Discussion of "The I Theory of Money" by M. Brunnermeier and Y. Sannikov

Fernando Mendo

Universidad del Pacifico and World Bank

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Overview

- A novel unified framework to study financial stability and price stability

- Key role of money: <u>store of value</u>. Key friction: <u>financial friction</u>

- Wealth distribution $\rightarrow$ Extent of intermediation $\rightarrow$ Capital allocation, value of money (endogenous)

- Monetary policy: insurance (ex-ante), redistribution of wealth (ex-post)

Model

▶ Households

    – Savers (positive wealth, $p_t K_t + q_t K_t - N_t$)

    – Log utility (discount rate $= r$)

    – Assets: money (non-negativity constraint), risky claims on <u>one</u> entrepreneur

▶ Entrepreneurs

    – End-borrowers (zero wealth)

    – Production technology: $y_t = (a_t - i_t)k_t$

    – No utility, no consumption

▶ Capital Evolution: $dK_t/d_t = (\Phi(i_t) - \delta)K_t$

▶ Shocks

    – λ arrival rate of a macro shock

    – $\underline{\phi}$ probability that an entrepreneur steals capital and become HH (given the macro shock)

Model

▶ Financial Frictions
- HH cannot diversify across entrepreneurs
- HH have an inefficient monitoring technology (high $\underline{\phi}$)

▶ Intermediaries
- Positive wealth, N_t
- Log utility ($p > r$, more impatient)
- Diversification across entrepreneurs
- Superior monitoring technology ($\phi < \underline{\phi}$)
- Assets: money (no constraints), long-term bonds, risky claims on entrepreneurs

▶ Monetary Authority
- Interest rate on money ($i \geq 0$)
- Value of all perpetual bonds ($b_t K_t$)

▶ Government: Taxes output at rate τ, redeems money and bonds.

Amplification and Persistence

▶ Negative shock $\rightarrow$ Liquidity + Disinflation spirals
$\rightarrow$ Amplification, Persistence

    – Intermediaries net worth $\downarrow$

    – Intermediaries balance sheet $\downarrow$

    – Capital: Fire sales, price q $\downarrow$ $\rightarrow$ Liquidity spiral

    – Money: Inside money $\downarrow$, value p $\uparrow$ $\rightarrow$ Disinflation spiral

    – Value of intermediaries liabilities $\uparrow$

    – Intermediaries net worth $\downarrow$ (again)

▶ Monetary policy: $\uparrow N_t \rightarrow \downarrow$ Amplification, Persistence

Comment 1: Excessive credit flows

▶ Possibility of excessive credit flows is not explored
  $\rightarrow$ key for financial and monetary stability

▶ 3 options:

  – Risk neutral intermediaries

  – Heterogeneous entrepreneurs

  – Single intermediary

Comment 1: Excessive credit flows (Risk Neutral Intermediaries)

▶ Risk neutral intermediaries $\rightarrow$ Extra credit to entrepreneurs

  $\rightarrow$ Possibility of insolvency (prevented by log utility / risk aversion)
  $\rightarrow$ Larger exposure to shocks

▶ Problems of no risk aversion:

  - $\downarrow$ Incentives to shrink balance sheet $\rightarrow$ $\downarrow$ Relevance of disinflationary spiral
  - Tractability?

▶ *Message*: Intermediaries' risk aversion increase during crises.
  $\rightarrow$ How do we capture this?

Comment 1: Excessive credit flows (Heterogeneous Entrepreneurs)

- ▶ Credit to "bad" entrepreneurs = Excessive credit

- ▶ Two types of entrepreneurs: "Good" vs. "bad" (higher ϕ, lower a).

- ▶ "Bad" entrepreneurs only financed when value of money is sufficiently low (large η).

- ▶ Detail:
  - Need a limited supply of "good" investment projects (otherwise, no credit for "bad" entrepreneurs)

Comment 1: Excessive credit flows (Single intermediary)

▶ Single intermediary internalizes effects of changes in aggregate equity (N_t)
  $\rightarrow$ Lower credit in equilibrium

▶ Excessive credit = Credit (multiple banks) - Credit (single bank)

▶ Externality after a negative shock:
  Each intermediary $\downarrow$ balance sheet $\rightarrow$ aggregate inside money $\downarrow$ $\rightarrow$ externality
  on the rest of intermediaries ($\uparrow$ value of money)

▶ Problem:
  Single intermediary $\rightarrow$ less balance sheet contraction after a shock $\rightarrow$
  $\downarrow$ Relevance of disinflationary spiral

Comment 2: Bank Concentration

▶ In light of last point, the model has implications regarding banking concentration

▶ ↑ Banking concentration → ↓ Amplification of negative shocks

 → Concentration is good for stability

▶ Missing banking concentration costs?

Comment 3: Macro-prudential policies

▶ Model insight $\rightarrow$ liquidity/capital requirements should be function of aggregate variables (e.g. wealth share of financial sector, η)

  − High requirements when η large $\rightarrow$ Larger buffers

  − Low requirements when η small $\rightarrow$ Avoid exacerbating amplification

▶ As exogenous risk (ϕ) decreases (but endogenous risk increase, volatility paradox)..
  What would be the effect on financial and monetary stability of keeping η above its SS level through macro-prudential policies?

Comment 4: Indexed Deposits

▶ A critical assumption is that deposits are denominated in money

▶ If deposits are denominated in consumption goods $\rightarrow$ real value of intermediaries' liabilities constant

▶ Compare the model to a version with indexed deposits $\rightarrow$ disentangle relative importance of disinflationary spirals (and feedbacks)

Comment 5: Riskless Real Return Bond

▶ (Outside and inside) money $\rightarrow$ only riskless way for HH to transfer wealth to the future.

▶ No asset ensures HH a fixed real return (i.e. in terms of consumption goods) on its wealth.

▶ Would money still be valuable if HH can purchase real return bonds (offered by intermediates, endogenous real rate)?

▶ Personal guess: Yes, because money also allows risk hedging (as its value rises during crises).

Comment 6: Alternative Target for Monetary Policy

- Proposed monetary policy rule: $i_t = f(\eta)$, $f' > 0$, b_t/p_t fixed
  where η is the wealth share of intermediaries $\rightarrow$ non observable variable

- Observable proxy $\rightarrow \frac{N_t}{N_t + Dep_t}$

- Would monetary policy still be effective by targeting the proxy?

- Personal guess: No. In crises, intermediaries shrink their balances $\rightarrow$ prevent
  a large drop of $\frac{N_t}{N_t + Dep_t} \rightarrow$ Central Bank would not cut i_t enough.

Comment 7: Driving Shock

▶ The underlying shock → redistributional shock. No output or capital directly lost or destroyed.

▶ Wealth redistribution (always): Intermediaries → Households.

▶ Would there be amplification effects if the shock make HH relatively wealthier than intermediaries?
Would a redistributional policy towards intermediaries (e.g. interest rate cuts) still be effective?

▶ Example: Shock that destroys capital in a situation where HH have invested in capital more than banks.

Comment 8: Monetary Policy and Redistribution of Wealth

▶ Stress the flexibility of redistributional effects of monetary policy: different policy tools → different redistributional effects (depending on portfolio composition of each agent)

▶ Example: Households have mortgage contracts with intermediaries

- Policy 1: short term i_t cuts → Widen i_t term spread → $\frac{value\ of\ money\ today}{value\ of\ money\ future} \downarrow$ → Benefited agent: Intermediaries.

- Policy 2: forward guidance (keep i_t constant for a long period) → Narrow i_t term spread → $\frac{value\ of\ money\ today}{value\ of\ money\ future} \uparrow$ → Benefited agent: Households.

▶ Explore redistribution in a multi-sector model

Comment 9: Precautionary Savings

- Log utility functions $\rightarrow$ model more tractable, no precautionary savings.

- Large endogenous volatility during crises $\rightarrow$ precautionary savings: greater deflation

- Would it be possible to allow for precautionary savings and still have a tractable model?

Comment 10: Other comments

▶ Model: entrepreneurs $\approx$ production technology. May explore..

  – Possibility of issuing debt (not only equity)
  – Multi-period investment decision (change in technology) $\rightarrow$ demand transmission channel?
  – Entrepreneurs' wealth equivalent to HH wealth?

▶ Assumption: monetary authority can fully commit to rules/forward guidance

  – Monetary authority incentives?
  – Time consistency problems?

▶ Pending welfare analysis.