House Prices and Consumption

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Housing booms

- Housing boom-bust go together with cycle in consumer spending
- What are the channels?
  - Are wealth effects enough?
  - Role of credit markets, home-equity?
- How to model household spending?
- What facts to use to calibrate models?
- How to capture “bubble” elements of the episode?
  - What role of expectations about housing price appreciation?
- [Discussion based on ongoing project with David Berger, Veronica Guerrieri and Joe Vavra]
Elasticity

• In empirical work elasticity of consumer spending to house prices can be large
• Case-Quigley-Shiller find a range of elasticities using state-level US data
• Using elasticity of 0.1 they compute

\[ \frac{\Delta C}{C} = 0.1 \cdot (-35\%) = -3.5\% \]

for 2005-2009

• Campbell-Cocco find larger elasticities using UK micro data, even in the range of 1
Channels

- Three channels we would like to distinguish:
  - house values as signals of future income expectations
  - house values as wealth
  - house values as collateral

- In empirical work challenge is to find identified variation in house values that is not driven by future income
- Attanasio et al. claim is mostly income expectations
- Mian and Sufi’s work suggests otherwise
- Open empirical challenges here
Models: PIH

- Benchmark Permanent Income Hypothesis with housing
- Preferences
\[ U(C_t, H_t) = \frac{(C_t^\alpha H_t^{1-\alpha})^{1-\sigma}}{1-\sigma} \]
- Budget constraint
\[ C_t + P_t (H_t - (1-\delta)H_{t-1}) + A_t = Y_t + (1+r)A_{t-1} \]
- No income uncertainty, house price constant
\[ \beta (1+r) = 1 \]
- We get
\[ C = \alpha (1-q) \left[ \sum_{t=0}^{T-1} q^t Y_t + (1-\delta)PH_{-1} + (1+r)A_{-1} \right] \]
PIH

- Elasticity

\[
\frac{dC}{C} = \frac{dP}{P} \frac{PH_{-1}}{HW + PH_{-1} + (1 + r) A_{-1}}
\]

- With \(HW = 40\times\text{GDP}\) and \(PH = 1.5\times\text{GDP}\) and \(A = 1.5\times\text{GDP}\)

  elasticity = 0.035

- Too small for CQS and much too small for CC
- Suppose we assume only rich guys hold non-real estate wealth so use \(A = -1\times\text{GDP}\)

  elasticity = 0.037

  minimal change
Precautionary saving model

• Income is stochastic, AR1

\[ \log Y_t = \rho \log Y_{t-1} + \eta_t. \]

• Impatient households

\[ \beta (1 + r) < 1 \]

• Value function

\[ V_t (W_t, z_t) = \max U (C_t, H_t) + \beta E [V_{t+1} (W_{t+1}, z_{t+1})] \]

subject to

\[ C_t + P_t H_t + A_t = Y_{j,t} + W_t \]

\[ W_{t+1} = (1 + r) A_t + (1 - \delta) P_{t+1} H_t \]
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subject to

\[ C_t + \left[ P_t - \frac{1 - \delta}{1 + r} P_{t+1} \right] H_t + A_t + \frac{1 - \delta}{1 + r} P_{t+1} H_t = Y_{j,t} + W_t \]

\[ W_{t+1} = \left[ A_t + \frac{1 - \delta}{1 + r} P_{t+1} H_t \right] (1 + r) \geq 0 \]
State-dependent elasticity

• Choose $\alpha$ to match $PH/Y = 1.5$
• Fix $r = 2.5\%$
• Choose $\beta$ to match $A/Y$

<table>
<thead>
<tr>
<th>$A/Y$</th>
<th>$\Delta P/P = -10%$</th>
<th>$\Delta P/P = -20%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>0.19</td>
<td>0.21</td>
</tr>
<tr>
<td>0</td>
<td>0.36</td>
<td>0.42</td>
</tr>
<tr>
<td>-1</td>
<td>0.70</td>
<td>0.73</td>
</tr>
</tbody>
</table>
Channels

- Heterogeneity + concave consumption functions
- Leverage: 30% of agents are at $W = 0$, so they owe 92% of the value of their house
- Levered agents are in the steepest part of the consumption function and they are hit most by the price change
- + House value determines borrowing capacity
- Side remark:
  - Can model make sense of the different elasticities to stock market and to housing found by CQS?
  - Maybe if we can add heterogeneity (in $\beta$, in risk aversion) leading to different stock market participation
Illiquid housing

- Housing perfectly liquid so far
- Intuition that illiquidity can damp response
- Example: life cycle (with bequest), can only sell house when retiring, fixed mortgage payment
- House price only enters the problem at retirement
- If Euler equation is broken between $t$ and $t+1$ (because of binding constraint), then house price has no effect on consumption at periods before $t$
- However, with endogenous decision to trade housing, the probability of selling maybe positive
- Moreover mortgage payment “leverages” income fluctuations
Demand for housing

- So far exogenous shock to $P$
- If $P$ falls, housing demand goes up
- Total spending

$$X_t = C_t + \left( P_t - \frac{1 - \delta}{1 + r} P_{t+1} \right) H_t$$

- Elasticity of total spending to housing wealth $< 1$, substitution effect $= 1$ (Cobb-Douglas)
- How do we get housing demand to go down?
- Model the underlying shock
Bubble

- Low interest rates
- High expected appreciation, reduces

\[
(P_t - \frac{1 - \delta}{1+\delta} P_{t+1})
\]

for given \( P_t \)

- However high expected appreciation means higher cost of housing in the future
- If \( \sigma > 1 \) this induces a reduction in non-durable consumption today
Default

- Forecasting models for foreclosures
- Include house price appreciation + cyclical conditions (unemployment)
- Little work on using household savings models to match these forecasting models