Direct and Indirect Real Estate in a Mixed-asset Portfolio

- Is direct or indirect preferable?
Abstract

Studies carried out during the 2000’s have shown that securitized real estate has outperformed the direct real estate market with as much as up to 500 basis points on an annual basis during the 80’s and 90’s. Allocation to real estate among institutional investors has at the same time been at around 5%. Research conducted in the area during this period has suggested an allocation to real estate around 10% - 20% in a mixed-asset portfolio, depending on the specifics of the real estate.

Securitized and direct real estate come with different benefits and different problems, such as a better inflation hedge and asset-liability frameworks but worse information transparency for direct real estate, but a higher liquidity, return (including volatility) and information transparency for securitized real estate market.

This research shows that during the period 2000-2010 securitized real estate still outperforms direct real estate. The spread during the period is as much as 762 basis points per annum. The highest risk-adjusted return is given to the investor who invests between 21% - 30% depending on the specifics of the real estate. However, noticeable is that risk factors such as illiquidity, lower transparency and geographical could eventually give another perspective on the outcome of the risk-adjusted return.
Acknowledgement

I want to thank Christina Gustafsson at IPD Sweden for providing me with data regarding return series of the Swedish property market. Without this information the empirical analysis could not have been conducted.

Finally, I want to thank my supervisor, Associate professor Han-Suck Song. Without his constructive feedback and supervisory I would not have been able to provide this thesis.
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1. OBJECTIVES AND PURPOSE

1.1 BRIEF OVERALL DESCRIPTION

I will investigate if, and how, real estate can enhance and improve the risk-adjusted return within a mixed-asset portfolio. Also, I will try to conclude whether there are differences within the asset class of real estate itself, between the two kind’s direct real estate and indirect real estate. There are likely differences in terms of returns, risk, yields, and liquidities. Furthermore, I will thereafter investigate which one of the two different real estate is the most preferable to include in a mixed-asset portfolio.

1.2 THE STRATEGIC QUESTION THAT GUIDES THE PROJECT

“Which one of direct and indirect real estate enhances and provides the highest risk-adjusted return for a mixed-asset portfolio?”

1.3 OBJECTIVES OF THE PROJECT

The objectives of the master thesis are at first hand to investigate whether real estate as an asset class can enhance the performance, in terms of a higher risk-adjusted return, of mixed-asset portfolios. Moreover, the objective of this thesis is to compare the potential increase in performance (in terms of risk-adjusted return) when allocating capital to direct real estate on one hand, and to indirect real estate on the other hand.

2. JUSTIFICATION OF THE PROJECT

Allocation to real estate among institutional investors has been at roughly 5% for the years between 1980-2000 (Steinert and Crowe, 2001). Research done in the area suggest at the same time a theoretical allocation to real estate should be around 10% - 20% in a mixed-asset portfolio, depending on the specifics of the real estate. During the same period, real estate has outperformed most asset classes with a higher risk-adjusted return (ibid.), and securitized real estate has in turn outperformed direct real estate with 500 basis points per annum. Furthermore, real estate as an asset class is said to be a more stable investment during times of
economic turbulence. With no, or very little, research so far in the area during the period 2000-2010, combined with an asset class with proven high return and low risk, this thesis will shed new light on this topic.

3. RESEARCH QUESTIONS

The main questions that have been withdrawn from the objectives of the suggested research are as follows:

1. Can real estate as an asset class enhance a mixed-asset portfolio in terms of risk-adjusted return?
2. How does direct real estate differ to indirect real estate in terms of return, risk, and (if possible to determine) liquidity?
3. Does the potential increase in the risk-adjusted return differ when adding direct real estate compared to indirect real estate?

These questions are important to find answers to, in chronological order, to be able to conclude if real estate really can enhance a mixed-asset portfolio. If this turns out to be the case, it could create incentives to financial institutions to create easy-bought financial products that are linked to the type of real estate that turns out to be the most value adding. A less volatile portfolio, while maintaining (or even increasing) the return for the investor, whoever it may be, is a win-win situation for everyone. Especially with the recent financial crisis behind us one could agree to that most would have accepted a slightly lower return in for lesser volatility and risk.

4. RESEARCH DESIGN

4.1 METHODOLOGICAL APPROACH

The research design that will be applied for my research is causal research. Within the scope of causal research, the problems under scrutiny are structured as they are in descriptive research. The difference is that the researcher also is confronted with “cause-and-effect” problems. In other words, the researcher has a problem under scrutiny that may be regarded as a “cause” that will give some sort of “effect” in its wake.
In my research, the difference between landing in causal research and not descriptive research lies within the asset class of real estate, and how it affects a mixed-asset portfolio. The real estate asset class can be seen as a “cause” giving different “effects”, in terms of higher or lower risk-adjusted return, depending on what type of real estate (indirect or direct) is applied. A causal research approach towards the research questions suggests a quantitative approach towards data collection and data analysis. This goes hand in hand with my attempt to base my analysis on Modern Portfolio Theory (MPT). I will use secondary data to back up the justification why the research is significant, but also to highlight where we are right now. In other words, I will describe in what degree real estate actually is used within mixed-asset portfolios as of today.

4.2 RESEARCH METHOD

I will gather return series from direct real estate and indirect real estate in Sweden, but also from all asset classes that is regarded as a part of a mixed-asset portfolio, which are mainly equities and bonds. These return series will be used to conduct a portfolio optimization, based on MPT, to make out the potential difference of effect with the two different kinds of real estate.

5. INTRODUCTION

The allocation to real estate among institutional investors has been kept at low rates of around 5% for the years between 1980-2000 (Steinert and Crowe, 2001). Consequently, one can assume that real estate as an asset class is not growing as an attractive investment choice among institutional investors, with regard taken to both direct real estate and indirect real estate as an asset class.

During the same period, real estate has outperformed many other asset classes with a higher risk-adjusted return (Steinert and Crowe, 2001). Given the historical returns and also the safety that is related to owning real estate cash flows, it is an interesting task to examine if and why the allocation to real estate in a mixed-asset portfolio not has risen more than marginally during the last three decades.
The purpose of this literature review is summarize the current research material in the subject of benefits and problems with real estate as an asset class in a mixed-asset portfolio, and to investigate why this behavior of institutional investors have occurred, and whether it is likely to continue.

Recent studies show that securitized (indirect) real estate has outperformed direct real estate during the period 1980-2000, with sometimes up to as much as 500 basis points on annual basis. Explanations to this excess return compared to the direct real estate market could be seen as confusing, with respect to that the two different investment types still have the same underlying asset; properties. A possible answer to the gap in performance could be found in the problems associated when investing in the direct real estate market. Before going into the problems associated with investing in the direct real estate market, let’s examine the differences characteristics of the two different investments alternatives.

Securitized real estate, in terms of REITs, is traded on a daily basis on a stock exchange; consequently, they are subject to the same volatility of a common stock. Direct real estate on the other hand, are often subject to extended periods of not being traded at all. The only way for an investor to be able to follow the returns is to rely on appraisals that are done twice a year.

Both of these two different characteristics come with different benefits and different problems, such as a better inflation hedge and asset-liability frameworks but worse information transparency for investments in the direct real estate market, but a higher liquidity, return (and volatility) and information transparency for investments in the securitized real estate market.

An additional problem arise when to compare REITs return against direct real estate’s return, due to the smoothing effect caused by the long periods between appraisals. In general, there is a no such thing as a “true” return of the “property market”, and such, it is difficult to say with certainty that either of the direct or indirect real estate market is better than the other due to the lack of a proper benchmark. This may in turn be a contributor to the excess return by securitized real estate of indirect real estate.
6. LITERATURE REVIEW

6.1 IN WHAT DIFFERENT WAYS CAN AN INVESTOR GET EXPOSURE TO REAL ESTATE?

Until the mid 1990’s the main road an investor could undertake to gain exposure to the real estate market was by purchasing a tangible real estate, in other words stepping into the direct real estate market. Such approach has its advantages in terms of low correlation to other financial assets and thus implying a good diversifier within a mixed-asset portfolio. But there are also negative aspects, such as a market with very low liquidity, special management skills needed, and low information transparency. (Hoesli and Lekander, 2006)

But due to the securitization of asset classes in the early 1990’s it started to become easier for investors to take an exposure towards real estate. Hudson-Wilson et al. (2003) defines real estate as an asset class as of today as four different ways an investor can get exposure towards it:

1. Direct real estate
2. Direct real estate debt (held directly by issue from a real estate company)
3. Securitized real estate (i.e. REITs)
4. Securitized real estate debt (i.e. commercial mortgage-backed securities, CMBS)

Investors can nowadays undertake an exposure towards real estate in many different ways. For example by different funds with different risk levels, depending on what kind of properties the fund is actually holding, where the properties is located, what financial leverage the fund is restricted to, and of course what kind of risk I as an investor is willing to take. Beside funds, there are several securitized, or listed, real estate companies that are way more liquid and tax transparent than direct holdings, giving investors an opportunity to gain a higher liquidity in their portfolios. Furthermore, there are several derivatives developing in several countries trying to make it possible to take an exposure towards real estate to an even lower degree of needed capital.

This can more easily be shown in the four-quadrant model. The four-quadrant model of real estate investing is a new way of putting light into the world of investing in real estate. The
model consists of two dimensions, one is Equity/Debt and one is Private/Public. This model capture the major problems investors may have when comparing what kind of real estate exposure they should undertake. (Hoesli and Lekander, 2006)

![Figure 1: the four-quadrant model of real estate investing](image)

All these major changes that have been proceeded have resulted in that investors can have more flexible strategies, for example that they can gain higher liquidity in their portfolios while maintaining the same rate of diversification while also gaining the same rate of risk-adjusted return.

**6.2 IS INDIRECT REAL ESTATE REPRESENTATIVE OF DIRECT REAL ESTATE?**

Earlier studies in the early 1990’s regarding the issue whether securitized real estate is representative of owning direct real estate have shown that US REITs have strong similarities with the general stock market. Furthermore, there was little interdependence with the direct real estate market, giving limited opportunities to gain anything from diversification with other stocks. On the other hand, more recent studies from the mid 1990’s show signs that REITs have gain momentum and now have stronger similarities with the direct real estate market, in other words more driven by the same factors than in the early 1990’s. (Morawski et al., 2008)
In general, the market sees the direct real estate market as a market with high transaction costs, low information efficiency (i.e. low transparency), and is also often referred to as an illiquid market. All other things equal, securitized real estate is traded on a public stock exchange where it is being bought and sold with a supply and demand that sets the market value on a daily basis. Things bring other factors into play when comparing to the direct real estate market, due to that the general market condition, outlook, sentiment, liquidity and herding behavior can result in prices that are above or below the fundamental, or true, market value of the underlying real estate.

Morawski et al. (2008) investigate whether securitized real estate is to be considered as a regular equity investment or equivalent as in an investment in the direct real estate market. A correlation analysis is made, and the data periods used when comparing the two different investment types have been quarterly data from 1978-2006 for the US market and monthly data from 1983-2006 for the UK market. In the short-term, real estate stocks show similarities to the stock market in terms of co-movements, but this relationship have declined in the end of the data period. In the long-term, the interdependence is much stronger between securitized real estate and direct ownership of real estate. Furthermore, it can be seen that in the long-term, securitized real estate tend to lead the returns of the direct real estate market.

This raises a question regarding if securitized real estate can predict movements in the direct real estate market. If this were to be true, an investment in the direct real estate market when securitized real estate returns is high would indicate a potential low-risk arbitrage opportunity.

Brounen and Eichholtz (2003) have examined the relationships between the direct property market against securitized property shares and common stock in the US and UK market. For real estate indices the authors uses the NCREIF (National Council of Real Estate Investment Fiduciaries) for the US market and the IPD (Investment Property Databank) for the UK market. To measure the performance of the property shares in the respective markets they use the GPR General National Indices, which tracks the total return for all property stocks in each market. For common stock returns they use the S&P 500 index to track the US stock market and the FTSE to track the UK market. The authors also compare against bonds and they use the J.P Morgan Bond indices for both the UK and US market. The major findings show that property shares are experiencing a decline in correlation against common stock. This goes for
both for the UK market as for the US market, which in turn implies a potential increase in diversification benefits within a mixed-asset portfolio for a common stock investor over time.

International investors’ preferences are important factors to take into consideration when stating the fact that property shares are experiencing a decline in correlation against common stock, and that these preferences change over time. This can be seen very clearly during the dotcom bubble and its crash during the late 1990’s and early 2000’s.

During the dotcom bubble, when stocks were still booming, property shares and common stock took two different paths. Despite attractive yields, property shares became out of fashion and all investors were mainly interest in common stock. But when the market burst, investors seeking lower risk found this within property shares, which still offered attractive yields. In other terms, when common stock fell during the first three years of the new millennium, property shares were gaining and went the opposite direction.

6.3 **DIFFERENT VALUATION TECHNIQUES**

When valuing publicly held assets, or exchange-traded securities, the capital asset pricing model (CAPM) is a favorite among many analysts. In the CAPM model the beta reflects the risk and expected performance of a given asset. The performance assessment is done by comparing actual returns to expected returns while assuming that EMH (Efficient Market Hypothesis) hold. The CAPM model may not be appropriate when valuing privately held asset, such as direct real estate for instance. Direct real estate is often related to extended periods of not being traded and every asset is more often than rarely, unique. (Riddiough et al., 2005)

One must be aware not only of the different techniques that securitized real estate and direct real estate are being valued by, but also under what circumstances. Securitized real estate is being valued on a daily basis by supply and demand, and such have larger short-term volatility. Direct real estate is being valued by appraisals once or two times a year, which yields a smoothing and lagging effect on the returns, in other words, lower volatility in the short-term. Furthermore, appraisals tend to rely on previous property appraisals, which can potentially strengthen the smoothing and lagging effect. With this in mind, short-term data periods should not be undertaken when comparing the issue whether securitized real estate is
equal to an investment in direct real estate or a regular equity investment. (Morawski et al., 2008)

The most common used method to unsmooth direct real estate return series is the Fisher-Geltner-Webb’s (hereafter called FGW) unsmoothing methodology. The FGW method makes the assumption that the underlying property prices follow a driftless random walk, meaning that the returns are drawn from a normal population with mean zero and a constant variance. This is a fair assumption when analyzing property returns over short horizons, such as monthly data, but not when analyzing longer horizons, such as quarterly or annually. At longer horizons property returns are more likely to be mean reverting and returns to be serially correlated. As a result, when applying the FGW unsmoothing methodology on longer horizons the returns are likely to be inconsistent. Also, the FGW unsmoothing method also consist of a constraint that appraisers must combine information from different sources (known as Bayes’ rule), and furthermore, put weights on every information gathered so the total sums up in 1. An overweight of certain information, i.e. information gather by the appraiser self, would result in a bias in the appraisal. (Cho et al., 2003)

Cho et al. (2003) proves that the appraisal-based return series can be better modeled with an extension made on the FGW unsmoothing model when analyzing long horizon periods (such as quarterly and yearly data) by removing the constraints of that property prices are mean reverting and they property returns follows an autoregressive process, and also that the total weight of all information gathered by the appraiser must equal 1. But this alternative comes with two drawbacks, where one is that the extended model does not allow for any possibility of time-varying coefficients. Secondly, it does not capture any potential likelihood of a non-stationary variance.

6.4 IS INDIRECT REAL ESTATE MORE PREDICTABLE THAN OTHER ASSETS?

The global market of securitized real estate have tripled in size over the last 5 years (up to 2007), and now accounts for USD 794 billion. The fast increase in market capitalization is believed to be in a relationship with the increasing adoption of REITs all over the world, which provides an attractive tax-transparency at a corporate level. In 1995, REITs could be found in 5 countries, as of 2007, REITs were represented in over 30 countries with several countries considering an implementation, with Sweden as one of the countries considering.
The underlying demand of the increase in REITs is suspected to be an increasing demand for securitized real estate. As such, the question if securitized real estate returns differ from that of stock returns becomes even more important to investigate. (Hoesli and Serrano, 2010)

When comparing indirect real estate returns to direct real estate market returns and associated indices, it is important to know that they do not represent the underlying transaction prices fully. This is due to the fact that indices are based on valuations, which in turn are subject to appraisal smoothing- and lagging effects as well as the commonly known phenomenon that appraisers base their valuations very much on previous valuations (which in turn can enhance the smoothing effect). And the indirect real estate does not give an appropriate estimate how the direct real estate market have/will act due to that the indirect real estate market is geared.

A problem arises when knowing this, first of all; how should the true state of the real estate market be represented and second how can the frequency of data collections be improved. The UK market has during the last decade shown progress within these two areas. On one side, they have increased their use of statistical unsmoothing techniques to improve the quality of current indices. On the other hand, they have gain an increase and improvement in the quantity and frequency of information flows.

Previous studies within the area have found a relationship between the indirect real estate market and the direct real estate market in terms of Granger causality (if one time series is useful in forecasting another) running from the indirect real estate market to the direct real estate market, implying that there is information in the indirect market that potentially can explain movements and performance in the direct market. (Booth and Marcato, 2004)

Booth and Marcato (2004) try to investigate if there is a dependency between returns from the direct real estate market and the returns from real estate shares. This is done by constructing a monthly “de-gearred” real estate share performance index, after adjusting both the direct real estate market and the indirect real estate market so they are more comparable with regards to the smoothing problem within the direct real estate market and the gearing problem within the indirect (securitized) real estate market. By reducing the smoothing effect on the direct real estate indices, a much stronger relationship occur between the direct real estate market and the de-gearred real estate share performance index. This is given that the unsmoothed indices of
the direct real estate market are a more accurate indicator to the actual transaction prices. This makes the two different investment types more look-a-like. The following up relationship analysis shows that the de-geared real estate share performance index do have useful information that can contribute to an understanding of the direct real estate market, which also is in line with the conclusions made by Morawski et al. (2008)

This de-geared real estate share performance index is compiled at monthly basis. If this index is possible to assemble at weekly or even daily basis, there is a chance to be able to understand and explain short-term movements in transaction prices.

Hoesli and Serrano (2010) have conducted a research study over the period 1990-2007 with daily return series from securitized real estate, in terms of REITs through the NAREIT (National Association of Real Estate Investment Trusts) index, to compare to stock returns with the purpose of try to come up with an answer whether returns from securitized real estate is more easy predicted than that of ordinary stocks. The forecasts have been performed using ARMA and ARMA-EGARCH models. The result is somewhat surprising; in countries with established REIT regimes, securitized real estate returns are proven more predictable than stock returns. Consequently, the fact that one asset class, in this case the securitized real estate in terms of REITs, are more predictable than other asset classes, should lead to a change in investors’ perceptions regarding asset allocation. A more predictable asset class could lower the uncertainty, and by that also the risk, within a mixed-asset portfolio.

**6.5 IS REAL ESTATE IN GENERAL PREFERABLE WITHIN A MIXED-ASSET PORTFOLIO?**

Hudson-Wilson et al. (2003) concludes that real estate is a good risk reducer when put into a low- to moderate risk portfolio, but it does not enhance a very high-risk portfolio. As a result, real estate cannot produce the very high end returns which that stock equity can do. As already commonly known, real estate does work well as an inflation hedge. But it should not be taken for granted; different property types give different degrees of inflation hedge. It is important to be aware of what type of property that is added into a portfolio when aiming for an increased hedge against inflation. Finally, real estate is a great producer of steady cash flows generating a high cash yield, much higher than yields of stocks and bonds.
This is in line with the conclusions that Hoesli and Lekander (2006) states when investigating the benefits of having real estate in a mixed-asset portfolio, but with an addition of potential benefits of lucrative asset-liability frameworks:

1. **The already well documented risk diversification with low correlation to stock markets and sometimes even negative correlation to bond markets.**

2. **The long duration of property assets, which not only very commonly offers a contract with rents tied to the rate of inflation, resulting in an inflation hedge, but the assets can also very often match an institutions other long-term liabilities, which open doors to very lucrative asset-liability management frameworks.**

Riddiough et al. (2005) combined an index using data series from REITs from 1980-1998 and adjusted in terms of partial-year financial data, leverage, asset mix and fees, to be able to be compared to the direct real estate market. The direct real estate market was reflected by the NCREIF index. Without adjusting for partial-year financial data, leverage, asset mix and fees, the REIT index have had an annual return of 12.50% during 1980-1998. During the same time period the NCREIF index have only had an annual return of 8.51%, resulting in a difference of almost 400 basis points per year. When regards have been taken to partial-year financial data, leverage, asset mix and fees, the REIT index have made an annual return of 10.44% and the NCREIF index 7.36%, a difference of around 300 basis points. A large difference, yet a smaller gap when compared to when no regard had been taken to the differentials between the two index types. A possible answer to why the performance gap is true can be found within the illiquidity and the geographical aspect in the direct real estate market, which is missing as risk factors adjustment in the above analysis between the two different investment types. Nevertheless, given the above result the return is much more tempting within the indirect real estate market than in the direct real estate market.

A major problem for an investor who seeks to optimize a mixed-asset portfolio is which investment time series to use to reflect the true return of properties. The property stocks have a stock market component, which makes them more volatile, while direct property appraisals suffer from smoothing and time lags, which make them less volatile. By removing microstructure effects from both of the two series we get closer to what essentially would be the true return of properties, which most likely is somewhere between these two different
series. By accepting these adjusted series and apply a standard mean-variance optimization model we get an allocation to real estate of the substantial 10% for both the US market and the UK market, when optimizing for the highest Sharpe ratio. (Brounen and Eichholtz, 2003)

Sa-Aadu et al. (2010) conduct an analysis with the main focus on the timeliness (in other words the appropriateness) of gains from different asset allocations in a mixed-asset portfolio. The data series that have been used contains several different asset classes ranging from the period 1972-2008, a period that have undertaken several different crisis, but perhaps most important also the recent financial crisis.

The result of Sa-Aadu et al. (2010) is that real estate, commodities and precious metals are the asset classes that deliver the highest gains in a mixed-asset portfolio when consumption is low or very volatile. In other words, when investors turn more risk-averse, these asset classes tend to outperform others. An investor who dislikes poor portfolio performance should in such environment overweight these asset classes when consumption is decreasing. By conducting a mean-variance analysis the authors gets an efficient frontier consisting of a heavy exposure to these assets, given that consumption is deteriorating. The study also contribute to the literature regarding asset allocation in terms of the importance of asset allocation during different parts of the business cycle, and furthermore providing how portfolio gains can differ depending on asset allocation. Given the results from this study, the allocation of around 4% that institutional investors have today towards real estate could be seen as an underweight, especially during instable economic times with volatile consumption rates.

Chun et al. (2004) are trying to find an answer why institutional investors allocate so small portion to real estate within their mixed-asset portfolios, while at the same the all recent studies shows that the allocation should be higher. At the time of the study, institutional investors held real estate as an investment and asset class for about 2%-3% of their total portfolio. The result of the study concludes in four factors that points towards why institutional investors should undertake a bigger exposure towards the real estate market than they have done so far:

1. Real estate seems to pay off during times when it is needed the most and when other asset classes fail; during low consumption growth.
2. Real estate returns are predictable and can be compared to the predictability that can be found in equities.

3. Real estate investments works well within asset-liability management and frameworks.

4. Large losses on real estate are considered very small in the long-term.

The private sectors’ commercial real estate investments represent 6%-12% of the total investable wealth in the US, implying that an increase from the institutional investors towards these numbers in terms of exposure to real estate would result in an elimination of firm risk, according to CAPM (Chun et al., 2004). Which, all other things equal, should provide a higher risk-adjusted return.

The findings in the analysis gives unfortunately only more light that all signs points towards that institutional investors should undertake a more aggressive exposure towards real estate, but no answer why they don’t comply.

At the same time, the underweight in real estate in a mixed-asset portfolio might be justified. According to Liu and Lin (2008), little or no aspect at all have been taken to the illiquidity aspect when recent studies have concluded that mixed-asset portfolios should allocate a higher proportion to real estate.

Illiquidity is computed by the time a real estate takes to sell, or the “time on market” (TOM). The length of TOM differs from each transaction, and is affected by many factors such as the specific local real estate market and the nature of the specific real estate that is being sold. The uncertainty of TOM adds additional risk to an investor. In terms of this, direct real estate differs from that of other financial asset which is valued by returns and standard deviations which is turn is based on transaction prices on a usually daily basis. This way of valuing cannot be applied to the real estate market due to that no interest can be put into the uncertainty of TOM. A risk factor that is unique to the direct real estate market.

This constitutes a problem when comparing direct real estate returns (i.e. NCREIF index) to other financial assets. Earlier studies have shown that direct real estate have outperformed other asset classes, such as stocks and bonds, substantially in terms of Sharpe ratio. If this were to be true, real estate should contribute a very large portion in each institutional
investor’s portfolio, but that isn’t the case. Real estate usually has an allocation of around 5% of the total portfolio among institutional investors.

This is also what commonly is known as the “risk-premium puzzle” within real estate. If real estate were to outperform other asset classes by this degree, why have institutional investors’ not proceeded towards a higher degree of real estate within their portfolios? The answer is believed to be found is how real estate risk and return are being measured and the fact that no consideration has been taken to TOM. Current real estate prices are based solely on the return from successful sales without account taken to TOM.

The result from Liu and Lin (2008) after formulating a unified metric that combines both real estate prices risk and the uncertainty of marketing period risk (TOM), show that:

1. The traditional valuation of risk and return from real estate, which is based solely on return distribution of successful transactions without regard to TOM, is underestimating the volatility (risk) and overestimating the return.

2. The Sharpe ratio from direct real estate investments that earlier studies have shown that have been substantially higher than those from other financial assets, such as stocks and bonds, is with regard to TOM seriously overestimated.

6.6 INDIRECT OR DIRECT REAL ESTATE IN A MIXED-ASSET PORTFOLIO?

Pagliari et al. (2003) have conducted a research over the period 1981-2001 trying to investigate whether securitized real estate have outperformed direct real estate, and also whether there have been any difference in terms of volatility. Securitized real estate has been characterized by the NAREIT index and direct real estate as the NCREIF index. Prior to 1993 the NAREIT index accounted for 15%-20% of the total market capitalization in the real estate market (NAREIT + NCREIF). During the period 1992-2001 NAREIT have averaged an approximate of 65% of the total market share (NAREIT + NCREIF). Large institutional investors tend to favor investments within the direct real estate market, while smaller investors tend to favor securitized (public) real estate.
During the period 1981-2001 an investment in securitized real estate yielded an average annual return of 13.47% with a volatility of 14.66%. For the same period, an investment in the direct real estate market yielded an average return of 8.43% with a volatility of 5.91%. The difference in returns is 500 basis points and in volatility 250 basis points, which is somewhat in line with the results from Riddiough et al. (2005).

Important to take notice of is that these returns and volatility series have been adjusted by taking away non-core REITs, eliminating leverage and eliminating appraisal smoothing, so the two different investments types is more comparable to each other.

The difference in return and volatility between the two different investment types has decreased during the more recent years (1993-2001), compared to earlier data series. This implies that increased market efficiency, increased market capitalization and better data availability all contributes to a real estate market where securitized real estate and direct real estate displays a more long-term synchronization. (Pagliari et al., 2003)

Obviously, when regards have been taken to make the two different investment types more alike, there are still factors that can potentially be an explanation to the different return and volatility in terms of liquidity, governance, transparency, control or executive compensation. Due to the fact that institutional investors tend to invest more in the direct real estate market, while smaller investors tend to invest more in the securitized real estate market one can tell that these two different types of investors clearly value these factors different.

Mueller and Mueller (2003) have conducted a research trying to investigate whether direct real estate and indirect real estate together can enhance a mixed-asset portfolio in terms of a better efficient frontier than only giving exposure to one of the two investment classes. The data series used in the analysis is based on NCREIF from 1972-2002 for the direct real estate market, and also on NAREIT from 1977-2002 for the indirect real estate market. The long period is necessary to catch as many economic expansions and contractions as possible, which gives the analysis a higher degree of statistical certainty.

Earlier studies regarding the issue whether direct real estate or indirect real estate improves the performance of a mixed-asset portfolio have only been conducted with respect of adding
only either direct real estate or indirect real estate to the portfolio. It has up to this point not been given any room of analyzing the performance of applying both of the investment types, direct and indirect, to a mixed-asset portfolio.

The main findings by Mueller and Mueller (2003) show that direct real estate and indirect real estate have very low quarterly correlations, resulting in higher diversification benefits when applied into a mixed-asset portfolio. The benefits are in other words higher than if only one of the investment types would have been applied into the portfolio. Earlier studies have shown that the correlation between direct real estate and indirect real estate increases in the long-term, with a substantial higher correlation when comparing 3-year periods to quarterly periods. But most institutional investors and fund managers report on a quarterly basis, and thus, quarterly data series should be the most appropriate to use.

6. 7 What risk factors are accompanied with a real estate investment?

To calculate the risk (volatility) level within a portfolio of real estate, the general approach would be to use the return from a sample of properties and by this simulate portfolios with various sizes, but with equal weightings. The risk level is then calculated on average for each portfolio. Earlier studies have shown that the risk level decrease when the portfolio increases in size and, all other things equal, that the strongest decrease occurs within the first 20-40 properties (Byrne and Lee, 2001). Any increase in portfolio size after 40 properties results in a marginal decrease in risk level. Consequently, managers investing in a mix-asset portfolio would believe that only a relatively few properties is needed to decrease the unsystematic risk to almost zero.

According to Byrne and Lee (2001), there is a problem applying equal-weighted simulated portfolios when estimating risk levels within real estate, which more often than rarely actually is value-weighted. On the other hand, value-weighted simulated real estate portfolios are most likely unrealistic to obtain and be able to use by practitioners due to the uniqueness factors that influences real estate. Instead, actual data of real estate portfolios of different size are preferred to be used.
Byrne and Lee (2001) conducted an empirical study with actual data of real estate portfolios of different sizes. The regression results confirm earlier studies in the area that, on average, large portfolios tend to have lower risk than smaller portfolios. Noticeable is that there are still relatively many small sized portfolios that can have either very high risk, or very low risk, indicating the power of uniqueness of real estates. As a result, portfolio managers who invest with the aim to gain the average risk may very well get a risk greatly higher or lower than anticipated (in other words, the risk calculated as average), due to the large spread in actual risk.

Earlier studies showed that 20-30 properties are enough to reduce unsystematic risk to almost zero, based on equal-weighted simulated portfolios of various sizes. The result by Byrne and Lee (2001), which is based on actual real estate portfolios of various sizes, shows that it is a significant understatement. The actual properties needed to be held to reduce unsystematic risk to almost zero is more likely to be in the range of 400-500 properties.

There is also previous research within the area of correlation between public stock markets in different countries around the world that points out that there are both low correlations when comparing national stock markets, but a significant relationship when comparing major stock markets. This is an interesting aspect to investigate from a securitized real estate view. Liow and Webb (2009) have conducted a study on the US, UK, Hong Kong and Singapore which accounts for 74% of the global securitized real estate market to investigate if there is any common risk factors to be found. The research is based on data from 142 firms from US, UK, Hong Kong and Singapore during the period 1993-2003.

The result by Liow and Webb (2009) shows that securitized real estate returns are in great extent influenced by domestic economic forces; as a result the local market returns have a major impact on the local real estate returns (from a Arbitrage Pricing Theory view). The US securitized real estate market also has a higher capability of accounting for variances in the UK, Hong Kong and Singapore securitized real estate markets than vice versa. This indicates an economic interdependence from UK, Hong Kong and Singapore towards the returns from the US. Also, all the four markets have factors that are moderately correlated to the world real estate market (and to a lesser extent to the world stock market).
This in turn gives proof that country specific factors do influence the international real estate market. The relationship between the four economies US, UK, Hong Kong and Singapore are closely related, meanwhile the four securitized real estate markets in each country are less related, according to Liow and Webb (2009). As a result, the potential for attractive diversification benefits within a mixed-asset portfolio remains good for international securitized real estate.

7. EMPIRICAL ANALYSIS

7.1 APPROACH

I will be conducting a thorough analysis through portfolio optimization using Modern Portfolio Optimization (MPT) based on Harry M. Markowitz studies.

The period I will conduct my analysis on ranges from January 2000 to December 2010, which is mainly the period where academic research in the topic lacks research. In other words it hasn’t been conducted that many studies on the period 2000-2010 within the topic of mixed asset portfolios and real estate, compared to the 80’s and 90’s where lots of studies and research have been completed on. My analysis will show whether the previous research and studies in the topic is still current, or if the market and investors have changed its behaviors, or should change investment behavior, compared to before.

The assets used in the portfolio analysis are equities, bonds, direct real estate, and indirect real estate. Equities are represented by the Stockholm OMX 30 Index, bonds are represented by Swedish 10 Year Government Bonds, direct real estate is represented by the IPD Sweden Long Term Property Index, and indirect real estate is represented by the Stockholm OMX Real Estate PI Index. A more thorough description of the issuers of the assets/indices and the asset/index itself follows below.

The return series are continuously compounded to show the net return, meaning no account is taken for inflation. This assumes that \( P_t = P_{t-1} e^{r_t} \), where \( r_t \) is the rate of return during the period \((t-1, t)\). This allows us to assume that the average period return, \( r \), is equal to \((r_1 + r_2 + \ldots + r_{12})/12\). If assumptions are to be made about future returns and recommendations are to be drawn, we have to assume that our return series represent the distribution of future return
series. This indeed makes compounded return series more favorable to use than discretely compounded returns (common geometric returns) since it doesn’t provide as true picture of the true returns.

7.2 DATA SOURCES

7.2.1 IPD SWEDEN LONG TERM PROPERTY INDEX
To be able to reflect the returns of the direct property market, I have used the IPD Sweden Long Term Property Index in my portfolio analysis. IPD, Investment Property Bank, is one of the largest cooperatives in performance management and analysis of real estate in the world. The Swedish Property Index (Svenskt Fastighetsindex, SFI) was established in 1997 in conjunction with IPD Nordic, to provide the Swedish and international real estate market with independent and thorough analysis and benchmarking of the Swedish real estate market and its performance.

As of mid May 2012, the Swedish Property Index was an independent partner of IPD in Sweden, but is now a fully integrated company within IPD Nordic. With this step, IPD takes over all indices and benchmarking activities in Sweden from the Swedish Property Index. The Swedish Property Index have during its year implemented several guidelines for valuations and external audits, which as of today is the main standard in the Swedish commercial real estate market. They have also implemented a standard regarding how transactions of properties through liability companies should be accounted.

The IPD Sweden Long Tem Property Index measures the returns from direct investments in properties in the Swedish real estate market. It is mainly based upon valuations of properties made in Sweden, and property management data gathered from the annual reports from different real estate companies all over Sweden.

“Basis of Measurement
Performance is measured 'as earned', with data recorded on the accruals principle where possible, i.e. income is taken on a receivable rather than received basis and costs are recorded as incurred not paid. Bad debts are deducted in the year in which they are written off in the accounts. Provisions for bad debts are not deducted. The invested amount are deducted - not the depreciations. The performance measures used are year-on-year calculations of income return, capital return, total return and percentage changes in market rental value. Measures are net of all property specific costs. Costs for portfolio management and finance are not included. The capital and rental values employed in the analysis are those supplied by the external or internal valuers and reported by the investors. All properties in the IPD Databank are valued at 31 December.”

www.ipd.com

Figure 2: Basis of Measurement, by IPD.
The companies that cooperate with IPD provide data of all their properties under their asset management, and they all follow the same guidelines and definitions that are being used by the index. The index excludes properties that have been subject for major investments in new-or reconstructions, due to the expected large increase in value. The index is as a result value-weighted into a continuous time-weighted series.

The capital growth has been desmoothed using Geltner’s reversed engineering formula, using Alpha of 0.6. The total return has been desmoothed using the formula \(((1+\text{Income Return})*(1+\text{Desmoothed Capital Growth})-1)\).

Predominant use of the properties (>50 percent) decides what asset the property shall contribute to (retail, office, industrial, residential, or hotels and other commercial).

Figure 3: Return of the IPD Sweden Long Term Property Index between 2000-2010

7.2.2 Swedish 10Y Government Bonds
The Riksbank is the Swedish central bank and a fully controlled government authority directly under the Swedish parliament. Their main responsibility is to provide the Swedish market with money liquidity and make sure that their value remains stable under an extended period. Within this responsibility comes also to maintain a low and stable inflation, which at the moment has the goal to remain over an extended period at 2 percent. The Riksbank oversees and monitor the Swedish market rates, including STIBOR, treasury bills, government bonds,
mortgage bonds, and corporate bonds. But the issuer of the treasury bills and government bonds is the Swedish National Debt Office (Riksgälden). Riksgälden took over the mandate to issue government backed bonds from the Riksbank in the late 1980’s.

I have used Swedish 10Y government bonds in my empirical analysis to add a more stable, inflation-linked, asset to my mixed asset portfolio analysis. A government bond is a security that has been issued by a government, usually denominated in its own currency. In Sweden, it’s the Swedish National Debt Office, Riksgäldskontoret, which handles all the issuing and buy backs of government bonds. A couple of years earlier, government bonds usually were called “risk-free bonds or assets”. But after the financial crisis in 2008, several countries, the USA included, have seen their national credit ratings been cut by the international credit institutions. Furthermore, the ongoing sovereign debt crisis in Europe, especially among the southern European Union’s members of the Euro, has put the government bonds on its limit, where several nations are being proclaimed of not being able to handle their debt payments. These proclaims indeed have impact on the yields which the nations have to pay for the money of the international underwriters and investors.

The yield that investors and underwriters demand from the government to buy their bonds constitutes mainly from two things:

1. The expected inflation in the nation
2. The repayment ability of the nation

A higher yield represents a nation which has an expected higher future inflation rate and/or has indicated potential problems with its repayment ability in the future.

The Swedish 10 year government bonds have yielded an average of 4.19% during January 2000 to December 2010. From January 2000 to December 2010 the yield has decreased from 5.95% to 3.21%, i.e. a decline of 274 basis points over the ten year period. This means that investors and underwriters have high expectations of the repayment ability of Sweden, and/or low inflation expectations of Sweden.
The lowest average monthly yield during the period was in August 2010, where investors and underwriters bought Swedish 10 year government bonds for a yield of 2.45%, a spread of 350 basis points compared to the beginning of year 2000. The average yield during 2010 was 2.89%.

Figure 4: Return of the Swedish 10Y Government Bonds between 2000-2010, index start = 100.

7.2.3 **OMX STOCKHOLM REAL ESTATE PI & STOCKHOLM 30**

NASDAQ OMX Group is the world’s largest company owning and managing stock exchanges. NASDAQ OMX provides the technology and infrastructure for stock exchanges over the whole world for over 3,500 listed companies. Until 2008 OMX was an independent Swedish listed company providing stock exchange services in Sweden and the Nordic region. But in 2008 NASDAQ completed the acquisition of the company, and it is now a fully owned subsidiary. NASDAQ OMX Nordics includes the stock exchanges in Helsinki, Copenhagen, Stockholm, Iceland, Tallinn, Riga and Vilnius.

To reflect investments and returns of indirect real estate, I have used the index OMX Stockholm Real Estate PI in the current absence of REITs listed in Sweden. I have used price index instead of gross index as a result of that profit from real estate companies is not very often fully returned to the company. Usually a share is divided to the shareholders, which in this case I let reflect the potential dividend that is being paid out of the listed companies, and furthermore has the effect of lower share prices.
The index is based upon 18 companies: Balder, Brinova, Castellum, Catena, Corem, Diöss, Fabege, Fast Partner, HEBA, Hufvudstaden, JM, Kungsleden, Klövern, Atrium Ljungberg, Sagax, Wallenstam, and Whilborgs. The index is value-weighted, meaning that each company’s market value equals its share of the index compared to the whole portfolio of the 18 companies. The index can vary over time regarding which companies that are being used within the index, depending on core business and the market value.

![OMX Stockholm Real Estate PI](image)

Figure 5: Return of the OMX Stockholm Real Estate PI between 2000-2010

To reflect the return of equities in the portfolio analysis, I have used the OMX Stockholm 30 index. The index reflects the 30 largest listed companies on NASDAQ OMX.

![OMX Stockholm 30](image)
The index consists of ABB, Alfa Laval, ASSA ABLOY, Atlas Copco, AstraZenica, Boliden, Electrolux, Ericsson, Getinge, H&M, Investor, Lundin Petroleum, MTG, Nordea, Nokia, Sandvik, SCA, SCANIA, SEB, Securitas, Handelsbanken, Skanska, SKF, SSAB, Swedbank, Swedish Match, Tele2, TeliaSonera, and Volvo. The index is value-weighted, meaning that each company’s market value equals its share of the index compared to the whole portfolio of the 18 companies. The index can vary over time regarding which companies that are being used within the index, depending on core business and the market value.

7.3 RESULTS

The portfolio optimization has been divided between three optimizations to be able to compare and reflect over the first and second research questions. The first optimization is done using only bonds and equities, and the second optimization is used using only bonds, equities, and direct real estate. The third and last optimization is used using only bonds, equities, and indirect real estate. The third research questions can be answered by comparing the second and third optimization. When comparing the different optimizations, I have used the Sharpe ratio to range the different portfolios according to how well they deliver their return in terms of how much risk the investor need to take. The Sharpe ratio is calculated as the expected return deducted with the risk-free return, divided with the standard deviation of the portfolio, sigma ($\frac{E[R-R_f]}{\sigma}$).

When comparing the individual assets isolated, they show the following results:

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>E(return)</th>
<th>Stdev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds</td>
<td>4.02%</td>
<td>0.87%</td>
</tr>
<tr>
<td>Equities</td>
<td>2.54%</td>
<td>27.12%</td>
</tr>
<tr>
<td>Direct real estate</td>
<td>9.33%</td>
<td>9.22%</td>
</tr>
<tr>
<td>Indirect real estate</td>
<td>16.95%</td>
<td>24.43%</td>
</tr>
</tbody>
</table>

When conducting the first portfolio optimization using only bonds and equities, the highest Sharpe ratio is given by the portfolio including 62% bonds and 38% equities. The expected
return equals 3.46% with a standard deviation of 2.67%, resulting in the highest Sharpe ratio by the portfolio of 0.52.

When conducting the second portfolio optimization using only bonds, equities, and direct real estate, the highest Sharpe ratio is given by the portfolio including 43% bonds, 30% direct real estate, and 27% equities. The expected return equals 5.22% with a standard deviation of 3.37%, resulting in the highest Sharpe ratio by the portfolio of 0.94.
When conducting the third and last portfolio optimization, using only bonds, equities, and indirect real estate, the highest Sharpe ratio is given by the portfolio including 49% bonds, 21% indirect real estate, and 30% equities. The expected return equals 6.29% with a standard deviation of 4.14%, resulting in the highest Sharpe ratio by the portfolio of 1.02.

Figure 9: Portfolio optimization using only bonds, equities, and indirect real estate.
8. SUMMARY

The majority of all empirical studies that have been conducted during the 2000’s concerning real estate as an asset class in a mixed-asset portfolio have shown signs of problems what return series that should be used as a benchmark when comparing real estate returns. In other words, what return series that expresses the true return of properties best.

Studies have shown during the 2000’s that REITs have outperformed the direct real estate market by far, sometimes as much as 500 basis points on an annual basis, during the 80’s and 90’s. It is possible that there is a premium paid to the higher liquidity and tax-transparency followed by the REITs. Although the two different investment types (REITs and direct real estate) have the same underlying asset; properties, they have different characteristics beside the return. REITs are traded on a daily basis on a stock exchange, with following volatility of a common stock, meanwhile direct real estate are often subject to extended periods of not being traded at all – and investors can solely rely on appraisals done two times a year.

The conclusions of empirical analysis only proofs the previous studies that have been conducted within the area, that there is still a large premium paid for indirect real estate compared to direct real estate. The analysis shows clearly that the portion of real estate, whether it’s direct or indirect, is higher than the average of 5% that the institutional investors have been managing during the 80’s and 90’s (Steinert and Crowe, 2011). It is more likely to yield the highest risk-adjusted return when investing between 21% - 30% depending on the real estate specifics.

Research question 1: Can real estate as an asset class enhance a mixed-asset portfolio in terms of risk-adjusted return?

The portfolio analysis shows us that real estate, both direct and indirect, enhances a mixed-asset portfolio in terms of risk-adjusted return. For a mixed-asset portfolio containing direct real estate 176 basis points on an annual basis, and for a portfolio containing indirect real estate as much as 283 basis points on an annual basis. For both the portfolios containing real estate the Sharpe ratio increases from respectively 41 and 50 basis points to 0.92 and 1.02, compared to only 0.52 for a portfolio not containing real estate.
Research question 2: *How does direct real estate differ to indirect real estate in terms of return, risk, and (if possible to determine) liquidity?*

As been pointed earlier, there are previous studies showing that REITs have outperformed the direct real estate market by far, sometimes as much as 500 basis points on an annual basis, during the 80’s and 90’s. The conclusion of the empirical study shows clearly that this major spread has not diminished, in fact it has increased.

During the period being analyzed, indirect real estate has outperformed direct real estate in terms of annual return by 762 basis points. Direct real estate have on an annual basis returned 9.33% with a standard deviation of 9.22%, meanwhile indirect real estate during the same period have returned 16.95% with a standard deviation of 24.43%. If account is taken to the risk-adjusted return, i.e. the Sharpe ratio, the outcome is less different. Indirect real estate has during the period a Sharpe ratio of 0.94 while direct real estate only shows 1.02. I.e. not that much higher risk-adjusted return compared to the higher standard deviation.

The documented problems of direct real estate in terms of illiquidity in combination with the lack of information transparency (compared to the information transparency of indirect real estate), could very well be a major contributor to the major differences in returns of the two assets in terms of both returns and risk.

Research question 3: *Does the potential increase in the risk-adjusted return differ when adding direct real estate compared to indirect real estate?*

As seen by the results from the portfolio analysis, there is a gap in terms of return and risk when comparing the portfolio containing direct real estate with the portfolio with indirect real estate. The portfolio containing indirect real estate outperforms the portfolio with direct real estate with 107 basis points on an annual basis, with the aspect of taking on 77 basis points more in standard deviation. The Sharpe ratio is almost the same for both portfolios, but the third portfolio (containing indirect real estate) should preferable due to the higher return and a couple of basis points higher risk-adjusted return.
9. CONCLUSIONS

The documented problems when investing in the direct real estate market in terms of illiquidity and lack of information transparency in combination with benchmark problems may be a contributor to the outperformance by indirect real estate of direct real estate. Also, studies have shown that indirect real estate tends to lead the return development in the overall real estate market, which also could be an additional contributor to the excess return of indirect real estate. Inclusion of direct real estate may according to these facts be seen as a more complicated investment than indirect real estate, but investment vehicles such as direct real estate commingled funds (similar to private equity funds) could be considered as an alternative investment to direct real estate. Still, the illiquidity factor remains a problem.

The changes that have occurred on the developing side of real estate instruments since the mid 90’s have resulted in a much more transparent and flexible real estate market. As a result, more investors have gain more exposure towards real estate through instruments that have let them gain higher liquidity in their portfolios while maintaining same degree of diversification. REITs accounts for only 5% of the total of the institutional real estate in US as of 2003. With regard to this small amount and to the already known problems with entering the direct real estate market in terms of illiquidity and local market knowledge, there is a potential increasing demand for additional ways to get an exposure to the real estate market.

Very interesting developments are occurring at the moment regarding derivatives in the real estate market, how these instruments will help investor to gain exposure and to hedge investments are too early to say anything about. But most likely the trend will continue with higher degree of transparency on the market and higher flexibility with regards to portfolio strategies including real estate as an asset class.

An interesting approach for further research is to look at private investors portfolios, instead of institutional investors. Private investors may, or may not, be less dependent on a liquid portfolio, and therefore be a more appropriate investor to gain a higher exposure towards real estate. A comparison between current portfolios and optimized mean-variance portfolios with different asset classes could, depending of the current portfolios among the private investors, provide an enhanced tool for the private investor advising market. Furthermore, depending on
the result, it could provide incentives for banks to come up with new financial products with an exposure towards real estate.
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**FIGURES**


Figure 2: basis of measurement of the IPD Sweden Long Term Property Index, by IPD. [www.ipd.com/Sweden](http://www.ipd.com/Sweden)

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