Interbank Market and Macroprudential Tools in a DSGE Model

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Interbank Market and Macroprudential Tools in a DSGE Model

- Examines how macroprudential tools and monetary policy shape business cycle dynamics in a DSGE model.
  - Reserve requirements
  - Collateral haircuts in Central Bank lending

- Introduces a tiered interbank market with frictions into a Bernanke, Gertler, Gilchrist-style model (with other modifications).
  - Nominal debt contracts (Christiano et al., DeFiore and Tristani)

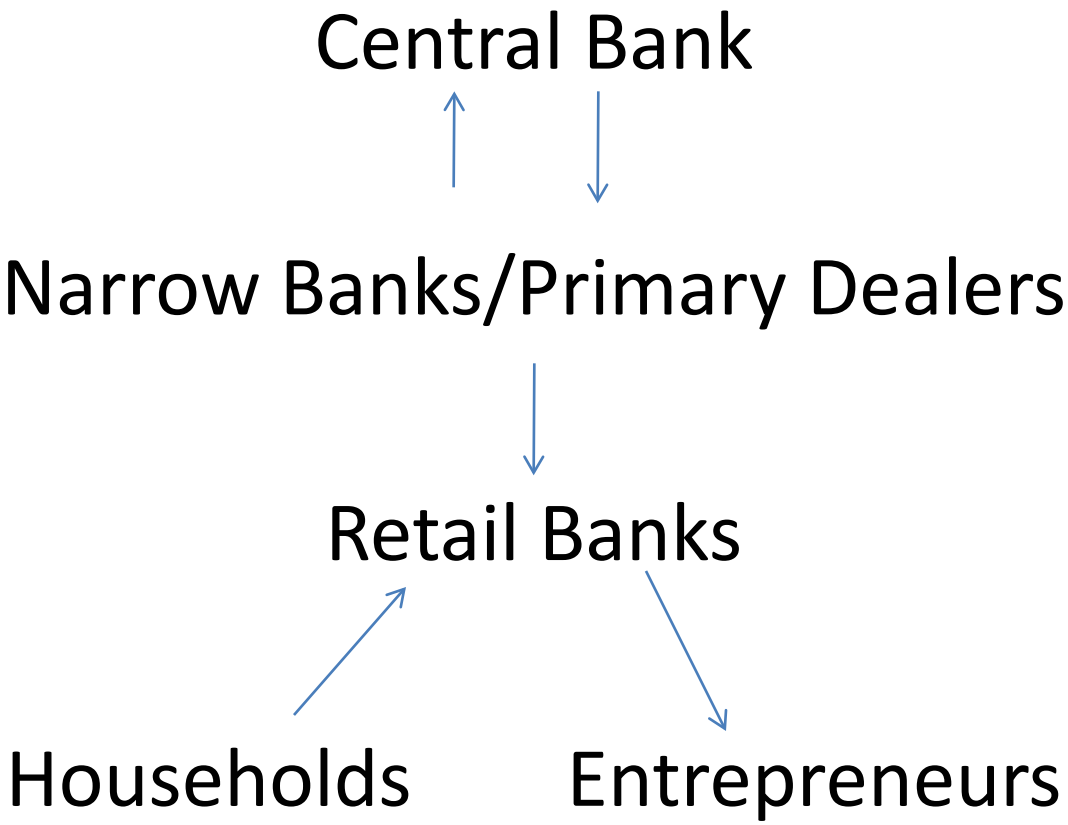
- Result: Macroprudential tools, especially reserve requirements, can have big effects on real variables and can "complement" traditional monetary policy.

Interbank Market and Macroprudential Tools in a DSGE Model

- Welcome contribution to the literature on DSGE models with financial intermediation
  - Brunnermeier and Sannikov, Christiano at al., Dib, Curdia and Woodford, Gerali et al., Gertler and Karadi, Gertler and Kiyotaki, Hillberg and Hollmayer, Van den Heuvel.

- Many non-bank features of the model are not essential, but help to make the business cycle dynamics look more realistic, as in CEE
  - Habit formation, Investment adjustment cost, etc
  - I will focus my discussion on the bank sectors and the results.

Banking System



Banking System

Not a model of why banks exist, or why they should be regulated:

- Banks are assumed to be essential
  - Households can only save through bank deposits
  - Entrepreneurs can only attract external finance from banks
- Model abstracts from moral hazard of banks, bank runs, etc.

Retail Banks

ASSETS:

- **Loans** [to entrepreneurs]
  - Costly state verification, as in BGG
  - One period, nominal loan contracts; *nominal* is assumed, but realistic and introduces Fisherian debt deflation effects.
- **Reserves** [at Central Bank] ← **Reserve requirement**

LIABILITIES:

- **Deposits** [from households]
  - Interest rate on deposit is subject to (ad-hoc) adjustment cost. Idea: imperfect competition (Gerali et al.) ← ***Friction #1***
- **Interbank loans** [from Narrow banks]
  - Marginal source of funds

Retail Banks: Comment

- Reserve requirements are no longer relevant to the U.S. banking system.

- However, it seems reasonably to think of this policy tool as a Basel III liquidity requirement.
  - Central bank is allowed to pay interest on reserves.
  - In this case, the requirements should be set against interbank loans as well as deposits.

Narrow Banks (Primary Dealers?)

ASSETS:

- **Interbank Loans** [to retail banks]
  - Convex monitoring cost ← ***Friction #2***
- **Deposits at Central Bank ← 'Collateral Haircut'**

LIABILITIES:

- **Central Bank Credit**
  - "Obtained via open market operations"

$$\underbrace{R^{CB\,DEP} < R^{POLICY} < R^{CB\,CREDIT}}_{\text{All set by Central Bank}} < R^{IB}$$

- R^{IB} is highest due to monitoring cost and collateral haircut.

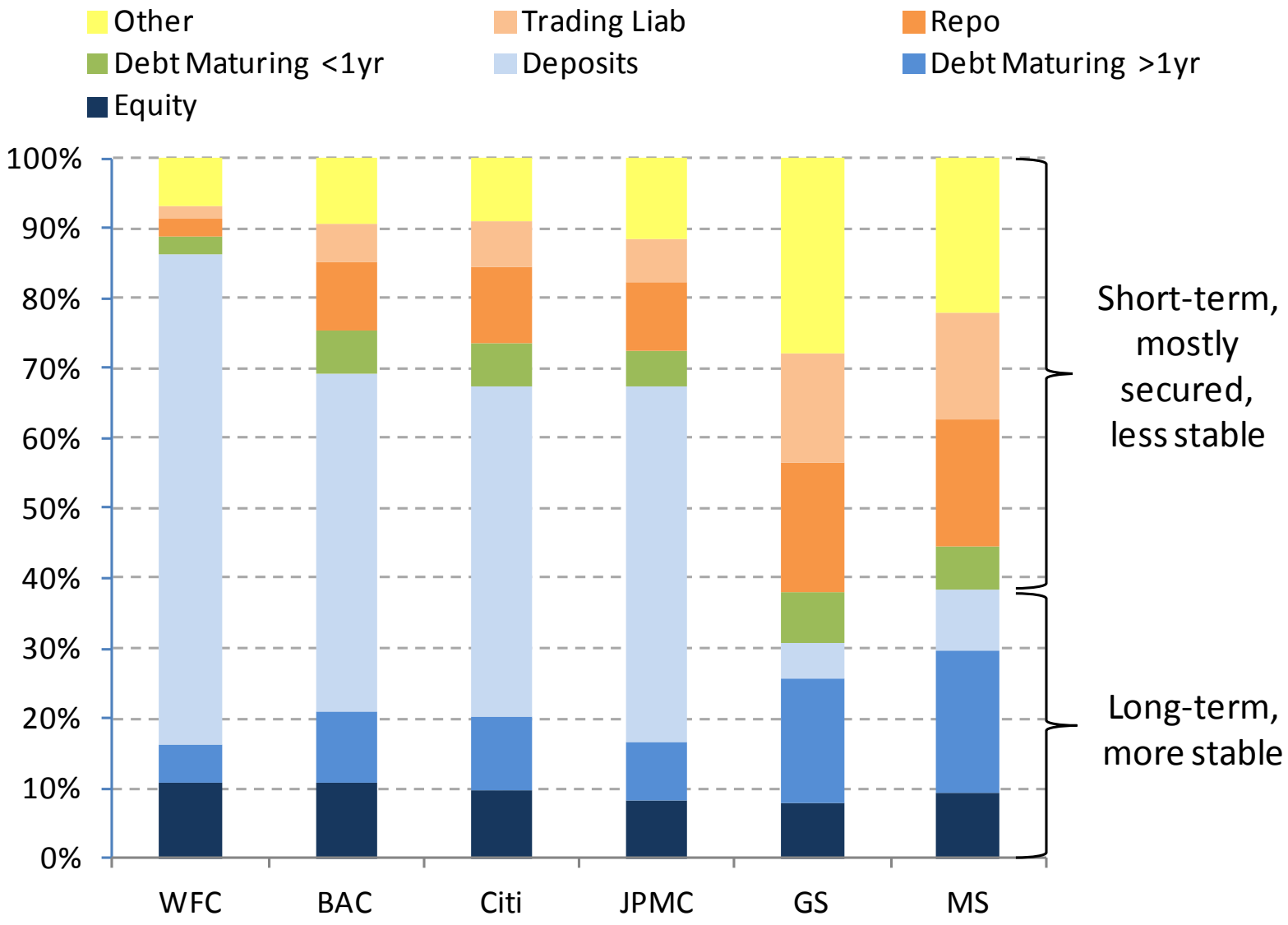
Narrow Banks: Comment 1

- Model's "Collateral haircut" requires the narrow bank to have 1-*HC* = 0.2 $ on reserve at central bank for every 1$ it has borrowed from the Central Bank.
- This is not a margin requirement or a collateral haircut, which would require, e.g., posting $1.1 dollars in collateral for 1$ of credit.
- It is more akin to a reserve requirement on borrowing from the Central Bank.

Narrow Banks: Comment 2

- Open market operations exchange one primary dealer asset (Treasuries) for another (Deposits at Central Bank), but do not involve borrowing of primary dealers from Central Bank.
- Discount window lending does create central bank credit, but regular banks can access this too. Moreover, it is not part of "normal" monetary policy operations.
- In fact, it is difficult to think of any U.S. financial institutions with a liability structure similar to the model's narrow bank.
  - Broker dealers have a high levels short-term debts, such as repos, but this is private credit, albeit often against government-issued assets.

BHC Liability Structure (4Q11)



Source: FR Y-9C

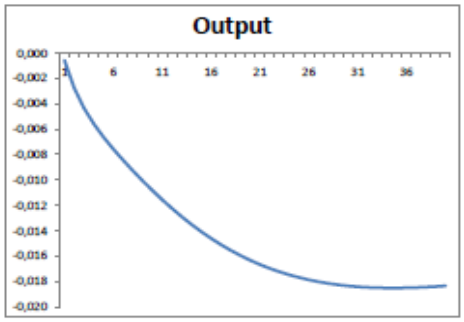
Monetary and Macroprudential Policies

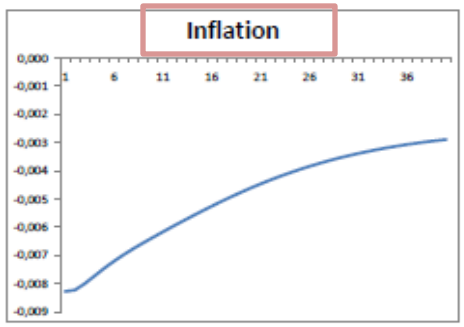
- Monetary policy: Taylor rule for the policy rate.
  - Very low coefficient on output gap (0.005) – why?

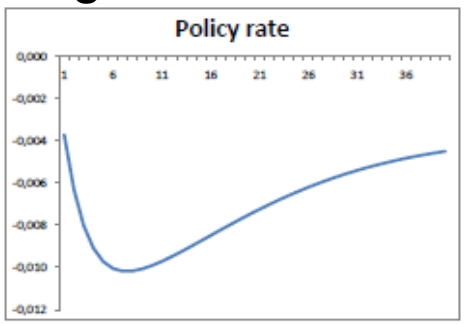
- Macro-prudential tools:
  1. Reserve requirements: act as a tax on financial intermediation → increases the cost of loans → lower GDP (though not credit!)
  2. 'Collateral haircut': Increases the cost of interbank loans, acts as a tax on financial intermediation → similar effects (though smaller)

Figure 5: Responses to a Reserve Requirement Shock

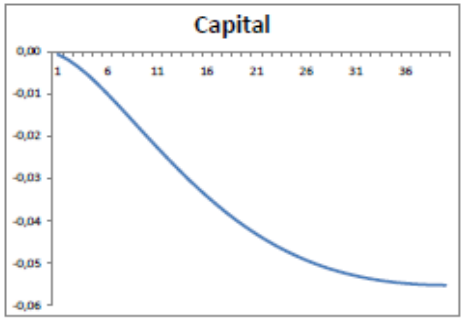
Role of nominal contracts: Lower inflation leads to higher real debt…

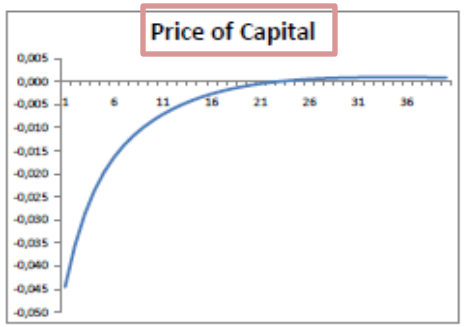


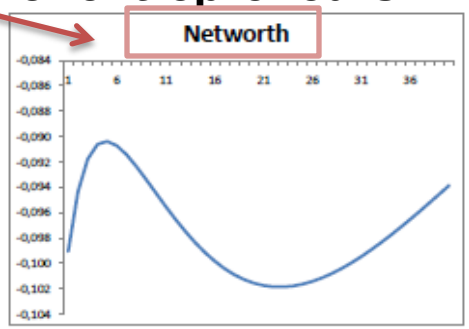




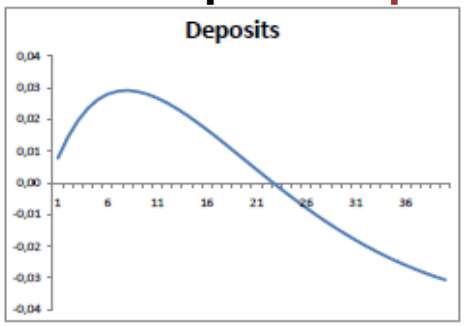
…and therefore lower net worth of entrepreneurs…

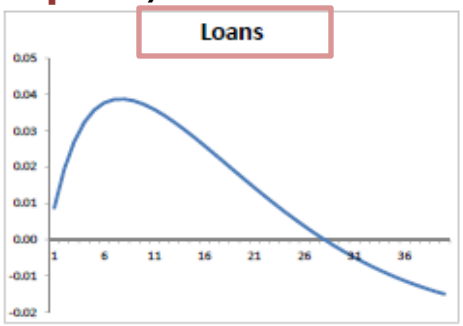


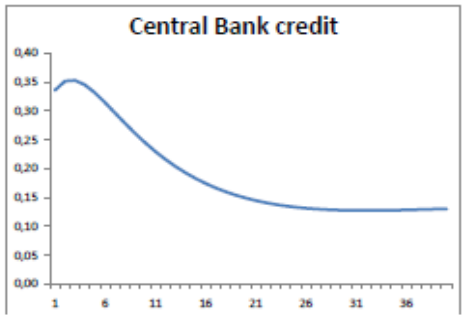




…and a drop in the price of capital, which reinforces the decline in net worth.







Loans rise to partially compensate for lower net worth (high leverage).

Suggestions and Ideas

1. Compare results to a benchmark with frictionless (BGG) banks.
2. Think of ways to increase the realism of/better interpret the narrow banks. What if you cut put up interbank loans as collateral?
3. Consider interest rate on reserves as a policy tool (R^{RR}).
4. Analyze the macro-prudential tools as a *substitute* for conventional monetary policy at the zero lower bound?
5. More ambitious: Consider welfare and analyze optimal policy.

Technical Comments

- Equation (33) should be have *QK/N*, not *PQK/N*, and $E_t[R^E_{t+1}]$ not R^E_{t+1}.
- State that $R = R^P$
- Adjustment cost on deposit rate paid by banks should show up in the social resource constraint.
- The resale value of old capital is assumed to be subject to a mysterious shock (*o*) for capital goods producers, but not for the entrepreneurs in the model. Needs to be clarified.
- How is the monitoring cost calibrated?
- Show steady state return on capital and rates on interbank loans and required reserves.