Introduction

- I study a simplified version of Kiyotaki-Moore.

- Entrepreneurs have good projects or bad projects.

- Housing serves as collateral.

- I discuss the properties of a particular equilibrium, with an exploding *bubble* in housing prices.

Equilibrium Dynamics With Stochastic Bubble

- Any positive bubble allows better allocation of capital among entrepreneurs.

  - people with good projects can borrow more b/c collateral is worth more.

- After the bubble bursts, huge redistribution of wealth.

- Output, consumption, wages collapse and then transit slowly to new (lower) SS.

- Capital grows *after* bubble collapses, but is used inefficiently.

Good and Bad Interventions

- Undesirable: give government debt to financial intermediaries.

  - they won't lend the debt to entrepreneurs
  - entrepreneurs have no collateral.

- Desirable: sell government debt at a low price.

- Allocate proceeds of sale to entrepreneurs ("fiscal stimulus").

Model

- Unit measures of entrepreneurs and workers

- Workers simply consume labor income.

- Entrepreneurs have log utility.

- They have technologies $A_t k_t^\alpha n_t^{1-\alpha}$.

- A_t is either 0 or 1 and is iid over time and entrepreneurs.

- Entrepreneurs find out the realization of A_t at date $t-1$.

- Install capital k_t then, and adjust labor demand at date t.

  - capital depreciates at rate δ.

Housing as Collateral

- Entrepreneurs each have a house.

- A house is an asset with zero consumption services.

- Entrepreneurs trade bonds, capital, and housing.

- Entrepreneurs can borrow up to the value of the house.

Simple, Simple, Simple!

• Entrepreneurs' payoffs are linear in k.

• Face a standard consumption-savings decision at each date.

• With log utility, always consume fraction $(1 - \beta)$ of wealth.

Stochastic Bubble Equilibrium

- One equilibrium works like this ...

- At each date, a coin is flipped, with low probability ε of getting heads.

- If tails, then house price is $p^* > 0$.

- There is a *bubble* in the house price.

- Investors $(A_t = 1)$ are always leveraged as much as possible.

- They are able to borrow up to p^* at each date.

- Savers $(A_t = 0)$ put almost all of their wealth in housing + bonds.

  - put ε/δ into capital as a hedge.

Key Technical Point: Why do Bubbles Exist in this Model?

- Usually: bubbles can't exist in eq'm b/c they provide an arb. opp.

  - sell house and rent instead
  - NOTE: arbitrage position is an infinitely long one.

- In model: entrepreneurs with good projects are always on their borrowing constraint.

- They hit their borrowing constraint infinitely often along every sample path.

- Can't execute infinitely long arbitrage to exploit the bubble.

Bubble Collapse

- Heads: house price falls to zero and stays there forever.

- Immediate impact is a wealth redistribution.

- Investors' wealths are unchanged, but savers lose almost all their wealth.

- Any intermediary is insolvent - owe savers p^* and have 0 to give them.

- Next period and *forever* after: Output crashes.

  - See Figure 1 in paper.

- Huge need for re-allocation in economy because of iid productivity shocks.

- Without collateral: Capital can no longer be re-allocated efficiently.

Post-Bubble Interventions

- Interventions must cure two problems.

  - entrepreneurs have lost wealth
  - entrepreneurs have lost ability to borrow/lend

- Bad approach: just give government debt to intermediaries.

  - won't work: they won't lend to investors w/o collateral

A Good Plan

- Offer to sell government debt at a low price.

  - that is, raise interest rate (to 0 from $-\delta$).

- Distribute proceeds of sale to entrepreneurs.

- Then roll over debt in future periods.

- I show in paper: government sells exactly p^* worth of debt.

  - savers buy debt and investors don't
  - gov't is an intermediary

- Aggregates immediately return to (and stay at) bubbly steady state.

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Conclusion

• Simple model that allows bubbles to interact with productive activities.

• Provides a way to think about some aspects of current macroeconomic policies and events.

• Missing: Other forms of collateral?