Low interest rates and house price bubbles: Not post hoc or propter hoc

Kenneth N. Kuttner
Williams College

November 10, 2011

International Banking Conference
Federal Reserve Bank of Chicago / European Central Bank
Conventional “wisdom”

- Low interest rates drive up house prices.
Conventional “wisdom”

- Low interest rates drive up house prices.
- By keeping interest rates low, the Fed inflated house prices and created a bubble.
Review the transmission channels from monetary policy to property prices.

Discuss the quantitative implications of the User Cost model.

Present some new evidence on the effects of interest rates.
The conclusion in advance

The conventional wisdom is wrong.

- Conventional theory: interest rates have a big impact on house prices. No bubbles needed.
The conventional wisdom is wrong.

- Conventional theory: interest rates have a big impact on house prices. No bubbles needed.

- Evidence: interest rates have only small effects on property prices.
The User Cost (UC) model

\[
\frac{R_t}{P_t} = UC_t = i_t + \delta + \Lambda_t - \pi^e_t
\]

**Implication:** 1% (not percentage point) reduction in $UC \Rightarrow$ 1% increase in Price/Rent ratio.

- $R/P = \text{Rent/Price ratio}$, $i = \text{interest rate}$,
- $\delta = \text{depreciation}$, $\Lambda = \text{risk premium}$,
- $\pi^e = \text{expected appreciation}$, $\dot{P}/P$.
- Property and income tax rates omitted for simplicity.
A dynamic UC model

\[
\frac{R}{P} = i + \delta - +\Lambda_t - \frac{\dot{P}}{P} \quad \text{UC equation}
\]

\[
R = f(H) \quad \text{Demand}
\]

\[
\dot{H} = g\left(\frac{P}{C}\right) - \delta \quad \text{Flow supply}
\]

**Implication**: Rate reduction \(\Rightarrow\) house price overshoot.

- \(f(\cdot) = \) inverse demand function,
- \(C = \) marginal cost of house production,
- \(g(\cdot) = \) flow supply function.
Dynamic effects of a rate reduction

\[ H = 0 \]
\[ P = 0 \]
Dynamic effects of a rate reduction

\[ \dot{H} = 0 \]

\[ \dot{P} = 0 \]
Credit conditions

- Credit conditions are nowhere in the standard UC model.

- How could they be included?
  - Credit constraints $\Rightarrow UC < R/P$, relaxing constraints $\Rightarrow P \uparrow$.
  - Increased credit supply can speed $\dot{H}/H$. 
Owning a home is risky: reflected in risk premium in UC model, $\Lambda$.

Conjecture: low interest rates encourage risk-taking.

Implies a reduction in $\Lambda$, higher $P$. 
UC model $\Rightarrow$ large interest rate effect

- UC decline from 6% to 5% $\Rightarrow$ 18% rise in $P/R$.
- *Actual* increase was closer to 33%.
Existing studies find small effects

- Sá et al. (2011): 25 bp policy shock → 0.3% Δ house price (industrialized countries).
- Glaeser et al. (2010): 100 bp change in real 10-year interest rate → 7% Δ house price.

Much smaller than implied by the UC model!
Results from an error correction model

- 1 percent (transitory) UC shock $\Rightarrow$ 2.2% change in property price after two years.

- Also much smaller than the UC model prediction.
The magnitude of the boom (and bust) varied widely across countries... 

What explains this variation?
House price and credit growth

### Real property price gain

- **< 0**: Other (1), Eurozone (1), Emerging (1)
- **0 - 5**: Other (2), Eurozone (6), Emerging (2)
- **5 - 10**: Other (4), Eurozone (4), Emerging (4)
- **10 - 15**: Other (2), Eurozone (2), Emerging (2)
- **> 15**: Other (1), Eurozone (1), Emerging (6)

### Housing credit growth

- **< 0**: Other (2), Eurozone (1), Emerging (1)
- **0 - 1**: Other (1), Eurozone (2), Emerging (2)
- **1 - 2**: Other (2), Eurozone (4), Emerging (4)
- **2 - 3**: Other (1), Eurozone (2), Emerging (2)
- **3 - 4**: Other (2), Eurozone (2), Emerging (2)
- **> 4**: Other (2), Eurozone (2), Emerging (4)
Inflation and nominal GDP growth
Interest rates

Real short-term rate

Real lending rate
A simple regression model

\[ Y_i = \beta_0 + \beta_1 r^L_i + \beta_1 r^S_i + \beta_2 \%\Delta MB_i + \beta_3 D^{eu}_i + \beta_4 D^{em}_i \]

- 38 countries: Euro, emerging markets, none of the above
- Time span: 2003Q4 through 2007Q2
- \( Y \) = property price appreciation, housing credit growth, inflation, nominal GDP growth
- Property price data from the BIS
## Regression results

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Property price</th>
<th>Inflation</th>
<th>Housing credit</th>
<th>Nominal GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real S.T. rate</td>
<td>0.37</td>
<td>-0.93***</td>
<td>-0.11</td>
<td>-1.40***</td>
</tr>
<tr>
<td>Real lending rate</td>
<td>-1.22</td>
<td>0.54***</td>
<td>-0.43**</td>
<td>0.58**</td>
</tr>
<tr>
<td>Rates' joint significance</td>
<td>0.01</td>
<td>0.05</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Real base growth</td>
<td>0.35***</td>
<td>0.04**</td>
<td>0.17***</td>
<td>0.08**</td>
</tr>
<tr>
<td>Emerging market</td>
<td>4.17</td>
<td>-0.01</td>
<td>-0.99*</td>
<td>1.69</td>
</tr>
<tr>
<td>Euro area</td>
<td>-3.95</td>
<td>0.47</td>
<td>-0.72</td>
<td>-2.87**</td>
</tr>
<tr>
<td>Adj R-squared</td>
<td>0.21</td>
<td>0.72</td>
<td>0.40</td>
<td>0.65</td>
</tr>
<tr>
<td>Observations</td>
<td>36</td>
<td>37</td>
<td>33</td>
<td>37</td>
</tr>
</tbody>
</table>

---

### Notes:
- *******: Significant at the 1% level
- ****: Significant at the 5% level
- ****: Significant at the 10% level
## Regression results

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Dependent variable</th>
<th>Property price</th>
<th>Inflation</th>
<th>Housing credit</th>
<th>Nominal GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real S.T. rate</td>
<td></td>
<td>0.37</td>
<td>−0.93***</td>
<td>−0.11</td>
<td>−1.40***</td>
</tr>
<tr>
<td>Real lending rate</td>
<td></td>
<td>−1.22</td>
<td>0.54***</td>
<td>−0.43**</td>
<td>0.58**</td>
</tr>
<tr>
<td>Rates' joint significance</td>
<td></td>
<td>0.01</td>
<td>0.05</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Real base growth</td>
<td></td>
<td>0.35***</td>
<td>0.04**</td>
<td>0.17***</td>
<td>0.08**</td>
</tr>
<tr>
<td>Emerging market</td>
<td></td>
<td>4.17</td>
<td>−0.01</td>
<td>−0.99*</td>
<td>1.69</td>
</tr>
<tr>
<td>Euro area</td>
<td></td>
<td>−3.95</td>
<td>0.47</td>
<td>−0.72</td>
<td>−2.87**</td>
</tr>
<tr>
<td>Adj R-squared</td>
<td></td>
<td>0.21</td>
<td>0.72</td>
<td>0.40</td>
<td>0.65</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
<td>36</td>
<td>37</td>
<td>33</td>
<td>37</td>
</tr>
</tbody>
</table>
### Regression results

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Property price</th>
<th>Inflation</th>
<th>Housing credit</th>
<th>Nominal GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real S.T. rate</td>
<td>0.37</td>
<td>−0.93***</td>
<td>−0.11</td>
<td>−1.40***</td>
</tr>
<tr>
<td>Real lending rate</td>
<td>−1.22</td>
<td>0.54***</td>
<td>−0.43**</td>
<td>0.58**</td>
</tr>
<tr>
<td>Rates’ joint significance</td>
<td>0.01</td>
<td>0.05</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Real base growth</td>
<td>0.35***</td>
<td>0.04**</td>
<td>0.17***</td>
<td>0.08**</td>
</tr>
<tr>
<td>Emerging market</td>
<td>4.17</td>
<td>−0.01</td>
<td>−0.99*</td>
<td>1.69</td>
</tr>
<tr>
<td>Euro area</td>
<td>−3.95</td>
<td>0.47</td>
<td>−0.72</td>
<td>−2.87**</td>
</tr>
<tr>
<td>Adj R-squared</td>
<td>0.21</td>
<td>0.72</td>
<td>0.40</td>
<td>0.65</td>
</tr>
<tr>
<td>Observations</td>
<td>36</td>
<td>37</td>
<td>33</td>
<td>37</td>
</tr>
</tbody>
</table>
High base growth ⇒ housing boom?
Low rates $\Rightarrow$ base growth?
Conclusions

- Standard economic theory says interest rates should have large effects on property prices.
- Econometrically estimated effects are significantly smaller.
- Low rates were probably a minor factor in the recent housing boom.
- Interest rate policy is an ineffective tool for dampening booms.
- Do “monetary conditions” more broadly have an effect?