Determinants of Private Real Estate Fund Performance 2004-2010: The Roller Coaster Ride

by

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B.S., Business Management, 2004

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Submitted to the Center for Real Estate on July 23, 2010 in Partial Fulfillment of the Requirements for the Degree of Master of Science in Real Estate Development

at the

Massachusetts Institute of Technology

September 2010

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August 3, 2010

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Abstract

The National Council of Real Estate Investment Fiduciaries (NCREIF) real estate fund database was analyzed for the time period 2004-2010. Real Estate funds were grouped into three categories: core, value-add and opportunistic. The thesis explores several possible determinants of fund performance during the time period which was examined. Ultimately, the analysis indicates that there was generally no systematic indication that a given fund’s characteristic(s) would portend either better or worse performance. The analysis did however yield the conclusion that in general core funds displayed a negative correlation between returns and leverage ratio. Finally, the thesis demonstrates the material difference in measured absolute and relative performance of opportunity funds when two different metrics are used: Time Weighted Return (TWR) and Internal Rate of Return (IRR).

Thesis Supervisor: Professor David Geltner

Title: Professor of Real Estate Finance
Acknowledgement

Many thanks are owed to the National Council of Real Estate Investment Fiduciaries (NCREIF) for their willingness to provide the requisite data to complete this thesis. The real estate industry stands to benefit from openness and transparency and NCREIF has helped advance that goal by opening their database for academic research.

Professor David Geltner's unsurpassed knowledge and enthusiasm in the classroom and as a thesis supervisor made my graduate school experience something to behold for the rest of my career. I feel fortunate to have been able to learn from Professor Geltner and am most grateful for his efforts.
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Chapter 1: Introduction

1.1 Background
The devastating effect of the financial crisis of 2008-09 has caused investors to reevaluate the methods by which they have traditionally invested in private real estate. Paramount in this effort is a closer study of the relative performance of closed end private real estate funds.

- Which strategies have performed the best among focused and non-focused funds with respect to geographic region and mix of real estate product type?
- Do larger funds perform better relative to smaller funds?
- How has the use of leverage influenced the return characteristics of core, value-added and Opportunity real estate funds?
- What are the possible implications of relying on time weighted returns (TWR) versus internal rate of return (IRR) for the determination of the best (and worst) performing funds?
- What conclusions can be drawn about fund characteristics as reliable predictors of performance?

In an effort to help answer these questions, this thesis will examine whether there have been systematic influences with respect to fund performance during the period from 2004 through the first quarter of 2010 which may indicate either the profile and/or strategy of a fund which is more likely to outperform its peers during a period of time which encompasses both an upturn and a downturn in the market.
The time period from 2004 - 2010 is particularly worthy of examination given that it encapsulates two extremes: a torrid rise in property values followed by an historic crash.

Table 1-1: NCREIF National Property Index Total Returns

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>2.56%</td>
<td>3.13%</td>
<td>3.42%</td>
<td>4.66%</td>
</tr>
<tr>
<td>2005</td>
<td>3.51%</td>
<td>5.34%</td>
<td>4.44%</td>
<td>5.43%</td>
</tr>
<tr>
<td>2006</td>
<td>3.62%</td>
<td>4.01%</td>
<td>3.51%</td>
<td>4.51%</td>
</tr>
<tr>
<td>2007</td>
<td>3.62%</td>
<td>4.59%</td>
<td>3.56%</td>
<td>3.21%</td>
</tr>
<tr>
<td>2008</td>
<td>1.6%</td>
<td>.56%</td>
<td>-.17%</td>
<td>-8.29%</td>
</tr>
<tr>
<td>2009</td>
<td>-7.33%</td>
<td>-5.2%</td>
<td>-3.32%</td>
<td>-2.11%</td>
</tr>
<tr>
<td>2010</td>
<td>.76%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: [www.ncreif.com](http://www.ncreif.com)

1.2 Data

The data for this thesis has been provided by the National Council of Real Estate Investment Fiduciaries (NCREIF). The following description of NCREIF was taken from the organization’s website (http://www.ncreif.org/about)

NCREIF is a not-for-profit trade association that serves its membership, and the academic and investment community’s need for improved commercial real estate data, performance measurement, investment analysis, information standards, education, and peer group interaction by:

- Collecting, processing and reporting data in a secure environment;
• Producing performance measurement indices;

• Encouraging academic and member use of NCREIF data for objective research;

• Providing forums with strong educational content to address industry issues;

• Publishing informed industry related articles and reports; and

• Contributing to the development of Real Estate Information Standards.

The data set is a compilation of the underlying funds which comprise the NCREIF Townsend Fund Index. The funds are each characterized as either core, value-add or Opportunity vehicles. For a full review of the current NCREIF Townsend policies, see Appendix A.
Table 1-2:

Historical Total Returns for the NCREIF Townsend Fund Index, sorted by Core funds.

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>2.72%</td>
<td>3.1%</td>
<td>3.32%</td>
<td>3.91%</td>
</tr>
<tr>
<td>2005</td>
<td>4.36%</td>
<td>5.18%</td>
<td>5.02%</td>
<td>5.13%</td>
</tr>
<tr>
<td>2006</td>
<td>3.88%</td>
<td>3.92%</td>
<td>3.63%</td>
<td>4.11%</td>
</tr>
<tr>
<td>2007</td>
<td>3.96%</td>
<td>5.08%</td>
<td>4%</td>
<td>2.04%</td>
</tr>
<tr>
<td>2008</td>
<td>1.34%</td>
<td>.26%</td>
<td>-.75%</td>
<td>-10.75%</td>
</tr>
<tr>
<td>2009</td>
<td>-13.44%</td>
<td>-9.2%</td>
<td>-7.3%</td>
<td>-3.7%</td>
</tr>
<tr>
<td>2010</td>
<td>1%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: [http://www.ncreif.com](http://www.ncreif.com)

Table 1-3:

Historical Total Returns for the NCREIF Townsend Fund Index, sorted by Value-Add funds.

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>2.89%</td>
<td>3.52%</td>
<td>3.07%</td>
<td>7.34%</td>
</tr>
<tr>
<td>2005</td>
<td>4.14%</td>
<td>5.54%</td>
<td>5.38%</td>
<td>10.11%</td>
</tr>
<tr>
<td>2006</td>
<td>3.34%</td>
<td>5.17%</td>
<td>2.71%</td>
<td>7%</td>
</tr>
<tr>
<td>2007</td>
<td>3.23%</td>
<td>6.38%</td>
<td>3.39%</td>
<td>3.37%</td>
</tr>
<tr>
<td>2008</td>
<td>.33%</td>
<td>.16%</td>
<td>-3.04%</td>
<td>-17.26%</td>
</tr>
<tr>
<td>2009</td>
<td>-15.33%</td>
<td>-12.6%</td>
<td>-7.6%</td>
<td>-13.5%</td>
</tr>
</tbody>
</table>
Table 1-4:

Historical Total Returns for the NCREIF Townsend Fund Index, sorted by Opportunity funds.

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>4.02%</td>
<td>4.01%</td>
<td>4.86%</td>
<td>14.3%</td>
</tr>
<tr>
<td>2005</td>
<td>5.81%</td>
<td>7.88%</td>
<td>8.77%</td>
<td>16.42%</td>
</tr>
<tr>
<td>2006</td>
<td>4.17%</td>
<td>7.19%</td>
<td>7.85%</td>
<td>18.68%</td>
</tr>
<tr>
<td>2007</td>
<td>8.02%</td>
<td>9.57%</td>
<td>3.85%</td>
<td>2.3%</td>
</tr>
<tr>
<td>2008</td>
<td>-.72%</td>
<td>-2.33%</td>
<td>-11.13%</td>
<td>-26.23%</td>
</tr>
<tr>
<td>2009</td>
<td>-14.76%</td>
<td>-11.3%</td>
<td>-3.1%</td>
<td>-4.1%</td>
</tr>
<tr>
<td>2010</td>
<td>2.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: http://www.ncreif.com

1.3 Methodology
This thesis will report on a quantitative analysis of a portion of the NCREIF/Townsend data. Only funds that reported data continuously from the first quarter of 2004 through at least the fourth of quarter of 2009 were considered for the analysis. Each of the qualifying funds was then examined for completeness of data for each quarter in the following categories:

1.) Gross Total Return Percent (which includes Income and Appreciation)
2.) Gross Real Estate Assets
3.) Leverage Percentage
4.) Investment Style (Core, Value-Add or Opportunity)

5.) Percentage allocation of real estate assets among the following product groups:
   a. Office
   b. Retail
   c. Industrial
   d. Apartment
   e. Hotel
   f. Resort
   g. Senior Living
   h. Health Care
   i. Mixed Use Specialty
   j. Residential Single Family
   k. Storage
   l. Parking
   m. Timber / Agriculture
   n. Land

6.) Percentage allocation of real estate assets among the following geographic areas:
   a. Northeast (US)
   b. Mideast (US)
   c. Southeast (US)
   d. Southwest (US)
   e. East North Central (US)
   f. West North Central (US)
   g. Mountain (US)
   h. Pacific (US)
   i. Canada
   j. Latin America
   k. Europe
   l. Asia Pacific
   m. Other Non-US
   n. Other Regional Division

In order to measure the degree by which a given fund was concentrated in either a particular product type or geographic region, I adopted the Herfindahl-Hirschman Index (HHI) and applied it to each of these two categories. The HHI is a measure of market
concentration. It is calculated by squaring the percentage allocation to each product type (or geographic region) and then summing the result\(^1\).

Table 1-5:

**HHI calculations for example funds**

<table>
<thead>
<tr>
<th>Fund</th>
<th>Office</th>
<th>Multifamily</th>
<th>Industrial</th>
<th>HHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Experts</td>
<td>90%</td>
<td>5%</td>
<td>5%</td>
<td>0.815</td>
</tr>
<tr>
<td>MF / Indust. Vehicle</td>
<td>5%</td>
<td>45%</td>
<td>50%</td>
<td>0.455</td>
</tr>
<tr>
<td>Diversified Fund</td>
<td>30%</td>
<td>40%</td>
<td>30%</td>
<td>0.340</td>
</tr>
</tbody>
</table>

For purposes of conducting the analysis, each fund’s leverage percentage was converted to a leverage ratio in order to more effectively analyze whether there was a linear relationship between fund performance and amount of leverage employed\(^2\).

Lastly, each of the funds was sorted by Investment Style: Core, Value-Add and Opportunity and each analysis was conducted within a fund’s given investment style group.

\(^1\) HHI = S_1^2 + S_2^2 + S_3^2 + \ldots + S_n^2 \text{ (where } S_n \text{ is the market share or percentage allocation to either product type or geographic region)}

\(^2\) Leverage Ratio = Loan to Value / (1-Loan to Value)
Chapter 2: Property Type and Geographic Region - Degree of Diversification

In order to explore the relative performance of funds within each investment style, I analyzed the performance of funds with respect to their degree of diversification across property type and geographic region. The analysis was performed in an attempt to answer the following question: During the time period from 2004-10, have funds which are concentrated in either one geographic area and/or one property type systematically outperformed more diversified funds? The analysis was performed for three separate time periods. 1) “The run-up”, which was determined to begin in 2004 and end in 2007 2) “The Crash”, from 2008-2010 and 3) The entire time period from 2004-2010.

2.1 Core Funds

The following scatter plots demonstrate the relationship between core funds cumulative total return and their HHI for both product type and region during the run up from 2004-2007. In total, fifteen (15) core funds were examined during this time period.

![Cumulative Tot. Return 04-07 and HHI Product](image)

\[ y = -0.229x + 0.6823 \]
\[ R^2 = 0.3536 \]
Note: The average HHI over the relevant time period was taken and then plotted versus cumulative total returns (see following tables).

It is interesting to note that without the presence of the outlier fund (the laggard performer) the relationship between the two variables would not be nearly as strong. In fact, the R-squared measure for the HHI (product) drops from 0.35 to 0.08 when the outlier fund is eliminated. The R-squared for the HHI (region) drops from 0.82 to 0.11 when the outlier is removed.

The following scatter plots demonstrate the relationship between core funds cumulative total return and their HHI for both product type and region during the crash from 2008-2010. In total, sixteen (16) core funds were examined during this time period.
The relationship between HHI Product and returns is significantly diminished during the downturn relative to the upturn. With respect to geographic concentration, the relationship is also diminished. Interestingly, the two outlier funds (outperformers) have nearly opposite geographic characteristics (focused versus diversified).

It will also be important to analyze fund performance during the entire time period (2004-2010) as it relates to the HHI measure of property type and geography. The following tables illustrate these relationships for fifteen (15) core funds.
2.2 Value-Add Funds

The following scatter plots demonstrate the relationship between value-add funds cumulative total return and their HHI for both product type and region during the run up from 2004-2007. In total, twenty one (21) value-add funds were examined during this time period.
The plots above demonstrate that during this period of time there is practically no relationship between a fund's performance and the degree to which it is concentrated among property types or geographic regions.

The following plots illustrate this same extremely weak relationship during the down turn.
It will also be important to analyze fund performance during the entire time period (2004-2010) as it relates to the HHI measure of property type and geography. The following tables illustrate these relationships for fifteen (15) core funds.
2.3 Opportunity Funds

Seventy nine (79) Opportunity funds were analyzed in an attempt to discern any relationship between the property type and geographic concentration variables. The plots below indicate that practically no relationship exists across any time frame with respect to property type or geographic concentration and returns.
Cumulative Tot. Return 04-07 and HHI Product

\[ y = 0.5259x + 0.819 \]
\[ R^2 = 0.0064 \]

Cumulative Tot. Return 04-07 and HHI Region

\[ y = 0.0442x + 0.9784 \]
\[ R^2 = 9E-05 \]

Cumulative Tot. Return 08-10 and HHI Product

\[ y = 0.0749x - 0.3412 \]
\[ R^2 = 0.0005 \]
Cumulative Tot. Return 08-10 and HHI Region

\[ y = 0.3368x - 0.5253 \]
\[ R^2 = 0.0087 \]

IRR and HHI Product 04-10

\[ y = -0.1101x + 0.1098 \]
\[ R^2 = 0.0065 \]

IRR and HHI Region 04-10

\[ y = 0.1601x - 0.0382 \]
\[ R^2 = 0.0134 \]
Chapter 3: Fund Size – Measured by Gross Real Estate Assets

This thesis set out in part to determine whether there has been any relationship between the size of a private real estate fund and its performance. Do larger funds which have large amounts of capital to invest sacrifice performance relative to those funds which are smaller and can make more targeted investments? Or, do smaller funds lack the capital to compete for the most attractive deals and therefore suffer as a result? These questions are somewhat related to earlier research which found that the largest properties (in excess of $100 million) typically provide the largest return while also exhibiting the greatest volatility.\(^3\)

3.1 Core Funds

The analysis indicates that Core funds generally do not show a relationship between fund size and performance. The following plots illustrate this relationship during the market bubble period from 2004-2007 for fifteen (15) core funds.

---

While this plot does suggest a positive correlation between fund size and total return, the following plot suggests the opposite relationship during the down turn from 2008-2010.

It is interesting to examine the influence that the two outlier (outperforming) funds have on this analysis. These funds were the best performing funds with cumulative total returns of approximately 10% and 15% and were also the two smallest funds with
average gross real estate assets of approximately $253 million and $33 million respectively. If these outlier funds were removed, the results of the analysis are fundamentally changed. The trend line becomes essentially flat and the R-squared is reduced from 0.12 to 0.002.

Ultimately, core funds do not show much of a relationship between fund size and performance. The following plot shows performance relative to fund size for the entire period from 2004 to 2010.

![Annual Total Return (TWR) and Gross Real Assets](chart)

\[ y = 0.0255x + 0.0255 \]

\[ R^2 = 0.0206 \]

### 3.2 Value-Add Funds

Value add funds do exhibit some meaningful relationship between their size and performance. Perhaps this is because value creation strategies are fewer and further in between and those funds with larger amounts of capital struggle to consistently find good investments that fit this billing.
The plot below shows this relationship during the period from 2004-2007. There does not seem to be any relationship during this period when practically funds enjoyed a similar positive performance.

The downturn exhibited a similar weak relationship.

It is not until the entire time period is examined that a modest negative relationship between fund size and performance emerges. The following plot illustrates this.
3.3 Opportunity Funds

Opportunity funds were found to exhibit no real relationship between fund size and performance. One might expect that these funds would share similar characteristics with respect to size and performance as value add funds. Particularly, if one is to believe the idea that well performing yet riskier investments are harder to come by and therefore those funds with more capital might struggle to consistently place their capital with these sorts of opportunities. However, we cannot draw this conclusion based on the following quantitative analysis which is illustrated in the scatter plots.
Chapter 4: The Influence of leverage on fund returns

The use of leverage to execute real estate investments is rather pervasive among private real estate funds. The implications are obvious: the potential for enhanced total returns along with the increase in risk and volatility that accompany it. But how has the use of leverage impacted the core, value-add and opportunity fund space? Have some fund types been more successful at utilizing leverage than others? Are the results similar for the bubble and the subsequent crash? The following scatter plots will help to illustrate some answers to these questions.

4.1 Core Funds

Core funds exhibit a fairly strong correlation with respect to returns and leverage ratio even though the amount of leverage they employ is rather small relative to value-add and opportunity funds. The following scatter plot illustrates this relationship for 2004-2007.
While the relationship is fairly weak during the upturn, this is not the case during the downturn. Clearly, a stronger pattern is exhibited on the way down: more leverage, worse returns. It is apparent that while core funds did not necessarily garner much benefit from additional leverage on the way up, they surely felt the harsh effects of the added risk on the way down.

And finally, the analysis of this relationship during the entire time period of 2004-2010 shows that even though returns were generally positive during this time period, those funds which utilized more leverage tended to underperform.
4.2 Value-Add Funds

Value-Add funds share similar characteristics as core funds with respect to returns and leverage. However, the relationship does not appear to be as strong. On the way up, those funds with more leverage generally benefited as illustrated below.

Similarly, on the way down – funds with the worst performance tended to have more leverage.
The analysis which encompasses the entire time period from 2004 to 2010 does show a negative relationship between leverage ratio and overall returns but it is not overly compelling. Additionally, the slope of the trend line is undoubtedly rather influenced by each of the outlier funds which have a -100% IRR (i.e. the cumulative outlay of cash/losses was larger than the initial outlay itself).
4.3 Opportunity Funds

Opportunity funds display the expected characteristics with respect to the amount of leverage which they employ (on average higher than the other funds) but do not show a strong relationship between overall returns and the amount of leverage in any of the time periods which are examined. Interestingly, we do not see the same negative relationship between returns and leverage ratio for the time period 2004-10 with opportunity funds.
Cumulative Tot. Return 08-10 and Leverage Ratio

\[ y = -0.2156x - 0.0077 \]
\[ R^2 = 0.0781 \]

IRR 04-10 and Leverage Ratio

\[ y = 0.0037x + 0.0553 \]
\[ R^2 = 0.0004 \]
Chapter 5: IRR versus Time Weighted Return – Opportunity Funds

In the White Paper, “Real Estate Opportunity Funds: Déjà Vu All Over Again” by Pension Consulting Alliance, Inc., the authors elevated the potential pitfalls of evaluating opportunity fund performance by using the Time Weighted Return Metric (TWR) in lieu of an Internal Rate of Return (IRR). “If small dollar amounts are involved in terms of contributions and distributions in the early quarters of the partnership, the TWR metric disproportionately reflects the impact of those quarters in the since-inception returns….TWR’s do not pay benefits to beneficiaries, IRRs do”\(^4\). Moreover, gains or losses when small dollar amounts are involved at any point of a fund could potentially distort the performance of a fund as well as its relative performance among its peers\(^5\).

The following table and example illustrate the material variance in overall ranking that exists when examining NCREIF Opportunity funds during the time period 2004-10.\(^6\)

The importance of this topic should be readily apparent as the fund which ranks first out of fifteen (highest) in TWR during the period 2004-2010 is actually the twelfth ranked fund in terms of IRR over the same period.

---

\(^4\) Pension Consulting Alliance, Inc. White Paper: Real Estate Opportunity Funds: Déjà Vu All Over Again. May 2003
\(^5\) Time Weighted Return measure is also referred to as the “geometric mean return” and does not weight the actual fund cash flows as an Internal Rate of Return would.
\(^6\) Note that each fund’s “since inception” IRR has been estimated by counting the 1\(^{st}\) Quarter 2004 TWR Denominator as the initial, “Time Zero” Investment.
### Table of top Fifteen Opportunity Fund Annual Total Return (TWR) and IRRs 2004-2010

<table>
<thead>
<tr>
<th>TWR Rank</th>
<th>TWR Rank</th>
<th>TWR</th>
<th>IRR Rank</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>104.2%</td>
<td>12</td>
<td>18.7%</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>63.7%</td>
<td>12</td>
<td>12.7%</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>52.9%</td>
<td>12</td>
<td>49.2%</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>46.0%</td>
<td>12</td>
<td>55.6%</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>45.0%</td>
<td>12</td>
<td>73.7%</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>39.0%</td>
<td>12</td>
<td>20.7%</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>27.8%</td>
<td>12</td>
<td>38.7%</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>25.8%</td>
<td>12</td>
<td>32.9%</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>25.7%</td>
<td>12</td>
<td>21.3%</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>23.7%</td>
<td>12</td>
<td>35.1%</td>
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<td>11</td>
<td>15</td>
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<td>12</td>
<td>13</td>
<td>22.6%</td>
<td>12</td>
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<td>13</td>
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<td>22.6%</td>
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<tr>
<td>14</td>
<td>8</td>
<td>22.3%</td>
<td>12</td>
<td>25.6%</td>
</tr>
<tr>
<td>15</td>
<td>7</td>
<td>21.0%</td>
<td>12</td>
<td>30.6%</td>
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| Arithmetic Mean | 37.7% | 30.6% |
| Min             | 21.0% | 12.1% |
| Max             | 104.2%| 73.7% |
Chapter 6: Conclusion

This thesis set out in part to answer the following two questions:

- Which strategies have performed the best among focused and non-focused funds with respect to geographic region and mix of real estate product type?
- Do larger funds perform better relative to smaller funds?

Based on the data set which was provided by NCREIF and the analysis described herein, there does not appear to be systematic determinants of real estate fund performance in respect of each of the factors listed above. We have seen that there is generally no meaningful relationship between most of the variables which were examined and each of the three real estate fund types. Therefore, what are some of the determining factors of fund performance? Clearly, macroeconomic conditions and capital markets sentiment must have played a major role on both the way up and the way down. But what about other factors, namely the amount of leverage which a given fund employed?

This thesis also set out to answer the following question:

- How has the use of leverage influenced the return characteristics of core, value-added and Opportunity real estate funds?

In this area, the analysis yielded some more concrete results which indicated that Core funds experienced a fairly strong relationship between the amount of leverage they employed and their overall returns. Most interestingly, even though Core funds used the least amount of leverage and returns were generally positive for the time period 2004-2010, we saw a negative correlation between the amount of leverage a fund
employed and its reported returns. This findings suggests that Core funds may not have been particularly adept at utilizing debt financing to capitalize their real estate investments. In fact, while the other fund categories did not show as strong a relationship in this area, we can still say that systematically, Core fund returns were diminished as the amount of leverage utilized increased.

Lastly, this thesis endeavored to explore the impact of the different return metrics which are employed in the fund industry, namely with opportunity funds. As the table of the top fifteen (15) opportunity funds ranked by TWR indicated, there can be a very material difference in both the absolute returns of a given fund and more importantly, its relative ranking among other funds within its peer group. While others have demonstrated the importance of this point in concept, this thesis was able to demonstrate this issue using actual fund data. The results were rather striking given that the highest ranked fund by TWR was in fact the twelfth (of fifteen) ranked fund by economic IRR.
Appendix A: Literature Review


2. Bergsman, Steve, “Joint Ventures: How The Deal is Done: The Growing Trend of REITs teaming with Institutional Partners is Gaining Momentum”, NAREIT Real Estate Portfolio, July/August


Appendix B: NCREIF Townsend Policies
Bibliography

White Paper:

Article:


Thesis:

Core, Value-Added and Opportunistic Fund Indices (Index or Indices) demonstrate the general risk / return characteristics of the three broad investment styles within real estate. The Indices are designed to reflect the performance of funds available to U.S. institutional investors, investing in private real estate equity / equity-oriented investments, without regard to geographic location.

Core funds typically utilize low leverage and invest domestically in stabilized assets, whereas Opportunistic funds typically utilize high leverage, take on more market risk, and may invest domestically and/or internationally. Value-Added funds generally fall somewhere between the two. Currently, all funds are being reported by the managers in U.S. dollar terms. Over time, the intent is to collect data in other currencies and apply currency conversions, if necessary, to increase the representation of non-U.S. dollar denominated funds. In the future, multiple sub-indices may be created within each broad style to provide more insight as to the performance of specific investment strategies. One example of this that exists today is the NCREIF Fund Index-Open-end Diversified Core Equity (NFI-ODCE), a sub-index of Core, that includes only open-end diversified core strategy funds with at least 95% of their investments in U.S. markets.

The Indices are jointly produced by the National Council of Real Estate Investment Fiduciaries (NCREIF) and The Townsend Group (TTG). The NFI-ODCE was created by NCREIF in May 2005 and is a specialized sub-index with its own set of index criteria. Please refer to the NFI-ODCE detail report at www.NCREIF.org for further information.

Funds are classified into a style index based on various qualitative criteria. The starting point is the style classification that the manager uses when marketing the fund to prospective investors. TTG and NCREIF personnel (Staff) will assess new fund classifications based on the funds’ overall goals, objectives, and strategies. Because new funds may have broad investment discretion, various layers of portfolio and investment level risks, and limited performance history, classifications are somewhat subjective. Although it is generally not expected, in the cases where Staff believe a classification is deemed not appropriate, the situation will be discussed with the fund’s portfolio manager and Staff will make a final decision as to which style Index to include the fund. Historically, fund classifications were evaluated by TTG during their due diligence process.

Staff believes that turnover in each respective style Index should be limited and avoided when possible; however, classification changes will be made if the conditions clearly warrant it. For purposes of the time-weighted Index, if it is decided that a fund should be removed, such fund’s historical data will remain. For purposes of the IRR Vintage Period composites, Staff will decide how to classify the fund’s performance based on the facts and circumstances at the time.

Indices represent gross of fee time-weighted returns (TWR) of the Limited Partners (common investors) in the respective funds weighted based on the Limited Partners’ net invested capital of each fund. A TWR is an investment performance return measure that excludes the effects of external cash flows (investor contributions and distributions) from the calculation. For real estate investments, the Global Investment Performance Standards (GIPS) require the use of a TWR for calculating the performance of funds within a composite. The TWR provides a composite level comparability measure both within real estate and across other asset classes.

Generally, funds are included when the fund receives its first contribution from common investors and when such fund makes substantial real estate investments (i.e. theIndices are designed to track real estate performance, not cash returns). Funds are excluded from the Index when the fund disposes its final real estate investments. In both cases, however, the partial periods are excluded from the Index. The funds included in the Indices, especially for All Opportunistic, may vary from quarter to quarter since data collection is voluntary for non-NCREIF members; however, the objective is to limit; to the extent possible, the amount of volatility related to funds entering and exiting the composite.
### Policies

<p>| Supplemental Data (IRR's, Multiples and Vintage Periods) | The distribution or range of IRR's and Multiples are presented on an equal-weighted basis for each Vintage Period. A Vintage Period will be created every calendar year for new funds drawing down capital and investing in real estate assets as long as there is a minimum of eight funds. For periods when the minimum is not achievable, multiple years will be combined to derive a Vintage Period. A data field within a Vintage Period composite is shown as long as either eight funds or 50% or more of the funds within that Vintage Period report such data field. The number of funds reporting each of the data fields is listed on the line referenced by the term &quot;# of Funds Reporting&quot;. NOTE: Not all the funds may report all the same data fields each quarter, therefore, direct comparison between data fields may not be appropriate. Please refer to the definition of &quot;# of Funds Reporting&quot; in the glossary of terms for further details. When presenting the first year or two of a Vintage Period composite, only certain data fields, such as net assets, are shown since other data points will not be meaningful due to lack of underlying asset sales transactions within the individual funds. Further, Vintage Periods will be created in &quot;arrears&quot; since the number of funds within a Vintage Period will not be known until the first quarter of the next year. In this report, in order to keep the IRR since inception data current, useful and comparable, funds are only included in the Vintage Period composites if a current quarter questionnaire is received or if a prior quarter questionnaire has been returned indicating a fund is 100% complete. If a fund does not report in time, all of the funds' balance sheet and since inception IRR and Multiple data will be excluded from the Vintage Period composite. If a questionnaire is submitted timely in the next quarter, the fund's balance sheet and since inception IRR and Multiple data will be added back in the Vintage Period composite. This policy may or may not impact the presentation of Vintage Periods, although the intent is to maintain composite construction and consistency in reporting from quarter to quarter. |
| Index Contributors | Fund Data Contributing Manager (FDCM) must be an investment management company offering a commingled fund vehicle to multiple U.S. Institutional Investors, which are generally characterized as non-individual investors, tax-exempt or taxable, including but not limited to, pension funds, endowments, insurance companies, banks, profit sharing trusts, etc. FDCM's consist of both NCREIF and non-NCREIF members. All information presented is based on data provided by the FDCM's. Although funds included in the Index are available to U.S. institutional investors, certain non-U.S. funds may follow local accounting, valuation and performance measurement standards which may or may not be comparable to U.S. standards. Such differences, if any, predominantly apply to opportunistic funds where investments are made outside the U.S. and are not believed to be material. NCREIF and TTG do not calculate any individual fund's returns or other data points. As a result, NCREIF and TTG do not provide any guarantees as to the accuracy or completeness of the data. |
| Data Collection Process | The Townsend Group, a real estate advisory company, is responsible for collecting data from the FDCM's. NCREIF produces the Indices based on such data. Data is collected via excel and word questionnaires. Generally the data for open-end funds is due by the 25th of the month following quarter-end and for closed-end funds by the 15th of the second month following quarter-end, but no later than the end of the third month following quarter-end. Individual fund performance is not disclosed as a condition of the data collection. |
| Index Schedule | The timing of publication for this report is anticipated to be quarterly in arrears approximately on the 15th of the fourth month following quarter-end. |</p>
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<th>Risks and Disclaimers</th>
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<td>The underlying data in this report has been obtained from sources considered to be reliable, and is believed to be accurate, but is not guaranteed. Generally, data is supplied by the FDCM’s, however for certain inactive funds, the data may have been obtained from other sources such as financial statements and annual reports. For all funds there is a risk that data was supplied using older questionnaires and differing standards of practice and therefore such data may not be consistent with the current definitions used in this report. Previously reported results may be revised for various reasons, including but not limited to data corrections, audit adjustments, and certain funds (primarily opportunistic) not meeting reporting deadlines from quarter to quarter. If a fund is not submitted by the deadline the revision to the previous reported results will appear in the next quarter’s report. Such revisions will be monitored but are not anticipated to have a significant impact on the long term time-weighted Index return and risk characteristics.</td>
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This report is for informational purposes only and is not to be an offer, solicitation, or recommendation with respect to the purchase or sale of any security or a recommendation of the services supplied by any advisory management organization. Past performance is no guarantee of future results.

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