On Speculative Frenzies and Stabilization Policy

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Motivation

- Financial crisis led to calls that central banks act against asset booms
- Would this conflict w/central bank goals of stabilizing prices and output?
  - Bernanke-Gertler (1999) look at exogenous bubble term, find no conflict
  - This paper looks at endogenous asset boom per Harrison-Kreps (1978)
    - Shock that causes asset boom in model leads to a *lower* price level
    - At the same time, asset boom still coincides with an *output* boom
  - Asset boom not always same as aggregate demand shock
- **Intuition**: Speculators save to buy assets in the future, incl liquid assets

Insights from Model

1. Highlights difficulties of adding financial stability mandate
   - Trilemma: can't use liquidity to stabilize output, prices, *and* asset prices
   - More liquidity raises price level, but it boosts either real asset prices or output
2. Captures tradeoffs observed during asset booms (e.g. Japan 1980s)

Quick Overview

- Paper merges two existing models
  - **Harrison and Kreps (1978)** model of speculation due to disagreement
  - **Rocheteau, Weill, and Wong (2019)** model of money and inflation

- Overview of talk:
  1. Start with pure monetary model from RWW (2019)
  2. Add illiquid asset and allow for disagreement as in HK (1978)
  3. Add production and discuss policy trilemma

Rocheteau Weill Wong (2019) Model

- Continuous time model with mass 1 of infinitely-lived households
- Households endowed w/flow y of nondurable good (endogenize later)
- Households enjoy consumption *only* at random dates $\{t_n\}_{n=1}^{\infty}$
  - Urge to consume follow Poisson arrival w/rate λ, assume LLN holds
  - Assume utility when agents consume is linear, i.e

$$U = \sum_{n=1}^{\infty} e^{-\rho t_n} c_{t_n}$$

Money

- Goods should only go to those with a current urge to consume
- No intertemporal contracts, but agents can trade goods and money
- Fixed money supply $\overline{M}$ endowed according to atomless distrib $F_0(M)$
- Let P_t denote price of goods in terms of money at date t

Equilibrium

- Eqbm is path for P_t and $F_t(M)$ s.t. agents optimize and markets clear
- Focus on **stationary monetary eqbm**: $P_t < \infty$ and proportional to $\overline{M}$
  - Agents without an urge to consume sell y
    - Consuming yields no utility while money has some value

      $\Rightarrow \dot{M}_t = P_t y$ inbetween urges to consume
  - Agents with urge to consume must decide how much of their M to spend
    - Stationarity implies $\dot{P}_t = 0$, no reason to wait to consume (no better price)

      Agents with urge to consume spend their entire money holdings M

Equilibrium Spending

- Urge to consume independent of money holdings $\Rightarrow$ spending = $\lambda \overline{M}$
- Almost all agents sell goods, so value of goods sold is $Py \Rightarrow P = \frac{\lambda \overline{M}}{y}$
- Agents save with money in order to consume in future

Adding Asset w/Heterogeneous Beliefs

- Add fixed supply of 1 asset w/dividend flow of D goods and price p_t
  - Initial endowment of asset for household i is a_{i0} where $\int_0^1 a_{i0} = 1$
  - Agents can trade money/goods and money/asset but not goods and assets

    $\Rightarrow$ allocate wealth $W_{it} = M_{it} + p_t a_{it}$ each instant, use only M_{it} to consume
  - Trade off: ability to consume vs. earning a return
  - Agents disagree on asset as in Harrison and Kreps (1978) to generate trade

Modelling Disagreement

- Agents expect payoff events at random dates $\{\tau_n\}_{n=1}^{\infty}$
  - Payoff event arrives independently for each agent at Poisson rate α
    - Agents track different aspects of asset and form beliefs on implications
  - At these dates, agents expect lump-sum payment Δ_n (beyond flow D)
    - Optimists expect next payoff $\Delta_n = \frac{\Delta^+}{q} > 0$ w/prob q, else $\Delta_n = 0$
    - Pessimists expect next payoff $\Delta_n = \frac{-\Delta^-}{q} < 0$ w/prob q, else $\Delta_n = 0$
    - Beliefs alternate (next payment positive $\rightarrow$ payment after that negative)
- Assume true $\Delta_n = 0$, so payoff never occurs
  - Optimists expect $\Delta^+ > 0$, see 0 and turn pessimist; vice versa f/pessimist
- Half of agents start as optimists; fraction stays at $\frac{1}{2}$ at all t by symmetry

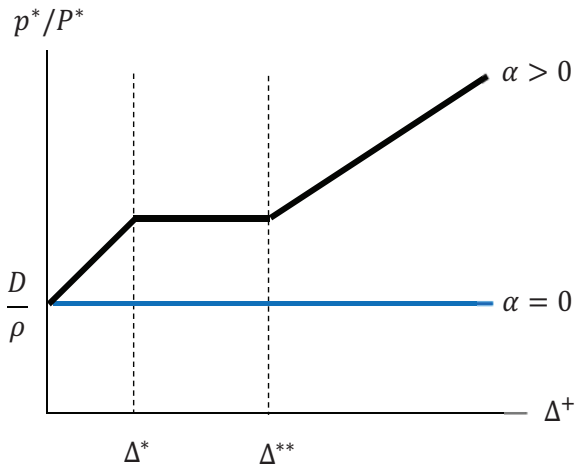
Equilibrium with Disagreement

- If $\alpha = 0$, homogeneous beliefs (disagree on events that never happen)
- **Disagreement shock**: Unexpectedly move from $\alpha = 0$ to $\alpha > 0$
  - Assume $\alpha\Delta^{-} > D \Rightarrow$ pessimists avoid asset in steady state
  - Pattern of trade in equilibrium:
    - Optimists hold all of *illiquid* asset, might also hold money to consume
    - Pessimists hold money, save to consume *or to buy assets later*

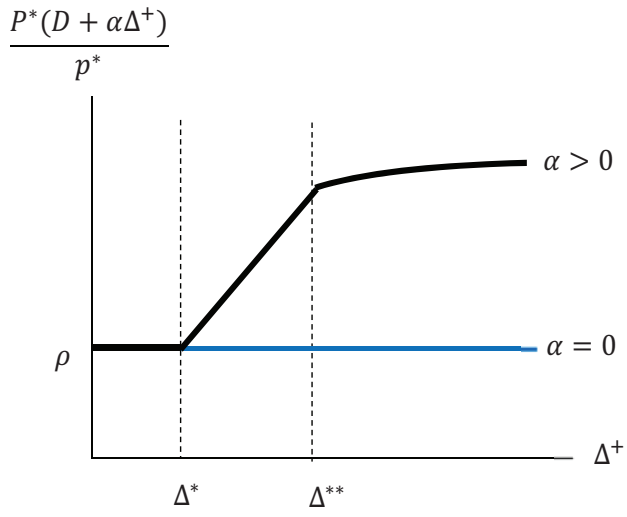
Disagreement, Asset Prices, Expected Returns

- If $\alpha = 0$, real asset price $\frac{p}{P} = \frac{D}{\rho}$ and return on asset equals ρ for all Δ^+
- If $\alpha > 0$, optimists keep buying asset until expected return to equal ρ

Real asset price



Expected return (of optimists)

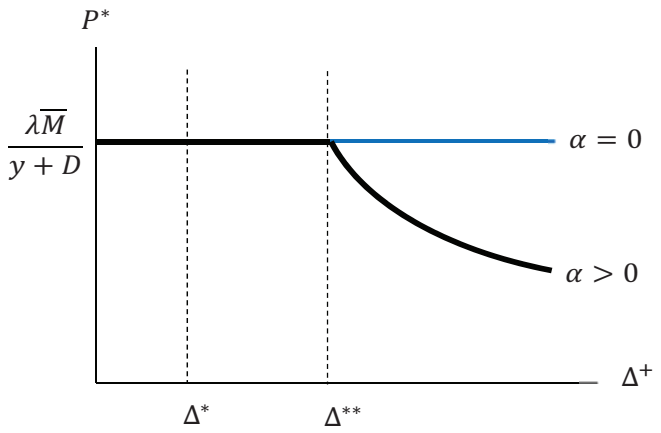


- Disagreement raises asset price p, may raise optimist return above ρ
- Real price starts rising again for really large Δ^+, i.e. if $\Delta^+ > \Delta^{**}$

Very Large Optimism Δ^+

- If $\Delta^+ > \Delta^*$, asset price p equal to wealth $\overline{W}^+$
- If P were constant, expected return $\frac{P(D+\alpha\Delta^+)}{p}$ increases w/o bound

  $\Rightarrow$ Pessimists eventually save for next τ_n rather than consume
- For very large Δ^+, above some Δ^{**}, price level P must adjust
  - P falls until pessimists just indifferent between saving/spending
  - Pessimists save to buy assets, which is why $P < \frac{\lambda\overline{M}}{y+D}$

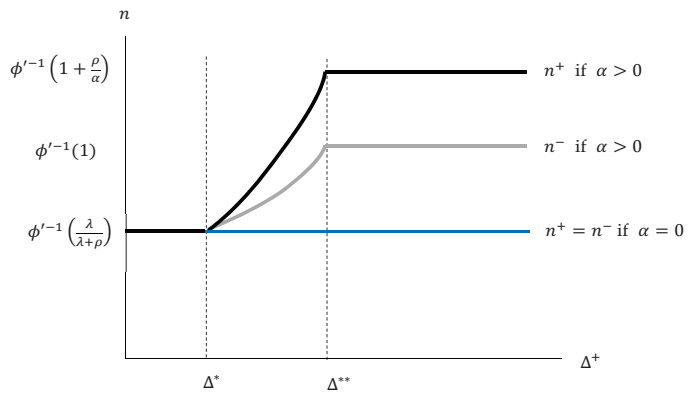


Endogenous Output

- Instead of fixed endowment y, let agents choose how much to work
- Linear production $y_{it} = n_{it}$ with convex cost of effort

$$U = \sum_{n=1}^{\infty} e^{-\rho t_n} c_{t_n} - \int_0^{\infty} e^{-\rho t} \phi(n_t)$$

- **Proposition:** Disagreement leads to higher n^+ and n^-, so output boom



- Optimists work harder given higher expected return; pessimists save

Policy Interventions

- Can monetary policy stabilize output, P, and p w/disagreement shock?
- Consider one-time liquidity injections, i.e., increasing $\overline{M}$ to $(1+\mu)\overline{M}$
  - Increasing in proportion to current wealth is neutral, raises p and P by μ
  - Directing liquidity to optimists temporarily boosts real price of asset $\frac{p}{P}$
  - Directing liquidity to pessimists temporarily dampens real price of asset $\frac{p}{P}$

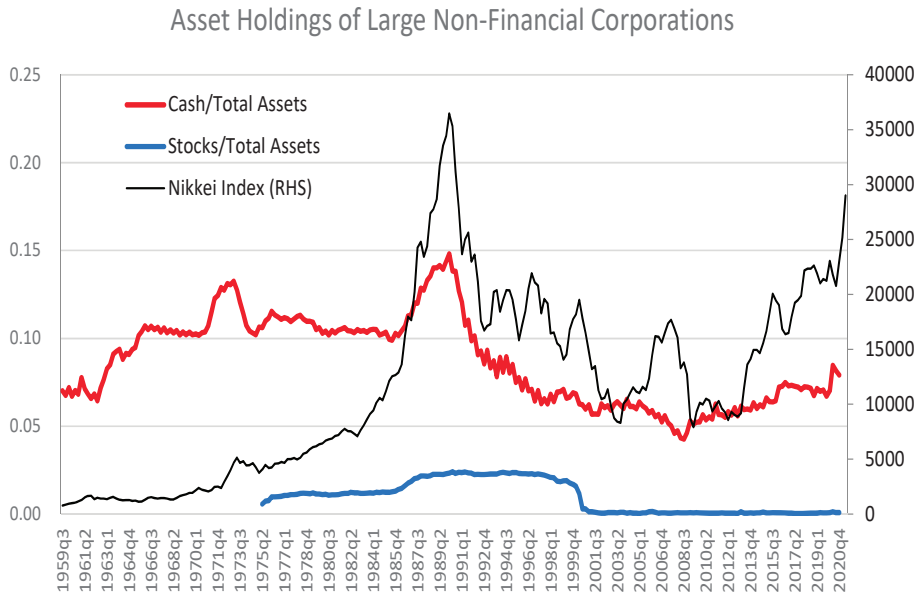
    ... BUT expected return on asset rises, which leads to higher output

Empirical Relevance

- Several papers identify stock booms and show linked to low inflation
  - Bank of Japan faced tension in 1980s (e.g. Shirakawa speeches)
  - Broader evidence that asset booms historically associated w/low inflation
    - Bordo and Wheelock (2007) confirm this for 5 countries since 1900
    - Christiano et al (2010) confirm this for 18 US stock market booms since 1800
- Can we find evidence of liquidity hoarding channel?
  - Challenging given this is about demand rather than actual liquidity
  - Might be able to look at *who* holds liquidity (although outside model)

Cash Holdings in Japan

- Look at cash holdings of large Japanese corporations
  - Firms have incentive not to hoard cash (rebate to shareholders/repay debt)



  - Large firms held roughly 10% of their assets in cash before 1980s
  - Cash holdings increased in 1980s boom (and earlier stock boom)
  - Firms engaged in speculation (zaiteku), held more stocks

Conclusion

- Model suggests financial stability can conflict w/other mandates
- Above conflict seems to be relevant in practice
- More work needed before we evaluate tradeoff in terms of welfare