Discussion of "A Macroeconomic Model with a Financial Sector" by Brunnermeier and Sannikov

Monika Piazzesi
Stanford & NBER

Lisbon Conference June 10-11, 2010

Summary

- Paper studies model with borrowing constrained banks/firms, also considers externalities and securitization

Contribution:

- technical: model is in continuous time, where authors get more tractable solutions to contracting problem between productive agents (banks & firms) and unproductive agents (households)
- go beyond log-linearization, study global dynamics
- find that after some bad shocks, in region of the state space close to the borrowing constraint, *risk* becomes important: firms become more prudent, invest less, price of capital drops even further, system becomes volatile & unstable

Comments

- Banking sector is not special.

  => Model of the recent crisis?

- Assumptions made for tractability:
  - source of fluctuations
  - behavioral assumptions on firms/banks
  - preferences and technology

  => Balance between tractability and quantitative work?

- Model does not allow for contracts contingent on the aggregate state, restricts risk sharing between firms/banks and households.

  => Makes constraints in the model more important?
  How to map to firm/bank financing in the data?

Banking sector is not special

- Two layers of moral hazard as in Holmstrom & Tirole:
  m_t = banks' monitoring effort
  Firms need to hold a fraction $\alpha^E \geq b(m_t)$ of internal funds to obtain loans from banks
  Banks need to hold a fraction $\alpha^I \geq c(m_t)$ of internal funds to obtain loans from households
- Holmstrom & Tirole: net worth of banks and firms matter **separately**
- Assumption here: $b(m_t) + c(m_t)$ is constant in m_t
- Fraction $\alpha = \alpha^E + \alpha^I = b(m_t) + c(m_t)$ matters, only **combined** net worth of productive agents matters,
- Is this a good model for recent crisis?
  Banks' net worth was affected, they were bailed out.

Source of fluctuations in model versus data

In model: TFP, capital move

- production function

$$y_t = ak_t$$

- driving force of output fluctuations: capital destruction shocks dZ_t

$$dk_t = \left(\phi\left(\frac{I_t}{k_t}\right) - \delta\right) k_t dt + \sigma k_t dZ_t$$

- alternatively, $y_t = a_t k_t$, TFP shocks have permanent effect on a_t and adjustment costs

$$\phi\left(\frac{I_t}{y_t}\right)$$

- extension with labor: households supply fixed amount of labor $\overline{L}$.

In data (last 30 years): hours move, not TFP, capital

Behavioral assumptions

- Key assumption: productive agents are *impatient*
  firms/banks discount future at higher rate $\rho > r$ than households
- Implication of the assumption:
  impatient agents want to consume today,
  borrow from more patient households
- Comparison to data:
  Retained earnings are important source of financing.
  Especially *before* the crisis, empirical corporate finance literature documents a puzzling **large amount of cash hoarding**
  (e.g., "Why do firms have so much cash?")

Balance between tractability and quantitative work?

- Assumptions that make the model easier to solve
  e.g., TFP/capital moves, impatient firms/banks, linear preferences, linear technology

  also make the model less suited for quantitative work
- Single state variable

$$\eta_t = \frac{\text{net worth of firms + banks}}{\text{capital}}$$

  Endogenous variables are functions of η_t,
  which solve differential equations
  e.g., price of capital $p(\eta_t)$, value functions $f(\eta_t) \times$ net worth
- Still, solutions are not closed form, done **computationally**
- Benefits from assumptions? Provide more justifications?

Comparison with Bernanke, Gertler & Gilchrist

- Brunnermeier & Sannikov:
  start from assumptions that make model with frictions easier to solve (including away from steady state),
  obtain model that seems less attractive for quantitative work
- Bernanke, Gertler & Gilchrist:
  start from standard New Keynesian business cycle model
  add frictions
  study whether frictions matter *quantitatively*
- Does BGG generate similar dynamics away from steady state?
  Are there important quantitative differences?
  Is the deviation from log-linearized dynamics quantitatively important?
  What features of the model are important to generate interesting dynamics?

Contracts

- Contracts between productive agents (banks/firms) and unproductive agents (households)
  do *not* allow productive agents to hedge any aggregate risk
- Benchmark model (only aggregate shocks):
  productive agents cannot issue state-contingent debt or outside equity,
  can only issue non-contingent debt (= more risky, once issued, may go bankrupt)
  issue less when close to the constraint
- Extension of the model for securitization (with idiosyncratic shocks)
  productive agents can issue state-contingent debt
  but only to other productive agents, not to households
- Limitation on contracts allowed restricts risk sharing between producing and unproductive agents
  => makes constraints **more** important
- Comparison to data:
  more risk sharing through outside equity etc.

Concluding comments

- For application to recent crisis, need banking sector that is special
- Interesting dynamics, are they quantitatively important?
- Right balance between not-much-tractability (use computer anyway) and quantitative work?
- Missing mechanism for fluctuations: hours
- In the data, firms hoard cash–are they impatient?
- In the data, firms issue equity directly to households–not allowed here