Discussion of Booms and Busts: Understanding Housing Market Dynamics by Craig Burnside, Martin Eichenbaum & Sergio Rebelo

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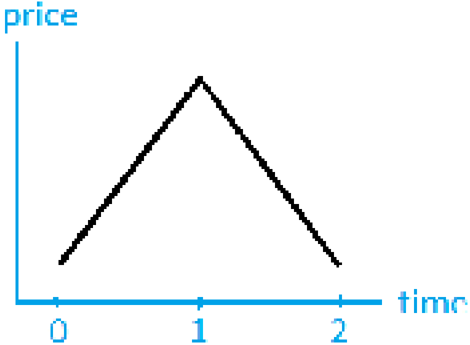
Summary

- Model of house trading & valuation
- Key ingredients
  - search & matching
  - trading constraints (no short sales, one house max per person)
  - heterogeneous beliefs
  - epidemic expectation formation
- Main result: boom-bust episode w/ small share of optimistic agents
- Very cool!

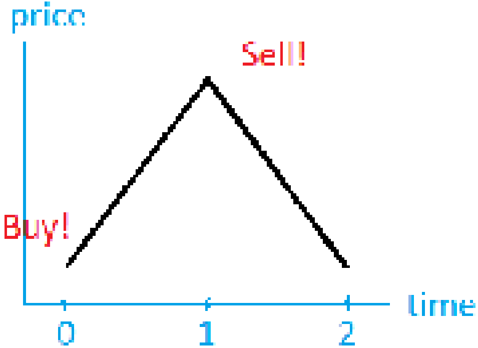
Discussion

- think about role of various ingredients
- contrast
  1. Competitive market with Bayesian learning & heterogeneous priors
  2. Market with trading frictions & epidemic expectations

Boom-bust episodes



Boom-bust episodes with hindsight



- Why not buy more at start (date 0), sell more at peak (date 1)...
  ... and make price pattern go away?

Learning with representative agent

- Representative agent, risk neutral, no discounting.
- At date 2, asset pays D at date 2; prior $D \backsim \mathcal{N}\left(0, \sigma^2\right)$
- At date 1, signal $s = D + \varepsilon$ at date 1 with $\varepsilon \backsim \mathcal{N}\left(0, \sigma_\varepsilon^2\right)$
- Competitive equilibrium prices $P_t = E_t P_{t+1}$

$$
\begin{aligned}
P_2 &= D \\
P_1 &= \gamma s, \quad \gamma = \frac{1/\sigma_\varepsilon^2}{1/\sigma^2 + 1/\sigma_\varepsilon^2} \\
P_0 &= 0
\end{aligned}
$$

- Boom-bust episode if high signal realization s
- Stronger effect if prior variance (and hence γ) is higher

Boom-bust with learning & representative agent

- Why not buy at start, sell at peak?
  Boom and bust *not* anticipated in real time $E_t [P_{t+1}] = P_t$
- Requires widespread optimism at peak
- Interesting model for 90s stock market runup
  (e.g. Zeira, Pastor-Veronesi, Christiano et al., Comin-Gertler)
- For housing: no widespread optimism in survey data
- Michigan Survey of Consumers (Piazzesi-Schneider 2009):
  At peak of recent housing boom,
    - majority believes it's a bad time to buy
    - 20% of households enthusiastic because of high price expectations
    - this fraction is overall small, (but historically large)

$\Rightarrow$ Can small number of optimists generate a boom?

Learning with heterogeneous priors

- Priors differ in variance
  - Most agents have prior variance σ^2
  - Some agents know less: higher prior variance $\bar{\sigma}^2$,
    $\Rightarrow$ weigh signal more $\bar{\gamma} > \gamma$
- Short sale constraints
- Price reflects belief of most optimistic traders (Miller)
  - at date 1, those with high conditional mean given the signal

$$P_1 = \max_i E_1^i [D] = \max \{\bar{\gamma} s, \gamma s\}$$

  - at date 2: those with high prior variance:

$$P_0 = \max_i E_0^i [P_1] = (\bar{\gamma} - \gamma) \sqrt{\bar{\sigma}^2 + \sigma_\varepsilon^2} \sqrt{\frac{\pi}{8}} > 0$$

- Still get boom-bust episode for high signal s
  (also $P_0 > \max_i E_0^i [D] = 0$ as in Harrison-Kreps)

Boom-bust with learning & heterogeneous priors

- Why not sell at peak?
  - optimists do not anticipate decline
  - pessimists cannot sell short
- Why not buy at start?
  Noone anticipates boom; most people anticipate a price drop
- Can a small number of optimists generate a boom?
  - yes if they are rich enough and can buy all the assets!
  - with borrowing constraint, price effect limited by optimists' wealth
  - with indivisible assets & one asset per agent, no price effect
- Interesting story for stocks
  (cross-country, cross-stock evidence on booms & shorting)
- Less relevant for housing market
  (transaction costs, search, indivisibility, lack of standardization)

$\Rightarrow$ Want model with more frictions!

Trading frictions & epidemic expectations (baby version)

- X houses; for sale by owner at t with prob. η; uncertain dividend D
- B_t = set of potential buyers at t; valuations V_t^i
- Price formation, buyer choice & matching
  - $P_2 = D$
  - at $t = 0, 1$, prices paid by individuals satisfy $P_t^i \le V_t^i$ for actual buyers
  - *average* price is increasing in average valuation, # potential buyers:

$$P_t = f\left(\frac{1}{\#B_t}\sum_{i\in B_t} V_t^i, \quad \#B_t\right)$$

- Valuations $V_1^i = E_1^i D$ and $V_0^i = \eta E_0^i P_1 + (1-\eta) E_0^i D$
- Transition equations for buyer set, and for individual beliefs
- Beliefs come from
  - epidemic process for $E_t^i D$, with sums $\sum_i E_0^i D < \sum_i E_1^i D$ known
  - knowledge of the price function f and aggregates $\Rightarrow P_1$ foreseen!
- can have $P_0 < P_1$ if less optimism at 0, few resales at 1

Boom-bust with trading frictions

- Why not sell at peak?
  - optimistic buyers do not anticipate decline
  - noone can sell short
  - sellers cannot "speculatively" sell high and buy low later
- Why not buy at start?
  - all agents anticipate the price increase
  - some optimists can't buy because they are not matched
  - optimism on price matters less at 0 if low probability of selling at 1
  - noone can buy more than one house
- Can small number of optimists move the market?
  - yes if the buyer set is small and optimists are well represented! (as in PS 09 search model with one time inflow of optimists)
  - here epidemic changes optimism in potential buyer pool
  - this leads to higher price because average valuation **and** number of high valuation buyers increase

Conclusion

- Neat story of complete boom-bust episode
- Role of trading constraints?
  - At the peak: what if owners can sell for speculation?
    (in PS 09, happy owners flood market if too many optimists
    $\rightarrow$ imposes discipline on parameters through volume implications)
  - At the start: what happens if optimists can buy more than one house?
- Cross-market implications of constraints?
  - e.g. cost of resale/flipping houses
  - recent boom-bust different by segments,
    e.g. more pronounced boom and bust in low price segments
  - Landvoigt-Piazzesi-Schneider 2010: relaxed borrowing constraints affect lower segments more (assignment model)
- Implication for quantities?
  (inventory, volume)