Some Thoughts on Past & Future Real Estate Returns

Joseph L. Pagliari, Jr.
Clinical Professor of Real Estate
November 6, 2012
6th Annual Booth Real Estate Conference
Chicago, Illinois
Commercial Real Estate: Past & Future(?)

• Macro Factors Affecting Real Estate Returns:
  – The Economy
  – The Housing Market
  – State & Local Finances
  – Loan Maturities
    – Commercial Real Estate Pricing
    – Too Much Growth!
    – Inflation?
    – Some Thoughts on Multi-Family

• Appendices
  – Growth at What Price?
  – CMBS Dysfunction
Historical Growth in U.S. Gross Domestic Product for the Period 1948 through 2011

Sources: Bureau of Economic Analysis and author's calculations
Return = \( f(\text{Economy, etc.}) \) | The Long View

**Historical Growth in U.S. Gross Domestic Product for the Period 1948 through 2011**

Sources: Bureau of Economic Analysis and author's calculations
Return = f(Employment, etc.) | The Long View

Historical Unemployment Rate
for the Period 1948 through 2011

Source: Bureau of Labor Statistics
Return = \( f(\text{Employment, etc.}) \) | The Long View

**Historical Unemployment Rate**
for the Period 1948 through 2011

Stylized Normal Distribution
(based on historical \( \mu \) and \( \sigma \))

\~2.5 \( \sigma \)-Event: Financial Crisis

Sources: Bureau of Labor Statistics and author's calculations
In Real Estate, the Local Market Matters!

Lost Jobs:

By itself, Detroit accounts for ~ 100,000 jobs lost

The economy remains fragile.

What else might go wrong?

Possibilities:
- Terrorist attack(s)?
- Contagious financial crisis?
- Natural disasters (Sandy)?
- Partisan political bickering increases (fiscal cliff)?
- Crude oil prices?

Domestic Crude Oil Prices (in Constant 2011 Dollars) for the Period 1948 through 2012

Source: InflationData.com
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Housing Market’s Correlation with Commercial Real Estate

- Residential market slightly led the downturn in the commercial real estate markets
- Most commercial real indices showed a similar correction

Residential Real Estate Still in the Doldrums

Annual New Homes Sold & Median Sales Prices: 1963 - 2011

Sources: U.S. Census Bureau, Morningstar and Instructors' Calculations
Case-Shiller Home Price Index
for the Period 1987 through 2012
for Selected Markets

San Diego Composite-10
Composite-20 Chicago
Back to fall of 2003 prices.

Source: S&P Case Schiller Index
Residential Real Estate Is Highly Localized

In addition to the average appreciation rate, volatility matters.

"Bubble" Growth and Subsequent Decline for Certain US Housing Markets: 2000 through 2012

Bubble Growth: Maximum Price Increase from January 2000

Source: S&P Case Schiller Index and instructor’s Calculations

Net Annual Appreciation Rate of 4%
Net Annual Appreciation Rate of 2.5%
Net Annual Appreciation Rate of 0%
The Rate of Inflation (\(\rho\))
Net Annual Appreciation Rate of 2.5%

Dallas
Denver
Charlotte
Cleveland
Minneapolis
Portland
Seattle
New York
Washington
Atlanta
Chicago
Composite-20
Detroit
San Francisco
San Diego
Los Angeles
Tampa
Miami
Phoenix
Las Vegas
Composite-20
Composite-10
Seattle
Cleveland
Net Annual Appreciation Rate of 0%
Can We Have an Economic Recovery without a Housing Recovery?

• Consider the depth of the housing market and its impact on:
  – the construction industry:
    • unemployment is disproportionately male and less-educated
  – the banking sector:
    • when will banks start lending again?
  – consumer confidence:
    • if your largest investment is faltering, how confident will you be?

• The administration has already attempted at directly reviving the housing market;
  – however, the positive effects seem to have been little.

• Is there the political will to make another attempt?
  – Should there be?

• Both parties are advocating some reform of the GSEs
  – Likely to hurt any short-term rebound in home prices
The “Shadow” Supply of Housing

• As estimated by the International Monetary Fund:

**Figure 1.24. Shadow Inventory of Houses Potentially for Sale**
*(In millions of loans)*

- Negative equity expected to default
- Private modifications
- HAMP modifications
- 60+ days delinquent loans
- Foreclosure inventory (excluding REOs)

Sources: Mortgage Bankers Association; and IMF staff estimates.
Note: REOs = Real-estate owned. HAMP = Home Affordable Modification Program.
A Rebound in Home Prices?

- An expected recovery in home prices gains momentum:
Path of Real Home Prices and Building Costs as well as Population and Interest Rates from 1890

\[ y = 0.5078x - 884.66 \]
\[ R^2 = 0.468 \]

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• It is no surprise that many state & local budgets are under enormous financial strain. As examples of just two perspectives, consider:
  – Muni bond swap (MCDX) rates, and
  – Muni bond spreads over Treasuries

Sources: Markit, Goldman Sachs.
• The fall in home prices contributes to the current strain on state and local budgets.
  
  – Fall in home prices contributes to declining consumer confidence
    • Which leads to a decrease in consumer spending
    • Which leads to a decrease in sales taxes
  
  – Fall in home prices is accompanied by a fall in the volume of home sales
    • Which leads to a decrease in transfer taxes
  
  – But (ad valorem) property taxes are largely a zero-sum game:
    • If everyone’s property increases by x%, your property tax bill is unchanged.

• As a result of the foregoing, a due diligence/underwriting item of increasing importance will be the financial condition of state & local entities.
  
  – Will be important to:
    • Tenants,
    • Lenders, and
    • Investors.
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?

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The Collapse of the CMBS Market

Annual CMBS Issuance ($ billion)

Source: Commercial Mortgage Alert
A Wave of Refinancings: ~$3.0 trillion Coming Due

Commercial Mortgage Maturities ($Bn)

Floating-rate CMBS run to maximum extension
Source: Morgan Stanley Research estimates

The Aggressive Vintages Coming Due Later

Source: Morgan Stanley Research, “Commercial Real Estate 2010.”
CMBS Loan Delinquencies by Vintage

- Decreasing rate of default for CMBS loans:

Delinquency and Specially Serviced by Vintage as Percentage of Original Balance
As a % of Original Vintage Balance

Data are as of end of September 2012.

CRE Loan Delinquencies by Property Type

- Increasing rate of default for CMBS loans.
- Note: default rate for multifamily is much higher for CMBS than GSEs
  - Peter Cooper Village Stuyvesant Town skews the numbers.

Total Delinquencies as a Percentage of Outstanding Balance

Core Property Types

- Total (↑13bp)
- Industrial (↑13bp)
- Multifamily (↑35bp)
- Office (↑13bp)
- Retail (↑15bp)
- Hotel (↑16bp)

Data as of end of September 2012

Note: “Non-core” properties are all those other than the five core sectors listed and includes, but is not limited to: self storage, healthcare, mobile home, and mixed use properties.

Net delinquencies have turned negative for multifamily, retail and hotels:

Data as of end of September 2012

Delinquencies Lead to Workouts or Foreclosure

- So far, we’re at ~ $350 billion of workouts or foreclosures
- About 1/3 have been resolved

Cumulative Distress for All Property Types

- But, when do these forbearance agreements expire?
- In the midst of the refinancing wave?

Source: Real Capital Analytics, “Quarter in Review, October 2012”
Lessening CMBS Underwriting Standards to the Rescue?

- Another case of “here we go again”?

Q3 Conduit Leverage Tops 100% MLTV

Source: Moody’s Investors Service Pre-sale Reports

Real Estate Debt Funds to the Rescue?

• Is there enough “powder” here? Not yet!

Fig. 1: Real Estate Debt Funds Launched, Q1 2011 - Q3 2012

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Path of NCREIF Market Values, Incomes & Cap Rates:

NCREIF Property Index: Market Values, Rescaled NOI and Capitalization Rates Based on a $100 Investment for the Period 1978 through 2012

Sources: NCREIF and instructor's calculations.
Annotated Path of NCREIF Market Values, Incomes & Cap Rates:

NCREIF Property Index: Market Values, Rescaled NOI and Capitalization Rates Based on a $100 Investment for the Period 1978 through 2012

Sources: NCREIF and instructor's calculations.
What About “Real Time” Indices?

- The NCREIF Index is appraisal-based.
- Other indices show more price recovery, e.g., Green Street:

Green Street Commercial Property Price Index

Source: Green Street Advisors, *Commercial Property Price Index*, October 4, 2012
What About Differences by Property Types?

- Not surprisingly, apartments have recovered most (and hotels the least).
- However, all property types show similar recovery:

  Green Street Property Sector Indices

- Apartments & Malls: > 100% of peak prices
- Hotels: > 80% of peak prices

Property sector indices are indexed to 100 at their respective peaks.

Source: Green Street Advisors, *Commercial Property Price Index*, October 4, 2012
Averages Can Be Misleading

- Said another way: significant differences by quality

Sources: Real Capital Analytics and Geltner Associates.
* CPPI Trophy => $10M, Non-Troubled, 6-City = NY, DC, SF, LA, Chicago & Boston
Components of Return: Fundamental Relationships

• In principle, the foregoing risks can be priced

• **RECALL**: In the long run, asset-level returns \( (k_a) \) are primarily a function of the initial cash flow yield \( \left( \frac{CF_1}{P_0} \right) \) 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 = \( \frac{NOI_1}{P_0} \neq \frac{CF_1}{P_0} \)
Components of Return: Holding Period & Cap Rates

Cap Rate Compression/Expansion

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

Holding Period (Years)
An Overview of Capitalization Rates

Historical Capitalization Rates by Property Type for the Period 2001-2012

Source: Real Capital Analytics.
Cap Rates → Cash-Flow Yields

- Significant ambiguities surrounding cap rates.
- Apartments have a very different “cap ex” behavior:

An Illustration: Conversion of Cap Rates to Cash Flow Yield

<table>
<thead>
<tr>
<th>Property Type</th>
<th>Estimated Capitalization Rate (1)</th>
<th>Estimated Dividend Pay-Out Rate (2)(3)</th>
<th>Estimated Cash Flow Rate (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartments</td>
<td>6.25%</td>
<td>82.5%</td>
<td>5.15%</td>
</tr>
<tr>
<td>Industrial</td>
<td>7.13%</td>
<td>66.0%</td>
<td>4.70%</td>
</tr>
<tr>
<td>Office</td>
<td>7.25%</td>
<td>61.8%</td>
<td>4.48%</td>
</tr>
<tr>
<td>Retail</td>
<td>7.13%</td>
<td>75.0%</td>
<td>5.35%</td>
</tr>
<tr>
<td>All</td>
<td>6.77%</td>
<td>70.4%</td>
<td>4.77%</td>
</tr>
</tbody>
</table>

(1) Source: Real Capital Analytics Quarter in Review, Oct 2012.

(2) Represents typical portion of NOI converted to cash flow. The difference represents "cap ex" (i.e., tenant improvements, leasing commissions and capital improvements.

(3) Source: NCREIF and author's calculations.

(4) Represents the product of the capitalization rate and the dividend pay-out ratio.
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\[ y = -0.1281x^2 + 0.3918x + 0.1456 \]
\[ R^2 = 0.2465 \]
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 the 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.
• Some simple assumptions:

\[ E[\text{Building Value}_{t+j}] = $100 \text{ million} \]

\[ \sigma_{E[\text{Building Value}_{t+j}]} = $10 \text{ million} \]

\[ E[\text{Building Cost}_{t+j}] = $90 \text{ million} \]

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

Land Value (1) = Land value at expiration.
Land Value (2) = Land value before expiration.

"Optionality" = Value of Uncertainty and Waiting
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:

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

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

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

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

<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.
Not Merely an Academic Exercise!

- Consider the CalPERS experience: [ > 40% loss]
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Let’s Revisit the Growth Components of Return

• Recall: 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 turn, the growth rate can be viewed as a function of inflation ($\rho$):

$$g = \lambda \times \rho$$

$\lambda$ = the inflation pass-through rate

• Historically, $\lambda \sim 75$

• So, real estate’s ability to (at least partially) hedge inflation may be important
What Does the Bond Market Suggest?

Implied Inflation Rates
based Upon Current Treasury Bonds & TIPS Yields

Source: Bloomberg (October 29, 2012) and Instructor's calculations.
Real Estate’s Correlation with Inflation?

RE’s long-term correlation with inflation ~28%

When Inflation is greater than average, RE’s correlation with inflation ~76%

RE’s real (i.e., inflation-adjusted) return ~5.5%

Sources: InflationData.com, NCREIF and author’s calculations
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Most of History Has Been Good to Apartments

• Consider the empirical case:

1. Vacancies

2. Growth in rents

3. Absolute returns

4. Risk-adjusted returns

⇒ In principle, the “holy grail” for institutional investors
Vacancies | Apartments Have Lowest Average

Vacancy Rates by Property Type
Quarterly Data from 1989 through 2011

Summary Statistics:

<table>
<thead>
<tr>
<th></th>
<th>Apartment</th>
<th>Industrial</th>
<th>Office</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>6.5%</td>
<td>8.2%</td>
<td>9.9%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Volatility</td>
<td>1.3%</td>
<td>2.6%</td>
<td>2.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>20.2%</td>
<td>31.3%</td>
<td>25.9%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Maximum</td>
<td>9.3%</td>
<td>14.1%</td>
<td>14.1%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Minimum</td>
<td>4.1%</td>
<td>4.7%</td>
<td>5.1%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

Sources: NCREIF and Instructor's calculations
Rental Rates by Property Type
for the Years Ended 1987 through 2011
Indexed: 1987 = $100

Rent Growth

Sources: CB Richard Ellis, REIS and Instructor's calculations
Historical Performance of the NCREIF Property Index and Various Property Types for the Period 1978 through 2011

- **Apartments**
- **CBD Office**
- **Warehouse**
- **R&D/Flex Office**
- **Community Retail**
- **NCREIF Property Index**
- **Regional Malls**
- **Suburban Office**

The graph illustrates the relationship between annual return and standard deviation for different property types, with Apartments showing the highest Sharpe Ratio and Suburban Office showing the lowest Sharpe Ratio.
Potential Storm Clouds on the Horizon

• Consider the non-empirical case:

1. NIMBY v. YIMBY

2. Are cap rates unsustainably low?
   a) At current interest rates, maybe not
   b) At future (higher) interest rates, maybe so
      i. Rates ↑ as a \( f(\text{real return}) \) \( \Rightarrow \) RE \( \leftrightarrow,\downarrow \)
      ii. Rates ↑ as a \( f(\text{inflation}) \) \( \Rightarrow \) RE \( \leftrightarrow,\uparrow \)
   c) Remember Greenspan’s admonition
Changing Apartment Composition

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

4th Quarter 2007

2th Quarter 2012

~ no $\Delta$

~ 1.5 x $\Delta$
"... I define a bubble as a protracted period of falling risk aversion that translates into falling capitalization rates that decline measurably below their long term trendless averages. Falling capitalization rates propel one or more asset prices to unsustainable levels. All bubbles burst when risk aversion reaches its irreducible minimum, i.e. credit spreads approaching zero, though analysts’ ability to time the onset of deflation has proved illusory."

(Alfred A. Milani, The Crisis, Brookings Institute working paper, April 15, 2010.)
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How Should We Think About Risk?

- In principle, all (unlevered) property investments should offer identical risk-adjusted rates of return.
- Because of its popularity, let’s frame the discussion in terms of high- v. low-barrier markets:

![Pricing Illustration of High- v. Low-Barrier Markets](chart)

The Required Rates of Return: $E(k)$

Market-Level Volatility: $\sigma$

Economic Principles:

- In principle, all (unlevered) property investments should offer identical risk-adjusted rates of return.
- Because of its popularity, let’s frame the discussion in terms of high- v. low-barrier markets:

![Pricing Illustration of High- v. Low-Barrier Markets](chart)
Let’s Be a Bit More Specific:

- Identical risk-adjusted rates of return = identical Sharpe Ratios

Pricing Illustration of High- v. Low-Barrier Markets
In Order to Produce Identical Risk-Adjusted Returns

\[
\frac{E(k_{a,H}) - r_f}{\sigma_H} = \frac{E(k_{a,L}) - r_f}{\sigma_L}
\]

The Required Rates of Return: \( E(k_a) \)

Market-Level Volatility: \( \sigma \)
Let’s Be a Bit More Specific (continued):

- We can include the expanded view of returns (assuming constant cap rates):

\[
\begin{align*}
\text{Sharpe Ratios} & \quad \frac{\left( \frac{CF_i}{P_0} \right)_{H} + E(g_{H}) - r_f}{\sigma_{ii}} = \frac{\left( \frac{CF_i}{P_0} \right)_{L} + E(g_{L}) - r_f}{\sigma_{L}} \\
E(k_{a,L}) & \quad H_f L_f \\
E(k_{a,H}) & \quad H_f L_f
\end{align*}
\]

Pricing Illustration of High- v. Low-Barrier Markets
In Order to Produce Identical Risk-Adjusted Returns

\[
\begin{align*}
\text{The Required Rate of Return: } E(k_a) =
\end{align*}
\]
How Should We Think About Investment Opportunities?

• Based on your beliefs (hopefully supported by research), consider the potential mispricing of markets:

Pricing Illustration of High- v. Low-Barrier Markets:
Possible Price Arbitrage based on the Expected Spread in Growth Rates and Estimated Volatility Ratio

If your beliefs place you above this curve, then acquire high-barrier properties

If your beliefs place you above this curve, then acquire low-barrier properties

Based on the risk-free rate ($r_f$), estimated $E(g_L)$ and the observable pricing spreads $(CF/P_L) - (CF/P_H)$
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CRE Loans: Foreclosures vs. Forbearance

• Upon a monetary default, lenders can choose to foreclose vs. forbear

• Consider the two sources of most defaults:

1. Commercial Banks: Administration decided to encourage banks to forbear
   → “extend & pretend”

2. CMBS: the tranched nature of security holders complicates the resolution of delinquent loans. Consider a simple A/B structure:
Inherent Conflicts between Security Tranches

<table>
<thead>
<tr>
<th>Note Holders</th>
<th>Foreclose at $t_2$</th>
<th>Forbear until $t_3$</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$60</td>
<td>50%* $60 + 50%* $50 = $55</td>
<td>Foreclose</td>
</tr>
<tr>
<td>B</td>
<td>$5</td>
<td>50%* $20 + 50%* $0 = $10</td>
<td>Forbear</td>
</tr>
</tbody>
</table>
The Effect of Forbearance: Undershooting Market?

This is the buying opportunity

"True" Prices

This is not

Over-shooting Market

Under-shooting Market

Prices

Time