Discussion of Guerrieri, Hartley and Hurst

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EFG Meetings

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This is an ambitious paper.

Model:
The authors develop a nontrivial model with two types of agents (rich/poor) and an externality that predicts:

a. When economy-wide interest rates fall
b. Then house prices in relatively inexpensive areas of an MSA appreciate faster than in relatively expensive areas.

Data:
Data on house prices from a variety of sources appear consistent with model predictions.
In the Model:

- In their explanation of changes to relative prices within MSAs, the authors abstract from changes to
  a. Risk (Piazzesi et. al. 2007)
  b. Credit constraints (Ortalo-Magne and Rady 2006)

- Changes to relative prices occur because relative rents change. (All rents are discounted using identical rates).

- We know that credit conditions changed and suspect that the premium to risk changed.
Credit Conditions

Source: Gerardi, Lehnert, Sherlund, Willen (2008)

Massachusetts Originations, 2000 - 2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Combined LTV Median</th>
<th>% ≥ 0.90</th>
<th>Subprime purchase %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.824</td>
<td>31.67</td>
<td>2.43</td>
</tr>
<tr>
<td>2001</td>
<td>0.850</td>
<td>34.42</td>
<td>2.89</td>
</tr>
<tr>
<td>2002</td>
<td>0.820</td>
<td>32.32</td>
<td>3.88</td>
</tr>
<tr>
<td>2003</td>
<td>0.850</td>
<td>34.47</td>
<td>6.86</td>
</tr>
<tr>
<td>2004</td>
<td>0.866</td>
<td>35.68</td>
<td>9.99</td>
</tr>
<tr>
<td>2005</td>
<td>0.899</td>
<td>39.40</td>
<td>14.81</td>
</tr>
<tr>
<td>2006</td>
<td>0.900</td>
<td>41.65</td>
<td>12.96</td>
</tr>
<tr>
<td>2007</td>
<td>0.900</td>
<td>41.62</td>
<td>3.95</td>
</tr>
</tbody>
</table>
Spreads on Debt

Credit Risk Reprices
S&P Composite Spreads

- S&P Investment Grade
- S&P Speculative Grade
- S&P Financial Institutions
- S&P Banks

Data as of April 24, 2008. Source: Standard & Poor’s Global Fixed Income Research

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Initial Thoughts

- When I first read the paper, I thought it was risky to propose a model that attributes observed changes in relative prices within MSAs to changes in relative rents.

- The authors do not have data on rents.

- Perhaps risk premia and/or credit conditions played a role.
Chicago Submarkets Data from REIS, Inc.

Submarkets:
1. Lincoln Park
2. City West
3. Gold Coast
4. The Loop
5. South Shore
6. Southeast Cook County
7. Southwest Cook County
8. Downers Grove
9. Woodridge/Lisle
10. Aurora/Naperville
11. Wheeling
12. Orland Park/Plainfield
13. Schaumburg/Lombard
14. Palatine
15. Glenview/Evanston
16. Rogers Park/Uptown
17. Belmont/Central
18. Oak Park
19. Glen Ellyn/Wheaton
20. O'Hare
21. East Lake County
22. West Lake County
23. McHenry County
24. Kane County
25. Joliet

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The within-Chicago rent data show some interesting variation.

Some of the results the authors document in the case of prices appear to hold (qualitatively) in the case of rents.

- Rents for the closest-in suburbs increased at the fastest rate (2000-2006).

- Rental growth is negatively correlated with initial rental level.
Chicago Submarkets Data from REIS, Inc.


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Chicago Submarket Data from REIS, Inc.

Ann. Growth Rate of Rents, 2000-2006 vs. Level of Rents, 2000

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Rent Regressions: Chicago Submarket Data

Regress Annualized Growth Rate of Rents, 2000-2006 on Level of Rents (2000).

<table>
<thead>
<tr>
<th></th>
<th>All Data</th>
<th>Rent &lt; $1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Growth, 2000-2006</td>
<td>0.41%</td>
<td>0.42%</td>
</tr>
<tr>
<td>Avg. Level, 2000</td>
<td>$889</td>
<td>$845</td>
</tr>
<tr>
<td>Coefficient</td>
<td>-0.0018</td>
<td>-0.0051</td>
</tr>
<tr>
<td>Robust SE</td>
<td>0.00094</td>
<td>0.0016</td>
</tr>
<tr>
<td>t-stat</td>
<td>-1.88</td>
<td>-3.29</td>
</tr>
<tr>
<td>N</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.14</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Regression of total pct. change in rent on log level of rent: estimate is $-0.27$ (0.07). The authors estimate $-0.33$ (0.05).
So, something very interesting is in the data.

But is this the model we want to explain the data?

Study closely two features of the model:

- Quasi-linear preferences.
- Fixed housing density.
Suppose agents in location $i$ have preferences of

$$c_i + \phi H_i h_i^\alpha$$

Agents take $H_i$ as given. The rental price must satisfy:

$$\alpha \phi H_i h_i^{\alpha - 1} = R_i$$

Implying $h_i = \left( \frac{R_i}{\alpha \phi H_i} \right)^{\frac{1}{\alpha - 1}}$

Quasi-linear preferences:
Housing demand is independent of income.

The authors vary $\phi$ by type so demand is a function of income.
From before

\[ R_i h_i = \alpha \phi H_i h_i^\alpha \]
\[ c_i = y_i - \alpha \phi H_i h_i^\alpha \]

Utility in any location \( i \) is therefore

\[ U_i = y_i + \left( \frac{1 - \alpha}{\alpha} \right) R_i h_i \]

- \( y_i, U_i \) are identical for all \( i \) in a given MSA.
- Within-MSA rental \textit{expenditures} are constant for each type.
- Within-MSA variation only due to variation in type.
But, as the authors note (p. 3)

Any model of housing price dynamics designed to explain cross-city house price dynamics should also be able to explain within city house price dynamics.

If utility is equated across MSAs $i$ and $j$, (holding type fixed)

$$y_i + \left( \frac{1 - \alpha}{\alpha} \right) R_i h_i = y_j + \left( \frac{1 - \alpha}{\alpha} \right) R_j h_j$$

For a given type:
In MSAs where wages are high, rental expenditures are low!
MSA-Level Data, 2000 Census

Discussion of Guerrieri et. al.
Housing supply restrictions play a key role in the paper.

If $R_i > \hat{r}C$, location $i$ will be fully developed. (meaning $n_i h_i = 1$ in that location).

Since $n_i h_i$ is always $= 1$, a shock to housing demand can only lead to a horizontal expansion of neighborhood boundaries.

Leads to “Gentrification” and/or “Expansion”

The locations where type switches (poor to rich) or newly developed locations (nothing to poor) have the fastest relative growth rates in rents.
Consider preferences: \( c_i + \phi H_i h_i^\alpha \) with \( \phi^p < \phi^r \).

In a segregated equilibrium, poor consume no housing.

- Denote boundary of rich neighborhood as \( I \). \( H_I = \gamma \).

\[
\hat{r}C = R_I = \alpha \phi \gamma h_I^\alpha - 1
\]

- Consider some other neighborhood \( i' = I - \gamma \). \( H_{i'} = 2\gamma \).

\[
R_{i'} = \alpha \phi 2\gamma h_{i'}^\alpha - 1
\]

- Indifference: \( R_I h_I = R_{i'} h_{i'} \). This implies \( h_{i'} = (1/2)^{1/\alpha} h_I \).

- \( \hat{r} \) or \( C \) fall: \( h_I \) and \( h_{i'} \) increase.

With fixed housing density, city must expand.