Discussion of "An Extrapolative Model of House Price Dynamics"
by Edward Glaeser & Charles Nathanson

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NBER Summer Institute 2015
Summary

- continuous time model with risk-neutral agents
- fixed supply of houses
- 1 house - 1 agent, exogenous moving shocks
- buyer $i$ at time $t$ needs to forecast future dividends & resale value

observe dividend $D_t^i = D_t + a^i$, $a^i \sim \text{iid } N(0, \sigma_a^2)$

do no observe common component

$\begin{align*}
    dD_t &= g_t dt + \sigma_D dW_t^D \\
    dg_t &= -\gamma g_t dt + \sigma_g dW_t^g
\end{align*}$

- signals (from comparables)

$D_t^s = D_t + s_t$, $s_t \sim \text{iid } N(0, \sigma_s^2)$

- equilibrium prices are linear in average $D_t^i$ among time $t$ buyers, perceived common component & its growth
Summary ctd.

- two assumptions on how buyers interpret past prices: rational or naive learning
- both cases generate short run momentum, long-term reversal (predictability), excess volatility
- naive learning model is important to match empirical moments on house prices

Comments

- well done, rigorous treatment of housing as cons good & asset
- endogenous beliefs = nice!
- survey evidence on house price expectations
- small vs large errors
- few vs many irrational investors
- cross sectional implications
Endogenous beliefs

- nice!

- intuitive mechanism: iid dividends

- with perfect information: prices = PV of expected future dividends
  returns are iid, prices are not more volatile than fundamentals

- with Bayesian learning about the mean: prices = posterior means
  after high initial dividend realizations, posterior mean > true mean
  current high prices are followed by lower future prices

  econometrician finds predictability, high volatility

- prevent learning from settling down:

  (log) dividends are random walk with stochastic growth
  Lewellen & Shanken 2002, JF
Q: "Generally speaking, do you think now is a good time or a bad time to buy a house?"

A: "good", "pro-con", "bad", "don’t know"

Q: "Why do you say so?"

A: respondents give up to two reasons, group these.
Piazzesi & Schneider 2009, Figure 1
Michigan survey (all households) ctd

Piazzesi & Schneider 2009, Figure 2
Michigan survey (all households) ctd

Early phase (2002 & 2003): enthusiasm about housing & credit

85% most say "good time to buy a house"
    peaks earlier than house prices, enthusiasm not particularly high
why? 73% say "good credit"
    which is always main reason for overall view of housing

Late phase (2004 & 2005): disagreement & momentum

fewer say "good time to buy a house", 60% in 2006

20% say "house prices are going up"
    peaks with house prices, momentum at an all time high
Case-Shiller surveys of homebuyers in 1988, 2003


Percent of responses except where stated otherwise

<table>
<thead>
<tr>
<th>Question</th>
<th>Los Angeles</th>
<th>San Francisco</th>
<th>Boston</th>
<th>Milwaukee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think that housing prices in the [city] area will increase or decrease over the next several years?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase</td>
<td>98.3  89.7</td>
<td>99.0  90.5</td>
<td>90.2  83.1</td>
<td>87.1  95.2</td>
</tr>
<tr>
<td>Decrease</td>
<td>1.7   10.3</td>
<td>1.0   9.5</td>
<td>9.8  16.9</td>
<td>12.9  4.8</td>
</tr>
<tr>
<td>No. of responses</td>
<td>240   145</td>
<td>199  158</td>
<td>194  201</td>
<td>233  187</td>
</tr>
<tr>
<td>How much of a change do you expect there to be in the value of your home over the next 12 months?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean response (percent)</td>
<td>15.3  10.5</td>
<td>13.5  9.8</td>
<td>7.4   7.2</td>
<td>6.1  8.9</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.8   0.6</td>
<td>0.6  0.6</td>
<td>0.6  0.4</td>
<td>0.5  1.0</td>
</tr>
<tr>
<td>No. of responses</td>
<td>217   139</td>
<td>185  147</td>
<td>176  179</td>
<td>217  160</td>
</tr>
<tr>
<td>On average over the next 10 years, how much do you expect the value of your property to change each year?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean response (percent)</td>
<td>14.3  13.1</td>
<td>14.8  15.7</td>
<td>8.7  14.6</td>
<td>7.3  11.7</td>
</tr>
<tr>
<td>Standard error</td>
<td>1.2   1.2</td>
<td>1.4  1.8</td>
<td>0.6  1.8</td>
<td>0.5  1.3</td>
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<tr>
<td>No. of responses</td>
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<td>211  169</td>
</tr>
</tbody>
</table>
small versus large errors

- paper argues small, page 39: "[naive] homebuyers make a small error in filtering information out of past prices"

- initial dividends = $10,000, expected growth rate is zero
- std price changes in data = $16,000 in Table 4

- small? std dev of forecast error = $22,000 in Table 6

- why care whether error is small or large?

  survey evidence suggests huge errors
many versus few

- paper argues many, page 4: "It seems incorrect to view housing markets in 2004-2006 as being dominated by a small number of highly irrational investors. Millions of Americans bought homes during that time period."

- housing markets have low turnover
  less than 10% of houses transact per year
  (for example, more than 100% of stocks transact per year)

- in the model, a small subset of all agents (= buyers) is marginal.
  1,130 buyers per period, 100,000 population

- Euler equations of marginal investors determine equilibrium prices

→ model is consistent with few irrational investors
cross sectional implications

- 2000-2006 boom-bust episode in low quality homes:
  higher capital gains/losses on homes that were cheap in 2000
  Landvoigt, Piazzesi & Schneider 2015 AER

- learning in different segments: observe signals/comparables in segment

\[ D_t^s = D_t + s_t, \quad s_t \sim \text{iid } N(0, \sigma_s^2) \]

- suppose low quality homes more standardized than high quality homes
  more precise signals/comparables, less volatility in low quality homes.

- more generally, cross sectional implications are interesting:
  segments can differ in many ways (e.g., sets of comparables, number of homes overall), also over time
summary of comments

- endogenous beliefs
  nice feature, generates momentum, predictability & volatility

- survey evidence on house price expectations
  in the hot phase of the boom (2004 & 2005), fraction of momentum households doubled (10% → 20% of all households, all time high)
  homebuyer surveys find exhuberant expectations

- small vs large errors, few vs many irrational investors
  model is consistent with few buyers who make large errors

- cross sectional implications – interesting avenue!