Transaction based indices for the UK commercial property market

26 June 2010

Steven Devaney (University of Aberdeen)
Roberto Martinez Diaz (IPD)
Research has identified potential problems with valuation based indices:
- Smoothing and/or lagging of market movements
- Potential for client influence of inputs

Constructing price based measures of commercial real estate performance is challenging:
- Low trading volumes, heterogeneous assets
- Sale samples may be unrepresentative

However, such measures may give more insights into the nature of real estate risk and return
• IPD research project launched to investigate creating a transaction based index (TBI) using IPD UK data

• This presentation aims to
  – Outline the approach selected to estimate a TBI
  – Show how this TBI compares as an indicator of market movements
  – Compare volatility of the TBI with that of published valuation based series

• Are results consistent with findings from other research and how should the output be used?
Assessed value approach
(Clapp & Giaccotto, 1992; Fisher et al., 2007)

- Hedonic modelling: real estate prices are a function of many characteristics
- Valuations capture the differences between properties within a single measure
- So instead of modelling:
  \[
  \text{Price} = \alpha + \beta \text{Age} + \beta \text{Floorspace} \ldots + \varepsilon
  \]
- We could estimate:
  \[
  \text{Price} = \alpha + \beta \text{Valuation} + \varepsilon
  \]
- Can use information to value representative asset over time or to mass appraise non-traded assets
Sample selection issue
(Gatzlaff & Haurin, 1998; Fisher et al., 2003)

- Problem: do not always get a representative sample of properties selling each quarter
- So standard Heckman two-step procedure is applied:
  1) Probit model of which properties sell (see paper)
  2) Use parameter generated by probit as additional variable in model of prices

\[ \ln P_i = \alpha + \beta \ln V_i + \delta D_{i,j} + \xi C_i + \varepsilon \]

where \( P = \) price, \( V = \) valuation, \( D = \) segment dummies and \( C = \) correction factor
Index generation

- Method applied to sales from IPD UK quarterly database over period Q1 2002 to Q2 2009

- In a given quarter:
  - All properties priced using coefficients from previous quarter’s model (a start price)
  - Properties priced again using coefficients from this quarter’s model (an end price)
  - Each set of price estimates is summed and the % change is computed

- Changes are chain-linked to form a value weighted TBI
Sample selection variable
Significance in price model
All Property capital growth (Index levels and changes)
**Growth rates & volatility (Q1 2002 – Q2 2009)**

<table>
<thead>
<tr>
<th></th>
<th>Geometric mean</th>
<th>Arithmetic mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBI – All Prop</td>
<td>-0.4</td>
<td>-0.3</td>
<td>4.5</td>
</tr>
<tr>
<td>TBI – All Prop</td>
<td>-0.9</td>
<td>-0.7</td>
<td>6.3</td>
</tr>
<tr>
<td>VBI – Retail</td>
<td>-0.2</td>
<td>-0.1</td>
<td>4.8</td>
</tr>
<tr>
<td>TBI – Retail</td>
<td>-0.9</td>
<td>-0.6</td>
<td>7.5</td>
</tr>
<tr>
<td>VBI – Office</td>
<td>-0.8</td>
<td>-0.7</td>
<td>4.6</td>
</tr>
<tr>
<td>TBI – Office</td>
<td>-0.5</td>
<td>-0.3</td>
<td>7.4</td>
</tr>
<tr>
<td>VBI – Industrial</td>
<td>-0.5</td>
<td>-0.4</td>
<td>4.1</td>
</tr>
<tr>
<td>TBI – Industrial</td>
<td>-1.0</td>
<td>-0.9</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Valuation index figures taken from IPD UK Quarterly Digest Q2 2009.
## Capital growth & turning points (Q1 2002 – Q2 2009)

<table>
<thead>
<tr>
<th></th>
<th>Peak of Index</th>
<th>CG to peak %</th>
<th>CG after peak %</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBI – All Prop</td>
<td>Q2 2007</td>
<td>53.2</td>
<td>-42.4</td>
</tr>
<tr>
<td>TBI – All Prop</td>
<td>Q2 2007</td>
<td>66.4</td>
<td>-53.5</td>
</tr>
<tr>
<td>VBI – Retail</td>
<td>Q2 2007</td>
<td>68.0</td>
<td>-43.6</td>
</tr>
<tr>
<td>TBI – Retail</td>
<td>Q2 2007</td>
<td>96.6</td>
<td>-60.8</td>
</tr>
<tr>
<td>VBI – Office</td>
<td>Q2 2007</td>
<td>37.8</td>
<td>-42.7</td>
</tr>
<tr>
<td>TBI – Office</td>
<td>Q3 2007</td>
<td>59.8</td>
<td>-46.2</td>
</tr>
<tr>
<td>VBI – Industrial</td>
<td>Q2 2007</td>
<td>43.8</td>
<td>-40.4</td>
</tr>
<tr>
<td>TBI – Industrial</td>
<td>Q3 2007</td>
<td>30.7</td>
<td>-43.1</td>
</tr>
</tbody>
</table>

Valuation index figures taken from IPD UK Quarterly Digest Q2 2009.
• Average returns should match in long run, but full cycle not spanned here

• TBI series do exhibit more volatility:
  – Standard deviation of changes in TBI is 1.4 times larger than that for VBI at all property level
  – For office and retail, figure is 1.6 times, industrial 1.3 times higher

• Rises and falls in TBI series generally larger

• Turning points are not notably different from valuation based comparators – why?
Issues and limitations

• TBI is sensitive to the filters and modelling assumptions that are used

• Difficulties producing series below three sector level

• Results adjusted for effects of sample selection, but not (yet) for variations in liquidity

• Period-by-period estimation contrasts with the panel approach used elsewhere:
  – Suitability of model can be reviewed each period
  – Prevents revisions of index history
  – But some loss in estimation efficiency
Potential applications

• Small sale samples and estimation noise would prevent use of TBI as a benchmark or traded index, applications that need precision and continuity

**but**

• It should provide evidence-based estimates of volatility in UK real estate returns, of use to risk modelling and asset allocation

• Could it be useful as a barometer of market conditions at the most aggregated levels (e.g. for all property and the three main sectors)?
Transaction based indices for the UK commercial property market

26 June 2010

Steven Devaney (University of Aberdeen)
Roberto Martinez Diaz (IPD)