Real Estate Price Index Measurement: Availability and Importance

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Real Estate Price Indexes

- Residential property price indexes: the hard area
  - Problems:
    - Infrequent transactions on heterogeneous properties.
    - Generally secondary data sources: coverage, methodology and other tradeoffs.
  - Achievements.
  - Some country illustrations.
  - Does measurement matter?
Coverage:
Geographical (capital, national, cities)
Type (sfh, apartment, terrace)
Vintage (existing, new)
Cash/loan limit
Residency

Price:
Asking, transaction, appraisal

Weight:
Stock/transaction

Quality-mix adjustment:
Hedonic characteristics
Repeat sales
Mix-adjusted SPAR

Private/administrative data:
Timeliness
Reliability/transparency/reputational risk
Longevity

Land registry
Lender
Realtor/Estate agent
Buyer
Builders (new)
Achievements

- **Handbook on Residential Property Prices Indices (RPPIs), 2013:**

- **Data dissemination:**
  - IMF’s Global Housing Watch
  - Bank for International Settlements’ (BIS) Residential Property Price Statistics
  - Others include: Eurostat; OECD; ECB; Federal Reserve Bank of Dallas; Havers

- **Encouragement to compile HPIs:**
  - Included as Recommendation 19 of the IMF/FSB G-20 Data Gaps Initiative (DGI);
  - Prescribed: within the list of IMF Financial Soundness Indicators (FSIs)
  - Adherence to IMF’s new tier of data standards, the Special Data Dissemination Standard (SDDS) plus.
Country illustrations: UK - Feast

UK (E&W): house price indexes, annual quarterly rates

- Also: LSL Acadata HPI (Land registry) and Rightmove (realtor) and two expert opinion survey.
- 2008Q4 coming into the trough
  - 8.7 (ONS)
  -12.3 (Land registry)
  -16.2 (Halifax)
  -14.8 (Nationwide)
  - 4.9 (ONS median unadjusted).
- Methodology and data source matter.
Country illustrations: US - Repeat sales HPIs:

United States: house price indexes, annual quarterly rates

Repeat sales

- CoreLogic
- Case-Shiller
- Federal Housing Finance Agency (FHFA) purchases only
- FHFA expanded data

- How repeat sales applied matters: FHFA more muted down-weighting than CS: 2.67 percentage points (absolute difference from CS in price change 2006Q3-2007Q3) Leventis (2008);

- Coverage matters. FHFA “extended data” and “purchases only”: 4.6 percentage points of difference in 2008Q4.
Country illustrations: Making your own luck

**France:** Notaires-INSEE index: apartment and house prices

- Monopolistic network of notaries who draw up deeds and collect stamp duty. Estimated 4,600 notary practices (2003).
- “Notaires-INSEE” 1983 apartments in Paris – not mix-adjusted
- Separate hedonic regressions for apartments and houses (Paris and Provinces) by 300 zones comparing transaction prices of fixed bundles of characteristics. Hedonic coefficients updated every 2 years and weights chain-linked.

**UK:** ONS Mix-adjusted HPI

- Council of Mortgage Lenders’ survey.
- 1969: 5% sample of mortgage transactions of “…a number of building societies.”
- From 1993: building societies to all mortgage lenders; 1993-2002 monthly sample 2—3,000.
- 2003: 5% sample each lender increased to 100%.
- 2012: average 27,000 monthly transactions; 75-80% of mortgage market; excludes cash sales.
- Pre-2003 hedonic mix-adjusted potential 300 cells; post-2003: 100,000 cells; chain-linked.
More formally: does HPI measurement matter?

- **Take quarterly HPIs** from 2005:Q1 to 2010:Q1 for 24 countries, 157 series. Regress on:

- ....measurement and coverage explanatory variables.

- Use a fixed country and time effect panel estimator.
Coverage

- **Age (benchmark: all residences)**
  - New: newly-built residences only;
  - Xist: existing residences excl newly-built.

- **GeoCoverage (benchmark: national)**
  - Capital: major city;
  - Urban: urban areas;
  - BCities: big cities, say population exceeds 100,000;
  - Rural: rural areas

- **Type (benchmark: single family houses and apartments)**
  - Sfh: single family houses
  - Apt: apartments

Methodology

- **Quality-mix adjustment (benchmark: unit price)**
  - Hed: hedonic adjustment;
  - SqM: price per square metre;
  - SPAR: sale price appraisal ratio;
  - MixAdjust: mix adjust (stratify)
  - Repeat: repeat purchase

- **Price (benchmarked on transaction)**
  - Ask: Asking price
  - Appr: Appraisal price (tax)

- **Fixed/Changing Weight (benchmark: fixed base)**
  - Chain: chained annual
  - Roll: rolling period
  - Unw: unweighted

- **Weight (benchmark: transactions)**
  - Wstock: stock of dwellings

- **Weight –higher level (benchmark: value)**
  - Wquantity: quantity shares
  - Wprice: relative base price
  - Wsqm: relative size (sq. m.)
  - Wpop: population shares

- **Aggregation (benchmark: geometric)**
  - Arith: Arithmetic
Table 2, Fit of measurement variables in moving window regression: *time varying*

RbarSq including:

<table>
<thead>
<tr>
<th>Time; Country;</th>
<th>Country;</th>
<th>Measurement/Coverage</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Measurement</td>
</tr>
<tr>
<td>05 Q1</td>
<td>0.322</td>
<td>0.211</td>
</tr>
<tr>
<td>05 Q2</td>
<td>0.253</td>
<td>0.242</td>
</tr>
<tr>
<td>05 Q3</td>
<td>0.282</td>
<td>0.273</td>
</tr>
<tr>
<td>05 Q4</td>
<td>0.330</td>
<td>0.324</td>
</tr>
<tr>
<td>06 Q1</td>
<td>0.365</td>
<td>0.358</td>
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<tr>
<td>06 Q2</td>
<td>0.416</td>
<td>0.409</td>
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<tr>
<td>06 Q3</td>
<td>0.347</td>
<td>0.343</td>
</tr>
<tr>
<td>06 Q4</td>
<td>0.286</td>
<td>0.282</td>
</tr>
<tr>
<td>07 Q1</td>
<td>0.266</td>
<td>0.265</td>
</tr>
<tr>
<td>07 Q2</td>
<td>0.182</td>
<td>0.177</td>
</tr>
<tr>
<td>07 Q3</td>
<td>0.181</td>
<td>0.175</td>
</tr>
<tr>
<td>07 Q4</td>
<td>0.193</td>
<td>0.193</td>
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<tr>
<td>08 Q1</td>
<td>0.264</td>
<td>0.254</td>
</tr>
<tr>
<td>08 Q2</td>
<td>0.303</td>
<td>0.281</td>
</tr>
<tr>
<td>08 Q3</td>
<td>0.343</td>
<td>0.324</td>
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<tr>
<td><strong>08 Q4</strong></td>
<td><strong>0.358</strong></td>
<td><strong>0.342</strong></td>
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<tr>
<td><strong>09 Q1</strong></td>
<td><strong>0.405</strong></td>
<td><strong>0.369</strong></td>
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<tr>
<td><strong>09 Q2</strong></td>
<td><strong>0.445</strong></td>
<td><strong>0.408</strong></td>
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<tr>
<td><strong>09 Q3</strong></td>
<td><strong>0.456</strong></td>
<td><strong>0.444</strong></td>
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<tr>
<td><strong>09 Q4</strong></td>
<td><strong>0.401</strong></td>
<td><strong>0.397</strong></td>
</tr>
<tr>
<td><strong>10 Q1</strong></td>
<td><strong>0.413</strong></td>
<td><strong>0.415</strong></td>
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</table>
Measurement matters most when it matters, as we go into and during recessions.
Does it matter in modeling?

- Deniz Igan and Prakash Loungani (2010)

- Illustrative model applied as they did (specification, dynamics, estimator) for both our measurement-adjusted and unadjusted HPIs.

- Rationale in Igan and Loungani.
Table 4, Pooled regression results for house price indexes

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<tr>
<td>Affordability, lagged</td>
<td>-0.0517***</td>
<td>-0.291*</td>
<td>-0.174</td>
<td>-0.085**</td>
<td>-0.077***</td>
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<tr>
<td></td>
<td>(0.0158)</td>
<td>(0.1772)</td>
<td>(0.1201)</td>
<td>(0.037)</td>
<td>(0.0271)</td>
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<tr>
<td>Income per capita, change</td>
<td>0.431***</td>
<td>0.392***</td>
<td>0.519***</td>
<td>0.395*</td>
<td>0.520***</td>
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<tr>
<td></td>
<td>(0.0684)</td>
<td>(0.1516)</td>
<td>(0.0917)</td>
<td>0.142</td>
<td>(0.0919)</td>
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<tr>
<td>Working-age pop, change</td>
<td>0.999***</td>
<td>0.735*</td>
<td>0.494**</td>
<td>0.754*</td>
<td>0.503**</td>
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<tr>
<td></td>
<td>(0.1970)</td>
<td>(0.3941)</td>
<td>(0.2354)</td>
<td>(0.411)</td>
<td>(0.2438)</td>
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<tr>
<td>Stock prices, change</td>
<td>0.0044*</td>
<td>-0.017**</td>
<td>-0.007</td>
<td>-0.016***</td>
<td>-0.00604</td>
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</tr>
<tr>
<td></td>
<td>(0.0026)</td>
<td>(0.0086)</td>
<td>(0.0071)</td>
<td>(0.010)</td>
<td>(0.0077)</td>
<td></td>
</tr>
<tr>
<td>Credit, change</td>
<td>0.0190***</td>
<td>0.165***</td>
<td>0.191***</td>
<td>0.156**</td>
<td>0.186***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0053)</td>
<td>(0.0268)</td>
<td>(0.0253)</td>
<td>(0.031)</td>
<td>(0.0273)</td>
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<tr>
<td>Short-term interest rate</td>
<td>-0.0009**</td>
<td>-0.010**</td>
<td>-0.006**</td>
<td>-0.010</td>
<td>-0.006***</td>
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</tr>
<tr>
<td></td>
<td>(0.0004)</td>
<td>(0.0046)</td>
<td>(0.0025)</td>
<td>(0.005)</td>
<td>(0.0025)</td>
<td></td>
</tr>
<tr>
<td>Long-term interest rate</td>
<td>-0.0006</td>
<td>0.0000001***</td>
<td>0.000</td>
<td>0.000006***</td>
<td>0.000002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0004)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td></td>
</tr>
<tr>
<td>Affordability, lag, squared</td>
<td>-0.0019*</td>
<td>-0.014</td>
<td>-0.007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0012)</td>
<td>(0.0121)</td>
<td>(0.0085)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction costs, change</td>
<td>0.129***</td>
<td>0.320*</td>
<td>0.312*</td>
<td>0.285*</td>
<td>0.295*</td>
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<tr>
<td></td>
<td>(0.0366)</td>
<td>(0.1671)</td>
<td>(0.1709)</td>
<td>(0.172)</td>
<td>(0.1738)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.243***</td>
<td>-1.267**</td>
<td>-0.838**</td>
<td>-0.553**</td>
<td>-0.504***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0554)</td>
<td>(0.6384)</td>
<td>(0.4232)</td>
<td>(0.247)</td>
<td>(0.1796)</td>
<td></td>
</tr>
</tbody>
</table>
Country-specific parameter estimates for stock prices

Bars in black: not statistically significant at 10 percent level

Measurement-adjusted  Unadjusted
India: House price index by major cities, 2011=100

- Mumbai
- Delhi
- Bengaluru
- Ahmedabad
- Lucknow
- Kolkata
- Chennai*
- Jaipur
- Kanpur
- Kochi