Discussion of ”A Model of Intermediation, Money, Interest and Prices”
by Saki Bigio & Yuliy Sannikov

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Overview

- model of money as a store of value in incomplete markets
- nice feature: risk choice about endowment

Discussion:
- study effects in an environment where financial structure is real
- connect to literature on fiscal policy
Environment

- utility function over consumption

\[ E \int_0^{\infty} e^{-\rho t} \frac{(c_{i,t}^{1-\gamma} - 1)}{1 - \gamma} \, dt \]

- nontradable exogenous income

\[ dw_{i,t} = y(u_{i,t}) \, dt + \sigma(u_{i,t}) \, dZ_{i,t} \]

  - \( dZ_{i,t} \) idiosyncratic shock
  - risk choice \( u_{i,t} \): high mean \( y_H \) and volatility \( \sigma_H \)
    or low mean \( y_L \) and volatility \( \sigma_L = 0 \)

- in every instant, choose consumption \( c_{i,t} \) and \( u_{i,t} \)

- resource constraint: aggregate consumption = aggregate output, output endogenous!
First best allocation

- all households choose high risk: $u_{i,t} = H$
  mean $y_H$ is high for everyone!
- perfect risk sharing: $\sigma_H$ does not matter
- high output $Y_t = y_H$
- high consumption $C_t = y_H$
Incomplete markets

- financial structure as in Aiyagari: real noncontingent bonds save and borrow at real interest rate $r$ up to a debt limit $\bar{s}$

\[ E \int_0^\infty e^{-\rho t} \frac{\left( c_{i,t}^{1-\gamma} - 1 \right)}{1-\gamma} dt \]

\[ dw_{i,t} = y(u_{i,t}) \, dt + \sigma(u_{i,t}) \, dZ_{i,t} \]
\[ ds_{i,t} = (r \, s_{i,t} - c_{i,t}) \, dt + dw_{i,t} \]
\[ s_{i,t} \geq \bar{s} \]

- close to debt limit $\bar{s}$, precautionary motive is strong:
  - households choose low risk $u_{i,t} = L$ with low mean $y_L$
- output and consumption are inefficiently low: $Y_t < y_H$
- equilibrium interest rate $r$ is low
Comparison with other incomplete markets models

- Models with imperfect risk sharing without aggregate shocks
  - strong precautionary motive $\rightarrow$ welfare loss
  - output may be distorted relative to first best

- Aiyagari 1994 endowment model
  - idiosyncratic shocks to endowment, real bonds have low rate
  - no aggregate output loss

- Aiyagari model with production
  - idiosyncratic skill shocks, capital and bonds are perfect substitutes
  - overaccumulation of capital, aggregate output inefficiently high

- Angeletos 2007 with sufficiently high EIS
  - capital and bonds are not perfect substitutes, low real interest rate
  - underaccumulation of capital, aggregate output inefficiently low

- Bigio & Sannikov model
  - risk choice makes aggregate output inefficiently low
Fiscal policy in incomplete markets

- Aiyagari & McGrattan 1998: debt in model with production
  - capital and government debt are perfect substitutes for savers
  - government debt $B_t$ crowds out private capital $K_t$, reduces output
  - equilibrium real rate depends on debt and taxes

- Bigio & Sannikov with government debt
  - household and government debt are perfect substitutes for savers
  - government debt allows precautionary savings
  - equilibrium real rate depends on debt and taxes

- Fiscal policy can improve risk sharing and output distortion
Intermediation and spreads

- So far, banks are a veil
- Without government debt: competitive banks take household savings $A_t$ and pay interest $r^A$, lend to households $L_t$ and collect interest $r^L$, maximize

$$L_t \left(1 + r^L\right) - A_t \left(1 + r^A\right)$$

banks’ FOCs equalize rates of return: $r^L = r^A$
- What if government forces banks to hold some government debt?

$$L_t \left(1 + r^L\right) + B_t \left(1 + r^B\right) - A_t \left(1 + r^A\right)$$

$$B_t \geq \rho A_t$$

If constraint binds, $r^L > r^A > r^B$
- If $\rho = 1$, narrow banking, no loans to households $L_t = 0$

→ Fiscal policy not only changes real rate but also spreads
Fiscal policy vs monetary policy

- So far, theory of fiscal policy, how do we think about monetary policy?
- recast model with nominal assets and nominal interest rates
- definition of equilibrium
  - given initial price level $P_0$, nominal interest rate path $i_t^B$, nominal supply of government debt $M_t$
  - find path of prices $P_t$ so that real interest rate $r_t^B = i_t^B - \dot{P}_t / P_t$ clears market for path of real debt $M_t / P_t$

- changing nominal rate has real effects holding fixed $M_t$
- interpretation of government debt as reserves
  - bank constraint from before = reserve requirement
  - government forces banks to also hold some reserves $\rho P_t A_t$
  - if constraint does not bind: $i^L = i^A = i^M$ floor system
  - if constraint binds: $i^L > i^A > i^M$ corridor system
Money as store of value

- reinterpretation of the model works if there are no other assets that dominate money in rate of return

- tradition of Bewley 1980, Samuelson 1968
  money is the only asset, useful as store of value

- in data, rate of return dominance is important
  - floor system: spread between deposit rates, T-bill rates
T-bill rate and deposit rate in Floor System

Shaded areas indicate U.S. recessions

Sources: Board of Governors, St. Louis Fed
fred.stlouisfed.org
Money as store of value

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  money is the only asset, useful as store of value
- in data, rate of return dominance is important
  - floor system: spread between deposit rates, T-bill rates
- can explain spread with money as medium of exchange
- Bewley/Samuelson not typically used for monetary policy
  but Aiyagari/OLG workhorse models for fiscal policy
- Bigio-Sannikov: very interesting insights about fiscal policy, risk choice, output and welfare