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AN INVESTIGATION INTO THE IMPACT OF LISTED PROPERTY (PROPERTY UNIT TRUSTS) IN A DIVERSIFIED INVESTMENT PORTFOLIO IN SOUTH AFRICA.

Tumellano Sebehela

A research project submitted to the Faculty of Engineering and the Built Environment, of the University of the Witwatersrand, in partial fulfillment of the requirements for the degree of Masters of Building (Property Development and Management)

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ABSTRACT

Investors seek to maximize the overall returns of diversified investment portfolios. That is, ideally investors would like to receive increasing risk-adjusted returns over a given period. In order to achieve this they allocate different percentages in different asset classes to form diversified investment portfolios.

One of the asset classes that is considered for asset allocation is property. When allocating the property component, an investor has a choice of investing in either direct-held properties or listed properties. This research report focuses on listed properties, and property unit trusts (PUTs) will be the main focus not property loan stocks (PLSs).

The literature (national and international) consensus is that listed property can be equity security, fixed-income security or hybrid security in a diversified investment. However, the dominant school of thought is that listed property funds has similar characteristics supported by empirical studies by Myer and Terris (1995), and Friday and Higgins (2000) and the less dominant school of thought is that listed property has gilts characteristics supported by empirical study by Kuhle (1987). Most of those empirical studies were undertaken in United States of America. At the moment, in South Africa (SA), there hardly any empirical studies comparing listed property funds and other asset classes expect a few real estate analyses by real estate analysts such as Leon Allison from First South Securities (South Africa) which show high positive relationship between listed property funds and bonds.

Directly held property is a complex asset due to its physical structure, types of property, and natural forces and factors that affect land. Proper and efficient maintenance contribute to the value appreciation of property. When you diversify through usage of directly held property, it is better to have a limited the number of properties included in a diversified investment portfolio in

order for them (physical property) to be manageable. The more physical properties you have in an investment portfolio, the more people needed to manage those physical properties. More importantly, physically help property has direct impact on the listed property fund. Tax changes can either persuade or dissuade people to invest in property market.

In attempting to establish whether or not PUTs increase the overall returns of diversified investment portfolio conclusions were drawn from literature survey, research findings and hypothesis testing. There was no conclusive evidence suggesting whether PUTs enhances overall absolute returns; however, listed property funds reduce risk of the diversified investment portfolios. In certain case, as shown by Kuhle (1987), the more assets investors include their investment portfolios, the more risk reduction is prevalent in diversified investment portfolios. Other studies such as Friedman (1971) showed the inclusion of listed property trusts in a diversified investment portfolio minimizes maximum losses and earns reasonable returns. Therefore, listed property is a hybrid security and diversification does not necessarily increase after risk-adjusted returns but does reduce risk.

From available data, the hypothesis test confirmed that introduction of PUTs in a diversified investment portfolio does not necessarily increases returns. The research report further confirmed that listed property funds have both characteristics of equities and fixed-income securities.

Going forward, having a diversified investment portfolio is an advisable strategy especially in case of unforeseen market conditions. Diversified investment portfolios works more like *defensive stocks* because investors make minimum losses while making reasonable returns during unforeseen circumstances.

Historically the property market has outperformed other markets. Finally, diversification seems not to increase the overall returns of diversified investment despite decreasing the risk of diversified investment portfolio.

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted to the Department of Construction Economics and Management in the Faculty of Engineering and Built Environment, University of the Witwatersrand (Johannesburg, South Africa) for the partial fulfillment of the requirements of the degree of Masters of Building (Property Development and Management). It has not been submitted before for any degree or examination in this or any other Institution of Higher Learning.

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Tumellano Sebehela

January 2007

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To the Man above, thank you for giving courage and strength to write this report.

Glossary from understanding of the literature

a) Defensive stock is a stock when there is unexpected market occurrences, the stock does not make major losses or gains.

b) Diversified investment portfolio is a portfolio that includes at least two of the following asset classes, namely: equities, bonds, cash, and property.

c) Hybrid security is a security that has features or characteristics of at least two different securities.

d) Index is a basket consisting of a numerous companies or securities and used to measure performance or movement of a specific sector or feature of the financial market.

e) International means any country in world except South Africa.

f) Local means within South African boundaries.

g) Property institution is any organizations that invest and research in property market.

h) Property market includes physically held property and listed property.

i) Property professionals are property analysts, asset managers and investors within property market.

j) Listed property includes property loan stocks (PLSs) and property unit trusts (PUTs).

k) Primary residence is a primary residence as explain in South African Taxation Act.

l) Prime rate is the interest rate at which South African Reserve Banks lend money to the public.

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CHAPTER 1 - INTRODUCTION

1.1 Background

The purpose of this study is to investigate the impact of Property Unit Trusts (PUTs) in a diversified investment portfolio in South Africa. Investing in PUTs in South Africa started around 1969 according the Association of Property Unit Trusts of South Africa (APUTSA), when only two trusts were established and listed on the Johannesburg Securities Exchange of South Africa (JSE). Listed property encompasses Property Unit Trusts (PUTs) and Property Loan Stocks (PLSs). Listed property on the JSE in 2004 stood around twenty-four billion Rand and over seventeen billion Rand is PLSs. Now, in 2007, the value of listed property is around twenty billion Rand. Unit Trusts Control Act, No.54 of 1981 used to regulate PUTs but since March 2003 it was replaced by Collective Investments Scheme Control Act, No.54 of 2002.

There are a lot of uncertainties in the financial world that cause investment portfolios to either make losses or unacceptable absolute returns. Despite of uncertainties, investors want to make positive absolute returns continuously. In optimizing returns of diversified investment portfolios, different percentages of funds are invested in different asset classes; namely: equities, bonds, cash and property. Each asset class has its own characteristic that makes it unique. Funds invested under property sector are either in the form of listed property or directly held property. Brueggeman and Fisher (2001) say that within listed property, there are three types of trusts, namely; equity trusts, mortgage trusts and hybrid trusts. The fundamental difference between the three mentioned trusts is that equity trusts' exposure is only in stocks, mortgage trusts' exposure is only in mortgage and hybrid trusts can be a combination of any two different securities; normally hybrid trusts' exposure is to both bonds and bonds.

The process where funds are allocated to different asset classes is called diversification. Portfolio theory is one of the most prominent methods used for the explanation and finding out the results of

diversification. According to Statman (1987) and Litterman and the Quantitative Resources Group, Goldman Sachs Asset Management (2003), the aim of diversification is to reduce the risk of the portfolio by introducing non-correlated asset. The more assets are non-correlated, the lower the risk of the portfolio which might give better returns.

The main benefits of investing in real estate are capital appreciation of the asset and rental income according to Benjamin and Chinloy (2000), Case (1956), Brown (1991) and Bodie, Kane and Marcus (2002). After taking into account deductions, you receive 'a nice cash-on-cash return' on your property (Stone and Strauss, 1999). Real estate has characteristics of debt and equity behaviors that enhance real estate performance. If this statement is true, then in a diversified investment portfolio that has listed real estate, there might be no need to have equities or bonds. Some authors such as Jaffe and Sirmans (2001) say that there are other good reasons to consider real estate investment; reasons such as profit and protection from inflation. Later this report will state other reasons.

Traditionally investors have invested in PLSs rather than PUTs because of the high flexibility of PLSs. Over the years some clauses governing the PUTs have been changed (for instance, PUTs can gear up to 30% of the value of the fund: Collective Investment Scheme Control Act, 2002, No.54 of 2002). Will the change of some clauses help PUTs to enhance their returns? Ideally an increase in debt should increase return on equity (ROE), but at the same time it introduces financial risk (the risk of gearing).

1.2 The Problem Statement

Most investment managers are trying to outperform financial markets, in doing so; they need to have the right investment portfolio made up of different asset classes. Some of assets have characteristics similar to other assets making it difficult for investment managers to have assets

with similar characteristics in the same investment portfolio. Empirical studies by Ramushu (2004) and Zagaretos (2002) show that listed property (Property Unit Trusts and Property Loan Stocks) have characteristics similar to equities and fixed income securities. Now, the problem is whether the inclusion of listed property will enhance the overall returns of diversified investment portfolio that includes bonds and equities?

1.3 Significance of the research

The importance of this research can be appreciated by the fact that diversification in most cases reduces the risks of investment portfolios in most parts of the world. Empirical studies by Markowitz (1952), Friedman (1971) and Ong and Sing (2000) illustrate that investors have been successful in reducing risks of portfolios through diversification. In the South African context from the academic perspective, there is a need to consider whether the inclusion of listed property in a diversified investment portfolio reduces a portfolio's risk. The crux of diversification is put your 'eggs' in different baskets that have non-correlated assets as stated earlier from Litterman and the Quantitative Resources Group, Goldman Sachs Asset Management (2003)'s readings. If listed property has its own unique characteristics then it might help to increase the returns of diversified investment portfolios due to risks reduction.

1.4 Research Objectives

The primary objective is to find out if the inclusion of property unit trusts (PUTs) enhances overall returns of diversified investment portfolios.

Hooks and Kriss (1995) and North and Ring (1967) say that listed property's performance is indirectly affected by directly-held property. Therefore, an investor in listed property market should be aware of things such as material used to build the building and factors affecting value of

directly-held properties, and regulatory and taxation mechanism of various listed and unlisted properties.

1.5 Limitations and Assumptions

- The research report focuses mainly on PUTs and not much on PLSs.
- The focus will be on six PUTs listed on the Johannesburg Securities Exchange of South Africa (JSE).
- The constituents of the indexes have change over time. Therefore, indexes might not be consistent over time and there might be discrepancies in true reflection of market values of indexes.
- It is assumed that minimum acceptable correlation co-efficient is at least fifty percent (50%). Therefore, the more correlation co-efficient is less than fifty-percent the it makes sense why those particular assets should be in the same diversified investment portfolio.
- The time series data is from 1995 to 2004.

1.6 Outline of the Research Report

Chapter 2 Literature Review and Theoretical Framework

The literature review is drawn from the property, insurance, taxation, and finance and investment local and international disciplines. Different school of thoughts' views of property investment will be reviewed.

Chapter 3 Research Methodology

There are is qualitative and quantitative research methodology when analyzing data. In this research report, quantitative methodology would be used as there is secondary available data from different sources about listed and unlisted property markets. Ong and Sing (2000) suggest that the returns from empirical data are most likely to be driven by market fundamentals as opposed to

people's perceptions. Available data on performance of both listed and unlisted property should be a fair representation of what happened over the years. In order to draw conclusions, different statically variables will be calculated and results from variables will be compared to literature review.

Chapter 4 Interpretation of results

Chapter four interprets results from chapters three. Hypothesis testings are undertaken in this chapter and calculation of other statistical variables that help in analysis the results are calculated.

Chapter 5 Conclusion

Conclusions are made in chapter five. Results of the research findings, literature surveys, and hypothesis tests make conclusion and recommendations. This chapter also gives the overview whether or not research objectives have been met. The chapter also outlines areas that might need to be researched in future.

Chapter: 2 - LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 History and background on different assets

Over the years, individuals invested mainly in capital markets, equities, and cash. The bond market is the oldest of all the three investment markets. At least fifty years ago, cash and instruments invested in equities and capital markets were not same as nowadays securities. More exotic products are in the market with different features and risk levels, making investors to be cautious about their investment strategies. More and more investors started sourcing for new opportunities to grow their investments and investing in property market was seen as an alternative. However, according to Brueggeman and Fisher (2001), initial investments in property market were in directly-held property. Thereafter, the phenomenon of investing in listed property started and was initially spearheaded by developed countries.

2.1.1 Bond market

The bond market is also known as the capital market. In this market, long-term financial instruments are exchanged. Long-term financial instrument matures or expire after one year from the issue date. In June 1989, Bond Exchange of South Africa (BESA) was established as house for capital market instruments. Manning, Rodriquez and Roulac (1997) say that this market has both primary and secondary markets. In this market (both primary and secondary), long-term investors who want take-limited risk invest in the bond market.

Generally, the longest maturity period is thirty years. The Long-term bond is the best indicator of what you can earn on a risk-free investment. Property investment, just like the fixed income security, is ideal for investors who want long term, good returns on their investments. Both assets (property and bonds) perform fairly well under stable interest rate environment. According to Jaffe and Sirmans (2001:501) “Real estate markets are rapidly becoming integrated into capital markets”.

Issuers and investors are main market participants. Issuers are government institutions and big corporates that issue bonds while investors are banks, insurance companies, hedge funds, mutual and pension funds, and trust companies that invest in bonds.

2.1.2 Equities

Equities are also known as shares or stocks. In South Africa shares are traded on the Johannesburg Securities Exchange (JSE). There are rules that govern companies listed on JSE and requirements needed for companies to list on the JSE such as Stock Exchanges Control Act No.1 of 1985 and Uncertificated Securities Tax Act No.31 of 1988. Shares can be issued through seasonal issues (shares issued by public trading companies) or through initial public offerings (companies issuing shares for the first time). Empirical studies by Downs and Hartzell (1995) show that equity prices are determined by market conditions and perceptions, mostly perceptions out there in the financial market. The same principle of individuals' perceptions applies when investing in a particular listed PUT.

2.1.3 Listed property

Investing or investments in PUTs in South Africa started around 1969, when only two trusts were established and listed on the JSE according the Association of Property Unit Trusts of South Africa (APUTSA). Listed property encompasses PUTs and PLSs. According the APUTSA, one of the reasons for formation of listed property was to encourage investment in property market for individuals and small pension funds on the JSE. In South Africa, the value of listed property stands around twenty-four billion Rand, six billion Rand is property unit trusts (PUTs) and the rest is property loan stocks (PLSs) in 2004. Now, 2007, the value of listed property on the JSE stands around hundred billion Rand. Leon Allison of First South Securities (South Africa) said that listed property phenomenon has been established long time ago in developed countries.

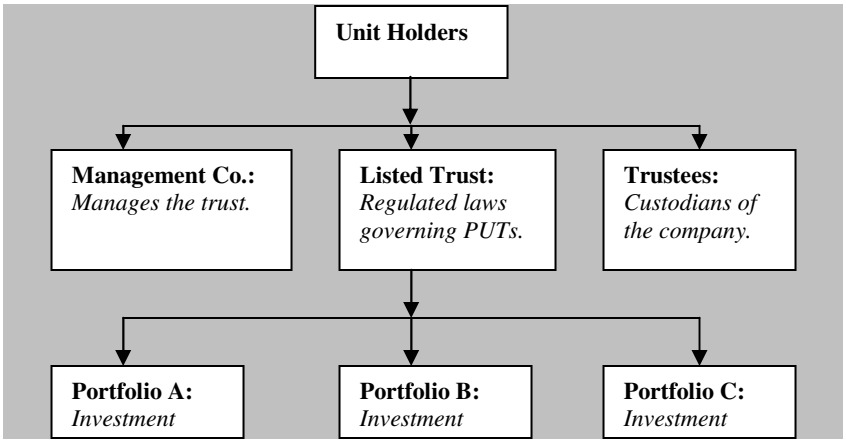
According to the National Association of Real Estate Investments Trusts (NAREIT) in the United States of America (USA) “Real investments trusts (REITs) are an efficient way of many investors to invest in commercial and residential real estate budiness”. In 2004, values of REITs in the USA exceed four hundred billion US dollars. The growth of listed property in the United States of America (USA) can be attributed to the notion that pension funds had to hold substantial proportions of their investment in new investment class, listed property; in the 1970s according to Downs and Hartzell (1995).

Until recent changes to clauses governing PUTs and PLSs, the norm has always been more on investors investing in PLSs than PUTs. One reason being that clauses governing PLSs were and are still not stringent compared to those governing PUTs, hence giving more flexibility in PLSs investment; from Collective Investment Schemes Control Act (No. 45 of 2002).

Eldred and McLean (2001) say that the value of the fund or trusts will be influenced by physical and economic characteristics of the land. Investors look at *yield* when investing in listed property. Therefore, factors that influence yields of the PUTs are important to the investors. Some factors such credit rating of an asset and government policies are important to bond investors while other factors such as perception on the asset are more important to equities investors. Investing in PUTs or PLSs is the almost the same, difference lies in the regulation of PUTs and PLSs according to William Midgley of Edward Nathan Fridland Inc. The characteristics and regulatory framework of listed property will be discussed later. So far, it can be inferred from the different authors’opnions and studies, that some writers and appraisers such as Mader (1975), North and Ring (1967) and Zagaretos (2002) say that listed property is a hybrid security, in certain cases with more equities characteristics than fixed income or visa verse.

In order to able to analyse and understand the impact of physical property and other market related features on PUTs, one needs to understand the structure of the PUT investment, showing all its stakeholders.

The rough structure of PUTs:



Rough sketch- Tumellano Sebehela (information from William Midgley)

The unit holders are the owners of the trust according to William Midgley of Edward Nathan Fridland Inc. One can only become a shareholder in the trust by purchasing unit that is part of the trust. Units are put in one special purpose vehicle (SPV) to form a PUT. Then PUT is listed on the JSE according the rules of the JSE. The management company is formed solely to manage the trust. However, there are trustees who are the custodians of the trust. The trust can invest in more than one portfolio and normally pays tax at forty percent according to South African Revenue Services (SARS).

PUTs like real estate investment trusts (REITs), when they (PUTs) sell shares in property companies do not pay capital gains tax. Garrigan and Pagliari, Jr. (1995) say that the idea behind REITs was to create leveraged investments for tax-exempt investors. The implication is that investors would invest in REITs over a long period and only pay tax then, when selling their shares. Individuals who invest in the property market are taxed between zero percent and ten percent capital gains tax. The other route of investing in a PUT is by buying shares of companies

owning properties. Income from PUTs is taxed in the hands of shareholders not the company. Currently, companies also pay Secondary Tax on Companies (STC) on dividends that they declare and is standardize currently at 12,5% more over companies tax paid as per SARS' instructions. PUTs offer long-term value at low risk and its income is highly predictable.

In 2004, there were only six listed PUTs on the JSE. Each PUT is worth at least one billion South African Rand as shown by appendix 1. According to Leon Allison and William Midgley, investors would not normally invest in PUTs less than one billion Rand because of restrictions such as investor's holding in that trust is small from Collective Scheme Act's perspective and liquidity problems. Due to these restrictions, normally an investor would hold at most 5% of the trust. This would not make any major impact to investor's investment portfolio according to Leon Allison. Investors in listed property get rental income in the short run and value appreciation in the long run according to Fleming (2002), same rule applies to PUTs. This gives listed property a hybrid character.

In 2004, there were twenty-three PLSs listed on the JSE. Most of the stocks are less than one billion Rand in value and it is not encouraging for investors for the same reasons as in PUTs, however there is more variety in PLSs than PUTs. However, as time evolved, some funds have increased in size, in 2007 some funds are worth at twenty billion Rand.

2.1.3.1 Regulation of listed property in South Africa

Listed property in South Africa is not governed under a specific Act or regulatory framework according APUTSA but different acts govern listed property, such as JSE Listings requirements, The Companies Act of 1973 and Securities Regulation Code on Mergers and Takeovers (pert of JSE Listings Requirements), Collective Investments Schemes Control Act No.45 of 2002 and Standard Trust Deed (formed by the trustees of the trust). The Companies Act of 1973 and

Securities Regulation Code on Mergers and Takeovers (part of JSE Listings Requirements), and JSE Listings Requirements regulate PLSs while Collective Investments Schemes Control Act No.45 of 2002 and Standard Trust Deed (formed by the trustees of the trust) and JSE Listings Requirements regulate PUTs. Collective Investments Schemes Control Act No.45 of 2002 is the important one for PUTs regulation because of changes that it has brought. Here are some changes to listed property sector that were brought by introduction of Collective Investments Schemes Control Act according **Mr. William Midgely of Edward Nathan Friedland Inc.:**

PUTs can now gear up to thirty percent of the book value of the assets as stated earlier. If PLSs are taxed, then individuals might opt to invest in PUTs. PUTs must be listed on the JSE but it is not necessary for PLSs. PUTs are over regulated because any changes that PUT management has to make, the management has to get permission from someone as per regulatory environment.

Some authors such as Roulac (1995) say that the lower debt level of listed property is advantageous in rising interest rates. High debt increases the Return on Equity (ROE) and investors like companies with a high ROE. More importantly, the trust can use excess funds in the form of debt to make more acquisitions or invest in other profitable businesses.

2.1.4 Physically held property

Investing in physically held property has been practiced for many centuries. Brueggeman and Fisher (2001) say that during those years, physical held property was not differentiated. Currently, there is much differentiation in physically held property according to characteristics, functionality, age, location, grade of the property and size according to Harvey (1992). Therefore, it is important that investor should take all these into account when investing in physically held property.

Rents and vacancy are the main factors to look out for office sector according to Kateley (1995). Institutions invest heavily in office real estate investments. When investing in retail sector, it is

important that investor should know what kind of retail sector he is investing in. For example, is it neighborhood, community or regional retail sector? Kateley (1995) say that retail and industrial needs specialized skills but office sector does not need specialized skills. In South Africa, most listed property is mainly made of retail property. “It allows owners to participate in the success of the center’s merchants by sharing in the sales achieved in each store, over, and above negotiated minimum or base rent” (Kateley 1995: 411). Between 2003 and 2004, non-listed property in South Africa is approximately 31, 5 billion Rand according to Wiliam Midgley.

According to Dorhmann (1995) the characteristics of directly-held property are physical and economic ones. Physical characteristics include the immobility, indestructibility and non-homogeneity, and economic ones include situs (economic location rather than geographic location), scarcity, modification improvements and fixity of investment.

These physical qualities make one property to be different to another property irrespective of their locations according to authors such as Scarrett (1996). Buildings are also classified into grades according to the amenities they offer, location of the building and maintaince of the building. For instance, the building that is well maintained will normally be more valuable than the less maintained one. Being well maintained includes cleanliness of the building, walls being painted and supporting structures such as furniture being used being in order.

2.2 History and background on diversification

Diversification has been described in numerous ways by different authors. Despite of these different definitions, the concept is the same or similar. Different investors according to their schools of thought believe in different mechanisms to achieve diversification.

Brown (1991) focuses on the number of different assets that should build a diversified portfolio. Stevenson (2001) is concerned about the correlation between different asset classes. Addae-Dapaah, Ebrahim and Wee (2002) talked about reduction in volatility in relation to improvement of risk-adjusted returns. Bodie, Kane and Marcus (2002) and Statman (1987) say that diversification is achieved by including more assets in a portfolio in order to reduce portfolio's exposure in relation to 'firm-specific factors'. Hargitay and Yu (1993) talked about having a 'bundle' of assets in order to have the most desirable returns.

From the above schools of thought, we can see that to achieve diversification; time, different asset classes, national and international geographical regions, and sectorial allocation play an important role. Investors have a choice of investing within certain sectors of property or geographic regions.

Stone and Strauss (1996) say that real estate investing has evolved over time but it used to be based on region (geographic/economic) and type of property. Investing in physically held property is complex because of heterogeneous structure of the land, different temperatures from different seasons, government laws, and world disasters (for examples; earthquakes, volcanoes, and storms). Empirical studies by De Bondt (1995) show that other factors such as real estate cycles have great effect on the value of property. Their effect will be discussed later. However, it should be noted that the value of listed properties is directly and indirectly affected by the value of non-listed property. Theoretically investing either in listed property or physical property should not make any difference. Laws and neutral forces beyond human nature's control might bring up the difference in performance and returns.

In diversification, different valuation techniques and mechanisms are used to arrive at particular conclusion. Markowitz (1959) says that the ultimate goal of all this process is to reduce risk and hopefully the absolute returns of the portfolios will increase due to risk reduction. Different

portfolio strategies should be taken into account during diversification at different time intervals. Litterman and the Quantitative Resources Group, Goldman Sachs Asset Management (2003), Fabozzi (1998), and Bodie, Kane and Marcus (2003) define portfolio strategy by *selection* (designing or investing in a desired portfolio), *allocation* (choosing the assets to include in your portfolio), and *timing* (acquisition, disposal and changing of portfolio and its components).

Mader (1975) says that, there are two types of risks that investments are exposed to, namely; unsystematic (market) and systematic (non-diversifiable) risks. Studies by Bodie, Kane and Marcus (2002), and Friedman (1971) show that the main reason for diversification is to reduce market risk not to increase returns. In any investment, the investor should automatically be compensated for systematic risk by getting risk-free rate of return by investing. However, should he or she wants to take additional risk, the investor should be compensated for taking extra risk.

However, the investor should be aware that risk-free rate varies for different assets. Risk free rate is not risk free in the true sense, but is the minimum rate that investors benchmark their required minimum returns. Generally risk free rate is standardized against the government "standard" bond which generally has the shortest maturity according to Darst (2003). The challenge is to construct a portfolio that suits investors' risk and utility levels at same time have assets that are independent (non-correlated assets) of each other.

"The *portfolio problem* is defined as a problem of choosing a collection of individual investments, or bundles of investments, that taken together have the most desirable characteristics with respect to risk and expected return" (Hargitay and Shi-Ming Yu 1993: 15). Throughout portfolio construction and during management of the desired portfolio the objectives of the investor always should be taken into account.

Statman (1987) undertook an empirical study on how many stocks make a diversified investment portfolio. According to him, there was a general held notion that between ten to fifteen stocks makes a diversified investment portfolio. He goes further to say that the risk of stocks in a portfolio depends on individual stocks, their variances and their co-variances. Therefore, as long as the variances and co-variances of stocks in an investment portfolio are negative, more stocks can be added until variances, co-variances and correlation co-efficients start to be positive. The results from his empirical study showed that a well-diversified investment portfolio must include, at least, thirty stocks from borrowing investor and forty from lending investors. His reasons for investors not increasing number of assets in an investment portfolio were that some investors were looking for "safety first". Therefore, investors want to be guaranteed certain level of return as per their risk profile. Other investors were concerned about the skewness of the return as well as with the mean and variance. Hence, investors prefer their distribution curve to be normal irrespective of whether their potential absolute returns are higher on skewed distribution curve or not. More importantly, Statman (1987) encouraged investors to overlook the notion on investors' goals and preferences when constructing investment portfolios but concentrated where higher returns can be earned the most.

One of the most common ways of diversifying is through bond/equity split. Litterman and the Quantitative Resources Group, Goldman Sachs Asset Management (2003) and Markowitz (1959) say that the bond/equity split is diversification across public traded equity and fixed income securities, the level of currency hedging, the level and structure of active risk and investing in other securities, for instance: hedge funds, private equity and real estate. The bond/equity split is the most common technique used because it is the driver of portfolio risk. Aggressive investors will invest more into equities than fixed income securities, and visa verse.

What macroeconomic and microeconomic parameters to use when analyzing different asset depends from one investor to another. Studies by Gordon, Jr. and Liantonio (1995) show that different property appraisers use different macroeconomic and microeconomic variables depending on the type of property and view on a particular investment. For example, investors might use the following: interest rates, inflation rates, legal framework, management company, quality of management, history of volcanoes and earthquakes in that country, age of property and others. However, Addae-Dapaah, Ebrahim and Wee (2002), Jaffe and Sirmans (2002) and Markowitz (1959) say that there is a consensus that certain factors should always be taken into account, for instance interest rates and inflation rates.

After the analysis, the challenge is to allocate assets to suit a "desired portfolio". Before allocating different assets to an investor's "desired portfolio", each asset's impact to the portfolio should be tested. Beresen and Levine, Brown (1991), Markowitz (1959) and Young (1993) say that testing of each asset's impact to the portfolio is usually done through linear programming. This technique tries to look at the impact on dependent variable from changes by independent variables.

The following binomial model is used as an example to illustrate linear programming technique and concepts were taken from Litterman and the Quantitative Resources Group, Goldman Sachs (2003). However, the variables in the model are given different meaning to the original example so that they (variables) explain property market type of environment. $\gamma = \alpha + \beta_1 \chi_1 + \beta_2 \chi_2 + \varepsilon$, where γ = returns on property investment and is a dependent variable, α = constant (y-intercept), X_1 = interest rates, X_2= income spend on property (for example, money that first-home-buyers use to buy property), β_1 & β_2= slopes of the binomial and ε = error term. X_1 and X_2 are independent variables. The number of independent variables depends on the desired portfolio and on what investment analyst thinks about desired results by a particular investor as sated earlier.

From the above example, it can be seen that an increase in interest rates and income spend on property increases the returns on property investment. Assuming that interest rates are increasing going forward, an investment manager will have an investment strategy that allows him or her to increase rentals per increasing interest rates going forward. It is also assumed that as more people enter the job and their disposable income increases, the need to own properties by non-property owner increases. For instance, if the lessee was renting a property, the lessor should have inserted a clause within a lease contract that allows him or her to increase rentals as per increasing interest rates. The same rule would apply for increases in income spend on property. Therefore, ideally the landlord should sell property at higher prices. When the opposite happens to interest rates, the landlord should give lessees long tern lease agreements. This will help the landlord to charge interest rates above the market interest rates during declining interest rates.

In reality, there might be factors that might affect parameters of the above linear programme such as booms and busts in the property market which are not modelled in the linear model. However, they are related to the model because interest rates have impact booms and bust in the property market. Boom and bust in the property market cause real estate cycles. Offices, shopping malls, warehouses and vacant land benefit from real estate cycles. “The booms and busts of real estate have been most spectacular for office buildings, shopping malls, warehouses, and undeveloped land”(De Bondt 1995: 1156). Sometimes they bring negative effects to property market like decline in value, vacancies, rents and building activities.

The challenge to the investment analyst is to be able to model the impact of boom and busts in his or her linear model. However, the major problem of real estate cycles is more psychological than anything else according to Hudson-Wilson (2002). For instance, if there are booms in property market, people might interpret it as a possibility of over supply. This might lead to people not investing in more into property market and causing existing properties to remain vacant. On the

other hand the boom might be due to foreign investors having confidence in South African economy.

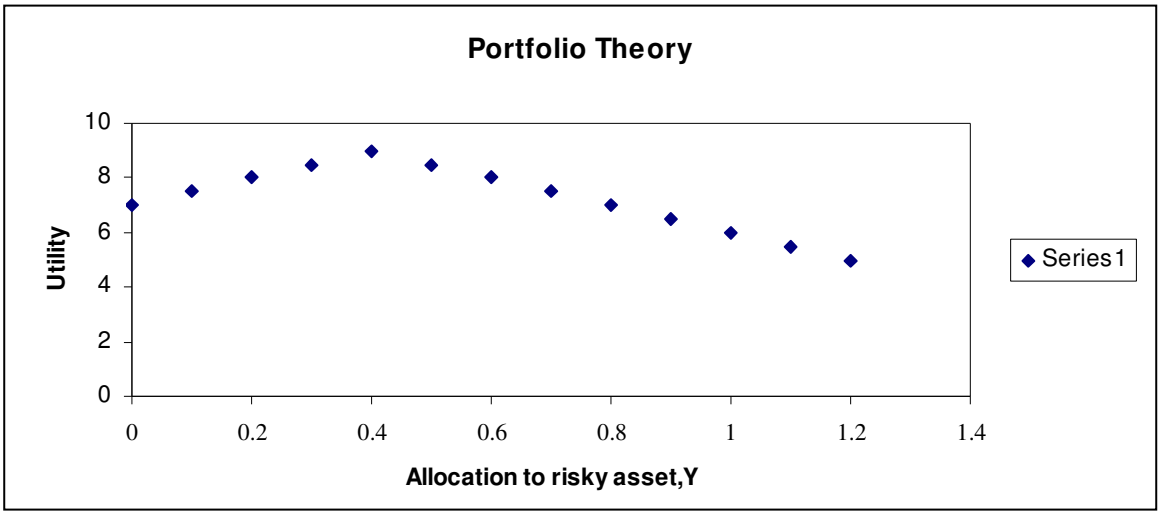
Major concern, for example is when investors react negative to either booms or busts. Studies by De Bondt (1995) have shown that during the last decade, there has been high prices volatility in real estate markets in the United States of America (USA), especially in office sector. Price volatilities were due to changing property prices; which affect the overall returns as indicated by the linear model. In some cases, the property prices increased to high levels, causing shortage money to buy building materials. This might cause constructors to use non-quality material and building non-quality properties. It is imperative that real estate cycles should be interpreted correctly at all times so that people make right decisions accordingly.

After checking the impact of each asset on the desired investment portfolio, the next step is to allocating different percentages on different assets in order to possibly achieve desired absolute return. The process where different assets are allocated to the desired investment portfolio is called asset allocation.

Asset allocation

In asset allocation, the investment manager tries how best to allocate funds such that investor's investment wants or needs are matched. One common phenomena of asset allocation is portfolio theory as shown by figure 2.1. However, it has its own short comings such as working mainly in idealistic world. Geltner and Miller (2001) and Markowitz (1952) say that the reason behind portfolio theory is that it assumed maximization of returns can be achieved at certain level of risk. Beyond the risk level where returns are maximized; investors would not be interested in taking additional risk to already taken one (risk level). Markowitz (1959) says that ideally, there should be more compensation for taking additional risk. Moreover, Markowitz (1952) in his study on

portfolio selection, that diversified portfolios vary as per discounting interest rates. This one criticism of portfolio theory that it (portfolio theory) does not illustrate compensation for taking additional risk after individual's highest risk level is achieved.



Source: Figure 7.4 (Bodie, Kane, and Marcus; Page: 192), Figure: 2.1

Figure 2.1 shows that at certain level no matter what asset you allocate to the portfolio, it will not make any difference to the investor's utility level. According this figure at that point (0.4; 9; in the above diagram) approximately, investor is not willing to take more risk. The challenge for the investment analyst is to allocate assets within a portfolio such the portfolio mix, matches the investor's utility, in this case point (0.4, 9) (approximately). Another short fall of portfolio theory is that it only explains asset allocation in terms of investor's utility not according to market conditions. The investor should buy under-priced securities and sell over-priced securities. "The strategy he should adopt in this case is to invest as much as possible in those assets which he knows to be under-priced because he can be guaranteed that they will provide abnormal performance" (Brown 1991: 209). At some point of risk level, individuals will not be willing to take additional risk because additional risk does not increase the overall wealth. Investment professional will need to create a balance between the risk appetite and loss that investor is willing to take. However, risks in investments cannot be avoided.

Some risk reduction can be reduced through international diversification. However this technique exposes an investor to currency fluctuations. Hence, the investor needs to come-up with currency hedging mechanisms. Hull (2006) says that ideally, currency hedging should be over a long term. Short term currency hedging is costly in terms of labour and techniques to be used. Long term currency hedging looks from a point to a point. In this kind of environment active management strategies are encouraged. According to Litterman and the Quantitative Resources Group, Goldman Sachs Asset Management (2003), most investors use *top-down*[1] approach to allocate their assets.

Asset allocation can be divided into policy asset allocation, dynamic asset allocation and tactical asset allocation.

Pagliari and Webb (1995) say that policy asset allocation is a long term view in which investor tries to allocate different assets in such a way of representing balance risk profile with enhanced return. This strategy is likely to be good for allocation that includes property.

Dynamic asset allocation emerged recently according Hull (2006). Asset mix is mechanically shifted in response of changing market conditions. Re-balancing of portfolios happens now and then and in turn, it exposes the investor to hedging risk. It would work for listed property not for non-listed property. Hedging risk is minimized either through dynamic hedging[2] or static hedging. Static hedging works better for non-listed assets and dynamic hedging for listed assets.

[1] First you look at the world. Then choose countries that are stable with good investment returns. From those countries look at well performing sectors. Ultimately invest in well performing companies within good performing sectors.

[2] More on dynamic and static hedging please see Hull (2006), Page: 345.

Tactical asset allocation is generally applied after policy asset allocation. Empirical studies by Chandrashekaran (1991) show that a departure from original asset mix may be permitted because of changing investment environment. Many strategies are involved under tactical asset allocation. It is more a fundamental approach to investment and allows change accordingly. Therefore, it is good for both listed and non-listed property. Tactical asset allocation can be approached either through *valuation approach* or *cyclical considerations.*

Valuation approach is based on the risk premium approach according to Markowitz (1959), Strong (1996) and Young (1993). It is applied in conjunction with the other three strategies (policy, dynamic and tactical asset allocations). For example, if you have three assets (property, equities and bonds) and returns are in the following descending order: property first, equities second and bonds last. Most asset allocation goes to property and smallest allocation goes to bonds. The logic is that most allocation should be allocated to the asset that gives most returns. Cyclical considerations are based on cycles of assets' price movements. Assumption is that, movement in asset's price is due to economic movements. De Bondt (1995) goes further to say that many market investors large rely on the economic activity of the place rather than past asset price's movements. This approach is ideal for index construction. Every time the asset moves and changing its percentage in the portfolio, one rebalances the overall portfolio.

Blom (1990) says that asset allocation works well in an investment portfolio when there is *rotating price leadership* (no asset class dominates other assets), *stable relationship* (returns, risk and interrelationships performance amoung assets remain constant over time) *low correlations* (asset do not move into the same direction), *stable ingredient/result profile* (small errors in ultimate portfolios), *appropriate rebalancing activity* (good monitoring and balancing) and *good investor judgement and skill* (well qualified professionals who understand their work). Between late 2003 to early 2004, asset allocation in South Africa was more or less allocated in the following

percentages; seventy-three percent in equities, eighteen percent in bonds, 7.5% in cash and 1.5% in property according to most investment managers. However, the investor has to re-balance his or her portfolio as per market changes. The re-balancing exposes the investors to risks such rolling over risk and hedging risk. This investment manager will indirectly need more resources to make sure that original investors' investment needs are met.

After asset allocation, the investment manager has to manage the overall desired portfolio so that individuals' returns are achieved. The process where the desired portfolio is managed is called portfolio management.

Portfolio management is about managing an investment portfolio in the best possible way in order to meet the objectives of the investor. The size of real estate is important for managerial reasons and daily monitoring for the asset's life. "Portfolio size is critical in real estate than in other asset classes due to the indivisibility of the asset itself and to discontinuities in the spectrum of available investment vehicles" (Louargand and Muller 1995: 967). The two most common used portfolio strategies are passive and active. These strategies apply to listed property and other asset classes. For directly held property, a management company will be formed in which different functions would be assigned to different people or divisions. The main company might outsource to different consultants or contractors some functions like cleaning and maintenance of the buildings.

Passive strategy for listed securities is based on the norm that there is an efficient market hypothesis (EMH). However, there has been criticism that EMH does not hold. Whether stock market crushes are due non-efficiency in the market or investors not reacting on time for new information, it (crushing of stock markets) needs to be researched further. Fama (1965) proved that EMH has three stages, namely; active EMH; when all information is priced in market, moderate EMH; when some information is priced in the market and weak EMH; when no information is

priced in the market. Darst (2003) say that active strategy is based on the belief that there are gaps in the market and exploitation of these gaps will result in superior returns.

2.2.1 Diversification using listed property

Diversification through usage of listed property in South Africa can be done by inclusion of either PUTs or PLSs in investment portfolio. Listed property diversification is a complex mechanism, which is affected by the physical property that makes the listed property and stock market perceptions.

There are different schools of thoughts about different characteristics of listed property according to Bodie, Kane and Marcus (2002), and Scarrett (1993). Some authors say listed property has characteristics of equities, other say listed have characteristics of bond mostly while others say listed properties are hybrid securities.

Friday and Higgins (2000), Acheampong, Hwa and Newell (2002), Hudson-Wilson (2002), Jaffe and Sirmans (2002) and Ramushu (2004) say that listed trusts are hybrid securities, Kuhle's (1987) empirical studies show that listed trusts and common stocks are not significantly different while O'Neal and Page (2000) say that is depends on what makes the listed property trust.. "Given the definition of real estate as a debt-equity hybrid, it only makes sense for the real estate investor to consider real estate as an asset for which the debt and equity components can be purposefully weighted to suit the investor's needs"(Hudson-Wilson 2002: 700).

O'Neal and Page (2000) in their study on abnormal performance and fund characteristics of real estate mutual fund looked at whether the inclusions of real estate mutual funds brought any diversification benefits to the diversified investment portfolio. Prior to analyzing their own data, they looked studies carried out by Kuhle, Walter and Wurtzebach (1989), Titman and Warga

(1986), Geobel and Kim (1989), Chan, Hendershott and Sanders (1990), Glascock (1991), Martin and Cook (1991), Myer and Webb (1993b) and Jensen (1968). Empirical studies by Kuhle, Walter and Wurtzebach (1989), Titman and Warga (1986), Geobel and Kim (1989), Chan, Hendershott and Sanders (1990), Titman and Warga (1986), and Glascock (1991) showed that the inclusion of Real Estate Investment Trusts (REITs) did not bring abnormal absolute returns; however, risk reduction was minimal This would imply that from those empirical reports are not different from equities and bonds. It is borne in mind that since REITs grew immensely in the mid 1990s. Liquidity in listed trusts in the mid 1990s was not as high as in the 2000s. Interestedly, Jensen's (1968) empirical study showed that when using Jensen's alpha, equity funds showed a negative risk-adjusted accomplishment in relative terms over 1945-64. This would imply that REITs have different characteristics to common stocks. REITs' inclusion in a diversified investment portfolio in Jensen's empirical study suggests that they (REITs) have diversification benefits.

O'Neal and Page (2000) used a model that was similar to the one used by Elton, Gruber, Das and Blake (1993) and Carhart (1997). In their sample, twenty-eight funds were aggregated into a single portfolio. The significance level for their hypotheses test was at an alpha of five percent (5%). The correlation co-efficient (ρ) between Standard and Poor 500 (SP500) and REITs -0.0006, ρ between REITs and MSCI World Stock Index was 0.077 and the model's R^2 was 0.98. R^2 in the model, how best the dependent variable explains the movement of independent variable MSCI World Stock Index is an index made of all blue chip companies round the world. The index is re-evaluated once annually. The calculated variable (ρ=-0.0006) clearly shows that REITs are different common stocks and bring diversification benefits. It can be inferred from this, that REITs do not have similar characteristics similar to stocks or shares. However, there were no abnormal absolute returns from the inclusion of REITs to diversified investment portfolios.

Kuhle (1987) looked at the effects of diversification on the reduction of total portfolio risk in REITs and mixed-asset portfolios. His empirical sample consisted of ex post monthly prices and dividends of a total of eighty-two firms (twenty-six equity REITs, sixteen mortgage REITs and forty-two common stocks listed on various stock exchanges). REITs were either defined as being equity REIT or mortgage REIT depending on equity or mortgage ownership. For REIT to be classified as equity REIT; it should have equity exposure of at least sixty percent and similar rule was applied for mortgage REIT classification. Any REIT which did not fit within the classification was left out of the sample.

The results of Kuhle (1987) showed that firstly, as the number of total assets increases in a portfolio, there was a substantial risk reduction. The assumption would be here that REITs had different characteristics to assets that were already in a diversified investment portfolio. Secondly, under normal distribution assumption, the study should that risk of common stocks is higher than that of equity and mortgage REITs. Therefore, the inclusion of REITs (both equity and mortgage) in a investment portfolio that has common stocks brings diversification benefits. The results further showed that diversification benefits are higher with equity REITs than mortgage REITs. All the above results were for an investment portfolio made up of non-mixed-assets. In essence, common stocks, equity REITs and mortgage REITs have different characteristics to each other in non-mixed-assets-portfolio. In a scenario like this one (non-mixed-assets-portfolio), there are diversification benefits due to inclusion of equity and mortgage REITs.

Kuhle (1987) went further to look at a mixed-asset portfolio. The results showed that firstly, equity REITs perform better than common stocks irrespective of number of assets held in a portfolio, while mortgage REITs do not perform better than common stocks. It can be inferred from the above statements that common stock have characteristics similar to mortgage REITs than equity REITs. This results contradicts Leon Allison (First South Securities); he says that the correlation

co-efficient between listed property and bonds could be as high as eighty-five percent. In conclusion, risk reduction of common stocks generally increases with number of stocks in the portfolio; however, for real estate assets, the number of funds does not have impact on risk reduction.

Myer and Terris (1995) took an empirical study on the relationship between healthcare REITS and healthcare stocks. Their sample of REITS had seven funds, namely; American Health Properties (APH), Health & Rehabilitation Properties Trust (HRPT), and Health Care Property Investors (HCPI), Health Equity Properties (HEP), Medical Properties (MP), Nationwide Health Properties (NHP) and Universal Health Realty Income Trust (UHRIT). A two-factor regression model was used to analysis the relationship between healthcare REIT and healthcare stock. The market was represented by the S&P 500 indices. The results showed a positive correlation between all listed property funds and S&P 500 indices. The correlation co-efficients between listed funds and S&P 500 varied between -0.035 for S&P 500 and AHP and 0.101 for S&P 500 and UHRIT. AHP was made up of ten acute care hospitals, three rehabilitation facilities and three psychiatric hospitals and UHRT was made up of six acute care hospitals, two rehabilitation centers and two psychiatric hospitals in 1992. More importantly, only two of the listed funds used for the empirical study had a negative correlation with S&P 500 and the rest had a positive correlation with S&P 500. In essence, it can be deduced that most listed healthcare funds have characteristics similar to common stocks. According to Myer and Terris (1995), two reasons why there is a positive relation between listed healthcare funds and healthcare stocks are that equity REITs (EREITs). Firstly, EREITs are traded on exchanges like common stocks; therefore, they are all affected by the same in-coming new information. Secondly, EREITs' returns are transaction based, whereas the returns of unsecuritized real estate are appraisal/accounting based. Another interesting point about their study was that REITs are homogenous in nature, hence, REITs most REITs are affected by same

information. The results were consisted with the arguments and assumption of the relationship between listed property funds and common stocks.

Friday and Higgins (2000) looked the day of the week effect in REITs. They used F-tests to determine whether the equality of the returns on each day-of-the week. According to Goffinet, Koehler and Merchant (1998) F-Test is used to whether two samples from populations have equal variances and comparison of two population means simultaneously. The results of their study showed that mostly traders buy REITs on Mondays and sell them of Fridays. This phenomenon is very common within equities market throughout the world. More importantly, information that traders use to make their decisions on REITs was the same information that was used by equity traders. More importantly, REIT trading was affected by overall market momentum in the absence of significant firm specific information. Interestedly, REIT portfolio's returns are positive on Monday when market's return was positive on Friday and visa verse. Their empirical study concluded that REITS behave more like common stocks or shares and less like real estate on a day-to-day basis. Therefore, REITs have characteristics similar to equities from day-to-day and adding REITs to a portfolio which has high exposure to common stocks will not bring any diversification benefits.

Jensen (1968) looked at the performance of mutual funds in the period 1945-1964. His study concentrate basically of two things; namely, portfolio analyst's ability to increase portfolio's performance through success predication of future security prices and minimization of amount of "insurable risk" born by investors in a certain portfolio. Authors from previous studies looked relative measures as opposed to absolute performance. He used a the following model, $E\left(\tilde{R}_j\right) = R_F + \beta_j\left[E\left(\tilde{R}_M\right) - R_F\right]$, where the tildes denote random variables,

and R_F = the one-period risk free interest rate. $\beta_j = \dfrac{\text{cov}(\tilde{R}_j, \tilde{R}_M)}{\sigma^2(\tilde{R}_M)}$ = the measure of risk (hereafter called systematic risk) which the asset pricing model implies is crucial in determining the prices of risky assets. $E(\tilde{R}_M)$ = the expected one-period return on the market "market portfolio" which consists of an investment in each asset in the market in proportion of its fraction of the total value of all assets in the market.

According to Jensen (1968) the model was based on the following principles; all investors have identical decision horizons and homogenous expectations regarding investment opportunities, all investors are risk averse, and are single period expected utility of terminal wealth maximizers, all investors are able to choose among portfolios solely on the basis of expected returns and variance returns, all transactions costs and taxes are zero and all assets are infinitely divisible. The results showed that 115 mutual funds were on average not able to predict future security prices in order to outperform buy and hold strategy. Therefore, one would assume that mutual funds' prices more like the common stocks and they (mutual funds) do not bring diversification benefits. On the second analysis, Jensen (1968) showed that on average mutual funds decrease "insurable risk" born by portfolio holders. Insurable risk in this case means the risk that accrues to shareholders for investing in a particular fund. However, mutual funds' prices movements are similar to common stocks. The risk reduction for the second analysis was more to with the strategies of the investment manager than diversification in the sense that the investment manager invested only in well performing mutual funds.

Friedman (1971) looked at the impact of selected real estate portfolio in an investment portfolio that included common stock. Real estate portfolio was made up of fifty properties from two different sources and common stock were fifty stocks listed on the New York Stock Exchange

(NYSE) and were picked up from Standard & Poor's Compustat Tape. Results of the study showed that there was a negative covariance between common stocks and real estate. Therefore, a fair assumption would be that real estate is different from common stocks. One reason according to Friedman (1971) was that real estate was a traded within various local markets and economic conditions for different regions are not same. Moreover, the study showed that taxes had an effect on the returns from common stocks as opposed to real estate returns. According to him, investors see the real estate as a tax shelter as opposed to common stocks. In conclusion, real estate in a portfolio consisting of common stock brings diversification benefits. The study further showed that real estate's returns are higher at a low risk than common stocks. In essence, Friedman's (1971) empirical study proved that real estate does not have similar characteristics to common stocks.

Bruggeman and Fisher (2001) say that structuring and maturity of leases influence characteristics of listed property. For example, take a ten-year lease, where the lessee has an option to renew the lease at the end of the lease period. When the lessee pays fixed periodically ten-year rentals, the lessee only pays what is agreed upon over the stipulated period of time. The lessor would have normally benchmarked the lease agreement on market conditions for the next ten years. In essence, the lease agreement would have some characteristics of fixed income market in the sense that rent payments are fixed over specific time. In this situation, the property can be viewed as having bonds' characteristics. When the lease expires at the end of ten years the lessor and lessee have to negotiate a new lease at the best possible price take into account market conditions at that particular period in time. This gives the lease equities characteristics because property make perceptions at that time will have influence on the price and conditions of the new lease agreement. For example, if interest rates are decreasing going forward then the landlord will prefer a long time lease in order to benefit from declining interest rates. If this example holds for the

fixed ten years period theoretically then you cannot have both bonds and listed property in your investment portfolio through out the lease period.

Typical diversification strategies are economic/geographic diversification, property type diversification, and management strategies which all indirectly affect listed property. Volk (1995) say that economic or geographic diversification has to do with right location and production capacity of the property. Physical property diversification focuses on how best to manage property in order to maximize income and minimize expense. In low inflationary environment, good economic growth and rise employment, the demand of property will be induced. Increasing demand in property might be through expansion of existing property offices and this might lead to increase in listing property. Good yield returns and higher liquidity offered by listed property also lead to more listing of property.

Authors such as Downs and Hartzell (1995), Jaffe and Sirmans (2001), and Fabozzi (1998) say that most listed trusts or funds invest retail, industrial, commercial and offices. Current listed property on JSE as shown by appendix1 is that similar trends as noted by the previous three writers hold in South Africa (SA) as well. Parameters such as retail sales, inflation rate, wholesale trade sales and manufacturing: production and sales indirectly influencing investing listed properties (retail, industrial, commercial and offices). Investing in vacant land is uncommon phenomenon, however individuals invest in vacant land because the land has future economic or investment benefits. Investors should bear in mind that there are costs associated with holding vacant land, although not much currently in South Africa for big property investors.

Geographically, property investors invest mainly in Gauteng, Kwazulu-Natal and Western Cape. Duni and Johnstone (1995), Kachadurian and Sack (1995), Domrese and Proud (1995), Kateley (1995) and Graston, Jr., Scott, Torto and Wheaton (1995) say that exposure of listed property

sector is influenced by economic activity of a place. Most economic activities are based within the three provinces, especially within their metropolitan areas. At the moment in SA, main economic activity is in Gauteng province; followed by Western Cape and Kwazulu-Natal. Appendix 2 shows that that listed funds in SA are mainly activity those earlier mentioned provinces. Decentralization of business activities throughout South Africa might cause investors to seriously consider other provinces other than Gauteng, Kwazula-Natal and Western Cape.

2.2.2 Diversification using non-listed property

When investing in non-listed property investors should beware of geographically location of the property, government regulations, population sizes, type of material used to build the building, structure of property, age of the building, and the grade of the property. Distinguishing a property by size, age, and population size is 'emotional as well as an analytical basis' (Del Casino, 1995). For example, a building that has been built many years ago, will be regarded a new one after alterations and improvements are done on it. It would be ideal to invest in densely polluted areas, where there is high demand of different property facilities.

Diversification using directly-held property is not the main topic of the study; however, diversification through non-listed property has indirectly influence on diversified investment port portfolios that include listed property.

Investors will have a choice of investing in residential property (for example; apartments), commercial property (for example; offices), retail property (for example; shopping centers), industrial property (for example; warehousing), hotels and leisure, parking, and vacant land. Each of the sectors of the non-listed property has its on advantages and disadvantages.

Residential property market is not a lucrative market for institutional investors because it has the highest cost to income ratio than any other property sector Leon Allison of First South Securities (South Africa). The other reason is that residential (can be apartments, hotels and residential houses) sector is high capital intensive and during high unemployment times; income form this sector is not much. However, in areas where employment rate is high and inflation rate is increasing, residential sector is fairly profitable. For example, in rented areas landlords will re-new lease agreements taking into account inflationary pressures. Kachandurian and Sacks (1995) say that investors should be invest in non-populated areas; cater for different tenants and supporting amenities when investing in residential sector.

When investing in office sector, Geltner and Miller (2001) say that the key factors that an investor should be aware of when investing in this sector are size, age, and location. They go further and say that the indicators of this sector are rents and vacancy rates. Users of this sector look for 'competitive' buildings to use as offices. The demand side is mainly driven by employment. "The demand for office space is driven primarily by employment within certain sectors of the economy" (Grayson, Jr; Torto; Tracy; and Wheaton 1995: 345). Type offices that investors need or want at that particular point in time drive supply. However, supplier should be aware of the consequences of over-supply. Office sector is currently one of the property sectors with high returns according to International Property Databank (IPD) in South Africa for 2001 to 2005. Emerging entrepreneurs are one of the drivers for office space.

Investment in this retail sector is mainly through establishment of shopping centers. Shopping centers are described according occupancy of land or space and the size of the community that they supply according to Kateley (1995) and there are mainly five common known shopping centers; namely; neighboured centers: size from 50 000 to 100 000 square feet and provide daily living or urgently needed goods, community centers: size from 100 000 to 4000 square feet and

provide urgently needed goods and things furniture and miscellaneous shoppers' goods, power centers: size from 200 000 to 500 000 square feet and sell product line goods such as sporting goods and children toys, outlet centers: size from 100 000 to 250 000 square feet and sell fashion-oriented goods. They are about 20 to 50 miles from main areas and regional and super-regional malls: anchor tenant takes at least fifty percent of gross lettable area (GLA). There is variety of amenities within these centers. An example of this kind of center in South Africa is Sandton Mall (Johannesburg).

Harvey (1992) says that the demand of these regional centers is driven by shopping capacity of customers and potential buyers. Shops within these centers should cater to surrounding communities at large. The sector is high institutionalized because good profits coming from South African retailers as shown by appendix 3. The key issues that an investor should aware of according Kateley (1995) are demand: trade area, which indicates potential sales, supply, competitive alignment, what percentage is captured by your competitors, tenancy and merchandise mix, ideally you should invest in retail where shops complement one another and there is variety, and leasing and management: leases of retail are advantageous to investors.

Domrese and Proud (1995) and Duni Johnstone (1995) say that industrial sector is made of warehouses of different types and sizes. Examples of warehouses are: minor warehouse market sub sectors (for single users), incubator buildings (less than 25 000 square feet, between 2 000 and 10 000 square feet used by tenants), single-user buildings (specialized buildings), R&D/Office buildings (for research and development), major warehouse market sub sectors (have recurring and similar requirements, and they are highly institutionalized), high-cube regional distribution centers (for storage and distribution of bulk goods), planned industrial parks/suburban parks (found in industrialized park areas and are highly institutionalized), and small and intermediate-size freestanding warehouses (small and intermediate-size freestanding warehouse properties).

Warehousing is generally a stable property sector and has performed well under inflationary and deflationary environment according Domrese and Proud (1995). Warehouse is more like a *defensive stock* that generates stable income to listed fund irrespective of market conditions. Storage, distribution of consumer and manufacturing goods are the main drivers of this sector. Domestic consumption and increase in exporting of local produced goods drive this sector and their leases allow full or partial passing of expenses to tenants. "Relatively low rents and relatively high land costs tend to discourage speculative warehouse development" (Domrese and Proud 1995: 429). Institutions, banks and loan companies are not keen investing in this sector. Transportation (road, rail, water, and air) business has a great effect to this sector.

The desire of the people to travel is major driver of the hotel sector; hence, the driver of demand. Supply side is mainly due to segmentation within hotel sector. According to Duni and Johnstone (1995) an investor in hotel industry should be aware of the following things that leases are mainly for twenty-four hours, hotel sector is a capital-intensive industry and branding with a chain affiliation is important. The profitability of this sector is generally positively related to tourism of the country. At the moment in South Africa, tourism figures are changing from time to time. We cannot exactly say that they are increasing of decreasing; however, South African unique tourism facilities, historical treasures and other entertainment centers are attracting tourists. One not should invest heavily in this sector because of fluctuating tourism figures and unpredictable incomes. In South Africa, institutions do not invest heavily in this sector due to fluctuating tourism and capital intensiveness of this sector. High income earners would generally stay at exclusive hotels with very good brand names because of their good reputations. Good reputations might be due to proper management, excellent services and other facilities that accompany hotel and leisure industry. Duni and Johnstone (1995) say that this industry outlook is vital in attracting consumers.

CHAPTER 3 - RESEARCH METHODOLOGY

3.1 Data collection

There are two methodologies of carrying out research; namely, quantitative and qualitative research methodologies. According to Punch (2000), there is no major difference between two methodologies except in their applications. He goes further to say that quantitative research methodology is more than the use of numerical data. “It refers to a whole way of thinking, or an approach, which involves a collection or cluster of methods, as well as data in numerical form” (Punch 2000: 4). About qualitative research methodology, Punch (2000) says it way of thinking and collection of non-numerical data for informed interpretation.

For this study, numerical data will be collected from various sources. It can be inferred from literature review that this study examines the impact of PUTs in a diversified investment portfolio. In order to successful illustrate this PUTs’ impact, statistical variables and hypotheses tests pertaining to this study will be calculated and carried out respectively.

In South Africa, data supplied by South African Property Index (SAPIX) is the available and reliable data that shows the performance of direct held properties. Data from SAPIX comes from different fund managers who have interest in property market (both listed and direct). In order to arrive at different percentages of income growth, income from previous year is subtracted from the current year and the difference is divided by income from previous year. Then the whole answer is multiplied by hundred, for conversation into a percentage. The same principle applies to capital growth and total returns. SAPIX/IPD defines *total return (or on asset classes)* is overall return on capital employed, and it the sum of income return and capital growth, i*ncome return* is income receivable net of operating costs divided by capital employed throughout the year, c*apital growth* is change in capital value from one valuation to the next net of any capital flows, divided by capital employed throughout the year, n*et income growth* is change in net income receivable from

December to December divided by net income receivable from the previous year, n*et initial yield* is year-end for properties held as standing investments throughout the year. For listed property sector, Inet-Bridge is regarded as a reliable data source for different listed securities including listed property.

Yearly data from 1995 to 2004 supplied by South African Property Index (SAPIX) and Investment Data Bank (IPD) will be used to undertake the analysis. South African Reserve Bank (SARB) supplies data on nominal interest rates from time to time and it is regarded as a reliable provider. The other data was supplied by the Property Hand Book 2005 (supplement of financial mail).

From the literature review, it was established that the performance of physical property be commercial, retail, industrial sectors, etc.; has direct impact of the performance of listed property. Moreover, it can be inferred from different authors such as Domrese and Proud (1995), Duni and Johnstone (1995), Kateley (1995), Kachadurian and Sack (1995), Arnold and Grossman (1995), Brueggeman and Fisher (2001), Chandrashekaran (1991), Craft (2001) and Dohrmann (1995) that the performance of physical property is a good indicator of the performance of listed property market.

Some indexes have changed over time; hence the constituents making indexes are not the same for a give period of time. In the mid 1990s the JSE asked PSG Securities to recalculate new indexes for PUTs and PLSs. Initially the indexes for PUTs and PLSs were known as IX48 and IX49 respectively according to I-Net Bridge. Currently, I-Net Bridge list PUTs' index as J255, and PLSs' index as J256. Cash here, represent fixed deposits according SAPIX/IPD. All Share Index will represent equities and its JSE code is J203.

All the statistical variables and hypothesis testing formulas are from taken from Bodie, Kane and Marcus (2002), and Hull (2006) unless otherwise stated. Within the analysis, the hypothesis testing will test whether the analysised data supports or does not support the tested inference. Berensen and Levine (1983), and Goodspeed (2002) say that when hypothesis tests are carried out, there is a choice of using either z-test or t-test. For z-test, the assumption is returns are normally distributed and sample size at least thirty. The concept of sample size being at least thirty is from the Central Limit Theorem (CLT). Hull (2006) states that CLT states that when you undertake a hypothesis test repetitively over time, your results will follow a normally distributed curve and be close to reality. Lastly when you z-tests you should have variance of the population. For a t-test, sample size should less than thirty and variance should be of the sample not population.

Formula for the t-value is: $t_{n-1} = \left(\Re - \mu\right) \Big/ \left(\frac{\sqrt{n}}{\sigma}\right)$

The formula tells us that the calculated t-value is the actual return ($\Re$) less the mean or average (μ). The difference of the actual return and mean (thus the excess return) is multiplied by ratio of squared of number of observations over the standard deviation (σ) and N is the sample size. Standard deviation of any asset is given by: $\sigma_i = \sqrt{\sigma_i^2}$ and variance (σ_i^2) $= \left(\frac{1}{n-1}\right)\left[\sum_{n=1}^{N} r_n^2 - N\mu^2\right]$. It (standard deviation) tells how far the data is dispersed from the mean of the sample or population. Hence, the more data is dispersed from the mean, the higher is the standard deviation. Mean (μ) is the average returns (either one or all assets included in a investment portfolio) over a period of time. The square root of n ($\sqrt{n}$), normalizes the calculated figure because the sample size is not closer the minimum number for a normal distribution as required by CLT. After calculating the t-value, we compare with our critical point and see if it (t-value) lies within the rejection region or non-rejection region. We get the critical value by choosing an alpha ($\propto$) percentage and taking value from the table of normally distributed curves.

For example if we choose $\propto$ = 5%, it means that we are 95% sure that our test is correct. Confidence Interval (C.I) = 1-$\propto$. When doing hypothesis testing, you have a null hypothesis (H_0) and an alternative hypothesis (H_1). Berensen and Levine (1983) say that the *null hypothesis* represents a theory that has been put forward, either believed to be true or used as an argument. An *alternative hypothesis* is a statement of what a statistical hypothesis test is set up to establish.

The correlation co-efficient (ρ) will be used to see the percentage of two variables moving together in any given time. It is assumed that a higher ρ (at least fifty percent) means two variables move together at least half of the time when those securities are in the same investment portfolio. Therefore, when two variables have a higher ρ amoung themselves, they should not be included together in a diversified portfolio unless inclusion of a third variable reduces the previous ρ of the previous two variables.

Correlation co-efficient (ρ) as calculated using this formula: $\rho_{12} = \frac{\sigma_{12}}{\sigma_1 \sigma_2}$ .Where σ_{12} is the co-variance given by: $\sigma_{12} = \left(\frac{1}{n-1}\right)\left[\sum_{n=1}^{N} r_{1,n} r_{2,n} - N\mu_1\mu_2\right]$ and σ_1 and σ_2 are standard deviation of asset one (1) and asset two (2) respectively. The μ_1 is average return from asset one; μ_2 is average return from asset two; $r_{1,n}$ returns from asset one at different times and $r_{2,n}$ returns from asset two at different times.

3.2 Approach

Most returns are already calculated by different sources. Returns of various property asset classes were interpreted over a period from 1995 to 2004. This study was actually carried in 2004 and I

left for Europe early 2005. Conclusions were made from the general findings; in some cases fair assumptions were used.

In the interpretation of results, from income return we got a general picture whether money was more or less made from 1995 to 2004. Capital growth gives a picture whether investors invested more or less in property over the period of time. The research report assumes that there more capital invested made within various property sectors; there returns from those sectors will increase. Net income growth gives us a picture whether net income from property increased or decreased over time.

Finally, from the different property returns, statistical parameters (i.e. means and variance) were calculated using different formulas in order to undertake hypothesis tests. Hypothesis tests results would be interpreted and compared to the literature review consensus.

Chapter 4 – ANALYSIS OF DATA

From the literature survey, authors like Myer and Terris (1995), Fabozzi (1998), Markowitz (1959) and Litterman and the Quantitative Resources Group, Goldman Sachs Asset Management 2003) say that investors include property in their diversified investment portfolio to reduce risk. They went further to say that hopefully, through risk reduction the absolute returns of diversified investment portfolio will increase. Other findings were that listed property has characteristics of bonds and equities from writers such as Jaffe and Sirmans (2002) and Bodie, Kane and Marcus (2002). Therefore, listed property is a hybrid security in nature. In order to verify the above statements, data supplied by SAPIX/IPD and other data sources will be used to undertake the hypothesis tests. To undertake hypothesis tests, mean or average and variance should be calculated as stated under chapter: 3.

From the literature review it can be deduced that hypothesises will be the following; main hypothesis test; the introduction of PUTs enhances the overall returns of a diversified investment portfolio, sub-hypothesis one; the performance of PUTs is correlated to the performance of bonds and sub-hypothesis two; the performance of PUTs is correlated to the performance of equities.

All assets represent all property, equities, PUTs, PLSs, bonds together. As stated earlier in chapter: 3 (3.2 Approach), the following variables needed to be calculated in order to undertake hypothesis tests.

Variables (in %)	All prop.	Equities	PUTs	PLSs	Bonds	Cash	All Assets
Mean	12.13	10.45	16.13	15.96	19.21	14.33	14.70
Standard deviation	3.87	23.00	17.00	21.00	11.20	2.90	13.16

Source: Data supplied by SAPIX/IPD (1995-2004)-Tumellano Sebehela

Parameter	Percentage (%)
Assets' means	15.07

Source: Data supplied by SAPIX/IPD (1995-2004)-Tumellano Sebehela

T-tests will be used for the hypothesis tests instead of z-tests for reasons explained in chapter 3, under data collection (3.1).

4.1 Main hypothesis

The introduction of PUTs enhances the absolute returns of a diversified investment portfolio.

Null hypothesis (H_0): $\mu \geq R$,where ***R*** is the actual returns from the market including returns from all assets and μ is the average returns of all of all assets excluding PUTs. In essence, the formula says that by including PUTs' returns to returns of the overall investment portfolio, the absolute returns (after including PUTs) increases.

Alternative hypothesis (H_1): $\mu \leq R$, the alternative hypothesis says that the inclusion of PUTs does not increase overall returns of the diversified investment portfolio.

Sample size is 8.

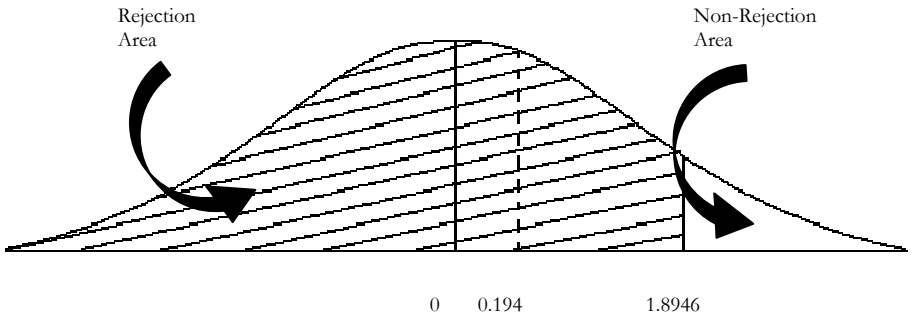
Significance level (∝) is equal to 5%.

$$t_7 = [16.125 - 15.22167] \times \left(\sqrt{8} \Big/ 13.1615 \right)$$

$$t_7 = (0.90333) \times (0.214901578)$$

$t_7 = 0.194$ (the calculated t-value for the test).

At α= 5%, the t-value is +1.8946 (critical value). This value tells us that should the calculated value fall below +1.8946, that value (calculated one) would be rejected and above the critical value the calculated value will not be rejected.



Reject H_0.

Therefore, the introduction of PUTs does not enhance the overall returns of the diversified investment portfolio. This means that at an alpha of 5%, given that conditions and variables of the sample size are correct, we are 95% sure that the introduction of PUTs in a diversified investment portfolio does not necessarily enhance the absolute returns of the portfolio. Some authors such as North and Ring (1967) from the literature review say that one property differ from another property despite that they might be within the same vicinity and of same use. Therefore, listed property is value is affected by properties that make it (listed property) and, there is no general rule of thumb that inclusion of listed property to a diversified investment portfolio enhances the total returns. Underlying factors need to be considered as well.

From the literature review, it was found that property is complex asset and diversification mechanisms that include numerous assets do not necessarily increase returns. Physical structure, sectorial segmentation and geographical location give each property its own unique characteristics. Moreover, it is not easy to monitor and value property as a pool of properties. Ideally, each property should be valuated on its own merits and de-merits.

Diversified investment portfolios mostly have equities, bonds, cash, and property (listed and unlisted). Brueggeman and Fisher (2001) say that property has hybrid structure or nature. If the

latter statement is true then why do investors include bonds and equities in their diversified investment portfolios which have listed property? Listed property seems to be driven by financial market's perceptions according the empirical studies by Myer and Terris (1995). However, we know that property is a real asset that should driven by real factors (for example: the quality of the soil making up the property and minerals within property structures) not perceptions. Secondly, there have not been enough empirical studies that show that there is enough evidence to support positive correlation between financial and real assets. Yes, financial assets are driven by people perceptions and people's perceptions make up most of financial markets' consensus.

Property (both listed and unlisted) have equities and bond characteristics depending on the lease agreement' conditions. The literature does not inform us in what way a lease agreement can be structured such that the underlying property has only bonds' characteristics or equities characteristics only. What are the key issues that give lease contract particular characteristics?

4.2 Sub-Hypothesis 1

The performance of PUTs is correlated to the performance of bonds.

H_0: $\rho(c; e) \neq 0$, the null hypothesis says that there is no positive correlation between performance of PUTs and bonds.

H_1: $\rho(c; e) = 0$, the alternative hypotheses says that there is a positive correlation between performance of PUTs and bonds.

Average returns of PUTs and bonds = $\left({(16.125 + 19.2125)}/{2} \right) = 17.66875$

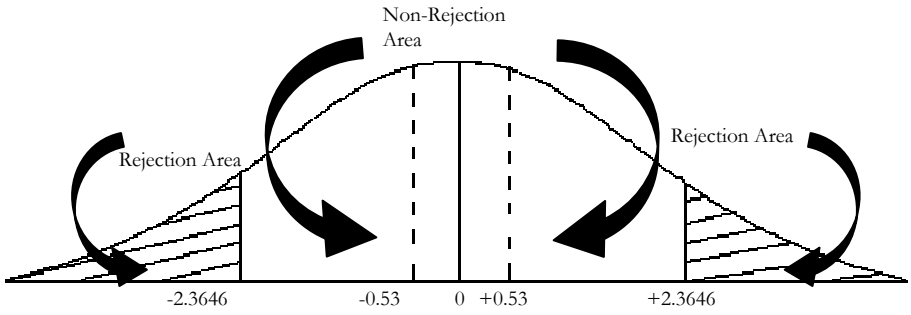
Sample size is 8.

The test is a two-tail test, instead of 5% significance level we use 2,5% significance level.

At $\propto$ = 2.5%, the t-value is +2.3646 (critical value). This value tells us that should the calculated value fall below +/-2.3646, that value (calculated one) would be rejected and above the critical value the calculated value will not be rejected.

$$t_7 = (17.66875 - 15.22167) \times \left(\sqrt{8} / 13.1615 \right)$$

$= (2.44708) \times (0.214901578)$
$= 0.5259$ (the calculated t-value for the test).



Do not reject H_0.

Therefore, it can be inferred from the above analysis that PUTs' performance is correlated to the bonds' performance. This means that at an alpha of 5%, given that conditions and variables of the sample size are correct, we are 95% sure that the PUTs' performance is correlated to bonds' performance. Stated earlier under history of bond market, Jaffe and Sirmans (2001) say that more and more real estate markets are integrated into bond markets. Therefore, listed property market react more like the bond instruments. Leon Allison of First South Securities (South Africa) said that the correlation between fixed income securities and listed property can be as high as eighty-five percent.

From the literature findings, there is consensus that the two assets (bonds and listed property) are positively correlated, hence their returns should correlated as well. At five percent significance

level, one is ninety-five percent sure that the results are correct. The same would apply in the second sub-hypothesis.

4.3 Sub- Hypothesis 2

The performance of PUTs is correlated to the performance of equities.

H_0: $\rho(b; c) \neq 0$, the null hypothesis says that there is no positive correlation between performance of PUTs and bonds.

H_1: $\rho(b; c) = 0$, the alternative hypotheses says that there is a positive correlation between performance of PUTs and equities.

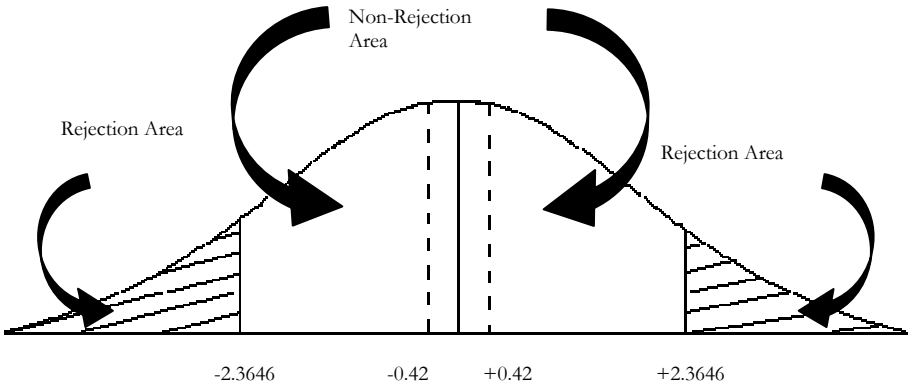
Average returns of PUTs and equities = $(10.45 + 16.125)/2 = 13.2875$

At $\propto = 2.5\%$, the t-value is +2.3646 (critical value). This value tells us that should the calculated value fall below +/-2.3646, that value (calculated one) would be rejected and above the critical value the calculated value will not be rejected.

Sample size is 8.

$$t_7 = (13.2875 - 15.33167) \times (\sqrt{8}/13.1615)$$

= (-1.93417) ×(0.214901578)
= -0.4157 (the calculated t-value for the test).



Do not reject H_0

The results confirm that PUTs' performance is correlated to the equities' performance. This means that at an alpha of 5%, given that conditions and variables of the sample size are correct, we are 95% sure that the PUTs' performance is correlated to bonds' performance. Second hypothesis results say that the performance of listed property is positively related to equities' performance. Empirical studies by authors like Downs and Hartzell (1995) show that listed property is a hybrid instrument; however, the correlation might more towards to equities than fixed income securities at different time intervals and visa verse. However, other authors such as Myer and Terris (1995) say listed property have characteristics similar to common stocks.

The report goes further to find out the correlation co-efficient of listed property and other investment securities in order to verify whether having a particular security and listed property together will increase diversification benefits. The table shows correlation between different assets in order to see which is more correlated to PUTs than others. The below summaries findings as follows:

Expected Returns for Different Assets

Assets	All prop. & Equities	All prop. & Cash	Equities & PUTs	Equities & Bonds	PUTs & Bonds	PUTs & Cash	PLSs & Bonds	PLSs & Cash
ρ (in %)	26	18	55	73	60	-14	50	-33

Source: SAPIX/IPD(1995-2004) -Tumellano Sebehela
Table 4.1: Correlation coefficient (in %)

From table1 4.1, we can see that from 1998 onwards there was a increase in returns of PUTs, PLSs, bonds, and cash in relative terms. From 1998 and onwards, South Africa started experiencing a decline in prime interest rates. Theoretically low interest rates are good for bonds and property market. Listed property is positively correlated to bonds as shown by table 4.1. The correlation between PUTs and bonds is sixty percent. The correlation co-efficient between PUTs and bonds, and PLSs and bonds is sixty percent and fifty percent respectively.

CHAPTER 5 - CONCLUSION

5.1 Data Analysis and Literature Review

There is no conclusive evidence to support that a certain school of thought is the only prevalent one; however, the dominant school of thought is that listed property has more characteristics of equities than any asset class supported by empirical studies from Myer and Terris (1995), Kuhle (1987), Friday and Higgins (2000) and O'Neal and Page (2000). In this report, the three schools of thoughts confirmed by different authors are listed property has characteristics of bonds, listed property has characteristics of equities the last school of thought being that listed property is a hybrid security.

The first school of thought is that listed property's characteristic is influenced by underlying asset that makes the listed property fund. Therefore, if a listed property fund is made up mostly of equities, the listed fund will have characteristics similar to common stocks and listed property made up mostly by mortgage securities will have bonds characteristics. For instance, empirical studies by Kuhle's (1987) and O'Neal and Page (2000) showed that if REITS is made of mortgage properties it will have more fixed income securities' characteristics and REITS with similar characteristics to common stocks are made of equities. However, irrespective whether the investment portfolio has listed-mortgage property fund or listed equity-property fund, there are diversification benefits. Results from empirical study by Kuhle (1987) showed that equity REITs are better diversifier than mortgage REITs; while, O'Neal and Page (2000) did not show whether mortgage REITs are better diversifier than equity REITs or versa verse. One reason for equity REITs being better than mortgage REITS is that information related to equity making decisions is readily available as opposed to information relating to mortgage.

The school of thought that listed property has characteristics of equities is supported by empirical studies by Jensen (1968), Friday and Higgins (2000). Jensen (1968) looked at two scenarios, one

where he compares listed property and common stocks and the other where he compares 115 mutual and security prices. In both empirical studies, Jensen (1968) showed that listed property is not different from common stocks. In essence, this supported the notion that listed property has characteristics of equities. Interestingly, Friday and Higgins (2000) showed that characteristics of equities on listed property can be observed on daily basis on bourses or stock exchanges. Their study further confirmed that equity traders use the same information to make decisions regarding every listed security. It seems that perceptions that equity traders have about financial assets in stock markets affect listed property and equities equally in the same way.

The last school of thought that says that listed property funds have characteristics of bonds was the less dominant one. O'Neal and Page (2000) said in an investment portfolio that has a high concentration of bonds, there was not much difference between mortgage REIT and common stocks. In South Africa, Leon Allison from First South Securities said that listed property has mostly characteristics of bonds than equities; however, the correlation co-efficient between bonds and listed property can be as high as eighty percent. Listed property and fixed income securities are mainly yield driven investment instruments. Therefore, anything that affects the yield affects the absolute returns listed property and bonds in a similar manner.

There is another school of thought that is not common stock, supported by empirical study by Friedman (1971). This school of thought that says listed property is a common stock than any else. His study looked at an investment portfolio compromising of common stocks and listed real estate. Results showed a negative covariance[3]. A negative covariance between two securities means that they do not move together and positive covariance means they move together; however, covariance does not confirm whether or not there is a positive or negative correlation between two assets. A fair assumption would be that a listed property is a defensive stock according Freidman

[3] A measure of the degree to which returns on two risky assets move in tandem.

(1971) empirical study. Therefore, inclusion of listed property in a diversified investment portfolio does not increase absolute returns of investment portfolio substantially or decrease most of the diversified investment portfolio's risk. Another fair assumption about Friedman's (1971) study would be that listed property is a hybrid security.

There were other factors that affected listed property such as the operational environment from one country to another. Acheampong, Hwa and Newell (2002) in their study about listed property trusts in Malaysia showed that the regulatory environment had impact on the listed property trusts and the way they function. Their paper further implicitly stated that listed property trusts are hybrid security and after the Asian economic crises, REITs were seen as alternative investments and way of repacking real estate portfolios.

Results from chapter 4 on data analysis showed that the inclusion of PUTs in a diversified investment portfolio does not increase the absolute returns. Markowitz (1965) said that diversification that does not necessarily increase absolute returns although there is risk reduction benefit.

The first sub-hypotheses the performance of PUTs is positive correlated to bonds in South Africa (SA). Correlation co-efficient between PUTs and gilts as shown by table 4.1 is sixty percent. One of the reasons might the regulatory environment in SA where there are specific rules governing property trusts over certain time. For example, PUTs having interest in a retail property that lessee has a lease agreement running over ten years at specific interest rate level in a deflationary environment. However, in South Africa there is a high positive correlation between listed property and bonds as opposed to international markets where correlation co-efficient is below fifty percent.

The second hypotheses confirms that PUTs have characteristics of equities; although, in SA between the period of 1992 to 2002, the correlation co-efficient between PUTs and equities was lower than correlation co-efficient between PUTs and bonds as shown by table 4.1. At this moment, it is not clear why the SA scenario is not the same as the international scenario, for example United States of America (USA). However, listed properties are re-packaged from time to time in order to acclimatize with a particular investment environment. For instance, in South Africa at the moment listed properties do not have any exposure to residential properties and might change in the future to include residential properties.

Going forward, attractive risk-adjusted returns are provided by South African property market. With favourable macroeconomic conditions sectors such as manufacturing should do well, hence stimulating industrial property sector. For diversification purposes property professionals look at wide of things such as yields, capital appreciation, risk profile, lease agreements and value of the listed property fund or trusts. Generally, investors would not invest any fund or trust less than one billion Rand in value because of illiquidity reasons.

5.2 Research objectives

Research objectives have been met. However, there was no clear distinction whether listed property or directly held property is a better diversifier. Changes to taxation of both listed and unlisted property indirectly influence investors' views about property market. Physical structures of soils give properties unique characteristics.

5.3 Areas for further research

- Diversification does not necessarily enhance returns of diversified investment portfolios. At most, how many different asset classes should you have in your diversified investment portfolio in order to increase the overall returns of the portfolio? The future researcher

should look under what circumstances diversification enhances the overall returns of diversified investment portfolio.

- In South Africa, investors would not invest in a listed property that is less than one billion Rand in value citing illiquidity as one of the reasons. Is illiquidity of funds or trusts due to trades not keen to trade property stocks or limited number of property stocks? Currently most traders like industrial and financials stocks. With the current favourable macroeconomic conditions and property boom, there are no reasons why we should not have more listed property funds or trusts.
- The relationship between real assets and financial assets. If there is any kind of relationship, is positive or negative? More and more empirical research should be undertaken in this area.

6. APPENDIX

Appendix 1

Name of PUTs	JSE code	Market cap. (millions of Rands)
Capial property	CPL	996,97
Cenprop	CEN	1,63
Emira	EMI	1554,85
Grayprop	GRY	3615,64
Martprop	MTP	1696,93
Prima	PRM	415,23
Sycom	SYC	2227,78

Source: Mr. Roger Perkin of Martprop Property Fund,. PUTs listed on the JSE (2004)

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