Assessing Real Estate Returns by Strategy: Core v. Value-Added v. Opportunistic

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Chicago, Illinois

* Superior research support provided by Camilo Varela
Core v. Non-Core Real Estate Returns

- What Do the Data Look Like?
- Promotes Create Asymmetries
- The Law of One Price
- Putting the Tools to Work: The Results
- Holding-Period Sensitivities
- Appendices
  - Other Sensitivities
  - Dispersion in Fund Returns

Based on the PREA-Sponsored research paper: “An Overview of Fee Structures in Real Estate Funds and Their Implications for Investors” *

* Draft version of the PREA paper will be available on the Conference website.
Exhibit 62: Reported Performance by Fund Type for the 17-Year Period Ended December 31, 2012

Gross & Net Returns by Strategy

Source: NCREIF/Townsend and Author's Calculations
Let’s Consider Fees by Strategy

### Strategy
- Core
- Value-Added
- Opportunistic

### GP Fees
- ~105 bps
- ~165 bps
- ~350 bps

### Exhibit 63: Reported Performance by Fund Type for the 17-Year Period Ended December 31, 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross (Value-Weighted) Returns</th>
<th>Net (Value-Weighted) Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core NPI</td>
<td>NFI-ODCE</td>
</tr>
<tr>
<td>1996-2006</td>
<td>12.56%</td>
<td>12.90%</td>
</tr>
<tr>
<td>1996-2012</td>
<td>9.92%</td>
<td>9.49%</td>
</tr>
<tr>
<td>%Δ</td>
<td>(21.05%)</td>
<td>(26.41%)</td>
</tr>
</tbody>
</table>

### Standard Deviation

<table>
<thead>
<tr>
<th>Year</th>
<th>NPI</th>
<th>NFI-ODCE</th>
<th>Value-Added</th>
<th>Opportunistic</th>
<th>NPI</th>
<th>NFI-ODCE</th>
<th>Value-Added</th>
<th>Opportunistic</th>
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</thead>
<tbody>
<tr>
<td>1996-2006</td>
<td>4.16%</td>
<td>4.74%</td>
<td>6.72%</td>
<td>16.20%</td>
<td>4.67%</td>
<td>6.18%</td>
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<tr>
<td>1996-2012</td>
<td>9.01%</td>
<td>12.27%</td>
<td>16.45%</td>
<td>21.45%</td>
<td>12.12%</td>
<td>16.05%</td>
<td>19.19%</td>
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</tr>
<tr>
<td>%Δ</td>
<td>116.86%</td>
<td>158.84%</td>
<td>144.75%</td>
<td>32.42%</td>
<td>159.51%</td>
<td>159.56%</td>
<td>40.30%</td>
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</tbody>
</table>
Volatility of Opp Fund Returns Looks Understated

Exhibit 63: Reported Performance by Fund Type for the 17-Year Period Ended December 31, 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Core</th>
<th>Non-Core</th>
<th>Core</th>
<th>Non-Core</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPI</td>
<td>NFI-ODCE</td>
<td>Value-Added</td>
<td>Opportunistic</td>
</tr>
<tr>
<td>Arithmetic Average</td>
<td>12.56%</td>
<td>12.90%</td>
<td>15.00%</td>
<td>24.19%</td>
</tr>
<tr>
<td>1996-2006</td>
<td>9.92%</td>
<td>9.49%</td>
<td>10.02%</td>
<td>17.02%</td>
</tr>
<tr>
<td>%Δ</td>
<td>(21.05%)</td>
<td>(26.41%)</td>
<td>(33.21%)</td>
<td>(29.64%)</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>4.16%</td>
<td>4.74%</td>
<td>6.72%</td>
<td>16.20%</td>
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<td>158.84%</td>
<td>144.75%</td>
<td>32.42%</td>
</tr>
</tbody>
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Pre-Financial Crisis

Entire Time Period
Problems with the Data for Non-Core Returns

• Voluntary, Self-Reported Results
• Inconsistent Methodologies for Reporting
• Mark-to-Market Staleness
• Incomplete Capture of Fund Universe
• Incomplete Characterization of Funds:
  • domestic v. foreign,
  • debt v. equity, etc.
• Survivorship Bias ← only element we can attempt to correct
  – Survivorship Bias = During & after the financial crisis, some funds stop reporting (without apparent termination)
  – Survivorship Bias Adjustment ($\theta$) = Percentage of assets lost by non-reporting firms
Opp Returns with Survivorship-Bias Adjustment

Exhibit 64: Reported Performance of the Opportunistic Funds for the 17-Year Period Ended December 31, 2012 with Survivorship Bias Adjustment ($\theta$)

Source: NCREIF/Townsend and Author's Calculations
Survivorship-Bias Adjusted Opp Returns

Exhibit 65: Reported and Adjusted Performance by Fund Type for the 17-Year Period Ended December 31, 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross (Value-Weighted) Returns</th>
<th>Net (Value-Weighted) Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core NPI</td>
<td>NFI-ODCE</td>
</tr>
<tr>
<td>1996-2006</td>
<td>12.56%</td>
<td>12.90%</td>
</tr>
<tr>
<td>1996-2012</td>
<td>9.92%</td>
<td>9.49%</td>
</tr>
</tbody>
</table>

| %Δ        | (21.05%) | (26.41%) | (33.21%) | (37.27%) | (28.45%) | (37.46%) | (41.98%) |

<table>
<thead>
<tr>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>1996-2006</td>
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<tr>
<td>1996-2012</td>
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</tbody>
</table>

| %Δ       | 116.86% | 158.84% | 144.75% | 42.22% | 159.51% | 159.56% | 52.90% |

* Adjustment to opportunistic funds, with \( \theta = 50\% \).

Ultimately, survivorship-bias adjustment does little to cure the suspected problem.
Survivorship-Bias Adjusted Opp Returns in Context

Exhibit 66: Reported and Adjusted Performance by Fund Type for the 17-Year Period Ended December 31, 2012

Source: NCREIF/Townsend and Author’s Calculations
Core v. Non-Core Real Estate Returns

- What Do the Data Look Like?
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Numerical Example: Pref & Promote Structure

Fund-Level Return Distribution:
- Gross Return: 13.0%
- Base Fees: 1.0%
- Net Return: 12.0%
- Volatility: 15.0%

Fund Structure:
- Investor’s Preference: 12.0%
- Residual Split:
  - Investor: 80%
  - General Partner: 20%

Notes:
- Investor’s preference typically set at or below fund’s likely return.
- The general partner’s “promoted” interest creates an option-like return for operator.
- The value of the option reduces the investor’s upside.
Exhibit 10: Illustration of Expected Fund-Level Returns with Investment Manager's Promoted Interest

Manager's Promoted Interest

Distribution of Expected Fund-Level Returns

Likely Returns
Promotes Truncate the Investor’s “Upside” Return

Exhibit 11: Illustration of Fund-Level and Investor-Level Returns when Investment Manager Receives a Promoted Interest

Likely Returns before Promote

Likely Returns after Promote

Estimated Frequency

Likely Returns

-33%  -28%  -23%  -18%  -13%  -8%  -3%  2%  7%  12%  17%  22%  27%  32%  37%  42%  47%  52%  57%
Fund’s Gross and Net Returns:

– **Likely Returns:**
  - Gross Return: 13.0%
  - Ongoing/Base Fees: 1.0%
  - Operating Partner’s Participation: 1.2%
  - Investor’s Net Return: 10.8%

– **Volatility (Standard Deviation):**
  - Fund-Level Volatility before General Partner: 15.0%
  - General Partner’s Participation: 1.5%
  - Investor’s Net Return: 13.5%

Notes:

– The general partner’s “promoted” interest reduces the investor’s net return by 120 bps:
  Even though the value of the promote equals zero at the most likely return,
  This is attributable to general partner’s asymmetric participation in returns.
– The reduction in the investor’s standard deviation is a statistical illusion:
  The investor still receives 100% of the economic downside.
Point #1: Average Expectation ≠ Expectation of the Average

A simple way to the think of the average promote:

\[
E(\pi) = \int_0^\infty \kappa (x - \psi) f(x) dx
\]

where: \( \pi \) = the “promote”, \( \kappa \) = general partner’s participation in the excess profits, \( \psi \) = investor’s preference, and \( f(x) \) = the distribution of fund-level returns, \( x \).

Because of the general partner’s asymmetric participation:

- The average expectation does not equal the expectation of the average:

\[
E(\pi) = \int_0^\infty \kappa (x - \psi) f(x) dx \neq \kappa (\overline{x} - \psi)
\]
Mathematically, it is true that the dispersion in net returns is narrower:

However, the investor retains all the “downside” risk
– Therefore, investor faces the same risk as before the promote
– This is an important point when examining index returns by strategy
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Use the “Law of One Price” to Create Risk/Return Continuum

Exhibit 68: Illustration of "Law of One Price"
Lever Core Assets to Create Risk/Return Continuum

- Expected Return ($k_e$)
- Expected Volatility ($\sigma_e$)

$k_e$: Levered Core Fund Returns
$k_u$: Unlevered Core Fund Returns

- 0% Leverage
- 25% Leverage
- 50% Leverage
- 75% Leverage
Exhibit 69: Application of "Law of One Price"
Levered Core Assets v. Non-Core Funds

- Expected Return ($k_e$)
- Expected Volatility ($\sigma_e$)

$\alpha$: Risk-Adjusted Returns

- Out-Performing Non-Core Fund
- Under-Performing Non-Core Fund

$0\%$ Leverage
$25\%$ Leverage
$50\%$ Leverage
$75\%$ Leverage

$k_e$: Levered Core Fund Returns
$k_e$: Unlevered Core Fund Returns

Positive Alpha
Negative Alpha
Interest Rates $= f(LTV \mid \text{Asset Quality, Sponsorship, etc.})$

Exhibit 67: Illustration of the Cost of Indebtedness as a Function of Leverage

- Mortgage Interest Rate
- Default Risk ($\delta$) Premium
- Structural Differences ($\gamma$) in Payment Schedules, Servicing Fees, Etc.
- Risk-free Rate

Relationship is for a given moment in time
Risk-Free Rates & Spreads Vary Over Time

Exhibit 71: Estimates of the Annual Interest Rate at Various Leverage Ratios for the Years 1996 through 2012

Changes Over Time:

1. Risk-free Rate, and

2. Spreads:

   a) low before the financial crisis,
   
b) spiked up during and after the financial crisis, and
   
c) have started to recede thereafter
Core v. Non-Core Real Estate Returns

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Let’s Put the Tools to Work: The Results

Exhibit 74: Reported and Adjusted Performance by Fund Type for the 17-Year Period Ended December, 2012 with Levered Core Creating the Law-of-One-Price Continuum

Tools:
1. Net Returns,
2. Survivorship Bias ($\theta$), and
3. Law of One Price:
   a) De-lever Core, assume $N = 7$
   b) Re-lever Core, assume $N = 3$

NPI Value-Added
Opportunistic
($\theta = .5$)

Gross Returns
Net Returns

0%
5%
10%
15%
20%
25%

0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
55%
60%

Volatility
Average Annual Compounded Returns

LTV
24% LTV
35% LTV
45% LTV
55% LTV
60% LTV
Let’s Put the Tools to Work: The Results (continued)

Exhibit 75: Reported & Volatility-Adjusted Performance by Fund Type for the 17-Year Period Ended December, 2012 with Levered Core Creating the Law-of-One-Price Continuum

Tools:
4. Volatility Adjustment (correct for statistical illusion)

Average Annual Compounded Returns

Opportunistic
($\theta = .5$)

NPI Value-Added

Core

Gross Returns

Net Returns - Unadjusted

Net Returns - Volatility-Adjusted

Volatility
Let’s Put the Tools to Work: The Results (continued)

Exhibit 76: Estimated Alpha for Non-Core Funds for the 17-Year Period Ended December, 2012

Tools:

5. Risk-Adjusted Returns (α)
Let’s Put the Tools to Work: The Results (continued)

Exhibit 76: Estimated Alpha for Non-Core Funds for the 17-Year Period Ended December, 2012

Results:

For Opportunistic Funds, an “efficient market” type answer: investors receive a “fair” return, while managers receive the “surplus”

For Value-Added Funds, no such answer: dramatic under-performance
Core v. Non-Core Real Estate Returns

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Any fair comparison examines a complete market cycle.

In a market downturn, there is a “flight to quality” → non-core assets are hit harder.

Let’s consider returns by “vintage” by strategy.
“Mountain” Chart for Value-Added Index’s Alpha

- Repeat the earlier ($\alpha$) exercise for differing vintages
- Choose any beginning and ending date, with minimum 6-year hold
- Value-add funds underperform before, during & after the financial crisis
- The pre-financial-crisis underperformance is particularly damning!

**Exhibit 78: Value-Added Funds' Estimated Alpha for Various Holding Periods**

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<td>2006</td>
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<td>(2.92)%</td>
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<td>(2.68)%</td>
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<tr>
<td>2003</td>
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<td>2000</td>
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<td>1999</td>
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<td>(1.53)%</td>
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<td>1998</td>
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<td>(1.63)%</td>
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<td>1997</td>
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<td>(1.39)%</td>
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<td>1996</td>
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<td></td>
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<td>(1.47)%</td>
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</tbody>
</table>

* Not applicable - The reported volatility of the value-added funds during this period is less than that of the core funds for the same period.

Our earlier result

CHICAGO BOOTH
Repeat the earlier ($\alpha$) exercise for differing vintages

The index of Opportunistic funds underperforms before the financial crisis

Yet, they overperform during & after the financial crisis!

How can this be? It cannot [$= f(\text{“flight to quality”})$]

Provides another perspective on data problems & survivorship bias

Exhibit 79: Opportunity Funds' Estimated Alpha for Various Holding Periods

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</thead>
<tbody>
<tr>
<td>2001</td>
<td>0.76%</td>
<td>(0.32%)</td>
<td>(3.78%)</td>
<td>(0.88%)</td>
<td>6.19%</td>
<td>4.05%</td>
<td>1.39%</td>
<td>0.58%</td>
<td>0.63%</td>
<td>0.53%</td>
<td>0.31%</td>
<td>0.11%</td>
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<tr>
<td>2002</td>
<td>(1.54%)</td>
<td>0.36%</td>
<td>5.04%</td>
<td>3.42%</td>
<td>1.27%</td>
<td>0.60%</td>
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<tr>
<td>2003</td>
<td>(3.78%)</td>
<td>0.88%</td>
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<td>0.58%</td>
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<tr>
<td>2004</td>
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<td>2007</td>
<td>(2.00%)</td>
<td>(1.11%)</td>
<td>(2.78%)</td>
<td>(2.95%)</td>
<td>(3.93%)</td>
<td>(1.84%)</td>
<td>2.66%</td>
<td>1.82%</td>
<td>0.48%</td>
<td>0.06%</td>
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<td>2008</td>
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<td>(2.86%)</td>
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<td>2009</td>
<td>3.96%</td>
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Our earlier result
Core v. Non-Core Real Estate Returns

- What Do the Data Look Like?
- Promotes Create Asymmetries
- The Law of One Price
- Putting the Tools to Work: The Results
- Holding-Period Sensitivities
- Appendices
  - Other Sensitivities: $\theta = .5$, $N_{\text{Core}} = 5$ & $N_{\text{Opp}} = 3$
  - Dispersion in Fund Returns

Based on the PREA-Sponsored research paper: “An Overview of Fee Structures in Real Estate Funds and Their Implications for Investors” *

* Draft version of the PREA paper will be available on the Conference website.
### The Sensitivity of Survivorship-Bias Adjustment ($\theta$)

#### Results

- $\theta = 0$
- $\theta = 0.5$ (base case)
- $\theta = 1$

As you'd suspect: $\alpha \downarrow$ as $\theta \uparrow$

Range $\approx 410$ bps

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**Exhibit S1: Opportunity Funds | Sensitivity of Alpha to Assumed Percentage ($\theta$) of Survivorship Bias**

#### Opportunistic Funds' Estimated Alpha, Given $\theta = 0$

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**Exhibit S2: Opportunity Funds | Sensitivity of Alpha to Assumed Percentage ($\theta$) of Survivorship Bias**

#### Opportunistic Funds' Estimated Alpha, Given $\theta = 0.5$

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**Exhibit S3: Opportunity Funds | Sensitivity of Alpha to Assumed Percentage ($\theta$) of Survivorship Bias**

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Neutralize Differences in Loan Maturities

- Assume that core funds have longer loan maturities ($N = 7$).
- Assume that non-core funds have shorter maturities ($N = 3$).
- In order to place core funds on equal footing with non-core funds, need to de-lever core funds at their assumed loan maturity and re-lever core funds at the assumed loan maturity of non-core funds.

Exhibit 7.2: Historical Path of Treasury Bond Interest Rates for 1- and 10-Year Maturities for the Period 1954 through 2012
### Results:

\[ N_{Core} = 5 \]

\[ N_{Core} = 7 \]
(base case)

\[ N_{Core} = 10 \]

As you’d suspect:

\[ \alpha \downarrow \text{ as } N_{core} \uparrow \]

Range \( \approx 40 \text{ bps} \)
# The Sensitivity of Assumed Core Debt Maturity ($N_{\text{Opp}}$)

## Results:

- $N_{\text{Opp}} = 2$
- $N_{\text{Opp}} = 3$ (base case)
- $N_{\text{Opp}} = 4$

As you’d suspect: $\alpha \downarrow$ as $N_{\text{Opp}} \uparrow$

Range $\approx 90$ bps
Core v. Non-Core Real Estate Returns

- What Do the Data Look Like?
- Promotes Create Asymmetries
- The Law of One Price
- Putting the Tools to Work: The Results
- Holding-Period Sensitivities
- Appendices
  - Other Sensitivities
  - Dispersion in Fund Returns

Based on the PREA-Sponsored research paper: “An Overview of Fee Structures in Real Estate Funds and Their Implications for Investors” *

* Draft version of the PREA paper will be available on the Conference website.
Note: An Index v. Individual Funds

Exhibit 80: Illustration of Dispersion in Manager-Specific Performance
Gross Returns as a Function of Investment Strategy

- Upper Quartile Performance
- Average Fund-Manager Performance
- Lower Quartile Performance

Expected Return ($E_r$) vs. Volatility of Expected Return ($\sigma_E$)
Hypothetical Dispersion in Performance for a Given Strategy

Exhibit A.2.6: Hypothetical Illustration of the Difference between the Average Fund's Volatility and Fund_i's Volatility

Major Assumptions:

- The average return of any one fund equals ~11%.
- The average volatility of any one fund equals ~18%.
- The average correlation between a given fund's return and its volatility equals 80%.
Risk/Return Characteristics: Index v. Funds

- The return of the index = the (weighted) average of the funds’ returns
- The volatility ($\sigma$) of the index < the (weighted) average of the funds’ volatility
- There’s a diversification effect (w.r.t. to volatility only)

Exhibit A.2.7: Hypothetical Illustration of the Difference between the Average Fund’s Volatility and the Index’s Volatility
• Consider the dispersion around the (weighted) average of the funds’ returns
  • not the index’s return!

• Each ellipse contains a certain proportion of fund returns:
Risk/Return Characteristics: Index v. Funds (continued)

- This diversification effect is greatest with opportunistic funds
  - → biggest difference between index’s $\sigma$ and the average fund’s $\sigma$
  - → need more opp funds to be well diversified (within that strategy)
- Under-diversified opp-fund investors experience greatest decline in $\alpha$

Exhibit A.2.9: Illustration of the Law of One Price
Lever Core Assets to Create Risk/Return Continuum

To be effectively diversified (i.e., within 50 bps of an index’s volatility) and given my underlying assumptions, an investor would need:

- $\geq 2$ core funds,
- $\geq 7$ value-add funds, &
- $\geq 15$ opportunity funds.