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

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Orlando, Florida
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” *

* Available on the PREA website.
Gross & Net Returns by Strategy

Exhibit 62: Reported Performance by Fund Type for the 17-Year Period Ended December 31, 2012

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

<table>
<thead>
<tr>
<th>Strategy</th>
<th>GP Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>~105 bps</td>
</tr>
<tr>
<td>Value-Added</td>
<td>~165 bps</td>
</tr>
<tr>
<td>Opportunistic</td>
<td>~350 bps</td>
</tr>
</tbody>
</table>

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></td>
<td></td>
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<tr>
<td>1996-2012</td>
<td></td>
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</tr>
<tr>
<td>%Δ</td>
<td>(21.05%)</td>
<td>(26.41%)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>1996-2006</td>
</tr>
<tr>
<td>1996-2012</td>
</tr>
<tr>
<td>%Δ</td>
</tr>
</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>Gross (Value-Weighted) Returns</th>
<th>Net (Value-Weighted) Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core (NPI)</td>
<td>Core (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>

<table>
<thead>
<tr>
<th>Year</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core (NFI-ODCE)</td>
</tr>
<tr>
<td>1996-2006</td>
<td>4.16%</td>
</tr>
<tr>
<td>1996-2012</td>
<td>9.01%</td>
</tr>
<tr>
<td>%Δ</td>
<td>116.86%</td>
</tr>
</tbody>
</table>

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

Gross Returns
Net Returns

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>Core 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>
<th>Core NFI-ODCE</th>
<th>Value-Added</th>
<th>Non-Core Opportunistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-2006</td>
<td>4.16%</td>
<td>4.74%</td>
<td>6.72%</td>
</tr>
<tr>
<td>1996-2012</td>
<td>9.01%</td>
<td>12.27%</td>
<td>16.45%</td>
</tr>
</tbody>
</table>

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

* Adjustment to opportunistic funds, with θ = 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?
- Promotes Create Asymmetries
- The Law of One Price
- Putting the Tools to Work: The Results
- Holding-Period Sensitivities
- Appendices
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Based on the PREA-Sponsored research paper: “An Overview of Fee Structures in Real Estate Funds and Their Implications for Investors” *

* Available on the PREA website.
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
Promotes Truncate the Investor’s “Upside” Return

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

- **Expected 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.
A simple way to think of the average promote:

\[ E(\pi) = \int_{\psi}^{\infty} \kappa(x-\psi)f(x)dx = .012 \]

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:

\[ E(\pi) = \int_{\psi}^{\infty} \kappa(x-\psi)f(x)dx \neq \kappa(\bar{x} - \psi) \]

\[ = .012 \neq .20(.12 - .12) \]
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
Core v. Non-Core Real Estate Returns

• What Do the Data Look Like?
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• **The Law of One Price**
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Use the “Law of One Price” to Create Risk/Return Continuum

Levered Equity:

\[ k_e = \frac{k_u - k_d \cdot LTV}{1 - LTV} \]

Volatility of Levered Equity:

\[ \sigma_e = \frac{\sigma_e}{1 - LTV} \]
Law of One Price → Risk-Adjusted Returns: “Alpha” (α)

Exhibit 69: Application of "Law of One Price"  
Levered Core Assets v. Non-Core Funds

\[
\begin{align*}
\text{Expected Return (} k_e \text{)} & \\
\text{Expected Volatility (} \sigma_e \text{)} & \\
\end{align*}
\]

\( k_e \): Unlevered Core Fund Returns  
\( k_e \): Levered Core Fund Returns

Out-Performing Non-Core Fund

Positive Alpha

75% Leverage

50% Leverage

25% Leverage

0% Leverage

Under-Performing Non-Core Fund

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

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 $N = 3$
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)
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

![Graph showing average annual compounded returns vs. volatility for different fund categories: NPI, Core, Value-Added, Opportunistic, and Opportunity Funds.]

Tools:

5. Risk-Adjusted Returns ($\alpha$)
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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* Available on the PREA website.
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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</thead>
<tbody>
<tr>
<td>2007</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
<td>(0.95%)</td>
<td>(1.10%)</td>
<td>NA*</td>
<td>0.28%</td>
<td>0.04%</td>
<td>0.31%</td>
<td>0.06%</td>
<td>(1.39%)</td>
<td>(2.50%)</td>
<td>(2.82%)</td>
</tr>
<tr>
<td>2006</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
<td>(0.95%)</td>
<td>(1.10%)</td>
<td>NA*</td>
<td>0.28%</td>
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</tr>
<tr>
<td>2005</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
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<td>NA*</td>
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<tr>
<td>2004</td>
<td>(0.89%)</td>
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<tr>
<td>2003</td>
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<td>(0.95%)</td>
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<td>(2.50%)</td>
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<tr>
<td>2002</td>
<td>(0.89%)</td>
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<td>(0.95%)</td>
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<td>NA*</td>
<td>0.28%</td>
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<td>(2.50%)</td>
<td>(2.82%)</td>
</tr>
<tr>
<td>2001</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
<td>(0.95%)</td>
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</tr>
<tr>
<td>1998</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
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<td>(1.10%)</td>
<td>NA*</td>
<td>0.28%</td>
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<tr>
<td>1997</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
<td>(0.95%)</td>
<td>(1.10%)</td>
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<td>0.28%</td>
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<td>(2.50%)</td>
<td>(2.82%)</td>
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<tr>
<td>1996</td>
<td>(0.89%)</td>
<td>(0.94%)</td>
<td>(0.95%)</td>
<td>(1.10%)</td>
<td>NA*</td>
<td>0.28%</td>
<td>0.04%</td>
<td>0.31%</td>
<td>0.06%</td>
<td>(1.39%)</td>
<td>(2.50%)</td>
<td>(2.82%)</td>
</tr>
</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.
“Mountain” Chart for Opportunistic Index’s Alpha

- 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(“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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<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>3.96%</td>
<td>0.51%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.46%)</td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>7.22%</td>
<td>4.60%</td>
<td>1.52%</td>
<td>0.60%</td>
<td>(2.46%)</td>
</tr>
<tr>
<td>2005</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>4.19%</td>
<td>4.05%</td>
<td>1.39%</td>
<td>0.58%</td>
</tr>
<tr>
<td>2004</td>
<td></td>
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<td></td>
<td></td>
<td>7.22%</td>
<td>4.60%</td>
<td>1.52%</td>
<td>0.60%</td>
<td>(2.46%)</td>
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<tr>
<td>2003</td>
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<td></td>
<td></td>
<td></td>
<td>4.19%</td>
<td>4.05%</td>
<td>1.39%</td>
<td>0.58%</td>
<td>(2.86%)</td>
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<tr>
<td>2002</td>
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<td></td>
<td></td>
<td>5.46%</td>
<td>3.62%</td>
<td>1.26%</td>
<td>0.53%</td>
<td>(2.58%)</td>
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<tr>
<td>2001</td>
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<td></td>
<td>5.46%</td>
<td>3.62%</td>
<td>1.26%</td>
<td>0.53%</td>
<td>(2.58%)</td>
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<tr>
<td>2000</td>
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<td></td>
<td>5.04%</td>
<td>3.42%</td>
<td>1.27%</td>
<td>0.60%</td>
<td>(2.60%)</td>
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<tr>
<td>1999</td>
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<td></td>
<td></td>
<td>4.14%</td>
<td>2.78%</td>
<td>0.89%</td>
<td>0.31%</td>
<td>(2.78%)</td>
</tr>
<tr>
<td>1998</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>3.03%</td>
<td>1.90%</td>
<td>0.24%</td>
<td>(0.25%)</td>
<td></td>
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<tr>
<td>1997</td>
<td></td>
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<td></td>
<td></td>
<td>2.18%</td>
<td>1.23%</td>
<td>0.24%</td>
<td>(0.25%)</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2.41%</td>
<td>1.52%</td>
<td>0.11%</td>
<td>(0.31%)</td>
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</tr>
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</table>

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” *

* Available on the PREA website.
### Results:

\[ \theta = 0 \]

\[ \theta = 0.5 \text{ (base case)} \]

\[ \theta = 1 \]

As you’d suspect:

\[ \alpha \downarrow \text{ as } \theta \uparrow \]

Range \( \approx 410 \text{ bps} \)
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 72: Historical Path of Treasury Bond Interest Rates for 1- and 10-year Maturities for the Period 1954 through 2012
### The Sensitivity of Assumed Core Debt Maturity ($N_{Core}$)

#### Exhibit 82: Opportunity Funds | Sensitivity of Alpha to Assumed Core Funds' Average Debt Maturity

**Opportunistc Funds' Estimated Alpha, Given $N_{Core} = 5$ Years**

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<tbody>
<tr>
<td>2007</td>
<td>3.33</td>
<td>2.22%</td>
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<td>2008</td>
<td>3.33</td>
<td>2.22%</td>
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<td>2011</td>
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**Opportunistc Funds' Estimated Alpha, Given $N_{Core} = 7$ Years**

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<tr>
<td>2007</td>
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<td>7.75%</td>
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**Opportunistc Funds' Estimated Alpha, Given $N_{Core} = 10$ Years**

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<td>2009</td>
<td>3.33</td>
<td>10.75%</td>
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<tr>
<td>2010</td>
<td>3.33</td>
<td>10.75%</td>
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<tr>
<td>2011</td>
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<td>10.75%</td>
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<tr>
<td>2012</td>
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<td>10.75%</td>
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</tbody>
</table>

**Results:**

- $N_{Core} = 5$
- $N_{Core} = 7$ (base case)
- $N_{Core} = 10$

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

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

**Exhibit 33: Opportunity Funds | Sensitivity of Alpha to Assumed Opportunity Funds' Average Debt Maturity**

<table>
<thead>
<tr>
<th>Estimated Alpha, Given $N_{\text{Opp}}$</th>
<th>2 Years</th>
<th>3 Years</th>
<th>4 Years</th>
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</thead>
<tbody>
<tr>
<td><strong>Earning Year</strong></td>
<td></td>
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</tr>
<tr>
<td>2001</td>
<td>0.04%</td>
<td>0.03%</td>
<td>0.02%</td>
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<tr>
<td>2002</td>
<td>0.05%</td>
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<td>2003</td>
<td>0.06%</td>
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<tr>
<td>2004</td>
<td>0.07%</td>
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<td>2005</td>
<td>0.08%</td>
<td>0.07%</td>
<td>0.06%</td>
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<tr>
<td>2006</td>
<td>0.09%</td>
<td>0.08%</td>
<td>0.07%</td>
</tr>
<tr>
<td>2007</td>
<td>0.10%</td>
<td>0.09%</td>
<td>0.08%</td>
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<tr>
<td>2008</td>
<td>0.11%</td>
<td>0.10%</td>
<td>0.09%</td>
</tr>
<tr>
<td>2009</td>
<td>0.12%</td>
<td>0.11%</td>
<td>0.10%</td>
</tr>
<tr>
<td>2010</td>
<td>0.13%</td>
<td>0.12%</td>
<td>0.11%</td>
</tr>
<tr>
<td>2011</td>
<td>0.14%</td>
<td>0.13%</td>
<td>0.12%</td>
</tr>
<tr>
<td>2012</td>
<td>0.15%</td>
<td>0.14%</td>
<td>0.13%</td>
</tr>
</tbody>
</table>

**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 vs. 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” *

* Available on the PREA website.
Exhibit 80: Illustration of Dispersion in Manager-Specific Performance
Gross Returns as a Function of Investment Strategy

Expected Return ($\mu_e$) vs. Volatility of Expected Return ($\sigma_e$)

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

Exhibit A.2.8: Hypothetical Illustration of the Difference between the Average Fund's Volatility and the Index's Volatility
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.