Discussion of:
“Finding Cap Rates: A Property Level Analysis of Commercial Real Estate Pricing”

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An Outline of My Thoughts

OVERVIEW:

- METHODOLOGY: My focus will not be on technique

- APPLICATIONS: My focus will be on theory & implementation:
  - income vs. cash flow,
  - term structure of leases,
  - growth in income (and/or cash flow),
  - other fixed effects,
  - instrumental variables, and
  - investor sentiment.

- CONCLUSION: Less a criticism, more an emphasis on future research avenues
Better Intuition about Gordon’s Dividend Discount Model

SUBJECT PAPER:
- Restatement of Gordon Model:

\[ P_t = \frac{NOI_{t+1}}{r_t - g_t} \Rightarrow \text{Cap Rate}_t = \frac{NOI_{t+1}}{P_t} = r_t - g_t \]

DISCUSSANT COMMENT:
- Correction: However, Gordon’s model is based on cash flows:

\[ NOI_t \neq \text{Cash Flow}_t \]

\[ P_t = \frac{NOI_{t+1} - \text{Cap Ex}_{t+1}}{r_t - g_t} \Rightarrow \text{Cash Flow Yield}_t = \frac{NOI_{t+1} - \text{Cap Ex}_{t+1}}{P_t} = r_t - g_t \]

- Modification: Would like to see the “cap ex” effects on yields
The level and volatility of cap ex ought to be included as a priced factor.

For example, 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>6.11%</td>
<td>82.5%</td>
<td>5.15%</td>
</tr>
<tr>
<td>Industrial</td>
<td>7.63%</td>
<td>66.0%</td>
<td>4.70%</td>
</tr>
<tr>
<td>Office</td>
<td>7.27%</td>
<td>61.8%</td>
<td>4.48%</td>
</tr>
<tr>
<td>Retail</td>
<td>7.01%</td>
<td>75.0%</td>
<td>5.35%</td>
</tr>
<tr>
<td>All</td>
<td>6.92%</td>
<td>70.4%</td>
<td>4.87%</td>
</tr>
</tbody>
</table>

(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.
A Small Aside: “Cap Rates” Are Ambiguous in Practice

- An aside: Variety of cap rate definitions in practice:
  - trailing v. forward income,
  - without v. with reserves ← ≈ cap ex smoothing
  - “stabilized” v. non-stabilized,
  - etc.

- How does your definition of “cap rate” relate to practice?
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  – **term structure of leases,**
  
  – growth in income (&/or cash flow),
  
  – other fixed effects,
  
  – instrumental variables, and
  
  – investor sentiment.

– **CONCLUSION:** Less a criticism, more an emphasis on future research avenues
SUBJECT PAPER:
– RESTATEMENT OF GORDON MODEL:

\[ P_t = \frac{NOI_{t+1}}{r_t - g_t} \Rightarrow \text{Cap Rate}_t = \frac{NOI_{t+1}}{P_t} = r_t - g_t \]

DISCUSSANT COMMENT:
– WARNING: However, Gordon’s model is based on cash flows growing at a constant rate.
  – This may be plausible for apartments, hotels and portfolios.
  – This may be implausible for individual industrial, office and retail properties.

– MODIFICATION: What about lease maturity date(s)?
Consider a Simple Example of a One-Time Rent Bump

Lease Payments

$CF_0$

$CF_N$

$N$

Time
Illustration of INCOME-DIFFERENTIAL Model:
Viewed as Two Perpetual Annuities | One Longer-Dated than the Other

\[
\frac{CF_N - CF_0}{k_2} \frac{1}{(1 + k_2)^N} \left\{ \begin{array}{c}
\frac{CF_0}{k_1}
\end{array} \right. \]
As Lease Maturity Dates Vary, “Cap Rates” Vary

- Consider: $10 < N \leq 60$
  - Must solve for cap rate, given $10 < N \leq 60$
  - where: $P_0 (= $100), r_t (= 10\%)$ and $g_t (= 2\%)$ are constant across all combinations

- Consider the two limiting cases:
  - 1) Constant rent growth:
    - Cap rate = $r_t - g_t = .10 - .02 = .08$
  - 2) No rent growth ($N \rightarrow \infty$)
    - Cap rate = $r_t - g_t = .10 - 0 = .10$
Cap Rates vary purely as a function of \( N \); all other factors are held constant.
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What About Growth?!?!

Clearly, cap rates can be greatly influenced by expected growth in future cash flows:

\[ P_t = \frac{NOI_{t+1} - CapEx_{t+1}}{r_t - g_t} \]  
Cash Flow Yield \( t \) = \( \frac{NOI_{t+1} - CapEx_{t+1}}{P_t} = r_t - g_t \)

Cap rates (or cash-flow yields) are positively correlated with returns:

- Longstanding story in mainstream finance:
  - Higgledy-piggledy growth (Little, 1962)
  - Value v. growth (Lakonishok, Shleifer & Vishny, 1994)
- Real estate work in this area as well:
  - *e.g.*, Plazzi, Torous & Valkanov (2011 RERI paper)

Like cap ex, my concern is that a richer story can be produced by empirically examining the pricing of the growth factor.
Let’s Explore Growth: Too Much of a Good Thing?


\[ y = -0.1281x^2 + 0.3918x + 0.1456 \]

\[ R^2 = 0.2465 \]
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What About Major v. Non-Major Markets?

- Prices and cap rates can significantly differ by quality

Asset Appreciation in Major v. Non-Major Markets
From December 2000 through January 2013

Ratio of Non-Major to Major Markets

Source: Real Capital Analytics and Instructor's calculations.
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The Collapse of the CMBS Market

Annual CMBS Issuance ($ billion)

Source: Commercial Mortgage Alert
How Can the CMBS Collapse Co-Exist with Falling Cap Rates?

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

Capitalization Rates (Right Axis)  Market Values  Rescaled NOI  Average Capitalization Rate (Right Axis)

Sources: NCREIF and instructor's calculations.
Pro-cyclical CMBS Underwriting Standards?

• Another case of “here we go again”?

Q3 Conduit Leverage Tops 100% MLTV

A Wave of Refinancings: ~$2.0 trillion Coming Due

Commercial Mortgage Maturities ($Bn)

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

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Better Intuition about Gordon’s Dividend Discount Model

SUBJECT PAPER:
– Expansion of Gordon Model:

\[ P_t = \frac{NOI_{t+1}}{r_t - g_t} \Rightarrow \text{Cap Rate}_t = \frac{NOI_{t+1}}{P_t} = r_t - g_t + f(s_t) + g(m_t) \]

where: \( s_t = \) investor sentiment and \( m_t = \) mortgage supply

DISCUSSANT COMMENT:
– Questions:

• Isn’t “sentiment” subsumed in \( r_t \)?
• Is it “sentiment” or is it:
  • “return-chasing” (Jensen’s \textit{ex post} \( \alpha \)) behavior?
  • “momentum-chasing (\textit{ala} Jegadeesh & Titman)”? 

\[ \text{NOI} + \text{NOI} + r = r - g + f(s) + g(m) \]