Liquidity and Monetary Policy Instruments

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A Discussion - "The Paranoid and the Cavalier"

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Overview - providing liquidity

- Interbank (wholesale) lending - banks facing excessive withdrawal borrow from other banks and repay when the high return asset pays off the next period -
- Common shock to all banks requires centralised liquidity provision - opens the question of the "the paranoid or the cavalier"
- Government deposit insurance - can insure perfectly if the λ (fraction of early period withdrawls) is known but if it is random and/or returns are stochastic then it might be costly and so not believable by late period consumers
- Macro story is about maintaining consumption or investment when collateral is required for transaction technology

Definition

Liquidity must be connected with providing late-period consumers/investors sufficient confidence not to withdraw early

Welfare Analysis of Banking

Theorem

1: banks can achieve an equilibrium allocation: $\frac{u_i'(x_{i1}(s))}{u_i'(x_{i2}(s))} \geq R$

Theorem

2: there is a mixed equilibrium of banks catering to both early and late consumers

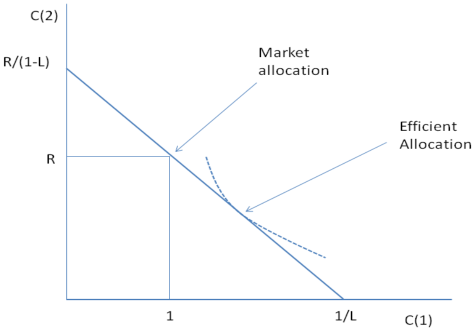
Theorem

4: under incomplete markets asset prices are too high (low) if RA is greater (less) than 1 - welfare is enhanced with liquidity minima (maxima)

Theorem

5: asset prices are very sensitive to liquidity shocks because
$\log\left(\frac{q(2)}{q(1)}\right) = \rho \log\left(\frac{\lambda(1)}{\lambda(2)}\right)$

Market and Efficient Allocation



- Efficient allocation allows optimality subject to risky preferences i.e. liquidity is short (long) in the market place when consumers are risk averse (loving) and so need a mechanism of providing countercylical liquidity provision

Asset price response to liquidity shock

$$\begin{aligned} \frac{\pi(1)}{q(1)} + \frac{\pi(2)}{q(2)} &= 1 \\ \sum_{s=1,2} \pi(s)\,\lambda(s)^{-\rho}\,(1 - q(s)) &= 1 \end{aligned}$$

- risk aversion $\rho = 2$, and early period consumers fraction $\pi(1) = 0.5$
  - liquidity shock of 1% generates 2% asset price change
- Results insensitive to $\pi(1)$

Corollary

Liquidity shocks can easily be amplified by asset price shocks that affect collateral and net worth of highly leveraged institutions

Asset price response to liquidity shock

$$\begin{aligned}\frac{\pi(1)}{q(1)}+\frac{\pi(2)}{q(2)} &= 1 \\ \sum_{s=1,2}\pi(s)\,\lambda(s)^{-\rho}(1-q(s)) &= 1\end{aligned}$$

- risk aversion $\rho = 2$, and early period consumers fraction $\pi(1) = 0.5$
  - liquidity shock of 1% generates 2% asset price change
  - liquidity shock of 20% generates 40% asset price change
- Results insensitive to $\pi(1)$

Corollary

Liquidity shocks can easily be amplified by asset price shocks that affect collateral and net worth of highly leveraged institutions

Asset price response to liquidity shock

$$\begin{aligned} \frac{\pi(1)}{q(1)} + \frac{\pi(2)}{q(2)} &= 1 \\ \sum_{s=1,2} \pi(s)\,\lambda(s)^{-\rho}\,(1 - q(s)) &= 1 \end{aligned}$$

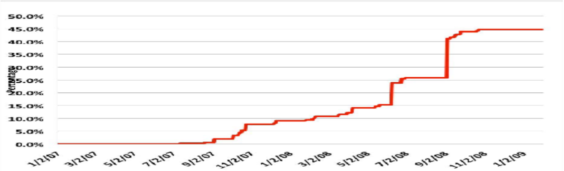
- risk aversion $\rho = 2$, and early period consumers fraction $\pi(1) = 0.5$
  - liquidity shock of 1% generates 2% asset price change
  - liquidity shock of 20% generates 40% asset price change
  - liquidity shock of 100% generates an asset price change of 300%
- Results insensitive to $\pi(1)$

Corollary

Liquidity shocks can easily be amplified by asset price shocks that affect collateral and net worth of highly leveraged institutions

Liquidity from Repo

Figure 4: The Repo-Haircut Index

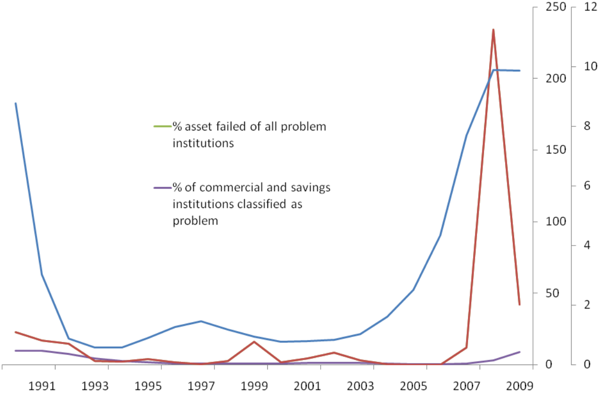


Notes: The repo-haircut index is the equally-weighted average haircut for all nine asset classes included in Table I, Panel D.

39

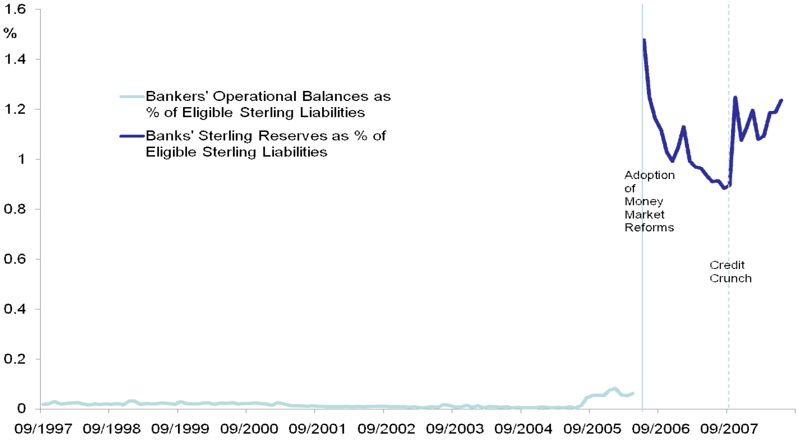
- Liquidity provision from the market is heavily procyclical (Gorton and Metrick 2009)

Failure rate of banks and assets (FDIC)

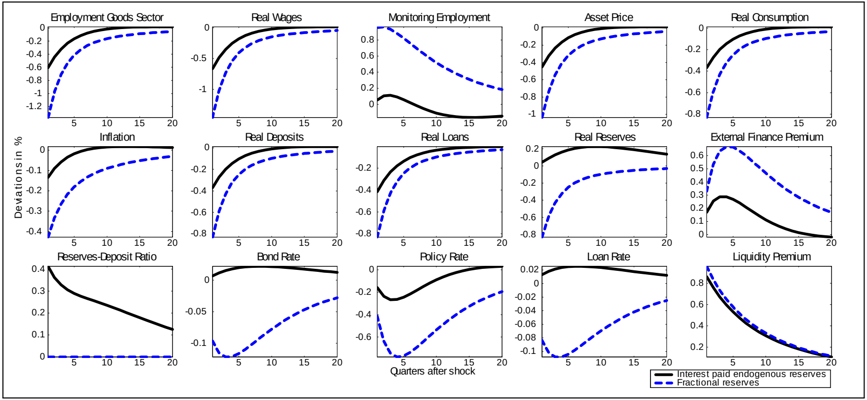


- Problem institutions as a fraction of all institutions (12% max) but asset fails can exceed those of problem institutions (220%) - correlated and countercyclical

Liquid Assets Relative to Total Assets (Bank of England)



Collateral Shock: Chadha and Corrado (2009)



- Endogenous liquidity mitigates EFP increase from collateral shock and alleviates need for policy rate to respond

Moral Hazard

- Banks fail because of liability demand or asset non-performance (payments system is taken as given)
- Bank net worth provides a cushion for depositors - losses impact first on equity/net worth of bank
- Banks insure themselves by careful accumulation of assets but if too much risk is taken on, neither depositors nor share holders will provide liabilities.
- With deposit insurance, retail depositors will not screen banks and require the highest rate of return and banks will have to provide that rate, by investing in risky assets
- Government can then limit risk taking by banks or limit deposit insurance or require capital minimum on net worth

Solution

Countercyclical liquidity provision and capital requirements required to support standard interest rate policy tool