and the co-efficient of variation (CV) for the two sample schemes categories.

The detailed risk and returns, the proportionate weight of each asset class in the portfolio over the period of study, and the t-test results on each schemes returns are included under the appendix P82 – 84.

Fund Manager 'D'

Risk - Returns 2000 - 2003

(Summary Table D)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
Scheme GS Av Return pa (%)	5.12		10.33		9.065		9.08			8.99
Variance = δ^2		1.0338		16.4183		28.6427		0.1840		
Standard Deviation (Risk) = δ		1.0168		4.0519		5.3519		0.4290		
C.V.		0.1986		0.3923		0.5904		0.0473		
Scheme LG Av Return pa (%)	9.82		13.38		12.49		6.89			10.64
Variance = δ^2		13.1044		40.5132		0.2500		0.3249		
Standard Deviation (Risk) = δ		3.6200		6.3650		0.5000		0.5700		
C.V.		0.3686		0.4759		0.0400		0.0827		
Weights (AV)									0.9451	

The two schemes four assets portfolio average return (ARR) for the period was 9.82%. Real estate has a competitive average return over the period, a respectable 7.98% p.a. In view of its considerable weight in the portfolio, this good eturn clearly helps improve the average for the portfolio. A more detailed review of this portfolio shows the property property values reviewed every three years. The high average return for property is on account of including the capital growth/appreciation value in the returns.

The results on standard deviation shows returns on T-Bills and T-Bonds as relatively more volatile than that on stocks; and with lower risk on real estate.

The standard deviation results order of ranking differs from that noted for the classic theory and other previous studies for the four asset classes. The C.V. ranking also shows real estate as having a lower risk per unit of return than quoted stocks; with government securities showing the highest risk per unit of return. And therefore confirms the standard deviation ranking.

The two-tail t-tests results, at 5% level of significance, show the computed ts as less than the critical ts; and therefore fail to reject the null hypothesis : (see P84). This effectively confirms the hypothesis that the real estate returns are comparable to that of quoted stocks, government t-bonds and bills.

4.2.5 Investment Portfolio : Fund Manager "E"

Background :

This fund manager with a portfolio of over 50 schemes provided data for 3 No medium size schemes that featured real estate in relatively low proportions; for the period 1998 – 2003.

Government securities and quoted equity featured in more dominant weights over the period; the four asset classes total weight averaging 81% over the period.

While the total portfolio worth under this manager was in excess of Kshs 4.4 billion these three schemes that featured real estate were worth only about Kshs 250 million (2003).

Table E here-under summarises the average returns, standard deviation and the co-efficient of variation (CV) for the three sample schemes.

The detailed risk and returns, the proportionate weight of each asset class in the portfolio over the period of study, and the t-test results on each schemes returns are included under the appendix P85 & 88.

Fund Manager 'E'

Risk - Returns 1998 - 2003

Summary : Table E

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
(Av) Return pa (%)	64.61		9.64		11.43		8.55			21.42
Variance = δ^2		6009.2017		5.0357		65.7196		24.4811		
Standard Deviation (Risk) = δ		77.5190		2.2440		8.1068		4.9478		
C.V.		1.1998		0.2327		0.7095		0.579		
Weights (AV)									0.8142	

The portfolio average returns for the period, a high 21.42%, was helped considerably by the high average 64.6% derived from quoted stocks. Real estate performed comparably well with average returns for the period of 8.55%. But with a lower impact on overall returns on account of the relatively lower weight of the asset class in the portfolio. And again because the constant property value in the portfolio for the four years given shows that the capital growth component of the income is not considered in the returns.

The results on returns also reflects the risk, ie, the standard deviation for the six year period : comparatively high for the high average return equity stocks; low risk for the lower returns T-bills; and medium risk for the medium returns real estate asset class. The nil returns for the first three years for T-bonds results in a high standard deviation for this class.

The standard deviation ranks quoted stocks as the highest risk; but rates real estate and T-bills as medium risk, and T-bonds rank as second highest to quoted stocks.

The C.V. ranking conforms to the classic theory ranking and that also noted in previous studies; except for T-bonds for the reasons explained.

The two-tail t-test results, at 5% level of significance again fails to reject the null hypothesis (see P88). And therefore effectively confirm the hypothesis that real estate returns are comparable to that on quoted stocks, T-bonds and bills.

4.3 Risk And Returns Summary : Administrators/Trustee Direct Sources

General Background :

A good number of the fund managers in the response group professed that they had no access to financial performance data on some or all real estate in the portfolios they managed. A few more stated that the skew on the real estate featured in their portfolios had recently been inherited with the pension schemes : and was not their choice. And that they had plans to off load excess stocks in the market at the first opportunity. Some to comply with RBA guidelines; quite a number of the others to jettison what they consider non or poorly performing stocks on which they had little or no past performance data.

All this pointed us in the direction of pension schemes administrators and trustees with sizeable real estate assets. The pick of four herein is random from a market with 15/20 large propertied schemes : the majority of which will have been featured under the fund managers here before.

A few more will feature as investors in property unit trusts, details of whose financial performance is still scarce. The RBA analysis data hereafter provides a brief insight to this asset class. The idea of targeting the sources, hoping for improved data collection can only be rated a partial success. Data kept on real estate even at this level is not significantly better.

One common flaw in the real estate performance data in the market is the lack of regular market re-evaluations to assess the capital yield; without this growth factor the assessment of returns on property is not complete. Consequently this gives the results derived a poorer performance image for real estate assets; compared with results achieved for real assets with capital yield factored in.

Trustees/Admin Sources

Risk - Returns 1998 - 2003

Summary : Table T/A

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
Scheme No CT (Av) Return pa (%)	38.10		10.20		9.75		1.26			14.83
Variance = δ^2		**2821.7604**		**5.1168**		**2.3114**		**0.7961**		
Standard Deviation (Risk) = δ		**53.1202**		**2.2620**		**1.5203**		**0.8923**		
C.V.		1.3942		0.2218		0.1560		0.7072		
Scheme No U1 (Av) Return pa (%)	27.59		16.07		14.82		4.30			15.70
Variance = δ^2		**2228.9243**		**76.6369**		**59.1416**		**3.1764**		
Standard Deviation (Risk) = δ		**47.2115**		**8.7543**		**7.6904**		**1.7822**		
C.V.		1.7111		0.5447		0.5188		0.4143		
Scheme No U2 (Av) Return pa (%)	15.81		13.33		15.41		9.12			13.42
Variance = δ^2		**449.5934**		**18.5887**		**49.2589**		**1.8833**		
Standard Deviation (Risk) = δ		**22.3516**		**4.3115**		**7.0185**		**1.3724**		
C.V.		1.4135		0.3235		0.4556		0.1505		
Scheme No K (Av) Return pa (%)	35.95		7.13		12.33		5.23			15.16
Variance = δ^2		**3760.9863**		**24.2845**		**63.9191**		**3.3728**		
Standard Deviation (Risk) = δ		**61.3269**		**4.9279**		**7.9949**		**1.8365**		
C.V.		1.7058		0.6916		0.6483		0.3513		
Weights (AV)									**0.5666**	

The four schemes portfolio average return (ARR) for the period was 14.78%; even with quoted stocks recovery in 2003. In this group of four assets classes, real estate has the lowest average return over the period, a low 4.98% p.a. In view of its considerable weight in the portfolio, this low return clearly lowers the average for the portfolio. The low average return on real estate is on account of excluding the capital growth/appreciation value in the returns. Property revaluation on these scheme was not done over five years; and therefore excludes the growth component. However scheme U2 shows property revaluations factored into the returns.

The results shows the returns profiles stable with low deviations (low risk) for the fixed income securities, but with notable declines in returns in 2002/3. Volatile on quoted stock from a low in 2000 to highs in 2003; and with comparably high standard deviations (risk) for the six year period.

The standard deviation order of ranking follows that noted on previous studies and the classic theory; except that real estate curiously ranks lower than the fixed income securities.

The C.V. order of ranking differs from that of the classic theory; with real estate ranking lower than T-bills and bonds in three of the schemes.

The two-tail t-test results, at 5% level of significance, show that we fail to reject the null hypothesis (see P88 &92). And therefore effectively confirms the hypothesis that real estate returns are comparable to that on quoted stocks, government T-bonds and bills.

4.4 Comparative Summary : Retirement Benefits Authority - Risk and Returns

Background :

The 40 large schemes portfolios and related investments income data provided by the RBA for year 2001 was primarily used to assess the performance of the four main asset classes : quoted stocks, government securities and real estate or property unit trusts. The performance data realised, being for only one year, will not have the study quality of a five year period research. We have used it here largely as a reference check for the data in the main part of the study collected from the fund managers; and trustees/administrators schemes direct sources. Of the 40 large schemes in the RBA analysis twelve are worth in excess of Kshs 1 billion each, and six of these feature real estate or property unit trusts in their portfolio. This small number observed over a limited one year period, can only offer a glimpse of the assets possible long term performance.

Guaranteed funds as an investment asset class, has not featured much in the portfolios of the fund managers and direct sources schemes forming the core of this study. A casual look at the RBA analysis partly explains the reason : most schemes investing in guaranteed funds seem to do so to the exclusion of almost all other assets. Considering that guaranteed funds as an investment asset class is the third highest net worth, after government securities and quoted equities (RBA June 2003), we considered it worth abstracting some performance data on it; even if only indicative. We have used the RBA analysis data to derive some performance measurements for guaranteed funds; even though it is for the one year period. Again as a reference check.

4.4 Comparative Summary : RBA Risk and Returns

4.4.1 (Schemes Nos 23 : Table R/A)

Investment Asset Class	Quoted Stocks/Shares		Government Securities		Property Unit Trusts		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year (2001)	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
Scheme No 9	8.16	0.3754	10.64	0.3674	0.0	13.8235	6.68	4.7929	0.7931	8.49
Scheme No 13	0	76.9597	0	126.4750	2.71	1.0161	8.48	3.2151	0.9999	4.49
Scheme No 19	7.34	2.0525	18.83	57.5154	2.54	1.3877	0	44.7149	0.8532	9.57
Scheme No 22	11.48	7.3297	0	126.4750	2.73	0.9761	0	44.7149	0.8915	7.11
Scheme No 55	5.24	12.4797	8.59	7.0549	0	13.8235	8.74	4.2151	0.8108	6.29
Scheme No 106	5.22	12.6214	13.10	3.4369	0	13.8235	5.94	0.5579	0.9522	8.09
Scheme No 109	13.91	26.3922	9.32	3.7099	0	13.8235	8.88	4.8096	0.9704	10.70
Scheme No 113	7.12	2.7313	11.40	0.0237	0	13.8235	8.29	2.5699	0.8559	8.94
Scheme No 116	5.21	12.6926	9.55	2.8768	0	13.8235	4.53	4.6523	0.5546	6.43
Scheme No 135	9.88	1.2262	10.81	0.1902	0	13.8235	6.10	0.3445	0.9486	8.93
Scheme No 225	0.00	76.9597	9.61	2.6769	0	13.8235	4.20	6.1848	0.7495	6.91
Scheme No 269	10.77	3.9893	12.77	2.3222	0	13.8235	4.46	4.9592	0.9648	9.33
Scheme No 369	3.59	26.8600	11.29	0.0019	3.35	0.1354	0	44.7149	0.7015	6.08
Scheme No 371	12.58	14.4958	10.64	0.3674	2.95	0.5898	0	44.7149	0.3278	8.72
Scheme No 391	11.68	8.4526	0.00	126.4750	0	13.8235	7.34	0.4265	0.9850	9.51
Scheme No 398	0	76.9597	11.40	0.0237	7.12	11.5736	0	44.7149	0.7121	9.26
Scheme No 410	9.88	1.2262	0	126.4750	3.69	0.0008	0	44.7149	0.0726	6.79
Scheme No 414	0	76.9597	10.48	0.5869	3.47	0.0615	0	44.7149	0.8470	6.98
Scheme No 416	0	76.9597	9.81	2.0624	4.68	0.9254	0	44.7149	0.7277	7.25
Scheme No 437	9.53	0.5736	11.53	0.0806	0	13.8235	7.05	0.1318	0.9417	9.37
Scheme No 439	0	76.9597	12.98	3.0064	3.94	0.0493	0	44.7149	0.9063	6.74
Scheme No 467	0	0	9.68	93.7024	0.00	0.0000	6.24	38.9376	0.9137	6.19
(Av) Return pa (%)	8.77		11.25		3.72		6.69			7.82
Variance = δ^2		27.0571		31.1775		7.6716		21.7378		
Standard Deviation (Risk) = δ		5.2016		5.5837		2.7698		4.6624		
C.V.		0.5929		0.4965		0.7450		0.6972		
Weights (AV)									0.7945	

This is an RBA 2001 analysis abstract of 23 No schemes with real property or unit trusts on their investment portfolio in both high and low net worth schemes : 6 No portfolios were worth in excess of Kshs 6 billion each while 7No others were below Kshs 100 million. One notable example was worth in excess of Kshs 8 billion : with 74% of that in real estate.

For the year of study 2001, the average returns for the asset classes were : quoted shares 8.77%; government securities 11.25%; real estate 6.69%; and a rather low 3.72% for unit trusts. The results from guaranteed funds with only four samples in this lot is not considered credible enough to be of note. The RBA analysis combined the results for both T-bills and bonds into one : government securities.

The standard deviation results for the different schemes over a one year period do not reflect the volatility observed in the longer period studies herebefore. All three asset classes show standard deviations that are not substantially incomparable; with government securities securities edging out quoted stocks as the highest risk. Real estate supplants government securities as the lowest risk in this group of three asset classes.

The C.V. performance test however rescues government securities : they have the lowest risk per unit of return in the group; followed by quoted stocks and real estate; in that order.

The two-tail t-test results, at 5% level of significance, for the set of 23 schemes, fails to reject the null hypothesis (see P89). And therefore confirms the hypothesis that real estate returns are comparable to that on quoted stocks and government securities.

4.4.2 RBA Guaranteed Funds

Schemes Nos 27 : Table GF(A)

Investment Asset Class	Guaranteed Funds		Total Weight	Av Return p.a. (%)
Year (2001)	Return pa (%)	Risk	ALL	ALL
No 12	2.34	**30.8066**	1.0000	2.34
No 13	2.27	**31.5886**	0.9831	2.27
No 37	0.05	**61.4714**	1.0000	0.05
No 49	14.02	**37.5724**	1.0000	14.02
No 56	11.58	**13.6134**	0.6478	11.58
No 146	7.87	**0.0004**	1.0000	7.87
No 160	8.64	**0.5619**	1.0000	8.64
No 167	8.40	**0.2597**	1.0000	8.40
No 175	7.92	**0.0009**	1.0000	7.92
No 198	7.37	**0.2708**	1.0000	7.37
No 217	6.11	**3.1697**	1.0000	6.11
No 228	9.10	**1.4632**	0.8902	9.10
No 253	5.97	**3.6878**	1.0000	5.97
No 280	10.11	**4.9268**	1.0000	10.11
No 296	11.12	**10.4305**	0.9993	11.12
No 326	6.09	**3.2413**	1.0000	6.09
No 334	9.60	**2.9228**	1.0000	9.60
No 335	9.41	**2.3093**	1.0000	9.41
No 367	7.30	**0.3485**	1.0000	7.3
No 380	14.13	**38.9330**	1.0000	14.13
No 392	9.04	**1.3216**	0.3936	9.04
No 396	6.95	**0.8843**	1.0000	6.95
No 449	8.79	**0.8093**	1.0000	8.79
No 516	4.38	**12.3227**	1.0000	4.38
No 584	5.01	**8.2965**	1.0000	5.01
No 587	9.82	**3.7235**	1.0000	9.82
No 652	9.65	**3.0963**	1.0000	9.65
(Av) Return pa (%)	7.89			7.89
Variance = δ^2		**10.2975**		
Standard Deviation (Risk) = δ		3.2090		
C.V.		0.4068		
Weights (AV)			0.959778	

The 27 schemes abstracted from the RBA analysis for year 2001 were each of a net worth in excess of Kshs 100 million. only one of these schemes had guaranteed funds worth in excess of Kshs 1 billion. The average weights of the guaranteed funds in the schemes portfoli, a high average of 95.9%, confirms the dominance of this asset class in the schemes where they feature : 23 of the 27 schemes are exclusively invested in guaranteed funds.

The average returns realised a commendable 7.89% p.a., for the year of study 2001, is quite competitive compared with the averages noted earlier for 2001 for quoted stocks and government securities; and is slightly higher than that of real estate for the period.

The standard deviation for guaranteed funds for the year is 3.21% is lower than that noted for quoted stocks, government securities and real estate for the year.

The Coefficent of Variation (C.V.) for the year shows lower (average) risk per unit of return than that realised on real estate, government securities and quoted stocks; in that order.

For the year 2001 it would therefore appear that risk conscious investors would have been attracted to guaranteed funds on account of their low risk and reasonably high average returns; relative to the four other asset classes in the study.

4.5 Comparative Summary : All Sample Schemes

All Schemes Summary : Table S/1

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Scheme No/Ref	Av Return pa (%)	Deviations	Av Return pa (%)	Deviations	Av Return pa (%)	Deviations	Av Return pa (%)	Deviations	ALL	ALL
A/1	37.63	5.8232	13.61	5.5313	13.47	3.0844	1.26	18.2457	0.9367	16.49
A/2	31.55	13.4460	13.97	7.3543	12.54	0.6827	5.30	0.0536	0.8258	15.84
A/3	32.72	6.2344	13.48	4.9367	13.73	4.0653	3.75	3.1737	0.8155	15.92
A/4	39.05	14.6928	13.96	7.3001	14.48	7.6521	9.91	19.1713	0.7668	19.35
B/1	19.30	253.3469	8.00	10.6154	8.00	13.7919	1.07	19.8693	0.6330	9.09
B/2	40.41	26.9685	10.74	0.2685	10.74	0.9482	6.32	0.6217	0.8579	17.05
B/3	57.05	476.6853	10.22	1.0777	10.22	2.2313	5.44	0.0084	0.9200	27.72
B/4	26.54	75.2882	6.10	26.6063	6.10	31.5142	3.80	2.9981	0.7613	10.64
C/1	82.22	2209.2938	9.97	1.6593	10.48	1.5221	7.13	2.5552	0.9887	27.45
D/1	5.12	905.8219	10.33	0.8614	11.43	0.0805	9.08	12.5919	0.9068	8.99
D/2	9.82	645.0013	13.38	4.5024	12.49	0.6026	6.89	1.8455	0.9833	10.64
E/1	64.61	863.9558	9.64	2.6183	11.43	0.0805	8.55	9.1113	0.8142	21.42
CT/A	38.10	8.3124	10.20	1.1196	9.75	3.8563	1.26	18.2457	0.6217	14.83
U1/A	27.59	58.1692	16.07	23.1541	14.82	9.6488	4.30	1.5166	0.3519	15.70
U2/A	15.81	376.6268	13.33	4.2927	15.41	13.6623	9.21	13.5314	0.6775	13.42
K/A	35.95	0.5375	7.13	17.0414	12.33	0.3798	5.23	0.0909	0.6254	15.16
Average Returns	**35.22**		**11.258**		**11.714**		**5.53**			**16.23**
Variance = δ^2		**371.2627**		**7.4337**		**5.8627**		**7.7269**		
Standard Deviation (Risk) = δ		19.2682		2.7265		2.4213		2.7797		
C.V.		0.5471		0.2422		0.2067		0.5025		
Weights (AV)									0.7804	

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Scheme No/Ref	Av Return pa (%)	**Deviation**	Av Return pa (%)	**Deviation**	Av Return pa (%)	**Deviation**	Av Return pa (%)	**Deviation**	ALL	ALL
(Av) RBA (2001) Return pa (%)	8.77		11.25		11.25		6.69		0.9338	8.90
Standard Deviation (Risk) = δ		**5.2017**		**5.5837**		**5.5837**		**4.6390**		
(Av) Returns Gfunds p.a.(%)	37.17		11.12		13.59		5.71			7.89

4.5.1 **All Samples in Survey : Average Returns and Standard Deviation**

Observations on these concluding results, for the six year period study, show commendable performance by quoted stocks : with high average returns but at a risk level that far outstrips the other three asset classes.

Government securities performance achieve the previously noted empirical results : medium level returns with low risk.

Real estate assets returns performance is well below the average realised for the four asset classes; but seemingly on account of the large majority of the samples returns considered not allowing for the capital growth factor.

However the standard deviation results show the risk on real estate, based on these returns, as nearly comparable to that on government stocks.

The Coefficient of Variation (C.V.) results uphold the overall rankings from the standard deviations tests.

The RBA 2001 analysis shows fairly comparable results for government stocks and real estate : but the returns on quoted stocks for the year 2001 are markedly lower than those realised from the six year study. The related standard deviation results are similar.

The guaranteed funds performance from the RBA 2001 analysis also compare well with the quoted stocks for the year; and are again slightly better than those realised on real estate.

The two-tail t-test, at 5% significance level, for the summary statistics again show results that do not allow us to reject the null hypothesis; the computed "t"s are less than the critical "t"s (See P93 : S/T : S/1). And thus the tests show that returns on real estate , are comparable to those realised on quoted stocks and government securities.

4.5.1 **All Samples in Survey : Correlation Coefficients**

The Correlation Coefficients between the pairings amongst the four asset classes quoted stocks, T-bills, T-bonds and real estate, using the summarised results, are as shown on Appendix P93 :C/C. The results show negative correlations between quoted stocks and real estate. And very low but positive, correlations between real estate and government securities. Results that appear to conform with the previous studies noted earlier.

PART V : SUMMARY FINDINGS AND CONCLUSION

5.1 Findings

The analysis on the risk/returns performance of the four main investment avenues commonly followed by institutional investors, shows substantial variation : between the assets classes; between the different fund manager schemes related to each ones portfolio make-up; and on year to year differentials for the six years period reviewed. By and large equity stocks show returns well above the average for the four asset classes reviewed : but with standard deviations to match. Government securities returns show slightly better performance than real estate stocks in a majority of the schemes studied.

Real estates comparatively lower returns performance would appear to be largely a price discovery related problem; poor or non-existent financial records, with the true returns distorted by most of the schemes returns overlooking the crucial capital yield factor in reporting their total annual returns. The real estate assets in these schemes show revaluations at best once every 3 years; with a good number of the schemes revaluing after 5 years. And there are worse cases. Real estate returns reported exclusive of capital yield are in the low 3 – 5% p.a. range; schemes portfolios with prime grade real estate that factor in capital growth show returns in the 10 – 15% p.a. range. For a real estate market that analysts considered as in low growth, if not recessionary over this period, these performance results bear out well against the competing asset classes.

Quoted equities high average returns was largely realised from the bull market run of 2002/3. This was partially a phenomenon associated with heightened business confidence related to the national elections and regime change at the end of 2002. But in keeping with the classic risk/returns trade-off theory, the high average returns on quoted stocks show an equally high standard deviation. Real estate assets with lower returns also show much

lower volatility. Government securities which traditionally serve as the benchmark; show average returns that are lower than quoted stocks; but at much lower risk levels. Further ranking of the four asset classes using the Coefficient of Variation (C.V.) measure shows ratings that conform largely to those from other studies.

The statistical tests to compare real estates returns paired against each one of quoted stocks, and government securities T-bills and bonds confirm that these returns do not differ significantly. The students "t"-test distribution used to test the study's hypothesis, factors in both the samples returns and standard deviation; and shows results that real estate returns compare with those on quoted stocks and government securities.

A further statistical assessment of the four assets classes returns correlations shows either negative or low positive correlation coefficients between real estate and quoted stocks; a result tending to higher positive in relation to government securities. Previous empirical studies have attested to high correlations between real estate and quoted stocks : real estate being used as a good hedge against inflation.

Previous studies in their study on the US and the world markets show results on risk and returns that are comparably lower, but remarkably similar in order of ranking, for the four asset classes studied here. The coefficients of correlation results again show good comparisons with those from previous studies. The relatively high returns on all four asset classes, compared to the US and world markets is noted in an earlier study as a feature of returns in emerging markets. To attract foreign direct investment in a market considered as relatively risky, investors factor in high returns in the risk/return trade-off.

The data collection survey questionnaire results point to the high rating given by institutional investors to risk and returns, in that order, as key factors in their investment choice. The

analysis herein shows real estates business risk level, the underlying asset risk from the expected level of productivity, as markedly lower than that on quoted stocks; and not substantially higher than that on government securities. While asset portfolio strategies take care of this market/systematic element of total risk, the financial risk related to debt financing remains an area of concern. The financing risk, essentially a cash liquidity or solvency problem, is identified by the institutional investors in the survey as their main deterrent to investing in real estate. The illiquidity problem emanates from a poorly developed real estate market, with no national exchange/market and lacking in a continuous auction facility; and that is therefore informationally inefficient. Indirect investment in real estate through securitization and stock market listing, to solve this illiquidity problem has been used in other markets.

5.2 Recommendations

The object of this study was primarily to establish the risk/returns performance of real estate; and thereafter its comparability to quoted stocks and government securities; the other two main competing investment asset classes in the portfolios of pension funds in Kenya. While the contribution of a choice selection of prime grade real estate in an optimally selected portfolio is seen as crucially important the illiquidity problem attaching to real estate assets, especially for institutional investors, has been a deterrent to its inclusion in their investment portfolios. The absence of any real estate in the investment portfolios of a large number of the pension schemes looked at and the low average for the industry, attests to this investor attitude. A fact borne out in part by institutional investment trends in the larger world market.

Several previous studies on the subject other studies recommend allocation of proportions in the range 15 – 20% for real estate in institutional investors portfolios. The RBA's recommended ceiling for real estate 30% is far from realised in the local market. The

indirect form of investment in real estate through securitisation and listing on the stock exchange is pointed out as one possible solution to the noted problems in real estate.

5.3 Problems and Limitations

In a sector of the market still considered as a grey area, a project of this magnitude requires ample time to be able to achieve a wider and more indepth coverage. In this project, our coverage was limited to a period of six years, ie, from 1998 to 2003 : with some of the fund managers only able to avail 3 years data. Consequently there is also an inconsistency problem. A wider coverage of say 10 years would have been more ideal to give a better picture of a sector only recently brought under the RBA as the regulatory authority.

Our realization from the survey is that, far worse than the charge of the real estate sector being informationally inefficient, is the poor financial record keeping that is so widespread.

A good number of the Fund Managers, and even schemes trustees and administrators readily admit to having no or poor financial records on their real estate assets. Data available is from annual financial statements. Weekly returns data, to compare with that for quoted stocks and government securities, would be ideal for a comprehensive study. Monthly returns data would permit improved sample collection; and a more thorough study.

Irregular and quite often infrequent revaluation of real estate in the range of 3 – 5 years, has meant that the capital yield component of total returns is all too often not factored in. In a relatively volatile market this leaves the data collected as suspect; at the very least. In some cases quite misleading.

The difficulties of data collection help explain the low number of samples realised. Part explanation for this low number is that two or three of the fund managers with large

numbers of schemes categorize them under one or two headings. ICEA with over 200 schemes have provided only two samples from the two main categories of pension guaranteed schemes and pension funds that they manage; and which feature real estate.

All in all, problems typical of emerging third world markets; compounded by an informationally inefficient property market sector with no national market or a continuous auction facility.

5.4 Suggestions for Future Study Research

Recognising that real estate performance data available could only be abstracted from annual financial statements, this study focused on comparatives with equity stock and government securities on this annual basis. A more refined study could, in future, look at performance data analysed on a monthly basis, data availability allowing. Although weekly stock market data is available for equity stocks and government securities, this might not be realised in the property market for a while longer.

For real estate data to be wholesome, regular annual revaluation should be the rule; and total returns should factor in the capital yield component.

A ten year period study on a pensions sector where the RBA has successfully enforced its regulatory authority and monitored the pensions schemes financial records could quite possibly avail invaluable study results. The sort of data necessary for the ultimate listing of real estate as a separate segment on the stock market. The setting up of a property market price index serving as the preliminary framework on which the future listing is grounded.

PART VI

REFERENCES

Anglo African Property Holdings (October 2002) : IPO Issue, Prospectus

Block, Ralph L (2000) : Investing in REITs, Real Estate Investment Trusts, Bloomberg Press, USA

Brigham, E F et al (1999) : Intermediate Financial Management , The Dryden Press

Copeland, Thomas E and Weston J Fred (1988), Financial Theory and Corporate Policy (Third Edition), Addison-Wesley

Corporate Capital Advisors Limited et al (April 1999), Conceptual Paper for the Introduction of a Secondary Mortgage Market in Kenya : The Kenya Association of Building Societies and Housing Finance Institutions

Cottle, Sidney (May – June 1977) : The Future of Pension Fund Management, Financial Analysts Journal (pp 23-25)

Cowdell, Jane (2002), Investments (5th Edition), CIB Publishing

Ennis, Richard M and Burik, Paul (May – June 1991) : Pension Fund Real Estate Investment Under a Simple Equilibrium Pricing Model, Financial Analysts Journal (pp 20-30)

Goetzmann, William N and Ibbotson, Roger G (1990) : The Performance of Real Estate As an Asset Class, Journal of Applied Corporate Finance (pp 65-76)

Hudson – Wilson, Susan and Elbaum, Bernard L (Spring 1995) : Diversification Benefits For Investors in Real Estate, The Journal of Portfolio Management (pp92 – 99)

Ibbotson, R G et al (Fall 1985) : World Wealth : Market Values and Returns, Journal of Portfolio Management 12 No 1 (pp4 – 23)

Johnson, Ramon E (1995) : Issues And Readings in Managerial Finance (Fourth Edition), The Dryden Press

Markowitz Harry M (1952) Portfolio Selection, Journal of Finance 7, No 1 (March 1952)

Neil Myer, F C and Webb, James R (Winter 1993) : Return Properties of Equity REITs, Common Stocks, And Commercial Real Estate, The Journal of Real Estate Research (pp 87 – 106)

Pricewaterhouse Coopers (2002) : Kenya Budget Review, Budget 2002

Pyhrr, Stephen A et al (1988) : Real Estate Investment; Strategy, Analysis, Decisions (2nd Edition) John Wiley & Sons

RBA, (December 2002) : Quarterly Newsletter of the Retirement Benefits Authority, RBA News (p7)

Reilly, F K and Brown, K C (2000) : Investment Analysis and Portfolio Management, (6th Edition) Dryden Press

Ross, Stephen A and Zisler, Randal C (1991) : Risk and Return in Real Estate, Journal of Real Estate Finance and Economics (pp 175 – 190)

Solnik, Bruno (1999) : International Investments (Fourth Edition), Addison - Wesley

Thumbi, M P (July 1996) : An Evaluation of Pension Schemes And Provident Funds Investments Portfolios in Kenya, Unpublished MBA Project, University of Nairobi

Wahome, Muna (August 12, 2003) : Yield for Pension Funds beats the rate of underlying Inflation : Daily Nation : Business Week (p3)

PART VII

APPENDICES

PART VII

APPENDICES

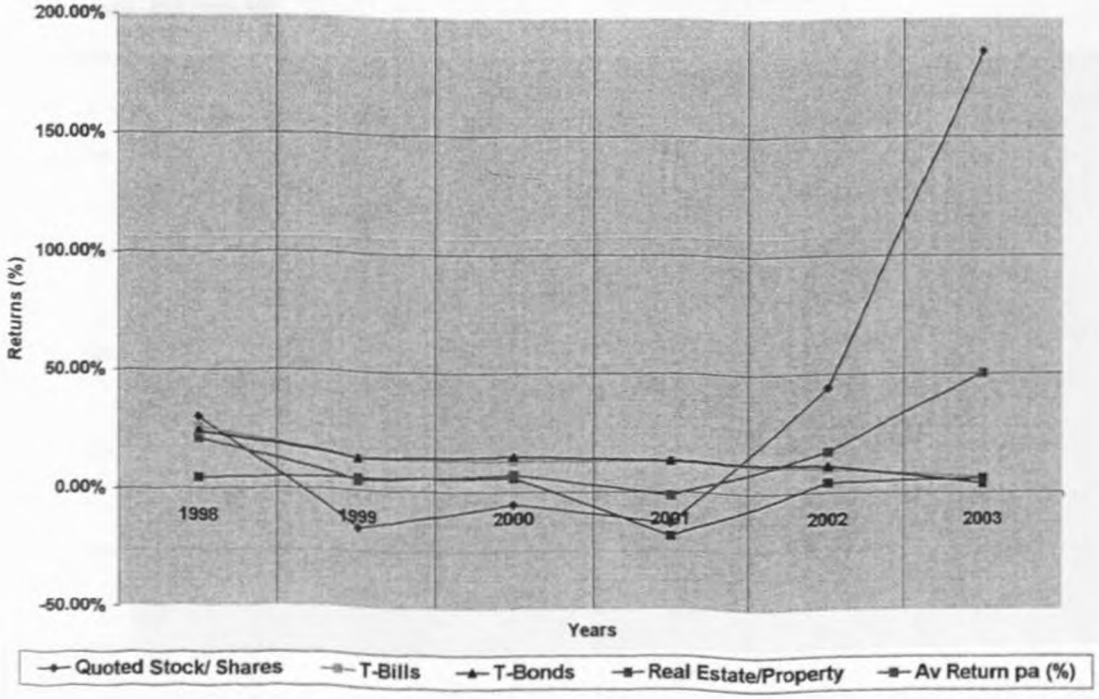
Fund Manager 'A'

Risk - Returns 1998 - 2003

(Scheme 1523 : Table A/1)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	30.13	56.2500	25.98	153.0994	24.17	114.4900	4.50	10.5084	0.9863	21.2
1999	(15.76)	2850.4921	13.57	0.0013	13.44	0.0009	5.40	17.1534	0.95	4.16
2000	(5.27)	1840.4100	12.93	0.4579	14.94	2.1609	6.00	22.4834	0.7959	7.15
2001	(13.11)	2574.5476	12.95	0.4312	13.36	0.0121	(18.56)	392.7663	0.9677	-1.34
2002	44.19	43.0336	9.76	14.7968	11.17	124.7689	4.36	19.0096	9683	17.37
2003	185.60	21895.1209	6.45	51.2179	3.74	13.9876	5.85	34.2225	0.9516	50.41
Av Return pa (%)	37.63		13.61		13.47		1.26			16.49
Variance = δ^2		4876.6424		36.6674		42.5701		82.6906		
Standard Deviation (Risk) = δ		69.8330		6.0554		6.5246		9.0934		
C.V		1.8558		0.4450		0.4844		7.2266		
Weights (AV)									0.9366	

Returns 1998- 2003 (Graph A/1)



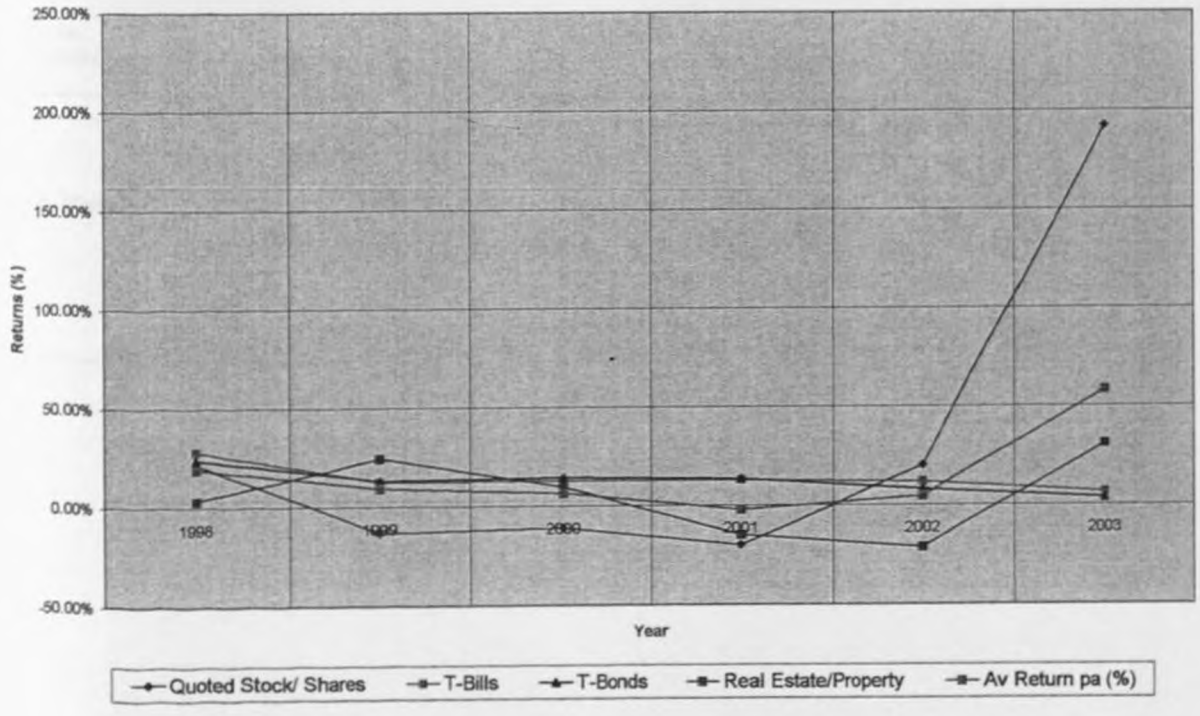
Fund Manager 'A'

Risk - Returns 1998 - 2003

(Scheme 1782 : Table A/2)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Risk	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	21.66	97.71323	27.91	194.2771	23.02	109.935225	3.32	3.9336	0.9114	18.98
1999	(13.49)	2028.1512	12.45	2.3155	12.99	0.2070	24.43	365.8294	0.8033	9.10
2000	(11.21)	1827.9900	12.65	1.7468	14.40	3.4782	9.40	16.7827	0.7433	6.31
2001	(19.93)	2649.6756	12.83	1.3034	13.30	0.5852	(15.08)	415.4803	0.8306	-2.22
2002	20.05	132.1350	11.63	5.4834	7.88	21.6690	(21.29)	707.2054	0.8348	4.57
2003	192.19	25806.8160	6.36	57.9375	3.62	79.4772	31.04	662.3760	0.8317	58.30
(Av) Return pa (%)	31.55		13.97		12.54		5.30			15.84
Variance = δ²		6508.4962		52.6127		43.0704		434.3215		
Standard Deviation (Risk) = δ		80.6753		7.2535		6.5628		20.8404		
C.V.		2.5575		0.5192		0.5236		3.9297		
Weights (AV)									0.8259	

Returns 1998 - 2003 (Graph A/2)



T-Tests

Fund Manager A1

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	4.5	*25.98*
Mean	0.61	11.54444
Variance	115.2513	8.277719
Observations	5	6
Hypothesized Mean Difference	0	
df	4	
t Stat	-2.212259	
P(T<=t) one-tail	0.045698	
t Critical one-tail	2.131846	
P(T<=t) two-tail	0.091396	
t Critical two-tail	2.776451	

Fund Manager A2

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	3.32	*27.91*
Mean	5.7	11.184
Variance	541.7218	7.48278
Observations	5	5
Hypothesized Mean Difference	0	
df	4	
t Stat	-0.523257	
P(T<=t) one-tail	0.314222	
t Critical one-tail	2.131846	
P(T<=t) two-tail	0.628443	
t Critical two-tail	2.776451	

T-bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	4.5	*24.17*
Mean	0.61	11.33
Variance	115.2513	19.8097
Observations	5	5
Hypothesized Mean Difference	0	
df	5	
t Stat	-2.062599	
P(T<=t) one-tail	0.047061	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.094121	
t Critical two-tail	2.570578	

T-bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	3.32	*23.02*
Mean	5.7	10.438
Variance	541.7218	20.85742
Observations	5	5
Hypothesized Mean Difference	0	
df	4	
t Stat	-0.446671	
P(T<=t) one-tail	0.339114	
t Critical one-tail	2.131846	
P(T<=t) two-tail	0.678229	
t Critical two-tail	2.776451	

Real Estate vs Stocks

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	7.13	82.22
Variance	28.8619	12299.12
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.171377	
P(T<=t) one-tail	0.181056	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.362111	
t Critical two-tail	4.302656	

Real Estate vs Stocks

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.303333	31.545
Variance	434.3215	6508.496
Observations	6	6
Hypothesized Mean Difference	0	
df	6	
t Stat	-0.771435	
P(T<=t) one-tail	0.234865	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.469731	
t Critical two-tail	2.446914	

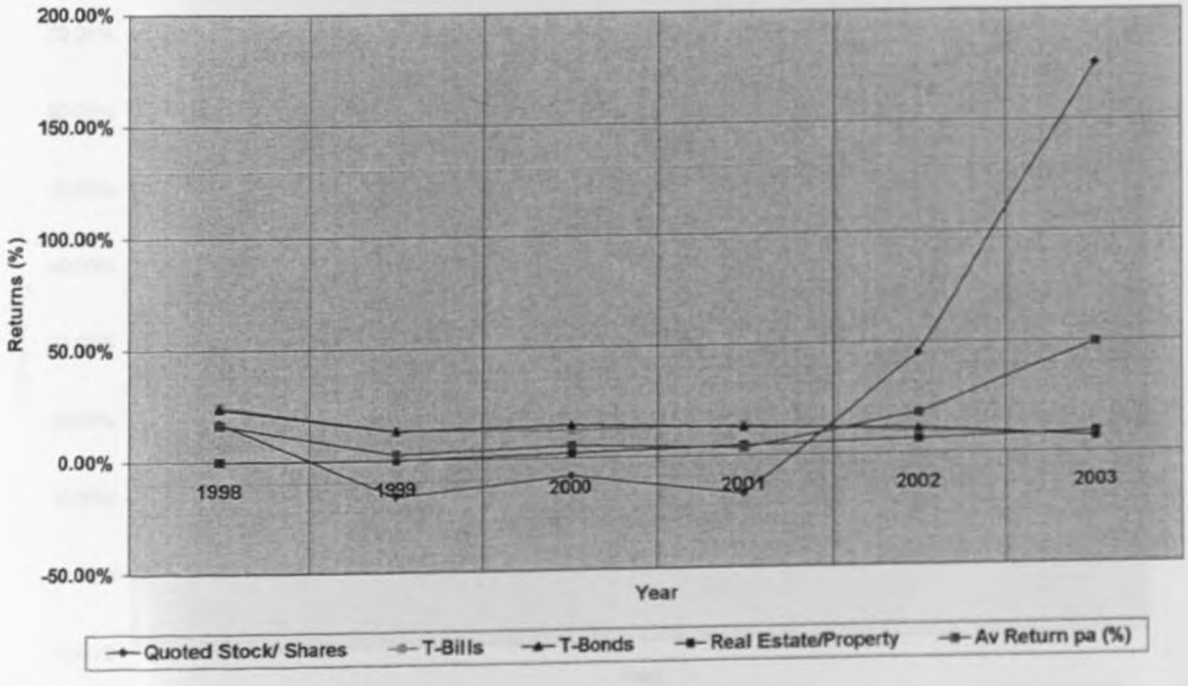
Fund Manager 'A'

Risk - Returns 1998 - 2003

(Scheme 1786 : Table A/3)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	17.00	247.0660	24.72	126.3001	23.69	99.1684028	0	14.0250	0.8928	16.35
1999	(16.47)	2419.4921	13.23	0.0633	12.94	0.6267	0	14.0250	0.7287	2.43
2000	(7.92)	1651.4741	12.75	0.5353	14.83	1.2063	2.35	1.9460	0.7960	5.50
2001	(17.10)	2481.8663	13.38	0.0103	12.71	1.0438	4.56	0.6642	0.7535	3.39
2002	45.28	157.7955	9.92	12.6855	11.37	5.5775	6.57	7.9806	0.8314	18.29
2003	175.52	20392.3160	6.89	43.4501	6.85	47.3573	8.99	27.5100	0.8904	49.56
(Av) Return pa (%)	32.72		13.48		13.73		3.75			15.92
Variance = δ^2		4558.3350		30.5074		25.8300		11.0252		
Standard Deviation (Risk) = δ		67.5154		5.5234		5.0823		3.3204		
C.V.		2.0635		0.4097		0.3701		0.8866		
Weights (AV)									0.8155	

Returns 1998 - 2003 (Graph A/3)



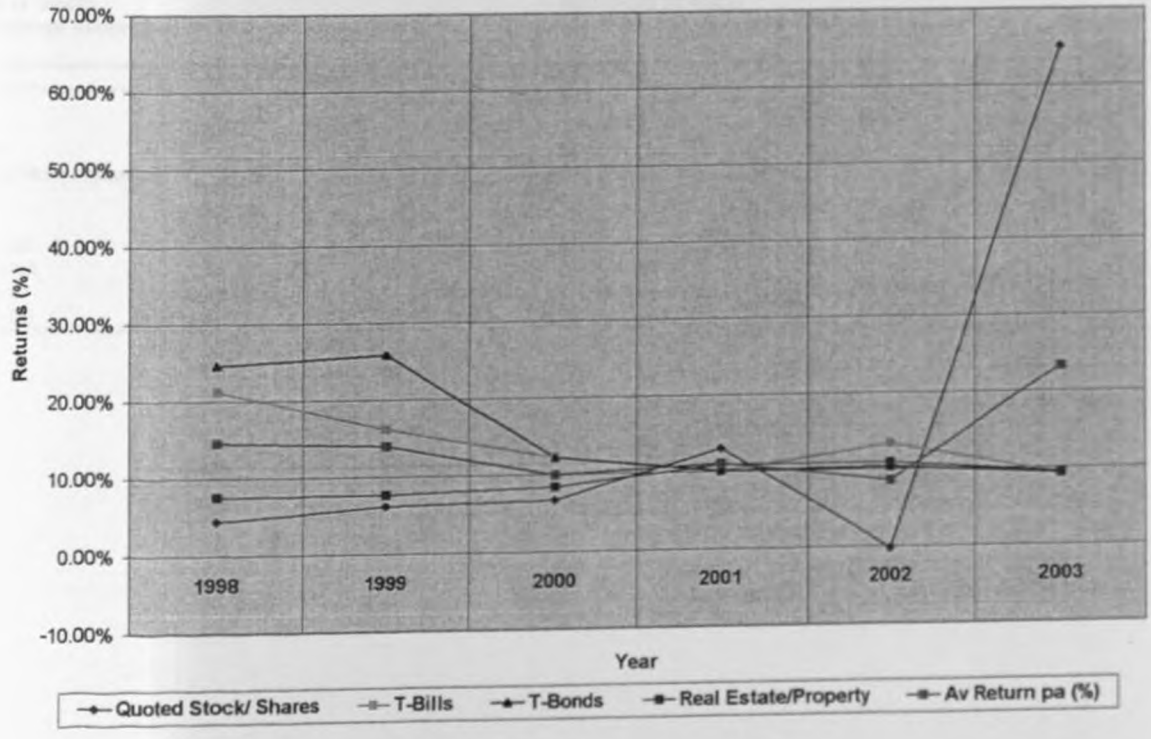
Fund Manager 'A'

Risk - Returns 1998 - 2003

(Scheme 1853 : Table A/4)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	22.88	261.4689	26.12	147.8656	25.46	120.6336	8.56	1.8090	0.7876	20.76
1999	(4.68)	1912.3129	13.73	0.0529	14.18	0.0880	7.56	5.4990	0.7132	7.70
2000	(7.33)	2151.1044	13.32	0.4096	15.20	0.5232	6.56	11.1890	0.7387	6.94
2001	(15.90)	3019.5025	12.87	1.1881	13.39	1.1808	7.56	5.4990	0.7576	4.48
2002	44.65	31.3600	10.03	15.4449	11.56	8.5069	21.63	137.475625	0.7963	21.97
2003	194.68	24220.6969	7.69	39.3129	7.07	54.8587	7.56	5.4990	0.8076	54.25
(Av) Return pa (%)	39.05		13.96		14.48		9.91			19.35
Variance = δ^2		5266.0743		34.0456667		30.9652222		27.82845833		
Standard Deviation (Risk) = δ		72.5677		5.8349		5.5646		5.2753		
C.V.		1.8583		0.4180		0.3844		0.5326		
Weights (AV)									0.7668	

Returns 1998 - 2003 (Graph A/4)



Fund Manager A3

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	0	*24.72*
Mean	4.494	11.234
Variance	12.33023	7.87113
Observations	5	5
Hypothesized Mean Difference	0	
df	8	
t Stat	-3.353162	
P(T<=t) one-tail	0.005017	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.010033	
t Critical two-tail	2.306006	

T-bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	0	*23.69*
Mean	4.494	11.74
Variance	12.33023	8.9945
Observations	5	5
Hypothesized Mean Difference	0	
df	8	
t Stat	-3.508662	
P(T<=t) one-tail	0.003989	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.007977	
t Critical two-tail	2.306006	

Real Estate vs Stocks

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	3.745	32.71833
Variance	13.23019	5470.002
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-0.95842	
P(T<=t) one-tail	0.190934	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.381868	
t Critical two-tail	2.570578	

Fund Manager A4

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	8.56	*26.12*
Mean	10.174	11.528
Variance	41.19998	6.70882
Observations	5	5
Hypothesized Mean Difference	0	
df	5	
t Stat	-0.437417365	
P(T<=t) one-tail	0.340028455	
t Critical one-tail	2.015049176	
P(T<=t) two-tail	0.68005691	
t Critical two-tail	2.570577635	

T-bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	8.56	*25.46*
Mean	10.174	12.28
Variance	41.19998	10.25775
Observations	5	5
Hypothesized Mean Difference	0	
df	6	
t Stat	-0.656474796	
P(T<=t) one-tail	0.267934543	
t Critical one-tail	1.943180905	
P(T<=t) two-tail	0.535869085	
t Critical two-tail	2.446913641	

Real Estate vs Stocks

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.905	39.05
Variance	33.39415	6319.289
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-0.895696925	
P(T<=t) one-tail	0.205728787	
t Critical one-tail	2.015049176	
P(T<=t) two-tail	0.411457574	
t Critical two-tail	2.570577635	

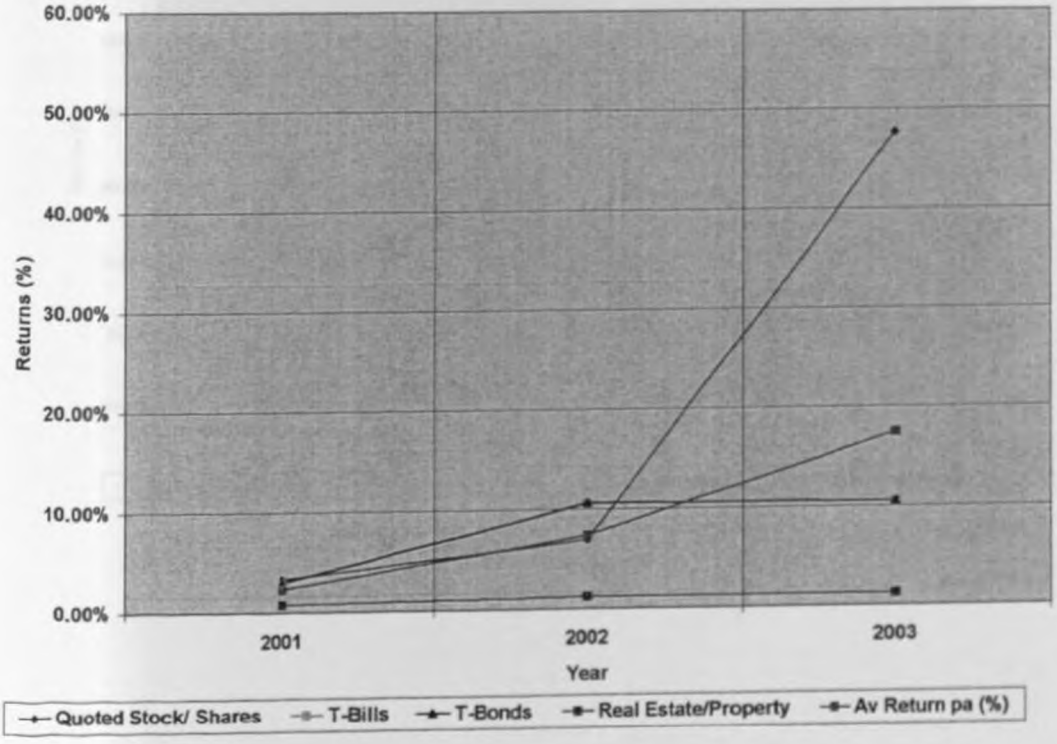
Fund Manager 'B'

Risk - Returns 2001 - 2003

(Scheme No 1 : Table B/1)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	-		-		-		-		-	-
1999	-		-		-		-		-	-
2000	-		-		-		-		-	-
2001	3.29	256.3201	2.91	25.8742	2.91	25.9081	0.78	0.0860	0.4740	2.47
2002	6.97	152.0289	10.57	6.6220	10.58	6.6564	1.22	0.0215	0.4555	7.34
2003	47.64	803.1556	10.51	6.3168	10.51	6.3001	1.22	0.0215	0.9694	17.47
Av Return pa (%)	19.30		8.00		8.00		1.07			9.09
Variance = ð²		403.8349		12.9377		12.9548667		0.0430		
Standard Deviation (Risk) = ð		20.095643		3.5968999		3.5993		0.2074		
C.V.		1.0412		0.4498		0.4499		0.1932		
Weights (AV)									0.6300	

Returns 2001 - 2003 (Graph B/1)



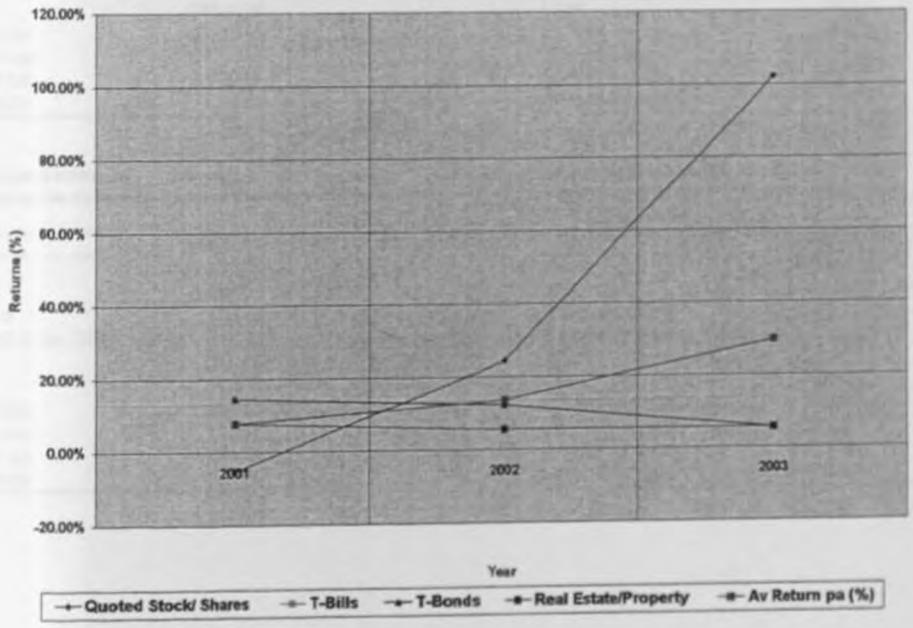
Fund Manager 'B'

Risk - Returns 2001 - 2003

(Scheme No 2 : Table B/2)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	-		-		-		-		-	-
1999	-		-		-		-		-	-
2000	-		-		-		-		-	-
2001	(5.25)	**2984.8356**	14.48	**13.9876**	14.48	**13.9876**	7.78	**2.1316**	0.9735	7.87
2002	24.37	**257.2816**	12.21	**2.1609**	12.21	**2.1609**	5.59	**0.5329**	0.8249	13.60
2003	102.11	**3806.8900**	5.53	**27.1441**	5.53	**27.1441**	5.59	**0.5329**	0.7751	29.69
Av Return pa (%)	40.41		10.74		10.74		6.32			17.05
Variance = δ^2		**2049.6691**		**14.4308667**		**14.4309**		**1.0658**		
Standard Deviation (Risk) = δ		**45.2733**		**3.79879806**		**3.7988**		**1.0324**		
C.V.		1.1203		0.3537		0.3537		0.1634		
Weights (AV)									0.8578	

Returns 2001 - 2003 (Graph B/2)



Fund Manager B1

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	0.78	*2.91*
Mean	1.22	10.54
Variance	0	0.0018
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-310.6667	
P(T<=t) one-tail	0.001025	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.002049	
t Critical two-tail	12.70615	

T-Bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	0.78	*2.91*
Mean	1.22	10.545
Variance	0	0.00245
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-266.4286	
P(T<=t) one-tail	0.001195	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.002389	
t Critical two-tail	12.70615	

Stocks vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	1.073333	19.3
Variance	0.064533	605.7523
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.282618	
P(T<=t) one-tail	0.164098	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.328197	
t Critical two-tail	4.302656	

Fund Manager B2

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	7.78	*14.48*
Mean	5.59	8.67
Variance	0	22.3112
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-0.982036	
P(T<=t) one-tail	0.252885	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.50577	
t Critical two-tail	12.70615	

T-Bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	7.78	*14.48*
Mean	5.59	8.67
Variance	0	22.3112
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-0.982036	
P(T<=t) one-tail	0.252885	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.50577	
t Critical two-tail	12.70615	

Stocks vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	6.32	40.41
Variance	1.5987	3074.504
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.064602	
P(T<=t) one-tail	0.199288	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.398576	
t Critical two-tail	4.302656	

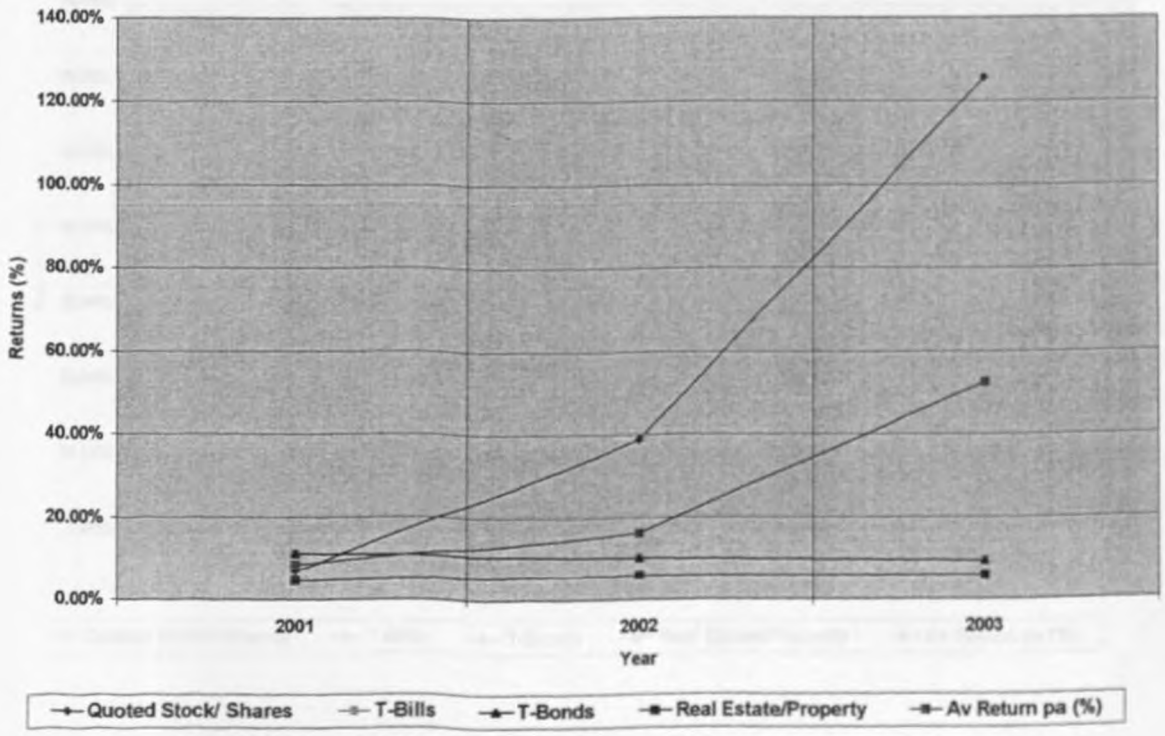
Fund Manager 'B'

Risk - Returns 2001 - 2003

(Scheme No 3 : Table B/3)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	-		-		-		-		-	-
1999	-		-		-		-		-	-
2000	-		-		-		-		-	-
2001	6.78	2526.7378	11.21	0.9867	11.21	0.9867	4.60	0.7056	0.9816	8.45
2002	38.74	335.1340	10.12	0.0093	10.12	0.0093	5.86	0.1764	0.8567	16.21
2003	125.62	4702.3020	9.32	0.8040	9.32	0.8040	5.86	0.1764	0.9218	58.50
Av Return pa (%)	57.05		10.22		10.22		5.44			27.72
Variance = δ^2		2521.3913		0.6000		0.6000		0.3528		
Standard Deviation (Risk) = δ		50.2135		0.7746		0.7746		0.5940		
C.V.		0.8802		0.0758		0.0758		0.1092		
Weights (AV)									0.9200	

Returns 2001 - 2003 (Graph B/3)



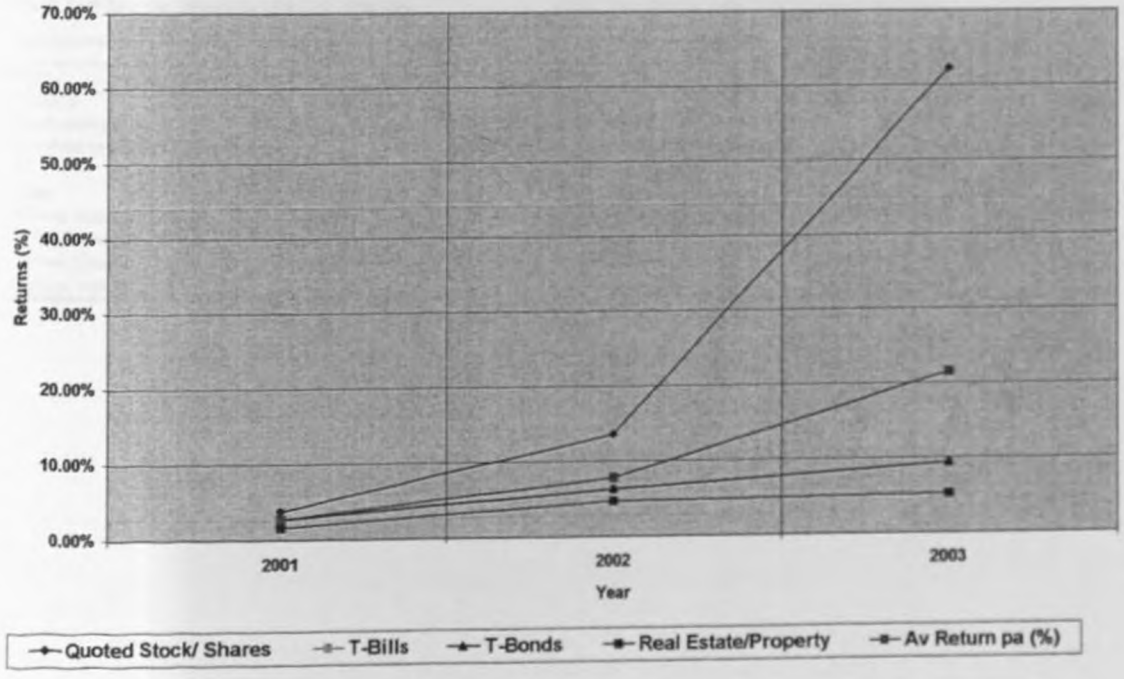
Fund Manager 'B'

Risk - Returns 2001 - 2003

(Scheme No 4 : Table B/4)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	-		-		-		-		-	-
1999	-		-		-		-		-	-
2000	-		-		-		-		-	-
2001	3.78	518.1693	2.68	11.7192	2.68	11.7192	1.57	4.9878	0.6960	2.68
2002	13.62	167.0125	6.28	0.0312	6.28	0.0312	4.70	0.8040	0.6174	7.72
2003	62.23	1273.5382	9.35	10.5408	9.35	10.5408	5.14	1.7867	0.9704	21.52
Av Return pa (%)	26.54		6.10		6.10		3.80			10.64
Variance = δ^2		652.9067		7.4304		7.4304		2.5262		
Standard Deviation (Risk) = δ		25.5520		2.7259		2.7259		1.5894		
C.V.		0.9627		0.4466		0.4466		0.4179		
Weights (AV)									0.7613	

Returns 2001 - 2003 (Graph B/4)



T-Tests

Fund Manager B3

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	4.6	*11.21*
Mean	5.86	9.72
Variance	0	0.32
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-9.65	
P(T<=t) one-tail	0.032868	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.065736	
t Critical two-tail	12.70615	

Fund Manager B4

T-bills & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	1.57	*2.68*
Mean	4.92	7.815
Variance	0.0968	4.71245
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-1.866916	
P(T<=t) one-tail	0.15653	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.31306	
t Critical two-tail	12.70615	

T-Bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	4.6	*11.21*
Mean	5.86	51.66
Variance	0	3451.143
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-1.102552	
P(T<=t) one-tail	0.234487	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.468974	
t Critical two-tail	12.70615	

T-Bonds & Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	1.57	*2.68*
Mean	4.92	7.815
Variance	0.0968	4.71245
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-1.866916	
P(T<=t) one-tail	0.15653	
t Critical one-tail	6.313749	
P(T<=t) two-tail	0.31306	
t Critical two-tail	12.70615	

Stocks vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.44	57.04667
Variance	0.5292	3782.087
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.45335	
P(T<=t) one-tail	0.141655	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.283309	
t Critical two-tail	4.302656	

Stocks vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	3.803333	26.54333
Variance	3.789233	979.36
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.25615	
P(T<=t) one-tail	0.167955	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.335911	
t Critical two-tail	4.302656	

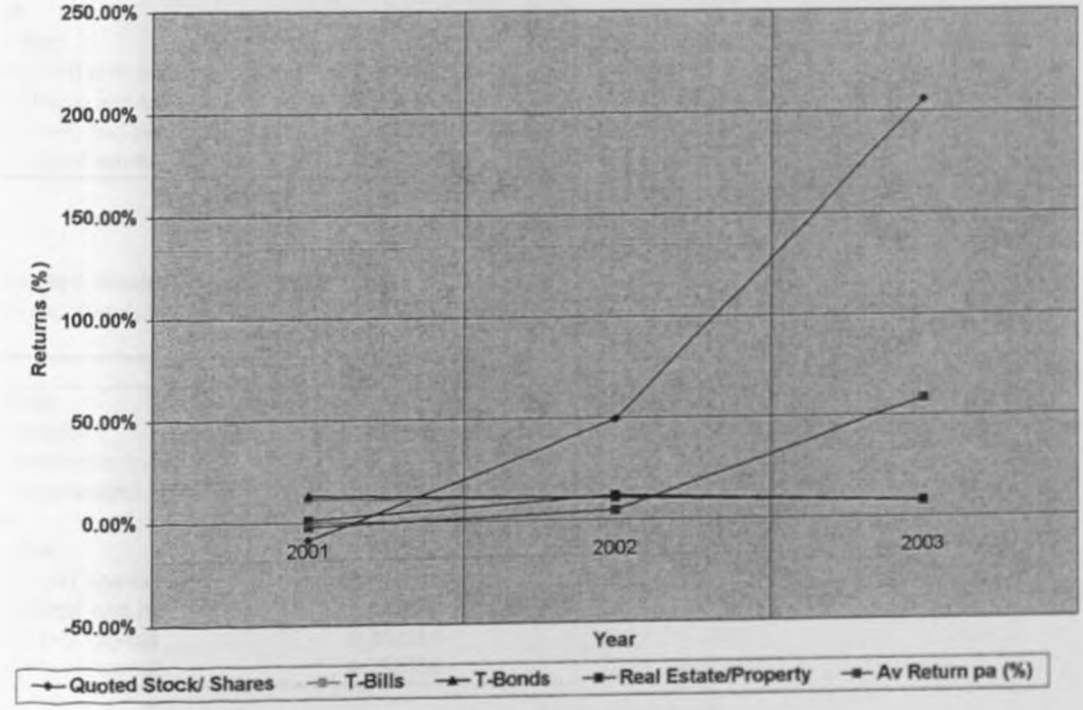
Fund Manager 'C'

Risk - Returns 2001 - 2003

(Scheme No C : Table C/1)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	-		-		-		-		-	-
1999	-		-		-		-		-	-
2000	-		-		-		-		-	-
2001	(8.56)	8241.0084	11.34	1.8769	12.85	5.6169	1.43	32.4900	0.9886	4.27
2002	49.39	1077.8089	10.36	0.1521	10.76	0.0784	12.10	24.7009	0.9928	20.65
2003	205.83	15279.4321	8.21	3.0976	7.83	7.0225	7.86	0.5329	0.9848	57.43
Av Return pa (%)	82.22		9.97		10.48		7.13			27.45
Variance = δ^2		8199.4165		1.7089		4.2393		19.2413		
Standard Deviation (Risk) = δ		90.5506		1.3072		2.0589		4.3865		
C.V.		1.1013		0.1311		0.1965		0.6152		
Weights (AV)									0.9887	

Returns 2001 - 2003 (Graph C/1)



T-Tests

Fund Manager C1

T-Bills & Real Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	7.13	9.97
Variance	28.8619	2.5633
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-0.87749	
P(T<=t) one-tail	0.236384	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.472768	
t Critical two-tail	4.302656	

T-Bonds & Real Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	7.13	10.48
Variance	28.8619	6.3589
Observations	3	3
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.9777	
P(T<=t) one-tail	0.200163	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.400326	
t Critical two-tail	3.182449	

Quoted Stocks & Real Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	7.13	82.22
Variance	28.8619	12299.12
Observations	3	3
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.17138	
P(T<=t) one-tail	0.181056	
t Critical one-tail	2.919987	
P(T<=t) two-tail	0.362111	
t Critical two-tail	4.302656	

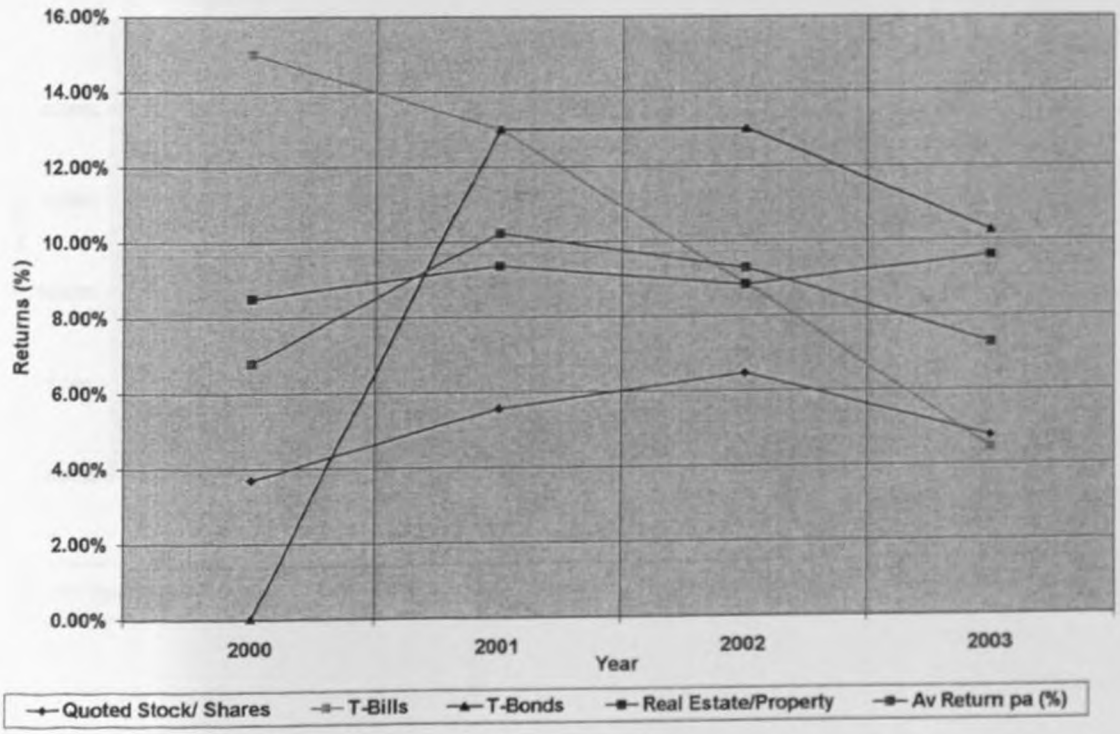
Fund Manager 'D'

Risk - Returns 2000 - 2003

(Scheme GS : Table D/1)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998									-	-
1999									-	-
2000	3.70	2.0164	15.00	21.8323	0	82.1742	8.51	0.3192	0.9601	9.17
2001	5.56	0.1936	13.00	7.1423	13.00	15.4842	9.36	0.0812	0.8827	10.23
2002	6.46	1.7956	8.86	2.1536	13.00	15.4842	8.83	0.0600	0.8792	9.29
2003	4.76	0.1296	4.45	34.5450	10.26	1.4280	9.60	0.2756	0.8852	7.27
Av Return pa (%)	5.12		10.33		9.065		9.08			8.99
Variance = δ^2		1.0338		16.4183		28.6427		0.1840		
Standard Deviation (Risk) = δ		1.0168		4.0519		5.3519		0.4290		
C.V.		0.1986		0.3923		0.5904		0.0473		
Weights (AV)									0.9068	

Returns 2000 - 2003 (Graph D/1)



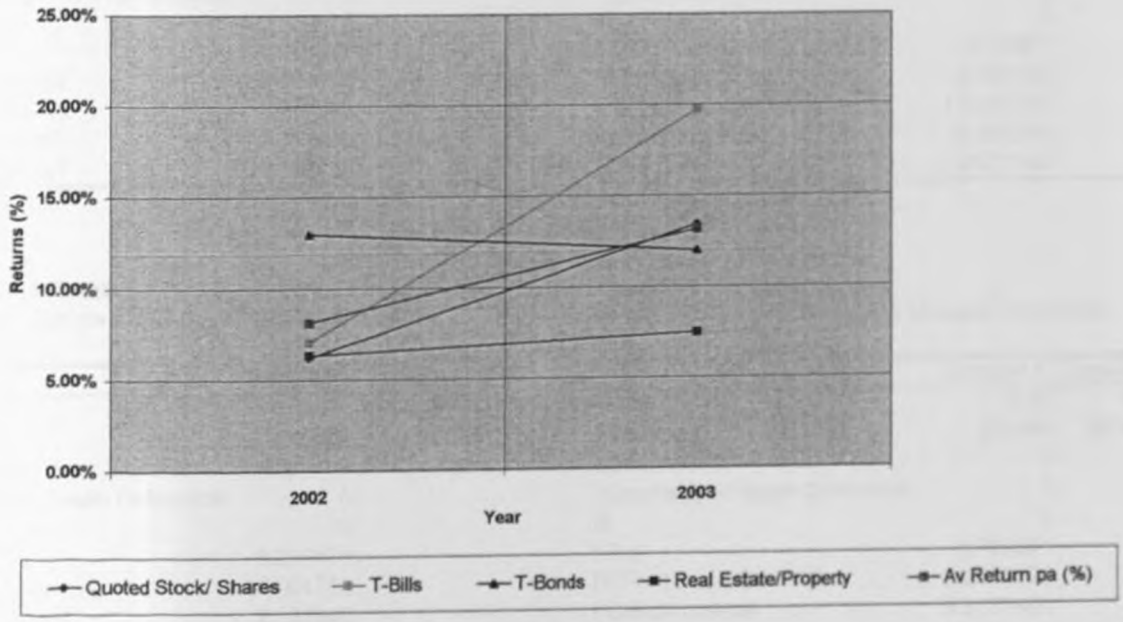
Fund Manager 'D'

Risk - Returns 2002 - 2003

(Scheme LG : Table D/2)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998										
1999										
2000										
2001										
2002	6.20	**13.1044**	7.01	**40.5132**	12.99	**0.2500**	6.32	**0.3249**	0.9967	8.13
2003	13.44	**13.1044**	19.74	**40.5132**	11.99	**0.2500**	7.46	**0.3249**	0.9678	13.16
Av Return pa (%)	9.82		13.38		12.49		6.89			10.64
Variance = δ^2		**13.1044**		**40.5132**		**0.2500**		**0.3249**		
Standard Deviation (Risk) = δ		**3.6200**		**6.3650**		**0.5000**		**0.5700**		
C.V.		0.3686		0.4759		0.0400		0.0827		
Weights (AV)									0.9833	

Returns 2000 - 2003 (Graph D/2)



T-Tests

Fund Manager D1

t-bills vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.075	0.169425
Variance	0.245367	0.015852
Observations	4	4
Hypothesized Mean Difference	0	
df	3	
t Stat	34.84898	
P(T<=t) one-tail	2.6E-05	
t Critical one-tail	2.353363	
P(T<=t) two-tail	5.2E-05	
t Critical two-tail	3.182449	

T- Bonds Vs R. Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.075	9.065
Variance	0.245367	38.19023
Observations	4	4
Hypothesized Mean Difference	0	
df	3	
t Stat	0.003226	
P(T<=t) one-tail	0.498814	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.997629	
t Critical two-tail	3.182449	

Stocks Vs R. Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.075	5.12
Variance	0.245367	1.3784
Observations	4	4
Hypothesized Mean Difference	0	
df	4	
t Stat	6.207471	
P(T<=t) one-tail	0.001713	
t Critical one-tail	2.131846	
P(T<=t) two-tail	0.003427	
t Critical two-tail	2.776451	

Fund Manager D2

t-bills vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	6.89	13.375
Variance	0.6498	81.02645
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-1.014792	
P(T<=t) one-tail	0.2476631	
t Critical one-tail	6.3137486	
P(T<=t) two-tail	0.4953262	
t Critical two-tail	12.70615	

t-bonds vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.6983333	5.713333
Variance	19.635977	39.69291
Observations	6	6
Hypothesized Mean Difference	0	
df	9	
t Stat	-0.00477	
P(T<=t) one-tail	0.498149	
t Critical one-tail	1.8331139	
P(T<=t) two-tail	0.996298	
t Critical two-tail	2.2621589	

Stocks Vs R. Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	6.89	9.82
Variance	0.6498	26.2088
Observations	2	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-0.799541	
P(T<=t) one-tail	0.2853123	
t Critical one-tail	6.3137486	
P(T<=t) two-tail	0.5706247	
t Critical two-tail	12.70615	

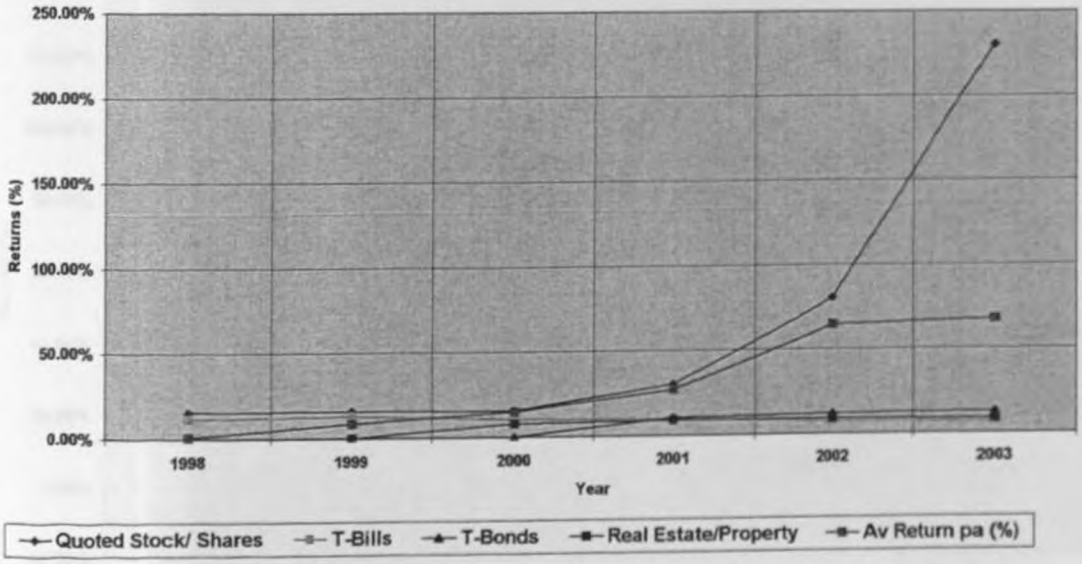
Fund Manager 'E' (SIMS)

Risk - Returns 1998 - 2003

(Scheme 200 : Table E/1)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	15.38	**2423.4288**	11.36	**2.9469**	0.00	**130.5687**	0.00	**73.0598**	0.8500	6.69
1999	15.81	**2381.2773**	12.98	**11.1333**	0.00	**130.5687**	0.00	**73.0598**	0.8000	7.20
2000	15.47	**2414.5758**	10.24	**0.3560**	0.00	**130.5687**	7.84	**0.5006**	0.7250	8.39
2001	30.29	**1177.7480**	9.58	**0.0040**	10.16	**1.6044**	8.95	**0.1620**	0.8000	14.75
2002	80.55	**254.1367**	7.14	**6.2667**	11.74	**0.0982**	8.87	**0.1040**	0.8500	27.08
2003	230.15	**27404.0434**	6.56	**9.5069**	12.38	**0.9088**	8.53	**0.0003**	0.8600	64.41
(Av) Return pa (%)	64.61		9.64		11.43		8.55			21.42
Variance = δ^2		**6009.2017**		**5.0357**		**65.7196**		**24.4811**		
Standard Deviation (Risk) = δ		**77.5190**		**2.2440**		**8.1068**		**4.9478**		
C.V.		1.1998		0.2327		0.7095		0.579		
Weights (AV)									0.8142	

Returns 1998 - 2003 (Graph E/1)



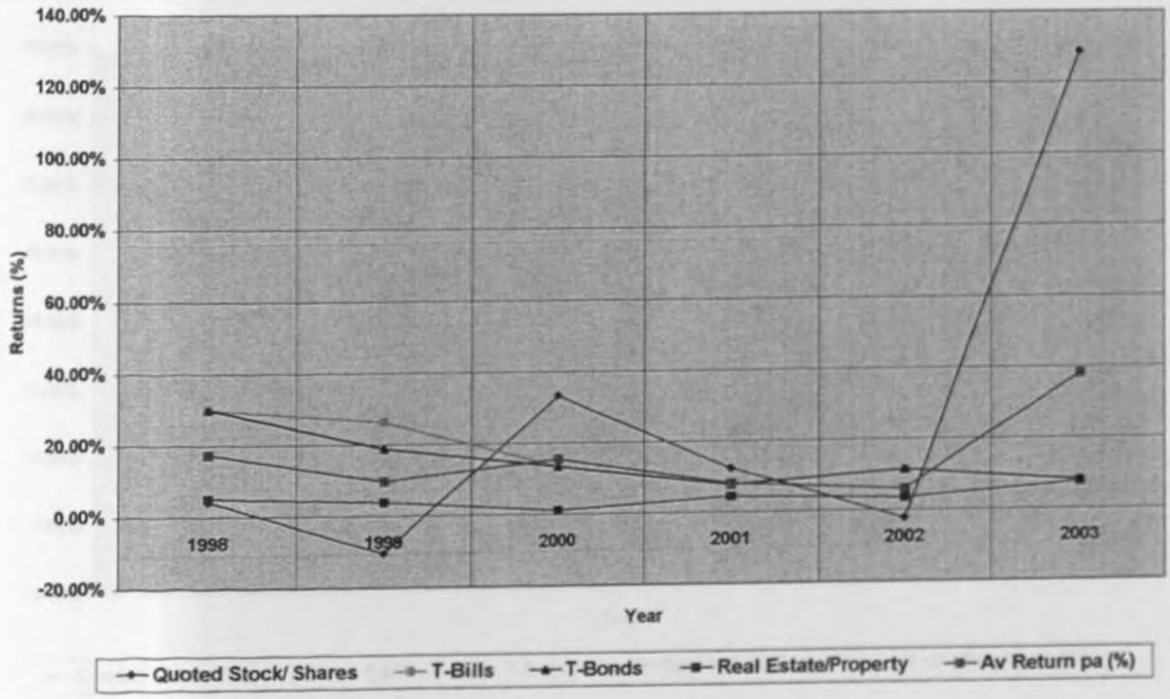
Trustees/Admin Sources Scheme (U1)

Risk - Returns 1998 - 2003

(Scheme U1 : Table U1/A)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	4.26	544.3667	29.92	191.7763	29.92	227.9093	5.00	0.4877	0.1498	17.28
1999	(10.57)	1456.3128	26.20	102.5831	18.71	15.1062	3.81	0.2417	0.1757	9.54
2000	33.30	32.5851	13.24	8.0183	13.24	2.5069	1.65	7.0313	0.3575	15.36
2001	12.30	233.8351	7.65	70.9245	7.65	51.4567	4.36	0.0034	0.4712	7.99
2002	(2.37)	897.7015	11.38	22.0117	11.38	11.8565	3.44	0.7425	0.4305	5.96
2003	128.63	10208.7448	8.04	64.5077	8.04	46.0136	7.55	10.5517	0.5269	38.07
(Av) Return pa (%)	27.59		16.07		14.82		4.30			15.70
Variance = δ^2		2228.9243		76.6369		59.1416		3.1764		
Standard Deviation (Risk) = δ		47.2115		8.7543		7.6904		1.7822		
C.V.		1.7111		0.5447		0.5188		0.4143		
Weights (AV)									0.3519	

Returns 1998 - 2003 (Graph U1/A)



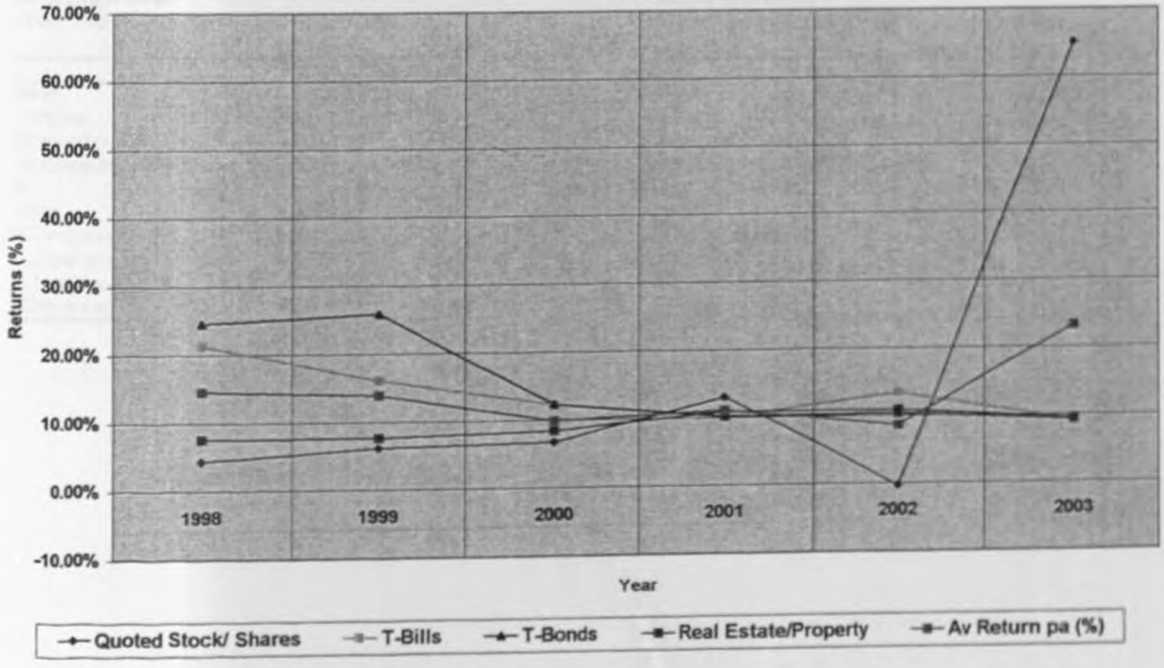
Trustee/Admin Source Scheme

Risk - Returns 1998 - 2003

(Scheme U2 : Table U2/A)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	4.36	131.1788	21.25	62.7792	24.67	85.8402	7.58	2.3665	0.7045	14.47
1999	6.16	93.1868	16.76	11.7878	25.81	108.2640	7.64	2.1855	0.6158	14.09
2000	6.69	83.2352	12.23	1.2027	12.23	10.0806	8.35	0.5903	0.6705	9.88
2001	13.03	7.7469	10.12	10.2827	10.12	27.9312	10.86	3.0334	0.4192	11.03
2002	(0.37)	261.9003	10.35	8.8605	10.35	25.5530	10.86	3.0334	0.3867	7.80
2003	65.01	2420.3120	9.25	16.6192	9.25	37.8840	9.42	0.0910	0.3393	23.23
(Av) Return pa (%)	15.81		13.33		15.41		9.12		0.2479	13.42
Variance = δ^2		499.5934		18.5887		49.2589		1.8833		
Standard Deviation (Risk) = δ		22.3516		4.3115		7.0185		1.3724		
C.V.		1.4135		0.3235		0.4556		0.1505		
Weights (AV)									0.6775	

Returns 1998 - 2003 (Graph U2/A)



Fund Manager E1
t-bills vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.698333	9.643333
Variance	19.63598	6.042787
Observations	6	6
Hypothesized Mean Difference	0	
df	8	
t Stat	-1.90693	
P(T<=t) one-tail	0.046485	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.092969	
t Critical two-tail	2.306006	

t-bonds vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.698333	5.713333
Variance	19.63598	39.69291
Observations	6	6
Hypothesized Mean Difference	0	
df	9	
t Stat	-0.00477	
P(T<=t) one-tail	0.498149	
t Critical one-tail	1.833114	
P(T<=t) two-tail	0.996298	
t Critical two-tail	2.262159	

Stocks vs R estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.698333	64.60833
Variance	19.63598	7211.042
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-1.69697	
P(T<=t) one-tail	0.075231	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.150463	
t Critical two-tail	2.570578	

Fund Manager U1
t-bills vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	4.301667	16.07167
Variance	3.811657	91.96434
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-2.94594	
P(T<=t) one-tail	0.016018	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.032036	
t Critical two-tail	2.570578	

t-bonds vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	4.301667	14.82333
Variance	3.811657	70.96987
Observations	6	6
Hypothesized Mean Difference	0	
df	6	
t Stat	-2.98032	
P(T<=t) one-tail	0.012313	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.024626	
t Critical two-tail	2.446914	

Stocks vs R estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	4.301667	27.59167
Variance	3.811657	2674.709
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-1.10229	
P(T<=t) one-tail	0.160271	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.320543	
t Critical two-tail	2.570578	

T-Tests

Fund Manager U2A
T- Bills Vs Real Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.118333	13.32667
Variance	2.260017	22.30643
Observations	6	6
Hypothesized Mean Difference	0	
df	6	
t Stat	-2.07977	
P(T<=t) one-tail	0.041381	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.082762	
t Critical two-tail	2.446914	

Fund Manager RBA-23 No
Govt Vs Real Estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	3.951364	9.201364
Variance	12.86041	23.93688
Observations	22	22
Hypothesized Mean Difference	0	
df	39	
t Stat	-4.05941	
P(T<=t) one-tail	0.000115	
t Critical one-tail	1.684875	
P(T<=t) two-tail	0.000229	
t Critical two-tail	2.022689	

t-bonds vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.118333	15.405
Variance	2.260017	59.11063
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-1.96569	
P(T<=t) one-tail	0.053255	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.106509	
t Critical two-tail	2.570578	

Stocks vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	3.951364	5.981364
Variance	12.86041	23.84791
Observations	22	22
Hypothesized Mean Difference	0	
df	39	
t Stat	-1.57154	
P(T<=t) one-tail	0.062068	
t Critical one-tail	1.684875	
P(T<=t) two-tail	0.124136	
t Critical two-tail	2.022689	

Stocks vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	9.118333	15.81333
Variance	2.260017	599.512
Observations	6	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-0.66851	
P(T<=t) one-tail	0.266712	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.533424	
t Critical two-tail	2.570578	

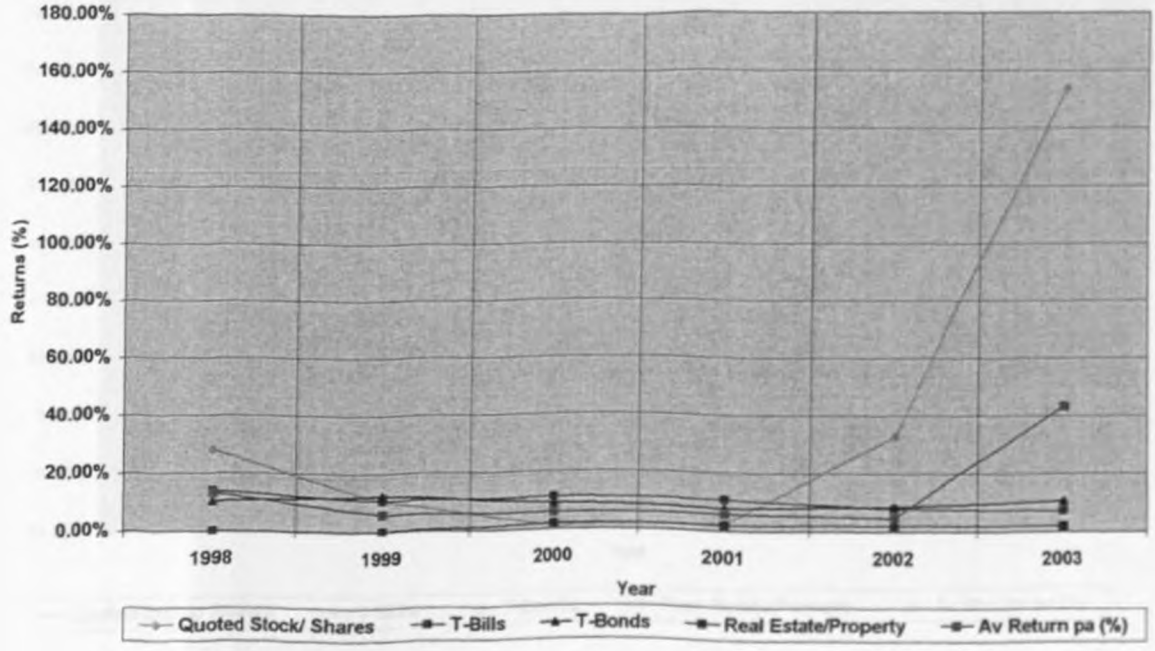
Trustees/Admin Sources Scheme CT

Risk - Returns 1998 - 2003

(Scheme CT : Table CT/A)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)	Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL	ALL	ALL
1998	28.05	101.0025	13.97	14.2255	10.38	0.3990	-	1.5918	0.2385	13.10	0.2385	13.10
1999	10.43	765.6289	10.49	0.0851	12.38	6.9257	-	1.5918	0.6644	8.33	0.6644	8.33
2000	1.09	1369.7401	11.15	0.9057	8.95	0.6373	1.88	0.3823	0.6955	5.77	0.6955	5.77
2001	2.43	1272.3489	10.68	0.2320	7.85	3.6037	1.87	0.3701	0.6878	5.71	0.6692	5.71
2002	32.77	28.4089	7.72	6.1421	8.43	1.7380	1.92	0.4334	0.7747	12.71	0.6878	12.71
2003	153.83	13393.4329	7.18	9.1103	10.50	0.5650	1.90	0.4075	0.8600	43.35	0.7747	43.35
(Av) Return pa (%)	38.10		10.20		9.75		1.26			14.83		14.83
Variance = δ^2		2821.7604		5.1168		2.3114		0.7961				
Standard Deviation (Risk) = δ		53.1202		2.2620		1.5203		0.8923				
C.V.		1.3942		0.2218		0.1560		0.7072				
Weights (AV)									0.6217		0.6217	

Returns 1998 - 2003 (Graph CT/A)



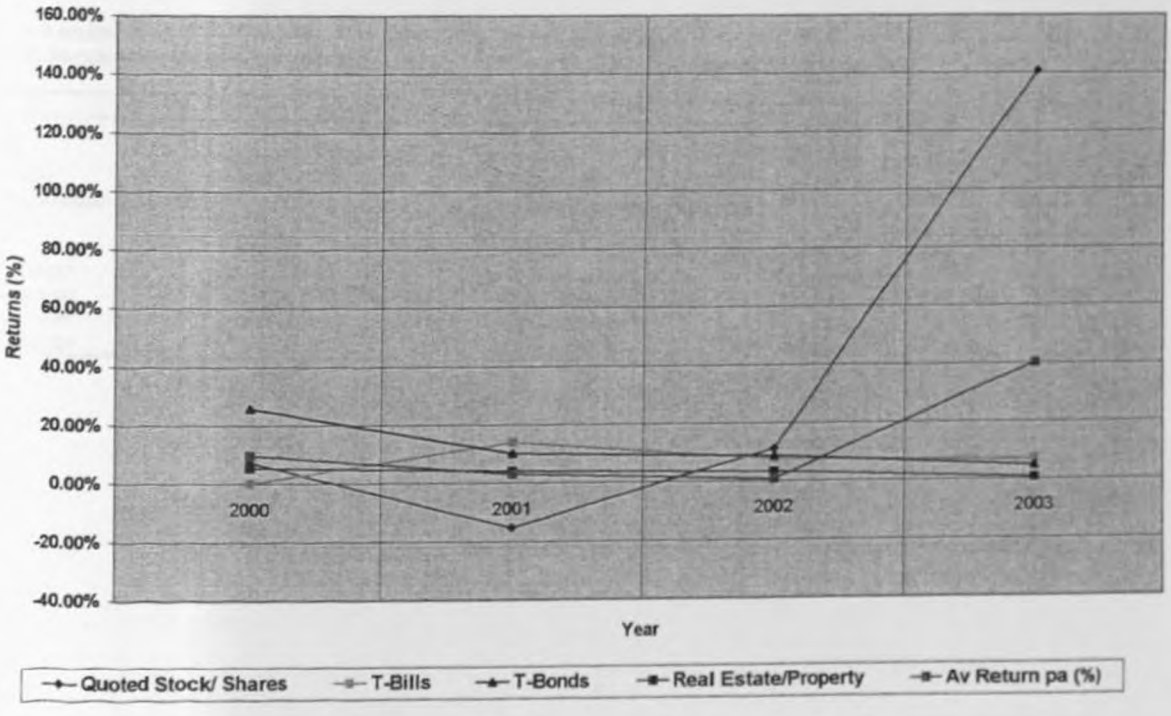
Trustee/Admin Sources Scheme "K"

Risk - Returns 2000 - 2003

(Scheme "K" : Table K/A)

Investment Asset Class	Quoted Stocks/Shares		T-Bills		T-Bonds		Real Estate/Property		Total Weight	Av Return p.a. (%)
Year	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	Return pa (%)	Deviation	ALL	ALL
1998	-		-		-		-		-	-
1999	-		-		-		-		-	-
2000	7.43	813.5330	-	50.7656	25.76	180.2978	5.55	0.1040	0.5463	9.69
2001	(15.45)	2642.2170	13.92	46.1720	10.13	4.8510	4.09	1.2939	0.5704	3.17
2002	11.13	616.1565	7.56	0.1892	8.66	13.4873	3.21	4.0703	0.6442	7.64
2003	140.70	10972.0388	7.02	0.0110	4.78	57.0403	8.06	8.0231	0.7406	40.14
(Av) Return pa (%)	35.95		7.13		12.33		5.23			15.16
Variance = δ^2		3760.9863		24.2845		63.9191		3.3728		
Standard Deviation (Risk) = δ		61.3269		4.9279		7.9949		1.8365		
C.V.		1.7058		0.6916		0.6483		0.3513		
Weights (AV)									0.6254	

Returns 2000 - 2003 (Graph K/A)



T-Tests

Fund Manager CT1
t-bills vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	1.8925	10.19833
Variance	0.000492	6.140137
Observations	4	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-8.21001	
P(T<=t) one-tail	0.000218	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.000436	
t Critical two-tail	2.570578	

Fund Manager K1
t-bills vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.2275	9.5
Variance	3.372819	14.7252
Observations	5	3
Hypothesized Mean Difference	0	
df	3	
t Stat	-1.80821	
P(T<=t) one-tail	0.084145	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.168291	
t Critical two-tail	3.182449	

t-bonds vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	1.8925	9.748333
Variance	0.000492	2.773737
Observations	4	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-11.5525	
P(T<=t) one-tail	4.26E-05	
t Critical one-tail	2.015049	
P(T<=t) two-tail	8.52E-05	
t Critical two-tail	2.570578	

t-bonds vs R. estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.2275	12.3325
Variance	4.497092	85.22543
Observations	4	4
Hypothesized Mean Difference	0	
df	3	
t Stat	-1.50018	
P(T<=t) one-tail	0.11527	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.230541	
t Critical two-tail	3.182449	

Stocks vs R estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	1.8925	30.972
Variance	0.000492	3740.419
Observations	4	6
Hypothesized Mean Difference	0	
df	5	
t Stat	-1.16467	
P(T<=t) one-tail	0.148347	
t Critical one-tail	2.015049	
P(T<=t) two-tail	0.296695	
t Critical two-tail	2.570578	

Stocks vs R estate
t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.2275	35.9525
Variance	4.497092	5014.648
Observations	4	4
Hypothesized Mean Difference	0	
df	3	
t Stat	-0.86738	
P(T<=t) one-tail	0.224775	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.44955	
t Critical two-tail	3.182449	

T-Tests

S/T : S/1

All Schemes Summary

T-Bills Vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.599647	11.25765
Variance	7.805842	7.433719
Observations	16	16
Hypothesized Mean Difference	0	
df	32	
t Stat	-5.97587	
P(T<=t) one-tail	5.82E-07	
t Critical one-tail	1.693888	
P(T<=t) two-tail	1.16E-06	
t Critical two-tail	2.036932	

T. Bonds Vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.599647	13.33118
Variance	7.805842	46.736
Observations	16	16
Hypothesized Mean Difference	0	
df	21	
t Stat	-4.31643	
P(T<=t) one-tail	0.000152	
t Critical one-tail	1.720744	
P(T<=t) two-tail	0.000305	
t Critical two-tail	2.079614	

Stocks Vs Real Estate

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	5.599647	33.66118
Variance	7.805842	412.4061
Observations	16	16
Hypothesized Mean Difference	0	
df	17	
t Stat	-5.64419	
P(T<=t) one-tail	1.46E-05	
t Critical one-tail	1.739606	
P(T<=t) two-tail	2.91E-05	
t Critical two-tail	2.109819	

Table C/C
(Correlation Coefficients)

	Stocks	*T-Bills*	T-Bonds	R. Estate
Stocks	1			
T- Bills	-0.1728	1		
T-Bonds	0.242371	0.196793	1	
R. Estate	0.055858	0.168598	0.129008	1

RESEARCH QUESTIONNAIRE

A Study of Risk and Returns of Real Estate Held in Pension Funds Investment Portfolios in Kenya:

I **Background information:**

1(a) Name of Scheme:

.....

(b) When did the scheme commence?

.....

2 For how many members does the scheme cater for?

.....

3 Please indicate the type of scheme. Please tick one.

[ ] Pension scheme

[ ] Provident fund

[ ] Others. (Please specify)

.....

II **Current Investment Portfolios:**

4 How are decisions on scheme funds allocations among the different asset classes currently made. Please tick one:

[ ] By investment committees

[ ] By trustees

[ ] By investment managers

[ ] Others. (Please specify)

.....

5 Are investment decisions made on the basis of set investment policy? Please tick one:

Yes [ ] No [ ]

6 On a scale of 1 to 10 (most important) points, please indicate the importance of the following factors in making investment policy?

	Points
Returns	[ ]
Risk	[ ]
Amount involved	[ ]
Preference of decision makers	[ ]
RBA investment guidelines	[ ]
Any other. (Please specify)	
.....	[ ]
.....	[ ]
.....	[ ]

7 (a) Please indicate the investment ceilings on the following asset classes that the scheme has to observe? Please specify whether percentage or amount or both:

Investment Vehicle	Amount (Kshs)	Proportion of Total (%)	RBA Recommended Ceiling (%)
(i) Cash and Demand deposits in Financial Institutions			5%
(ii) Fixed deposits			30%
(iii) Short term money market instruments:			
Commercial paper			
Corporate bonds			15%
Mortgage bonds			
Loan stocks			
(iv) Kenya Government Securities:			
T. Bonds			70%
T. Bills			
(v) Equity of quoted Cos. In East Africa:			
Preference shares			70%
Ordinary shares			
(vi) Unquoted shares in Kenya			5%
(vii) Off-shore investments:			
Bank deposits			
Govt Securities			15%
Rated corporate bonds			
Collective investment schemes			
(viii) Immovable property in Kenya:			
Land			30%
Buildings			
Units in property Trusts			
(ix) Guaranteed Funds			100%
(x) Any other asset (please specify)			5%
Total funds invested (Kshs)		100%	-

Note: Please note under (x) Any other asset, any real estate asset NOT forming part of statistics to the fund manager.

(b) Who sets the investment ceilings?

.....

8 Considering the factors as ranked under Q6, would you consider this your optimal asset allocation portfolio in terms of Returns/Risk realized? Please tick one:

Yes [ ] No [ ]

9 Please indicate the investment Portfolio composition and for each asset class

the Kenya shillings amounts current (2003) and over the last 5 years:

Investment vehicle (Proportions):	1998 Amount (Kshs)	1999 Amount (Kshs)	2000 Amount (Kshs)	2001 Amount (Kshs)	2002 Amount (Kshs)	2003 Amount (Kshs)
(i) Cash and Demand deposits in Financial Institutions						
(ii) Fixed deposits						
(iii) Short term money market instruments:						
Commercial paper						
Corporate bonds						
Mortgage bonds						
Loan stocks						
(iv) Kenya Government Securities:						
T. Bonds						
T. Bills						
(v) Equity of quoted Cos. In East Africa:						
Preference shares						
Ordinary shares						
(vi) Unquoted shares in Kenya						
(vii) Off-shore investments:						
Bank deposits						
Govt Securities						
Rated corporate bonds						
Collective investment schemes						
(viii) Immovable property in Kenya:						
Land						
Buildings						
Units in property Trusts						
(ix) Guaranteed Funds						
(x) Any other asset (please specify)						
Total funds invested (Kshs)						

Note:

(a) Please note under (x) Any other asset, any real estate asset NOT forming part of statistics to the fund manager.

(b) Please note the asset class allocation should be that at the end of the period (year); ignoring any mid-term re-allocations.

10 Please indicate the estimated (average) investment income for each asset class in the portfolio in Kenya shillings current (2003) and over the last 5 years:

Investment vehicle (Average Returns):	1998 Income (Kshs)	1999 Income (Kshs)	2000 Income (Kshs)	2001 Income (Kshs)	2002 Income (Kshs)	2003 Income (Kshs)
(i) Cash and Demand deposits in Banks						
(ii) Fixed deposits						
(iii) Short term money market instruments:						
Commercial paper						
Corporate bonds						
Mortgage bonds						
Loan stocks						
(iv) Kenya Government Securities:						
T. Bonds						
T. Bills						
(v) Equity of quoted Cos. In East Africa:						
Preference shares						
Ordinary shares						
(vi) Unquoted shares in Kenya						
(vii) Off-shore investments:						
Bank deposits						
Govt Securities						
Rated corporate bonds						
Collective investment schemes						
(viii) Immovable property in Kenya:						
Land						
Buildings						
Units in property Trusts						
(ix) Guaranteed Funds						
(x) Any other asset (please specify)						
Total Investment Income (Kshs)						

Note:

(a) Please note under (x) Any other asset, any real estate asset NOT forming part of statistics to the fund manager.

(b) For shares (equity of quoted companies) and real estate (property) assets respectively (average) investment income for the year is defined as:

(i) Shares:

(av) Income = (Closing Market Value – opening Market Value)
+ Dividends/Cash distributions to investor during year

(ii) Real estate/property:

Nett Operating Income (NOI) = Gross Rental Income Less (Vacancy)/Credit losses
+ Operating Expenses

11 Would comparable or better (average) annual risk and returns for real estate; vs equity stocks and government securities be the major consideration in any revision to the asset allocation (mix) of the investment portfolio? Please tick one:

Yes	No
[ ]	[ ]

III Real Estate Assets Valuation

12 Is the balance sheet value of the real estate assets in your investment portfolio also the market value for the period? Please tick one:

Yes	No
[ ]	[ ]

13 (a) Is the market valuation of the real estate assets in your investment portfolio carried out on a regular basis? Please tick one:

Yes	No
[ ]	[ ]

(b) How often are the valuations carried out? Please tick one:

Once every Year	[ ]
Once every 2 Years	[ ]
Once every 3 Years	[ ]
Any other; please specify	[ ]

14 Are the market valuations on the real estate assets carried out by a registered valuer? Please tick one:

Yes	No
[ ]	[ ]

15 If the balance sheet values on the real estate assets are based on accounting adjustments of historical costs, please indicate the allowance (in percent) for the adjustments effected per year:

Percentage
[%]

16 Please explain any other consideration(s) in the choice of preference between equity stocks and government securities vs investment in real estate:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

THANK YOU VERY MUCH FOR YOUR VALUABLE SUPPORT IN THE SURVEY.