Discussion of

“Housing and Debt over the Life Cycle and over the Business Cycle”

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Housing Financial Markets and Macroeconomy
Motivation

- **Micro** (since 1970s)
  1. Rise in volatility of individual earnings
  2. Development in the mortgage loans market

- **Macro** (before and after 1983)
  1. Decline in volatility of $Y$, $C$, $H$, $I$ (Great Moderation)
  2. Decline in $\sigma_D$ and $\text{corr}(Y, D)$

- Can **Micro** account for **Macro**?
Main Elements of the Model

1. Life-cycle general equilibrium model
2. Uncertainty
   - Uninsured idiosyncratic productivity shock
   - Aggregate TFP shock
3. Labor-leisure decision
4. Housing for consumption and saving
5. Tenure decision
   - Own: Higher utility, Can be used as collateral
   - Rent: Lower moving cost, No minimum size restriction
6. Missing:
   - Land
   - House price
   - Mortgage loans choice
   - Location choice
Findings: 1/3 and 2/3

1 Cross-section
   1 Replicates asset distribution
   2 Life-cycle profile of tenure decision
   3 Lumpy and low frequency of housing adjustment

2 Business cycles
   1 Highly volatile ($\approx 4\sigma_Y$) and procyclical residential investment
      - Davis and Heathcote (2005)
   2 Volatile ($\approx \sigma_Y$) and procyclical mortgage debt balance.
      - Model replicates procyclicality.
      - But way too large volatility ($\times 4$).
1. Higher individual earnings instability
   - Little effect on $Y$, $C$, $IK$
   - Reduce $\sigma_D$ and $\sigma_{IH}$
   - Intuition: Agents become less responsive to aggregate shocks (really?)

2. Lower downpayment requirement of mortgage loans
   - Little effect on $Y$, $C$, $IK$
   - Reduce $\sigma_D$ and $\sigma_{IH}$
   - Raise homeownership rate
   - Intuition: Less constrained debtors, more homeowners
### Findings: Effect of Micro Level Changes on Macro Dynamics

<table>
<thead>
<tr>
<th></th>
<th>SD% 70s-80s</th>
<th>SD% 90s-00s</th>
<th>Ratio</th>
<th>SD% Only $\sigma_y$ ↑</th>
<th>SD% Only $m$ ↓</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US economy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>2.09</td>
<td>1.27</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1.20</td>
<td>0.61</td>
<td>0.51</td>
<td></td>
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</tr>
<tr>
<td>IK</td>
<td>5.03</td>
<td>4.14</td>
<td>0.82</td>
<td></td>
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<tr>
<td>IH</td>
<td>8.24</td>
<td>3.78</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>2.23</td>
<td>1.79</td>
<td>0.80</td>
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<tr>
<td><strong>Model economy</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>2.10</td>
<td>2.01</td>
<td>0.96</td>
<td>2.05</td>
<td>2.06</td>
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<tr>
<td>C</td>
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<td>1.69</td>
<td>1.02</td>
<td>1.62</td>
<td>1.68</td>
</tr>
<tr>
<td>IK</td>
<td>3.84</td>
<td>3.63</td>
<td>0.95</td>
<td>3.46</td>
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<tr>
<td>IH</td>
<td>6.14</td>
<td>4.92</td>
<td>0.80</td>
<td>5.92</td>
<td>5.51</td>
</tr>
<tr>
<td>D</td>
<td>9.03</td>
<td>1.44</td>
<td>0.16</td>
<td>3.46</td>
<td>6.46</td>
</tr>
</tbody>
</table>

- Little effect on $Y$, $C$, and $IK$ (How about $L$?)
- Decline in volatility of $IH$ but small fraction of the observed change.
- Too much decline in volatility of $D$
Comments on Findings 1/2

- Effect of a lower downpayment ratio on homeownership rate:
  - Chambers et al. (2008) say “Little”
  - The authors say “Huge”
  - Why the difference?

- Timing of events:
  - Great moderation: started around 1983
  - Rise in individual earnings instability: around late 1970s (OK)
  - Rise in homeownership rate: started around 1994 (NOT)
  - Why don’t do the transition, with new events occur each year?

- Very very tough to solve → For the main results, could live without:
  - Life-cycle
  - Lumpiness of housing
  - Tenure decision
  - Labor leisure decision

- Do the sensitivity exercises for experiments as well!
As for the decline in the volatility of macroeconomic aggregates (except for $D$), a decline in the volatility of TFP can account for most of it (Arias et al. (2006)).

Why $\sigma_D$ excessively high in the baseline?
→ Too many constrained debtors initially?
→ Too many marginal renters initially?

Should match number of debtors, especially, number of borrowing-constrained debtors (for example, using $\beta$)

Should investigate cyclical properties of homeownership rate, or the number of first-time buyers (consistent with data?)

Borrowers’ hours worked is countercyclical?
(Nitpicky) Comments about Calibration

- It’s important to capture well the individual productivity shock, but... What are the (i) initial distribution of the persistent shock $z$ and (ii) transitory shock $t$ in the model?

<table>
<thead>
<tr>
<th></th>
<th>$\rho_z$</th>
<th>$\sigma_z$</th>
<th>$\sigma_{z0}$</th>
<th>$\sigma_t$</th>
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<tbody>
<tr>
<td>Storesletten et al. (2004)</td>
<td>0.952</td>
<td>0.168</td>
<td>0.378</td>
<td>0.255</td>
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<tr>
<td>Iacoviello and Pavan (2009) (70-80s)</td>
<td>0.900</td>
<td>0.131</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

- With housing, capital share of 0.33 seems high.

- Housing depreciation rate of 5% seems high.
This model seems highly non-linear. Is it enough to...
- Use only the first moment?
- Use only the linear term in the forecasting function?

Even with labor-leisure choice, only one forecasting function (for $\frac{K}{L}$).
- Basically, prohibit agents to know $K$ when making decision.
- Potentially optimal decision changes with the use of $K$.
- How about other information, like $H$?

With Tauchen (1986) method, 3 abscissas is too small to replicate well the original AR(1) process, especially for a high persistence. It also depends on how to place abscissas.

Number of size of housing is 15. A big chunk of lumpiness is generated by the small choice set of housing. Sensitivity?
Concluding Remarks

- Ambitious project.

- Compute a very tough model.

- Very rich model but authors do not fully exploit the richness:
  - Heterogeneous effect of recessions on homeowners (with and without debt) and renters?
  - Heterogeneous welfare implications of business cycles?

- Why focus on the changes in the cyclicality of debt, rather than...
  - Changes in the level of debt
  - House price


