Diversifying Among the Most Concrete of Assets; An Analysis of the Optimal Direct U.S. Real Estate Investment Portfolio

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[1] This is my thesis submitted to the Department of Economics for Honors.

I would like to acknowledge Professor Edward Tower for his insight and guidance, and my parents, Paul and Roberta Izzo, for their continuous support.

Abstract:

This paper presents the results of a basic portfolio optimization analysis on direct real estate investments in major U.S. real estate markets. A standard mean-variance methodology is used, optimizing portfolio mix over a series of objective functions. The

return series of the resulting optimal portfolio is then compared to those of real estate investment trusts, major U.S. equity markets, and an optimal portfolio of hedge funds.

I. Introduction:

In the past decade, as the major equity markets have exhibited their inherent volatility, many investors have turned to alternative investment vehicles. This group of investments, generally considered to include real estate, private equity, and hedge funds, are less correlated to the major equity markets than most traditional investment vehicles, providing a medium for investors to lower the volatility of their portfolios without necessarily reducing returns. As such, these investment opportunities have become the subject of much research and general interest by academics and institutional investors alike.[2]

Since most commercial real estate assets are large and relatively indivisible, meaning that their ownership structure cannot typically accommodate a large number of equity investors, the major players in the real estate investment arena have historically been institutional investors such as real estate investment trusts, insurance companies, universities, and pension funds. However, even these large investors cannot afford to be invested everywhere, nor do they want to be. Real estate has traditionally been a regional game, mainly because of the perception that asymmetric information scenarios result from the depth of insight required to fully evaluate a property.[3] These investors would prefer to pick and choose their investments to maximize return while minimizing volatility and avoiding unnecessary research-related expenditures.

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[2] Mulvey (2002)
[3] Georgiev (2003)

The primary purpose of this study is to derive portfolios that allow investors to enjoy the gains associated with direct real estate investments while mitigating the non-systematic risk associated with the individual assets. The risk-return characteristics of this optimal portfolio will then be compared to those of real estate investment trusts (REITs), the S&P 500, and an optimal hedge fund portfolio.

The rest of this paper is organized as follows. Section II will describe the data used in this study. It will explain the original sources used in the creation of the data set, and will define the different asset sets that are considered. Section III will outline the steps taken to create the optimal portfolios and the efficient frontier. Section IV will discuss the results of the analysis and postulate some reasons for any surprises. Section V will compare the optimal direct real estate investment portfolio with some other common investment vehicles. Finally, section VI will briefly summarize the results of the study and translate them into appropriate investment recommendations.

II. Data:

To determine the optimal direct real estate investment portfolio, data from the National Real Estate Index's *Market History Report* was used. The NREI has been the leading provider of commercial and residential real estate data for the past twenty years, serving brokerage houses, government agencies, commercial and investment banks, and academic institutions.[4] The *Market History Report* provides semiannual data on 60 metropolitan markets within the United States from the fourth quarter of 1985 until the second quarter of 1994, and quarterly data from the second quarter of 1994 until the second quarter of 2003, and is widely considered by industry experts to be the most

[4] http://www.graglobal.com/index.php?section=products&page=aboutNREI

comprehensive data set of its kind. Each market is subdivided into six property types: CBD office, suburban office, industrial, retail, apartment, and class B apartment. Prices, rents, and capitalization rates are provided for each sub-market, and are drawn from three main sources. They are either taken from actual transactional values, are estimates derived from actual data on typical properties (in the case that there is not enough data available to provide a statistically significant figure), or are taken from local market-specific sources of research and analysis.

Of the aforementioned six property types, I will focus my analysis on CBD office, retail, apartment, and industrial properties. The primary reason for this decision is that data is only available for suburban office properties and class B apartments starting in 1995 and 1997, respectively.

Since the distinction between property types is of fundamental importance in this paper, it is important to recognize the basic difference between each of these types of assets. CBD office properties are, in the context of this data set, defined as office buildings located in the central business district (CBD) of the target market, or in an area widely considered to be the primary office location for those more suburban markets that lack a clearly defined CBD. The buildings must be at least ten stories high, and be of high quality construction with a high quality exterior finish.

Retail properties are typically of an unenclosed nature, and house at least one credit anchor tenant. Typically these buildings range in size from 75,000 to 250,000 square feet, with anchor tenants inhabiting between one third and one half of this space.

Apartments considered in this survey typically have 100 or more units with standard amenities and access to covered parking.

Industrial properties are considered to be those whose primary usage is for distribution or storage. Typically, these properties are located in established industrial parks and house buildings of at least 50,000 square feet.

While the bulk of the data incorporated into this study is from the aforementioned NREI data set, some additional data sources were also used. The return data on the S&P 500 was taken from the "historical prices" section of the Yahoo! Finance website.[5] The S&P 500 was chosen over the Dow Jones Industrial Average and the Wilshire 5000 index, the two major alternatives, because it is larger, and thus more diversified, than the Dow, and has been in existence longer than the Wilshire.

The data on REIT returns was taken from the National Association of Real Estate Investment Trusts (NAREIT), which is a national trade association for all publicly traded real estate companies. The NAREIT has constructed several REIT indexes, covering equity and mortgage REITs in foreign and domestic markets. For this study, the domestic equity REIT index was used, because of the applicability of its subject matter with respect to the direct real estate investment data that was used.[6] Within this domestic equity REIT index, total return figures were utilized, because they include not only share price appreciation, but also dividends and special distributions. The appropriateness of this index for this study is confirmed by its stated purpose as a "'passive' benchmark for assessing relative risks and rewards of alternative 'active' investment strategies".[7]

III. Methodology:

[5] http://finance.yahoo.com/q/hp?s=^GSPC
[6] http://www.nareit.com/nareitindexes/monthlyindexes.cfm
[7] http://www.nareit.com/nareitindexes/indexpaper99.pdf

Of the 60 metropolitan markets covered in the NREI data set, this study will focus only on those 18 for which the data set included full information from 1986 until 2003. This group includes the following; Atlanta, Baltimore, Boston, Charlotte, Chicago, Dallas, Denver, Houston, Los Angeles, Minneapolis, Orlando, Philadelphia, Phoenix, Sacramento, San Diego, San Francisco, Seattle, Tampa, and Washington DC. After selecting which markets and sub-markets were appropriate for this study, semiannual returns were calculated. Semiannual periods were chosen over quarterly periods because they allowed the analysis to cover a longer time period, since the quarterly data is not available from 1985 until 1994. Since the data set includes prices, rents, and capitalization rates, which are inverse price multiples in the sense that they are equal to the property's net operating income divided by its price, returns needed to be derived from these figures. For this purpose, the following equation was used:

$$Return_1=((price_1-price_0)+(CAP_0*price_0))/price_0$$

The logic behind this equation stems from the fact that real estate returns have two components: capital appreciation and operating income. The $(price_1-price_0)$ clause represents the capital appreciation, and the $(CAP_0*price_0)$ clause represents the operating income.

Once the quarterly returns were calculated, they were converted into instantaneous rates of return in order to facilitate the aggregation process. This conversion was made by way of the following equation:

$$\text{instantaneous return}= \ln(1+\text{real return})$$

Using instantaneous returns throughout the rest of the study facilitated the aggregation process by enabling direct summation of periodic returns.

Next, optimal portfolios were created for a variety of objective functions by using the solver tool in Excel. Each of these portfolios consists of a blend of the 72 sub-markets included in this study. Since direct real estate investments cannot easily be "shorted", the weighting within the portfolio of each sub-market was limited to being between 0% and 100%. The various objective functions used represent the spectrum of risk aversion present in investors. This analysis is designed to find optimal portfolios for a hypothetical investor who makes investment decisions based solely on expected annual returns and standard deviations based on past return performance. It is important to note that this is a backward looking process, and represents the optimal portfolio that could have been purchased in 1986 at the beginning of the study, but does not necessarily represent the optimal portfolio for an investor to hold for the next 18 years.

The following objective functions were optimized for: annual return, annual return-3.5 standard deviations, annual return-4.0 standard deviations, annual return-5.0 standard deviations, annual return-7.5 standard deviations, annual return-10.0 standard deviations, annual return-15.0 standard deviations, annual return-20.0 standard deviations, annual return-50.0 standard deviations, and annual return-500.0 standard deviations. Optimizing for such a wide range of levels of risk aversion provided a reasonably comprehensive set of optimal portfolios. Each of these portfolios is defined by its weightings in the various sub-markets being considered in this paper. By adjusting the weightings within these portfolios, one can alter the risk/return characteristics of the composite portfolio. Refer to Table 1 in the appendix to see these optimal portfolios,

noting that only those sub-markets that are included in the optimal portfolios are featured in the table. Once the set of optimal portfolios was found, they were plotted on a graph to create the efficient frontier of direct real estate investments in these sub-markets.

IV. Direct Real Estate Investment Efficient Frontier:

The efficient frontier of direct real estate investments in the selected markets includes portfolios with annual returns ranging from approximately 11.89% to 14.72% and standard deviations ranging from approximately 1.45% to 5.90%. Refer to Chart A for a graphical representation of this frontier.

Of the 72 sub-markets considered in this study, only 21 are ever part of an optimal portfolio. In other words, 70% of the markets would never have been advantageous holdings, regardless of an investor's level of risk aversion. In general, an asset set might be omitted from the optimal portfolios because of its low historic returns, high historic volatility, or because of its correlation with other considered asset sets. Specifically, the Chicago, Dallas, Los Angeles, San Diego, and San Francisco markets are omitted from the optimal portfolios due to inferior risk/return profiles. Each of these markets offers relatively low returns with relatively high volatility, making them unattractive to our theoretical investor. Alternatively, the Tampa market has reasonably good risk/return characteristics, but is not represented in our optimal portfolios, probably because of its correlation with some of the other markets. Perhaps a more interesting observation is that office sub-markets in aggregate never account for more than 3.88% of any of the optimal portfolios, while apartment sub-markets never account for less than 22.55% of any of the portfolios. This trend is also reflected in the national averages. In aggregate, CBD office

properties offered the lowest annual return with the highest volatility of all of the asset classes considered by the *Market History Report*, while apartment properties offered the highest annual return with relatively low volatility. This consistent underperformance of office properties seems inconsistent with real estate's market dynamic, suggesting that there may be reasons other than risk-return characteristics for investors to consider CBD office properties. The most convincing reason is that corporations often own their own office space, and are thus able to derive additional value from the property that an outside investor would be unable to capture. This value could be derived from a host of sources, including the prestige associated with owning its own building, the certainty associated with not renting space for short periods of time, and the flexibility enabled by being able to modify the space.

The minimum variance portfolio that can be constructed from these asset sets offers an average annual return of approximately 11.89% with an annual standard deviation equal to approximately 1.45%. This portfolio derives its low volatility from the fact that it is comprised of investments in 16 different sub-markets, thus mitigating most of the non-systematic risk associated with these assets. On a practical note, this represents the portfolio that an extremely risk averse investor would choose if forced to invest directly in real estate.

As one moves along the efficient frontier towards the portfolios with higher returns, there is greater representation by the apartment sub-markets, and less representation by the retail and industrial sub-markets, keeping in mind that the CBD office properties are rarely incorporated into any of the optimal portfolios. This relative

increase in representation for apartment properties is due mainly to the higher risk and return characteristics of these sub-markets.

Finally, as one approaches the maximum return end of the efficient frontier, almost the entire portfolio is composed of apartment properties. This is due to the high returns offered by the apartment sub-markets in general, and is exemplified by the fact that the point at the very end of the efficient frontier represents a portfolio composed entirely of Boston apartment properties, yielding a return of 14.72% with a volatility of 5.90%.

The efficient frontier of direct real estate investments clearly illustrates the positive effects of diversification. The frontier encompasses portfolios that offer much better risk/return relationships than a portfolio fully invested in any one sub-market. This is illustrated in Chart B, as the frontier lies far above each of the data points representing the individual sub-markets.

When considered in addition to a risk free asset, the efficient frontier of direct real estate investments offers portfolios with even better risk/return characteristics. Finding the tangent line between the risk free asset, to which will be assigned an annual return of 2.9%, and the efficient frontier yields a tangency portfolio that offers a return of 12.28% with an annual standard deviation of 1.48%. This portfolio is composed of 16.99% Charlotte industrial properties, 16.58% Seattle retail properties, 11.43% Sacramento industrial properties, 11.20% Denver apartment properties, 9.91% Washington DC apartment properties, 8.95% Minneapolis apartment properties, 6.42% Denver retail properties, 5.86% Philadelphia retail properties, 5.76% Baltimore industrial properties, and 6.89% of properties in six other sub-markets. By creating a portfolio optimally

weighted between the risk free asset and this tangency portfolio of direct real estate investments, investors of any level of risk aversion can construct their own optimal portfolio. This assertion is illustrated by Chart A, which shows the tangent line lying completely above the efficient frontier. Further, if the assumption is made that the hypothetical investor can borrow at the risk free rate as well, then they can create portfolios with risk/return characteristics represented by the tangent line to the right of the tangency portfolio. Given these assumptions, the tangency portfolio should be equivalent to the market portfolio. That is, the actual market sizes should correspond to the weightings in the above calculated tangency portfolio. Unfortunately, data on actual sub-market sizes was not available to test this conjecture in this paper. However, the fact that 70% of the submarkets included in this study were not represented at all in the tangency portfolio suggests that the market and tangency portfolios are not equivalent, since there are valued assets in every one of these submarkets. This is most likely due to the fact that the direct real estate market is not perfect. Not only is it illiquid, but the assets are also indivisible and have inherent value that is not directly associated with their value as investments.

IV. Comparison with Other Investments Types :

As was previously mentioned, the tangency portfolio for direct real estate investments found in this study yielded an annual return of 12.28% with an annual standard deviation of returns of 1.48% from the beginning of 1986 until the middle of

2003. This compares favorably with the risk-return characteristics of other large investment types. The S&P 500 index, probably the most popularly used benchmark of equity performance in the U.S., offers a 9.1% annual return with an annual standard deviation of 14.5% over the same period of time. As can be seen in Chart C, this is inferior to the risk/return combination provided by the direct real estate tangency portfolio.

Another particularly applicable benchmark for comparison is the NAREIT equity REIT index. This index produced an annual return of 10.6% with an annual standard deviation of 13.4%. What is more interesting than the relative risk and return characteristics of direct real estate investments and REITs is their correlation to one another. REITs are publicly traded real estate investment companies that were introduced by the federal government in 1960 as a vehicle to allow individual investors access to the commercial real estate market. [8] Since most individual investors face financial constraints that would make it difficult to purchase large pieces of commercial real estate, and virtually impossible to create diversified portfolios of such assets, these REITs were designed to level the playing field. Common sense, along with the logic inherent to their creation, would seem to dictate that these ought to move relatively similarly to the actual real estate markets. However, the correlation of the NAREIT equity REIT index and the direct real estate tangency portfolio is actually -23.7%. In other words, these two portfolios move in opposite directions more often than not. While this may seem surprising at first, similar results have been reported before involving other REIT and direct real estate investments.[9] Although it is not within the scope of this paper

[8] Zeitz (2003)
[9] Seck (1996)

to research this apparent anomaly, it may be of interest to know that the primary reason for this is that REITs tend to behave like a composite of stocks and real estate, with the real estate influence lagged due to the relative liquidity of the REIT market as compared to the static nature of the direct real estate investment market.[10]

Judging by the aforementioned statistics, the direct real estate market seems to offer a far better risk-return scenario than either the broad equity market or REIT stocks. However, a major caveat should be noted when making this comparison. As was mentioned before, the tangency portfolio was created as a backward-looking portfolio. It is both chosen based on past results and reports on past results. This compares to the equity and REIT indices, which were constructed to mimic their respective markets. Since, the tangency portfolio is based on an optimal allocation and the indices are representative in nature, a direct comparison is unwarranted.

However, as Table 2 illustrates, even the national averages for each of the four property types have far superior investment characteristics than the equity and REIT indices. Comparing the indices to national averages negates the problem associated with the backward-looking nature of the tangency portfolio's formulation, but there are still other difficulties in making a direct comparison. While investors can easily invest in the S&P 500 or create a portfolio similar to the NAREIT equity REIT index, the national averages for direct real estate are extremely diversified baskets of assets that would be difficult, if not impossible, for any investor, institutional or otherwise, to invest in. This difficulty arises from the fact that these assets are large and indivisible, and require maintenance and management, unlike purely financial assets.

[10] Clayton (2003)

The fact that these are not purely financial assets and that they are large and indivisible, is exactly the reason that REITs were created; to enable smaller investors to group together to effectively form larger investors. Since the size increase should imprve performance, it follows that larger REITs ought to be able to provide better return profiles than smaller REITs. This conjecture, which follows from the findings above, has considerable support in the literature, as noted by Ciochetti et al who wrote that "institutional investors have a strong preference for REIT shares with greater market capitalization".[11]

One final interesting comparison for the direct real estate tangency portfolio is the optimal portfolio of hedge funds created by Emily Perskie in her honors thesis last year. While she does not explicitly name a tangency portfolio, an analysis of her results yields the portfolio with an annual return of 11.50% and an annual standard deviation of 1.92% as a close approximation.[12] While this portfolio still lies below the efficient frontier for direct real estate investments, it is much closer than the other indices, a point that is most likely attributable to the similarities between this portfolio and the portfolios constructed in this study. Although they had different subjects, both studies created optimal portfolios from baskets of alternative assets.

V. Conclusion:

The optimal portfolios produced by this study demonstrate the importance of diversification as a risk reducing tool in direct real estate investment. Due to the non-

[11] Ciochetti (2002), p. 592
[12] Perskie (2003)

systematic risk associated with each real estate sub-market, a portfolio composed of investments in multiple markets offers a superior risk/return profile than investment in any single sub-market. Further, by combing the tangency portfolio, which has a return of 12.28% with a volatility of only 1.48%, with a risk free investment, an investor can tailor the portfolio to their own level of risk aversion. This portfolio compares favorably to other investment vehicles such as REITs, the S&P 500, and an optimal portfolio of hedge funds, although the comparisons are admittedly flawed.

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Appendix:

TableI. List of Optimal Portfolios

		Optimal Portfolios									
Objective Functions		return	return-3.50sd	return-4.0sd	return-5.0sd	return-7.5sd	return-10sd	return-15sd	return-20sd	return-50sd	return-500sd
Atlanta	ind	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.16%	0.21%	0.00%
Baltimore	ind	0.00%	0.00%	0.00%	0.00%	1.99%	3.45%	4.54%	5.76%	8.17%	9.30%
Boston	apt	100.00%	4.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Charlotte	apt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	0.62%
Charlotte	ind	0.00%	1.60%	8.36%	12.38%	14.55%	15.30%	16.20%	16.99%	18.57%	18.75%
Charlotte	office	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.55%	0.64%	0.77%	0.92%
Denver	retail	0.00%	5.45%	8.15%	9.66%	8.79%	8.05%	7.44%	6.42%	4.42%	2.14%
Denver	apt	0.00%	16.70%	14.30%	12.70%	11.68%	11.40%	11.02%	11.20%	11.61%	12.04%
Houston	apt	0.00%	1.48%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Minneapolis	apt	0.00%	19.67%	20.25%	18.54%	15.88%	14.01%	11.88%	8.95%	3.74%	0.97%
Orlando	ind	0.00%	7.57%	6.28%	4.25%	0.61%	0.00%	0.00%	0.00%	0.00%	0.00%
Philadelphia	retail	0.00%	0.00%	0.00%	0.00%	5.19%	6.01%	6.38%	5.86%	4.82%	3.18%
Philadelphia	apt	0.00%	0.98%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Philadelphia	office	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	3.88%
Phoenix	ind	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.31%	1.38%	2.99%	4.23%
Sacramento	retail	0.00%	0.00%	0.00%	0.00%	0.54%	1.94%	2.88%	3.78%	5.84%	5.80%
Sacramento	apt	0.00%	9.31%	6.40%	3.83%	1.93%	1.07%	0.36%	0.42%	0.81%	1.18%
Sacramento	ind	0.00%	22.13%	19.94%	18.39%	15.30%	13.85%	12.46%	11.43%	9.26%	8.48%
Seattle	retail	0.00%	0.00%	3.26%	8.16%	12.41%	14.03%	15.62%	16.58%	17.57%	18.12%
Seattle	ind	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	2.01%	2.65%
Washington DC	apt	0.00%	10.59%	11.89%	12.10%	11.13%	10.69%	10.33%	9.91%	8.84%	7.74%
return		14.72%	13.51%	13.19%	12.98%	12.66%	12.52%	12.39%	12.28%	12.07%	11.89%
SD		5.90%	2.19%	1.91%	1.76%	1.59%	1.54%	1.50%	1.48%	1.46%	1.45%

	Aggregate Composition of Optimal Portfolios by Market Type									
Apartment	100.00%	63.25%	54.00%	47.17%	40.63%	37.17%	33.59%	30.49%	25.29%	22.55%
Industrial	0.00%	31.30%	34.58%	35.01%	32.44%	32.61%	33.54%	36.23%	41.20%	43.41%
Retail	0.00%	5.45%	11.42%	17.82%	26.93%	30.03%	32.32%	32.64%	32.65%	29.24%
Office	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.55%	0.64%	0.85%	4.80%

Chart A: The Efficient Frontier of Direct Real Estate Investments

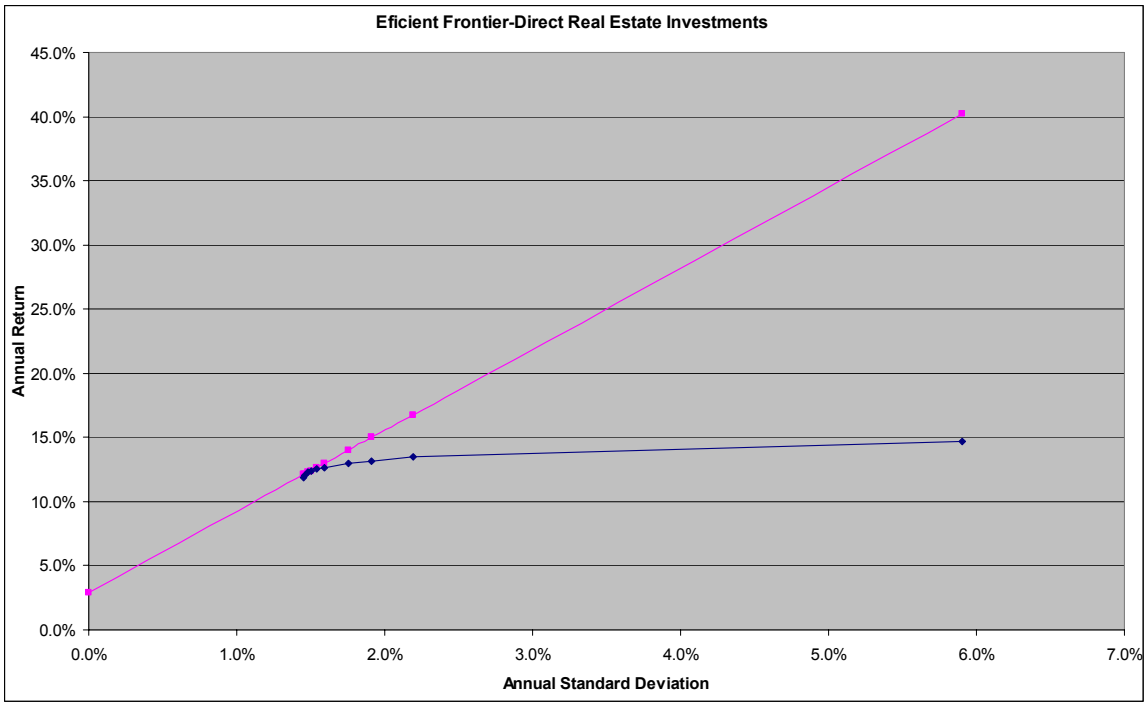


Chart A1: Cropped View of the Above Efficient Frontier

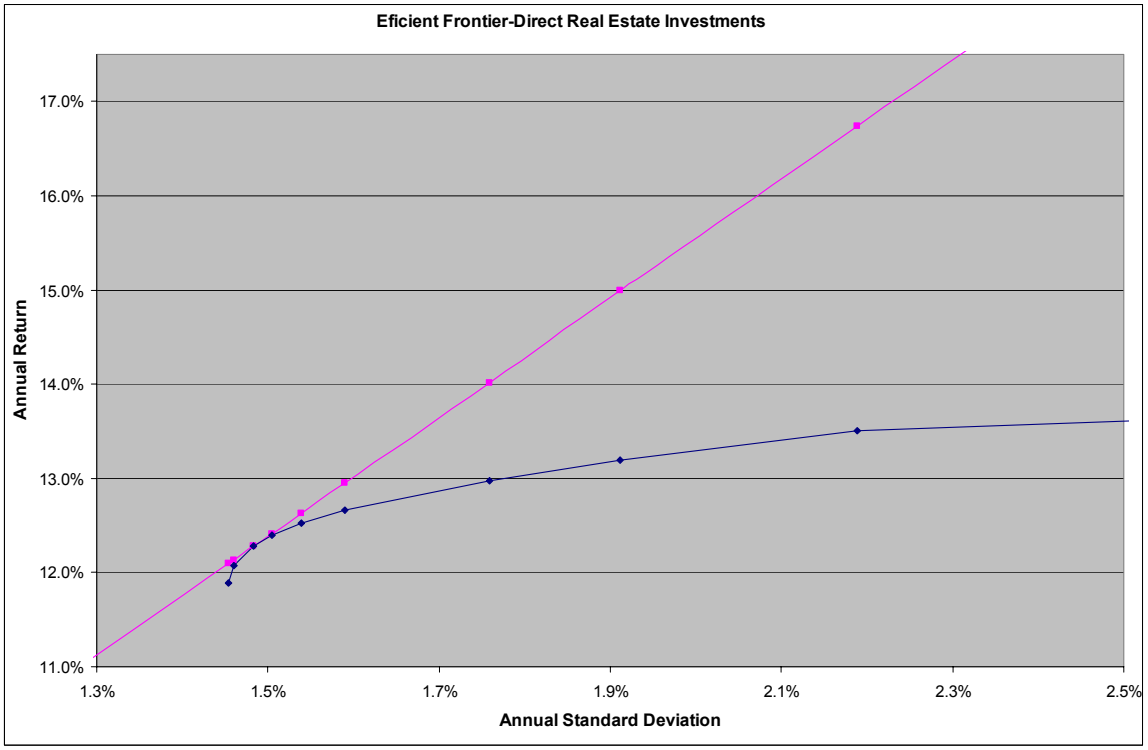
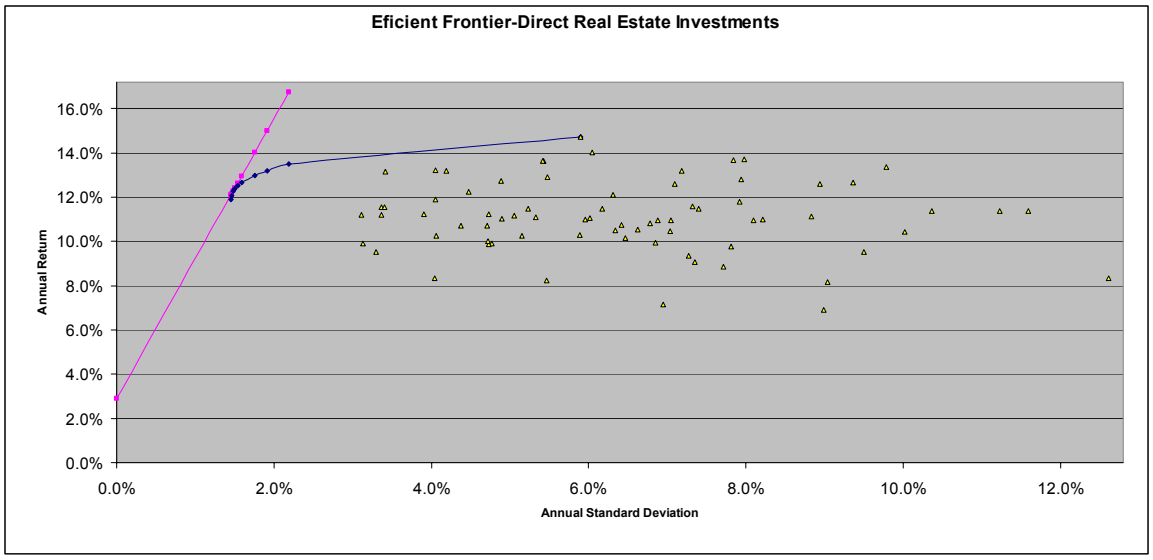


Chart B: frontier with individual submarkets



(note that each of the data points to the lower right of the efficient frontier represent direct real estate investments in each of the individual submarkets considered in this study)

Chart C: The Efficient Frontier of Direct Real Estate Investments with Other Investment Vehicles

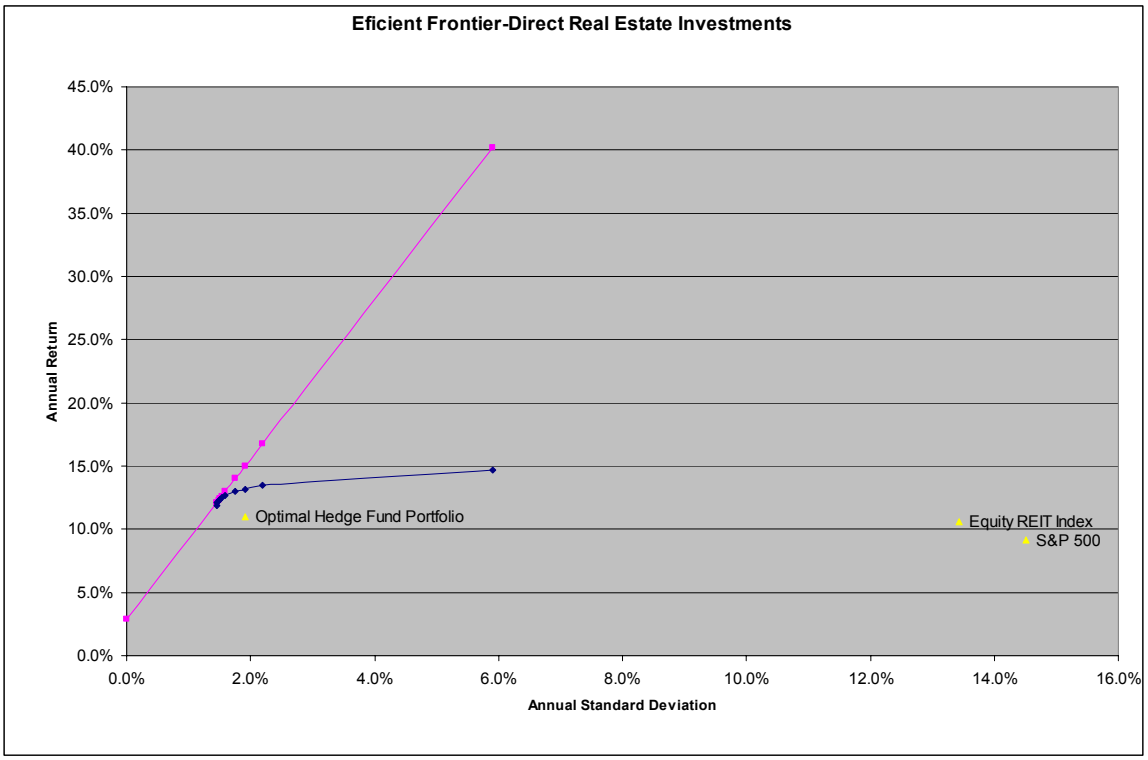


Table 2: Comparison of Direct Real Estate Investment National Averages with Other Investment Vehicles

		National Averages- Direct Real Estate				Other Indices	
Year	Half	Retail	Apartment	Industrial	Office	S&P 500	Equity REITs
1986	1	7.10%	5.54%	6.20%	6.25%	17.16%	15.93%
1986	2	7.18%	5.64%	6.60%	6.70%	-3.52%	1.60%
1987	1	7.13%	5.84%	6.64%	6.76%	22.74%	9.91%
1987	2	5.24%	5.40%	6.29%	4.99%	-20.73%	-13.61%
1988	1	5.66%	5.65%	6.13%	5.07%	10.16%	12.21%
1988	2	6.07%	5.55%	7.52%	2.78%	1.53%	0.44%
1989	1	5.61%	6.90%	7.01%	4.57%	13.54%	7.99%
1989	2	5.39%	4.39%	4.63%	4.38%	10.56%	0.48%
1990	1	3.98%	6.19%	4.58%	0.37%	1.30%	-4.07%
1990	2	2.96%	4.64%	4.27%	3.67%	-8.08%	-12.60%
1991	1	2.83%	2.83%	2.24%	2.16%	11.69%	21.27%
1991	2	-1.22%	3.06%	-0.66%	-3.93%	11.67%	9.26%
1992	1	0.44%	0.73%	2.47%	-1.01%	-2.17%	3.26%
1992	2	1.94%	4.12%	2.19%	-4.01%	6.54%	10.36%
1993	1	4.64%	6.86%	2.78%	0.51%	3.34%	16.68%
1993	2	4.78%	5.91%	2.51%	4.59%	3.47%	1.27%
1994	1	6.78%	9.56%	5.90%	6.83%	-4.87%	5.17%
1994	2	5.70%	6.24%	6.77%	7.24%	3.32%	-2.05%
1995	1	4.64%	5.63%	6.30%	4.41%	17.07%	5.55%
1995	2	4.90%	5.77%	5.13%	3.85%	12.28%	8.66%
1996	1	5.77%	12.13%	8.91%	8.39%	8.51%	6.60%
1996	2	7.69%	9.16%	7.80%	6.21%	9.94%	23.61%
1997	1	7.76%	9.04%	6.87%	9.98%	17.81%	5.55%
1997	2	8.58%	8.24%	8.09%	9.56%	9.20%	12.90%
1998	1	7.19%	8.90%	9.61%	13.75%	15.56%	-5.16%
1998	2	4.82%	8.61%	5.72%	6.98%	8.08%	-14.08%
1999	1	5.29%	6.78%	5.90%	7.85%	11.04%	4.67%
1999	2	6.05%	8.13%	5.68%	5.10%	6.80%	-9.40%
2000	1	5.43%	9.26%	7.71%	9.22%	-1.00%	12.38%
2000	2	4.88%	7.08%	5.47%	7.46%	-9.69%	11.02%
2001	1	3.06%	5.25%	4.39%	2.99%	-7.54%	10.84%
2001	2	3.19%	2.88%	2.21%	1.76%	-6.43%	2.20%
2002	1	6.22%	5.02%	3.97%	4.47%	-14.83%	12.82%
2002	2	6.04%	3.44%	4.84%	4.47%	-11.78%	-9.07%
2003	1	6.48%	6.28%	5.94%	3.88%	10.26%	12.99%
Annual Return		**10.8%**	**13.2%**	**11.4%**	**10.1%**	**9.1%**	**10.6%**
Annual Standard Deviation		**2.9%**	**3.3%**	**3.1%**	**5.2%**	**14.5%**	**13.4%**