Some Thoughts on
Greatest Hits (and Misses)!

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Chicago, Illinois
Some Thoughts on Winners & Losers: Agenda

► Winning Arguments:
  ▪ The components of return
  ▪ JVs as principal/agent problems
  ▪ The drag of transaction costs
  ▪ Core v. non-core performance

► Losing Arguments (at least for now):
  ▪ Cap rates v. interest rates
  ▪ Impact of leverage → the law of one price
  ▪ The volatility of land values → discount to replacement cost
  ▪ Mezz debt & levered loans
  ▪ State & local finances ← a mispriced risk

► My Next Argument:
  ▪ Urban multifamily: NIMBY v. YIMBY
Some Points of Clarification

• By “winning argument,”
  – I mean that:
    • the CRE market is now generally in agreement with my assertion(s)
  – I don’t mean that:
    • I was the first to make this assertion, or
    • that I strongly influenced the market’s acceptance of this assertion.

• [It could be that I simply well timed the market’s changing view.]

• By “losing argument,”
  – I do not mean that:
    • I am wrong in my assertion(s)
  – I do mean that:
    • market’s acceptance of this assertion has yet to take place.
Some Thoughts on Winners & Losers: Agenda

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The Components of Return

NCREIF Index - Market Values, Rescaled NOI and Capitalization Rates Based on a $100 Investment for the Period 1978 through (the Second Quarter of) 2016

- Property values fall by ~25% over 3 years
- Property values fall by ~35% over 2 years
- Perhaps most troubling is the stagnation of NOI growth over the last dozen or so years!
Components of Return: Fundamental Relationships

- In the long run, asset-level returns ($k_a$) are primarily a function of the initial cash flow yield ($\frac{CF_1}{P_0}$) and the growth rate ($g$):

  \[ k_a = \frac{CF_1}{P_0} + g \]

- In the short run, asset-level returns can be heavily influenced by the effects of shifting capitalization rates ($\nabla$):

  \[ k_a = \frac{CF_1}{P_0} + g + \nabla \]

  - $\nabla$: More easily seen in the following graph.

- Note: cap rate = NOI$_1$/P$_0$ ≠ CF$_1$/P$_0$
Components of Return: Holding Period & Cap Rates

Total Annual Return Based Upon Various Capitalization Rate Shifts and Holding Periods

Development & Redevelopment Deals:
- Value-Added & Opportunistic

Stabilized Deals:
- Core & Core Plus Funds

Cap Rate Expansion:
\[ k = \frac{CF_1}{P_0} + g \]

Everywhere Else:
\[ k = \frac{CF_1}{P_0} + g + \Delta \]
where: \( \Delta \approx 1 - \frac{N}{\sqrt{V}} \)

Cap Rate Compression:
\[ \frac{NOI_0}{P_0} > \frac{NOI_N}{P_N} \]

Cap Rate Expansion:
\[ \frac{NOI_0}{P_0} < \frac{NOI_N}{P_N} \]
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Joint Ventures: Numerical Example

• Property-Level Return Distribution:
  • Average Return: 12.5%
  • Volatility 15.0%

• Joint Venture Structure:
  • Ongoing fees 0.5%
  • Investor’s Preference 12.0%
  • Residual Split:
    – Investor 50%
    – Operating Partner 50%

• Notes:
  – Monitoring/supervision costs always reduce returns.
  – Investor’s preference typically set at or near deal’s likely return.
  – The operating partner’s “promoted” interest creates an option-like return for operator.
  – The value of the option reduces the investor’s upside.
Illustration of Venture-Level Returns and Operating Partner's Participation
Joint Ventures: Returns Before and After JV Participation

Illustration of Venture-Level Returns before and after the Venture Partner's Participation

Likely Returns before JV Participation

Likely Returns after JV Participation

Estimated Frequency

Likely Returns

-40% -30% -20% -10% 0% 10% 20% 30% 40% 50% 60% 70%

-40% -30% -20% -10% 0% 10% 20% 30% 40% 50% 60% 70%
Joint Ventures: Numerical Example (continued)

• Joint Venture Deal after Operating Partner:
  – Likely Returns:
    • JV Deal before Operating Partner 12.5%
    • Ongoing (Monitoring) Fees 0.5%
    • Operating Partner’s Participation 3.0%
    • Investor’s Net Return 9.0%
  – Volatility (Standard Deviation):
    • JV Deal before Operating Partner 15.0%
    • Operating Partner’s Participation 3.5%
    • Investor’s Net Return 11.5%

• Notes:
  – The operating partner’s “promoted” interest reduces the investor’s net return by 300 bps:
    • Even though the value of the promote equals zero at the most likely return,
    • This is attributable to operating 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.
• Investor’s net return declines with greater venture-level volatility.
• Of course, investor can alter “pref” &/or promote, given $E(\text{volatility})$.

Illustration of Joint Venturer’s Increasing Expected Participation as Project Volatility Increases
Motivational Issues – “In-the-Money” Promote

• If the operating partner has earned (but not realized) its promoted interest, they tend to make “safe” bets in the future (i.e., they become risk-averse).

Illustration of Operating Partner's Conservative Proclivities when the Promoted Interest is "in the Money"
Motivational Issues – “Out-of-the-Money” Promote

- If the operating partner has not earned its promoted interest, they tend to make risky bets (i.e., they become risk-seeking).

Illustration of Operating Partner’s Aggressive Proclivities when the Promoted Interest is "out of the Money"
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Transaction Costs: A “Drag” on Returns

• The “round-trip” costs to acquiring and disposing of real estate are quite high.

• The drag on returns can be approximated as:

\[
\text{Reduction in Total Return} = \frac{\text{Total Transaction Costs}}{\# \text{Years in Holding Period} \times (1 - LTV)}
\]

• These transaction costs clearly reduce (gross) returns; the “drag” increases as:
  • the holding period shortens, and
  • the loan-to-value ratio increases.

• This matters because the holding periods and leverage ratios tend to differ by core v. non-core real estate strategies:
  • Core properties tend to have long lives and low LTVs.
  • Non-core properties tend to have short lives and high LTVs.
**Transaction Costs: A “Drag” on Returns – Simple Examples**

- Let’s assume that the round-trip costs are 3.5% of the asset’s price (e.g., 1.5% on the way in and 2.0% on the way out).

- Let’s contrast:
  - a 5-year v. a 10-year hold, and
  - 0% LTV v. 50% LTV.

**Approximate Reduction in Total Return Due to Transaction Costs as a Function of Leverage and Holding Period**

<table>
<thead>
<tr>
<th>LTV Ratio</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</thead>
<tbody>
<tr>
<td>0%</td>
<td>3.50%</td>
<td>1.75%</td>
<td>1.17%</td>
<td>0.88%</td>
<td><strong>0.70%</strong></td>
<td>0.58%</td>
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<tr>
<td>10%</td>
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<td>20%</td>
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<td>30%</td>
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## Transaction Costs: A “Drag” on Returns – Core v. Non-Core

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<td>2.19%</td>
<td>1.94%</td>
<td>1.75%</td>
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- **Value-added & Opportunistic Deals**
- **Estimated All-In Transaction Costs = 3.50%**
- **Core (with Moderate Leverage) Deals**

Reduction in Total Return \[ \approx \frac{\text{Total Transaction Costs}}{\# \text{Years in Holding Period} \times (1 - \text{LTV})} \]
An Example of the Return Drag of Fees & Costs

Illustration of Net Levered Real Estate Returns
as a Function of the Holding Period

Major Assumptions:
- Leverage Ratio = 40%
- Interest Rate = 5.00%
- Loan Origination Fees = 1.50%
- Acquisition and O&O Costs = 1.83%
- Asset Management & Professional Fees = 1.67%
- Disposition Fees & Costs = 0.75%

Fee Drag = f(Time)

Gross Levered Real Estate Return

Investor's Net Return

Approximated Annual Return

Holding Period (Years)
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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

### Strategy

#### GP Fees
- Core: ~105 bps
- Value-Added: ~165 bps
- Opportunistic: ~350 bps
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></th>
<th>Net (Value-Weighted) Returns</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Core</td>
<td>Non-Core</td>
<td>Core</td>
<td>Non-Core</td>
</tr>
<tr>
<td></td>
<td>NPI</td>
<td>NFI-ODCE</td>
<td>Value-Added</td>
<td>Opportunistic</td>
</tr>
<tr>
<td>Arithmetic Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996-2006</td>
<td>12.56%</td>
<td>12.90%</td>
<td>15.00%</td>
<td>24.19%</td>
</tr>
<tr>
<td>1996-2012</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>
</tbody>
</table>

**Standard Deviation**

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross (Value-Weighted) Returns</th>
<th></th>
<th>Net (Value-Weighted) Returns</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>Core</td>
<td>Non-Core</td>
<td>Core</td>
<td>Non-Core</td>
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<td></td>
<td>NPI</td>
<td>NFI-ODCE</td>
<td>Value-Added</td>
<td>Opportunistic</td>
</tr>
<tr>
<td>1996-2006</td>
<td>4.16%</td>
<td>4.74%</td>
<td>6.72%</td>
<td>16.20%</td>
</tr>
<tr>
<td>1996-2012</td>
<td>9.01%</td>
<td>12.27%</td>
<td>16.45%</td>
<td>21.45%</td>
</tr>
<tr>
<td>%Δ</td>
<td>116.86%</td>
<td>158.84%</td>
<td>144.75%</td>
<td>32.42%</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 vs. foreign,
  - debt vs. 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
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

Average Annual Returns vs Volatility

- NPI
- Core
- Value-Added
- Opportunistic

\[ \theta = 0.5 \]

Source: NCREIF/Townsend and Author's Calculations
Law of One Price → Risk-Adjusted Returns: “Alpha” ($\alpha$)

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

- **Expected Return ($k_e$)**
  - $k_e$: Unlevered Core Fund Returns
  - $k_e$: Levered Core Fund Returns

- **Expected Volatility ($\sigma_e$)**

- **Leverage Levels**
  - 0% Leverage
  - 25% Leverage
  - 50% Leverage
  - 75% Leverage

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

- **Positive Alpha**
- **Negative Alpha**
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)

Average Annual Compounded Returns

Volatility

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

0% 2% 4% 6% 8% 10% 12% 14% 16%

Gross Returns
Net Returns - Unadjusted
Net Returns - Volatility-Adjusted

NPI Value-Added Core

Opportunistic ($\theta = .5$)

Levered Core Creating the Law-of-One-Price Continuum

1. Net Returns,
2. Survivorship Bias ($\theta$), and
3. Law of One Price
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

Tools:
5. Risk-Adjusted Returns (α)

Average Annual Compounded Returns

Volatility

Gross Returns
Net Returns
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.
“Mountain” Chart for Value-Added Index’s Alpha

- Repeat the earlier (α) 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

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1996</td>
<td></td>
<td>(0.89)</td>
<td>(0.94)</td>
<td>(0.69)</td>
<td>(0.87)</td>
<td>(1.29)</td>
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<td>(1.48)</td>
<td>(2.30)</td>
<td>(1.40)</td>
<td>(1.77)</td>
<td>(1.76)</td>
<td>(1.80)</td>
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<tr>
<td>1997</td>
<td></td>
<td>(1.10)</td>
<td>(0.79)</td>
<td>(0.95)</td>
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<td>(1.48)</td>
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* 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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<td>6.19%</td>
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<td>0.76%</td>
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<td>(0.88%)</td>
<td>6.19%</td>
<td>4.05%</td>
<td>1.39%</td>
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<td>(1.54%)</td>
<td>0.36%</td>
<td>3.62%</td>
<td>1.26%</td>
<td>0.53%</td>
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<td>4.14%</td>
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<td>0.89%</td>
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<td>3.03%</td>
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<td>1997</td>
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<td>2.18%</td>
<td>1.23%</td>
<td>0.24%</td>
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<tr>
<td>1996</td>
<td></td>
<td>(2.00%)</td>
<td>(1.26%)</td>
<td>(1.11%)</td>
<td>(1.64%)</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>
</tr>
</tbody>
</table>

Our earlier result
Investor Satisfaction with Fund Terms?

- Areas of improvement (and LP satisfaction/dissatisfaction):

**Fig. 4.19:** Areas of Fund Terms Investors Feel Have Shown the Most Improvement over the Past 12 Months and that Need to Improve Further in the Next 12 Months

Source: Preqin Investor Interviews, June 2016
Some Thoughts on Winners & Losers: Agenda

► Winning Arguments:

- The components of return
- JVs as principal/agent problems
- The drag of transaction costs
- Core vs. non-core performance

► Losing Arguments (at least for now):

- Cap rates vs. interest rates
- Impact of leverage → the law of one price
- The volatility of land values → discount to replacement cost
- Mezz debt & levered loans
- State & local finances ← a mispriced risk

► My Next Argument:

- Urban multifamily: NIMBY vs. YIMBY
Some Thoughts on Winners & Losers: Agenda

► Winning Arguments:
  ▪ The components of return
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  ▪ Cap rates v. interest rates
    ▪ Impact of leverage → the law of one price
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    ▪ Mezz debt & levered loans
    ▪ State & local finances ← a mispriced risk

► My Next Argument:
  ▪ Urban multifamily: NIMBY v. YIMBY
Is CRE in “Bubble” Territory?

- How should we view the level of CRE prices?

Green Street Property Sector Indices

Property sector indices are indexed to 100 at their '07 peaks.

Source: Green Street Advisors, Commercial Property Price Index, September 7, 2016.
Some Historical Context

Historical Path of Treasury Bond Interest Rates
1-, 10- and 30-year Maturities for the Period 1954 through YTD 2016

Note: The 30-year bond series begins in 1977, but was discontinued for four years (2002-2006).
Valuations & Interest Rates

• Some investors naively assume:
  • Interest Rates ↑ → Asset Prices ↓

• However, a change in interest rates = f(•):
  • a change in inflation (ρ) expectations, and/or
  • a change in the real return (r) requirement.

• These two factors can have very different impacts on asset values:
  • Inflation ↑ → Interest Rates ↑ → Asset Prices ↑
  • Real Return ↑ → Interest Rates ↑ → Asset Prices ↓

• Inflationary increases may be favorable for real estate
• Real return increases may be unfavorable for most all asset classes, including real estate
A comparison of cap rates & cash-flow yields v. 5-year Treasury rates:

Comparison of 5-year US Treasury Rates to NCREIF Cap Rates & Cash-Flow Yields for the Quarterly Periods 1979-2015

A “noisy” relationship!
History: Current Return v. Interest Rates

• A comparison of cap rates & cash-flow yields v. 5-year Treasury rates:

Comparison of 5-year US Treasury Rates to NCREIF Cap Rates & Cash-Flow Yields for the Quarterly Periods 1979-2015

You can find instances of all four combinations!

Possible Interest & Cap Rate Combinations

Interest Rates

Cap Rates

Possible Interest & Cap Rate Combinations

• You can find instances of all four combinations!

Cap Ex, TIs & LCs

NPI Cap Rates

NPI Cash-Flow Yields

5-year Treasury Rates
The differential highlights that these are fundamentally different securities:

The spread reflects:
1. the expected growth in CRE’s future cash flows, less
2. the difference in the expected real returns between CRE and Treasuries.

Note: Some investors like to invert this relationship – as it suggests positive or negative (cash-flow) leverage.
Conceptual: Interest Rates vs. Current Return

• What does the difference ($\delta$) between bond rates ($i/P_0$) and real estate’s cash-flow yields ($CF_1/P_0$) imply?

• Fundamentally, this is a comparison between a fixed-rate, nominal-yield security and a variable-rate, real-yield security.

• More specifically, the difference equals:

$$\delta = g - (r_{RE} - r_{TB})$$

  • expected RE’s growth ($g$) in cash flow less
  • the difference in:
    • RE’s expected real return ($r_{RE}$), and
    • Treasury bonds’ expected real return ($r_{TB}$).
Illustration: Interest Rates v. Current Return

• As an illustration, assume:
  • bond rates \((i/P_0) = 2.0\%\)
  • real estate’s cash-flow yields \((CF_1/P_0) = 5.0\%\)

• \(\therefore\) the **observed** difference \((\delta) = 2.0\% - 5.0\% = <3.0\%>\)

• Further assume:
  • real estate’s expected cash-flow growth \((g) = 1.5\%\)
  • real estate’s real return \((r_{RE}) = 5.0\%\),
  • Treasury bond’s real return \((r_{TB}) = 0.5\%\)

• \(\therefore\) the **implied** difference \((\delta) = 1.5\% - (5.0\% - 0.5\%) = <3.0\%>\)

• Also assumes that RE’s growth rate equals the inflation rate \((g = \rho)\)
Illustration: Interest Rates v. Current Return

Illustration of Observed and Implied Spreads:
Interest Rate v. Cash-Flow Yields

Observed Spread: \[ \delta = \frac{i}{P_0} - \frac{C_{F_1}}{P_0} \]

Implied Spread: \[ \delta = g - (r_{RE} - r_{TB}) \]

These are unobservable
An Aside: The Path of TIPS Rates

TIPS Yields of Varying Maturities
Quarterly Data from to 2003 to Present

Note: TIPS were first auctioned in 1997. In 2009, 20-year TIPS were discontinued in favor of 30-year TIPS. Treasury now offers 5-, 10-, and 30-year TIPS.
An Aside: The Path of TIPS Rates (continued)

TIPS Yields of 5-Year Maturities
Quarterly Data from to 2003 to Present

The historical average 5-year TIPS yield is ~0.64%

Given the 2007-08 financial crisis, the historical average may not be reflective of the equilibrium level.

Source: U.S. Department of the Treasury
Before considering the difference (δ) between bond rates (i/P₀) and real estate’s cash-flow yields (CF₁/P₀), we need two relationships:

- The nominal (k) and real (r) returns on any asset are linked by:

  \[ k = (1 + r)(1 + \rho) - 1 \]

- where inflation (ρ) is the link between nominal and real returns.

- The total (nominal) return on real estate is also given by:

  \[ k_{RE} = \frac{CF_1}{P_0} + g \]

- This assumes constant cap rates.

- Let’s use these relationships to examine δ
Technical: Interest Rates v. Current Return

• Consider:

\[
\delta = \frac{i}{P_0} - \frac{CF_1}{P_0} = \frac{i}{P_0} - (k_{RE} - g)
\]

Rewrite such that \(k = (1+r)(1+\rho) - 1\)

Recall: \(k_{RE} = \frac{CF_1}{P_0} + g \rightarrow \frac{CF_1}{P_0} = k_{RE} - g\)

\[
\approx g - (r_{RE} - r_{TB})
\]
Some Thoughts on Winners & Losers: Agenda

► Winning Arguments:
  - The components of return
  - JVs as principal/agent problems
  - The drag of transaction costs
  - Core vs. non-core performance

► Losing Arguments (at least for now):
  - Cap rates vs. interest rates
    - Impact of leverage → the law of one price
  - The volatility of land values → discount to replacement cost
  - Mezz debt & levered loans
  - State & local finances ← a mispriced risk

► My Next Argument:
  - Urban multifamily: NIMBY vs. YIMBY
Recall: The Return on Levered Equity

- The return on levered equity ($k_e$) can be written as:

$$k_e = \frac{k_a - k_d LTV}{1 - LTV}; \text{ where: } k_a = \text{(unlevered) asset return}$$

Note:
This illustration assumes the traditional approach that $k_d$ is constant across all $LTV$s – an approach we’ll revisit.
Recall: The Volatility of Levered Equity Returns

The volatility of levered equity returns ($\sigma_e$) can be written as:

$$\sigma_e = \frac{\sigma_a}{1 - LTV}; \text{ where: } \sigma_a = \text{volatility of (unlevered) asset returns}$$

Note: This illustration assumes fixed-rate financing.
Recall: Combining Risk & Return

- Let’s assume: $\kappa_a = 8\%$ and $\sigma_a = 12\%$
- Then, can lever up core to create risk/return continuum

Illustration of the Expected Return and Volatility of Levered Equity Returns (with Riskless Debt)

Note:
This illustration assumes the traditional approach that $k_d$ is constant across all LTVs – an approach we’ll revisit
Recall: Interest Rates \( = f(LTV|\text{Asset Quality, Sponsorship, etc.}) \)

Illustration of the Cost of Indebtedness as a Function of Leverage

- Interest Rate per Annum (\( k_d \))
- Loan-to-Value Ratio
- Mortgage Interest Rate
- Default Risk (\( \delta \)) Premium
- Structural Differences (\( \gamma \)) in Payment Schedules, Servicing Fees, Etc.
- Risk-free Rate

Risky Debt!
• As before, let’s assume: $\kappa_a = 8\%$ and $\sigma_a = 12\%$

• With risky debt $[= f(LTV)]$, continuum becomes a curve
The Equilibrium Condition: The Law of One Price

Each point \((x,y)\) can be described by:

\[
x = \sigma_e = \frac{\sigma_a}{1-LTV}, \text{ and}
\]

\[
y = k_e = \frac{k_a - k_d LTV}{1-LTV};
\]

where \(k_d = r_f + \gamma + \delta \frac{LTV}{1-LTV}\).
The Equilibrium Condition → Alpha!

Market's Equilibrium: the Risk/Return Continuum

Let's look at two possible deals

Expected Returns \([E(\tilde{k})]\) vs. Volatility of Expected Returns \([\sigma_e]\)

Core "Market"

Risk-free Rate

Core with Leverage

Note: Even though both projects provide an expected return higher than that offered by unlevered core, only one of the two offers positive alpha \(i.e.,\) a higher risk-adjusted return more than can be earned by simply leveraging up core).

This concept is frequently abused in practice!
The Equilibrium Condition ← Net Returns

Market's Equilibrium: the Risk/Return Continuum

Expected Returns $[E(k_e)]$

Volatility of Expected Returns $[\sigma_d]$

Risk-free Rate

Core "Market"

Core with Leverage

To be explicit, these are NET returns!

There are two types of fees and costs:
1. base fees and costs,
2. incentive fees.
Market's Equilibrium Risk/Return Continuum

- These are **gross** returns
- These are **net** returns

Expected Returns \[ E(k_e) \]

Volatility of Expected Returns \[ \sigma_e \]
**An Aside: Too Much Leverage**

When the lender’s risk aversion is high (and, therefore, loan spreads are high), high LTVs can be too much of a good thing!

An Aside: Too Much Leverage

Beyond this point, expected return falls while the volatility of return rises!

Two related points:

1. Do we even know/understand?
2. Expected value of a promoted interest increases with volatility.

\[ \sigma_e^* \Rightarrow LTV^* \]
Some Thoughts on Winners & Losers: Agenda

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    ▪ The volatility of land values → discount to replacement cost
  ▪ Mezz debt & levered loans
  ▪ State & local finances ← a mispriced risk

► My Next Argument:
  ▪ Urban multifamily: NIMBY v. YIMBY
Growth: Too Much of a Good Thing?


$$y = -0.1281x^2 + 0.3918x + 0.1456$$

$R^2 = 0.2465$
Too Much Growth → Land as an Option

Today’s land value is a call option on future development opportunities:

\[
\text{Land Value}_t = \max[0, \text{Building Value}_{t+j} - \text{Building Cost}_{t+j}]
\]

This option-pricing perspective leads to following results:*  

Land value is always greater than zero

\[
\text{Land Value}_t > 0
\]

Land volatility of value is substantially greater than building volatility:

\[
\sigma_{\text{Land Value}} \approx 3 \sigma_{\text{Building Value}}
\]

* Notwithstanding several underlying assumptions.
Land as an Option → A Simple Example

• Some simple assumptions:
  
  • $E[\text{Building Value } t+j] = $100 million
    
    $\sigma_{E[\text{Building Value } t+j]} = $10 million
  
  • $E[\text{Building Cost } t+j] = $90 million *
    
    • Holding Period ($j$) = 5 years
      
      • Risk-free Rate = 5%

• Result in the following graphical illustrations:

* Including developer’s “fair” profit.
Illustration of Potential Property Values and Resulting Land Values (Assuming Known Building Costs)
Illustration of Land Value as a Function of Uncertain Building Value and Constant Building Costs

(1) Land value at expiration.
(2) Land value before expiration.
What About the Discount to Replacement Cost?

• The premium/discount to replacement cost:

\[
\frac{\text{Building Value}}{\text{Replacement Cost}} = \frac{\text{Building Value}}{\text{Building Cost} + \text{Land Value}}
\]

• It is a well-worn metric for many practitioners, with regard to both development and acquisitions.
All Properties Trade at a Discount to Replacement Cost!

Let’s take a closer look:

\[
\frac{\text{Building Value}_t}{\text{Replacement Cost}_t} = \frac{\text{Building Value}_t}{\text{Building Cost}_t + \text{Land Value}_t}
\]

\[
= \frac{\text{Building Value}_t}{\text{Building Cost}_t + \max\left[0, \text{Building Value}_{t+j} - \text{Building Cost}_{t+j}\right]}
\]

\[
= \frac{\text{Building Value}_t}{\text{Building Cost}_t + \text{Building Value}_{t+j} - \text{Building Cost}_{t+j} + \text{"optionality"}}
\]

\[
= \frac{\text{Building Value}_t}{\text{Building Value}_{t+j} - \left(\text{Building Cost}_{t+j} - \text{Building Cost}_t\right) + \text{"optionality"}}
\]

< 1
And, It Doesn’t Matter Where in the Cycle!

Illustration of Changing Land & Building Values
as Market Value of Total Property Changes over the Real Estate Cycle

- Building Cost
- Land Value
- Total Replacement Cost
- Total Property Value
- Discount to Replacement Cost
- Premium/Discount to Replacement Cost

Market Cycle (Time)
Not Merely an Academic Exercise!

Consider the CalPERS experience:

[ < 40% loss]
Land Values Are the Most “Bubblicious” of All

Path of Real Home Prices and Building Costs as well as Population and Interest Rates from 1890

Land values are essentially a call option on future development opportunities. As such, they are more volatile than the property values themselves.

For convenience, let’s use the earlier home-price data.

Consider the differences between home prices and building costs as a proxy for land values:

\[ \sigma_{\text{Homes}} = 7.3\% \text{ vs. } \sigma_{\text{Land}} = 18.8\% \]
\[ \rho_{\text{Homes, Land}} = 73.3\% \]

Source: Robert Shiller | *Irrational Exuberance* and Instructor's calculations.
Replacement-Cost Fallacy = f(Land Value Volatility)

- There is an optionality value embedded in land values.
- The value of this option is extremely volatile.
- Consider the typical replacement cost analysis:

| Property Value | < | Land Value + Replacement Cost of the Improvements |

- Properties acquired (or developed) during the bubble (almost) always illustrate this inequality
- If you disagree, how many deals lost in investment (or loan) committee because:

  Property Value > Land Value + Replacement Cost of the Improvements
But, when the bubble bursts, land values crash and the inequality is reversed!

\[
\text{Property Value} > \text{Land Value} + \text{Replacement Cost of the Improvements}
\]

In a crash, land values approach zero

Consider the performance of various high-profile deals following the crash:
Some Thoughts on Winners & Losers: Agenda

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  - The drag of transaction costs
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  - State & local finances ← a mispriced risk

► My Next Argument:
  - Urban multifamily: NIMBY vs. YIMBY
Lending Spreads as $f(LTV)$ & Asset Quality

Illustration of the Cost of Indebtedness as $f(LTV)$ for a Given Maturity Date

- Mortgage Interest Rate$_1 = f(\sigma_1)$
- Mortgage Interest Rate$_2 = f(\sigma_2)$
- Default Risk ($\delta_1$) Premium
- Default Risk ($\delta_2$) Premium
- Structural Differences ($\gamma$) in Payment Schedules, Servicing Fees, Etc.
- Risk-free Rate

Note: Collateral Quality of Property$_1$ is Better than Property$_2$ $\Rightarrow \sigma_1 < \sigma_2$
Another View of Lender’s Required Risk Premia

- Moody’s estimate of realized loss as $f(LTV)$:

**EXHIBIT 2**

Moody's and Underwritten LTV as Indicators of Credit Risk

<table>
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<tr>
<th>MLTV</th>
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<tr>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Each conduit/fusion transaction rated by Moody’s between 2001 and 2008 is represented by a pair of dots, one for its average underwritten LTV at origination and one for its average Moody’s LTV.

Source: Moody’s Investors Service

Fundamental Relationship: Max $k_d \rightarrow E[k_a]$

- As the LTV $\rightarrow 100\%$, the $k_d \rightarrow E[k_a]$
  
  $i.e.$, the maximum interest rate = the asset’s expected return

- Why?
  
  Cannot distribute more than the asset produces!

- This is nothing more than one of the M&M propositions:
  
  Debt & equity positions merely divide up different claims on the asset’s return
Illustration of the Cost of Indebtedness as $f(LTV)$ for a Given Maturity Date

As $LTV \to 100\%$, 
Max $k_d \to E[k_a]$

Mortgage Interest Rate_2 = $f(\sigma_2)$

Mortgage Interest Rate_1 = $f(\sigma_1)$

Default Risk ($\delta_2$) Premium

Default Risk ($\delta_1$) Premium

Structural Differences ($\gamma$) in Payment Schedules, Servicing Fees, Etc.

Risk-free Rate

Note: Collateral Quality of Property_1 is Better than Property_2 $\Rightarrow \sigma_1 < \sigma_2$
Fundamental Relationship: Max $k_d \rightarrow E[k_a]$

- As the LTV $\rightarrow 100\%$, the $k_d \rightarrow E[k_a]$
  \[ \text{i.e., the maximum interest rate} = \text{the asset’s expected return} \]

- Why?
  
  Cannot distribute more than the asset produces!

- This is nothing more than one of the M&M propositions:
  
  Debt & equity positions merely divide up different (different) claims on the asset’s return

- So: How do lenders produce returns higher than $E[k_a]$?
  
  LEVERAGE

  This is true for both debt and equity positions!
• Assume $E[k_a] = 8\%$

• $\therefore$ As the LTV $\to 100\%$, the $k_d \to E[k_a] = 8\%$

• How can lenders produce returns higher than $E[k_a]$?

  Even though the debt cost ($k_d$) is less than $E[k_a]$

• As before, the answer is LEVERAGE

• In this case, consider subordinated junior tranches

  These positions effectively are “long” the entire loan, while being “short” the more-senior positions

• Consider the following example:
Let’s Look at an Example | Simple “Cap Stack”

- Assume:
  - 70% first mortgage @ 5.72%
  - 20% “mezz” loan @ 9.82%
- Further assume that mezz is split into “A” & “B” pieces
  - Mezz A @ 7.54%
  - Mezz B @ 12.11%
- The weighted cost of debt capital ($k_d$) is 6.63%
Another Look | Simple “Cap Stack”

Weighted Average Cost of Debt Capital:

\[ k_d = \frac{70}{90} \times 5.72\% + \frac{10}{90} \times 7.54\% + \frac{10}{90} \times 12.11\% = 6.63\% \]
Application: Illustration of Cost of Indebtedness as $f(LTV)$ for a Given Maturity Date

- Weighted Average Cost of Debt Capital at 6.63%
- Weighted Average Cost of Debt Capital at 5.95%
- Weighted Average Cost of Debt Capital at 5.72%
- First Mortgage at 5.72%
- Mortgage Interest Rate
- Mezz A at 7.54%
- Mezz B at 12.10%
For Opp Funds, “Distressed” Debt is the Rage

- Much of the opportunistic fund-raising in the debt space has been for various types of “distress” – consider:

Reminder:

Tom Barrack, Colony’s founder and chairman, provided the keynote address at the 2012 Booth Real Estate Conference

Notes:

Actual close at $1.2 billion, with $400 million oversubscribed. Another $600 million was raised through co-investment (or “sidecar”) vehicles.


Hedge funds are also active in this space

Blackstone Mortgage Trust (BXMT) is a milder version of this sort of activity.
As with Colony, these funds often quote mid-teen returns.

**How do they produce such returns?**

**LEVERAGE**

Let’s continue with our earlier example **w.r.t.** the B piece; assume it’s 50% levered (as in the Colony fund):

<table>
<thead>
<tr>
<th>Balance Sheet</th>
<th>Capitalization</th>
<th>Return (or Cost)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset = Mezz Loan B</td>
<td>$2,000</td>
<td>12.11%</td>
</tr>
<tr>
<td>Debt</td>
<td>1,000</td>
<td>9.82%</td>
</tr>
<tr>
<td>Equity</td>
<td>$1,000</td>
<td>14.40%</td>
</tr>
</tbody>
</table>

**Notes:**
1) This result is equivalent to having bifurcated the B piece into 2 securities:  
   - tranches B1 and B2
2) This result occurs without any “distress”!
3) Because of non-linearities (*e.g.*, max(*k*) = 14.4%), E{k} < 14.4%

- Or, consider the following illustration of the same result:
Application: Illustration of Cost of Indebtedness as $f(LTV)$ for a Given Maturity Date

Weighted Average Cost of Debt Capital at 6.63%

Weighted Average Cost of Debt Capital at 5.95%

Weighted Average Cost of Debt Capital at 5.72%

First Mortgage at 5.72%

Mortgage Interest Rate

Interest Rate on Mezz Loan | B at 9.82%

Mezz A at 7.54%

Expected Return on Equity - Mezz Loan | B at 14.40%
Levered Loans: A Few Additional Thoughts

- These levered loans are risky | Assume the asset’s volatility ($\sigma_a$) = 12%:
  - Then, the Prob(return = -1.0) $\approx$ 7%
  - Then, the Prob(return < 0.0) $\approx$ 14%
  - Thus, the Prob(return = .144) $\approx$ 86%

$$\therefore E\{k\} < 8\% \{ = f(\sigma)\}$$

[even worse after promoted interest]

• If property value is insufficient to repay the First Mortgage, Mezz A Piece, levered loan on Mezz B Piece & return levered Mezz B’s equity, then levered Mezz B investors earn less 0%

• If property value is insufficient to repay the First Mortgage, Mezz A Piece & levered loan on Mezz B Piece, then levered Mezz B investors lose all their equity

Illustration of Assumed Distribution of Ending Property Values
(assuming reinvestment of cash flows)

- First Mortgage Balance
- Mezz Debt A Balance
- Mezz Debt B Balance
- Levered Loan: Mezz Debt B Balance
- Assumes $P_0 = 10,000$ (thousands)
Expected Return on Risky as $f(\sigma)$

Expected Return on Debt Tranches as a Function of Asset-Level Volatility

- $E[\text{Mezz B}] < E[\text{Mezz A}]$
- $E[\text{Mezz B}] < E[\text{1st Mortgage}]$
- $E[\text{Mezz B}] < 0$

$\approx$ Range of NCREIF $\sigma$ for Annual Returns
Some Thoughts on Winners & Losers: Agenda

► Winning Arguments:
  ▪ The components of return
  ▪ JVs as principal/agent problems
  ▪ The drag of transaction costs
  ▪ Core vs. non-core performance

► Losing Arguments (at least for now):
  ▪ Cap rates vs. interest rates
  ▪ Impact of leverage → the law of one price
  ▪ The volatility of land values → discount to replacement cost
  ▪ Mezz debt & levered loans
  ▪ State & local finances ← a mispriced risk

► My Next Argument:
  ▪ Urban multifamily: NIMBY vs. YIMBY
The Financial Strain on State & Local Budgets

- It is no surprise that many state & local budgets are under enormous financial strain. Consider:
It is also no surprise that many state & local budgets are under enormous financial strain due to unfunded pension liabilities. Consider:

Increasing Realization: Taxing the Rich Doesn’t Work

At the state & local levels, “tax the rich” policies are increasingly problematic:
- The income of the rich is more variable than lower brackets
- The rich move to other states (e.g., Florida and Texas) with lower income taxes

Calls for “broadening the (income) tax base” will be met with political resistance.

In order to cope, state & local authorities considering a range of service cuts &/or increasing other forms of taxation (e.g., property and transfer taxes)
- Both the cuts and the tax increases adversely affect commercial real estate values

Will Aggressiveness Change with State Fortunes?

It Seems Regulatory Burden Associated with Finances
Some Thoughts on Winners & Losers: Agenda

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What About Multifamily Prices?

Property values fall by ~ 15% over 3 years
Property values fall by ~ 30% over 2 years

Presently, a difference of ~ 210 bps

Will property values fall precipitously again?
In addition to having the lowest average vacancy rate, the apartment sector did so with the least volatility.
Rental Rates by Property Type for the Period 1994 - 2015

Sources: CBRE and Instructor's calculations.
Apartments = Winner | Before & After Risk

Historical Performance of the NCREIF Property Index and Various Property Types for the Period 1978 through (the Second Quarter of) 2016
• Changing NCREIF Apartment Composition

• The NCREIF apartment index, increasingly moving away from “Garden.”
• Garden ← NIMBY v. Urban/High-Rise ← YIMBY:

NCREIF Apartment Allocations, for the Period 1991-2015

In earlier years, garden apartments was dominate
• Consider the Anecdotal Buzz

• Wherever you look, it seems the headlines are all pretty much the same.

• An aside: Which city is pictured here? Does it matter?
Concluding Thoughts

• As an academic, you often need a “thick skin”

• It helps to remember the old adage:
  – “Occasionally mistaken, but never in doubt!”
  – CHEERS!!
Survey Questions

- For each of the following, please rate your level of agreement with the good doctor:

<table>
<thead>
<tr>
<th></th>
<th>Completely Agree</th>
<th>Somewhat Agree</th>
<th>Unsure/Neutral</th>
<th>Somewhat Disagree</th>
<th>Completely Disagree</th>
</tr>
</thead>
</table>

- Winning Arguments:
  A. The components of return: __
  B. JVs as principal/agent problems: __
  C. The drag of transaction costs: __
  D. Core v. non-core performance: __

- Losing Arguments:
  A. Cap rates v. interest rates: __
  B. Impact of leverage → the law of one price: __
  C. The volatility of land values → discount to replacement cost: __
  D. Mezz debt & levered loans: __
  E. State & local finances ← a mispriced risk: __

- Next Argument:
  - Urban multifamily: NIMBY v. YIMBY: __