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 singals 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

$$U(C_t, H_t) = \frac{\left(C_t^{\alpha} H_t^{1-\alpha}\right)^{1-\sigma}}{1-\sigma}$$

- 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*GDP and PH = 1.5*GDP and A = 1.5*GDP

$$\text{elasticity} = 0.035$$

- 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*GDP

$$\text{elasticity} = 0.037$$

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

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

State-dependent elasticity

- Choose α to match $PH/Y = 1.5$
- Fix $r = 2.5\%$
- Choose β to match A/Y

A/Y	$\Delta P/P = -10\%$	$\Delta P/P = -20\%$
1.5	0.19	0.21
0	0.36	0.42
-1	0.70	0.73

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 β, 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

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

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