

**Imperfect Competition in the Interbank Market for Liquidity
as a Rationale for Central Banking**

Viral V. Acharya

LBS and CEPR

Denis Gromb

LBS, LSE and CEPR

Tanju Yorulmazer

Federal Reserve Bank of New York

INTRODUCTION

- The Subprime Crisis has underlined the importance of the (largely forgotten field) of banking.
- Very limited theoretical literature on the interbank market.

Questions:

- What are the roles of the interbank markets?
- Why do they function with significant volume most of the time but freeze up some of the time?
- Is it a problem that volumes drop to zero or is this part of the efficient operation of such markets?
- What is the market failure that justifies central bank intervention in the interbank markets?
- What is the optimal form of intervention by the central bank?

Our project:

- Market power: One possible source of failure of the interbank market.
- During crises, liquidity is concentrated with a small number of banks.
- \Rightarrow Liquid banks may enjoy market power.
- Implications for central banking (CB), banking regulation (+ others)?

Market Power

Historical evidence:

- Pre-CB: Liquidity insurance arrangements among banks.
- Failed during crises, partly due to competition and strategic behavior.
- \Rightarrow Modern CBs emerge: Not business competitor.
- Examples: US (1853, 1907, 1914), UK (1866), France (1867), Australia (1893).
- Donaldson (1992): Pre-fed, interest rates (up to 500%) higher during panics. Not so post-Fed.

Modern evidence:

- In US and UK, OMOs \Rightarrow Liquidity concentrated at a few settlement banks.
- Most banks have 1 or 2 relationships with liquidity-providing banks.
- During the crisis, in UK, 2 out of 11 settlement banks have increased their liquidity and captured a large share of the interbank market, causing concerns.
- Other, non-bank markets for liquidity.
- Suggestions welcome!

MODEL OUTLINE

- Two banks: Bank A has a liquidity need to refinance its loans while Bank B has excess liquidity
- At $t = 1$:
 - Bank A has risky assets (loans).
 - Each asset needs refinancing ρ .
 - Bank A can monitor refinanced assets.
- At $t = 2$:
 - Each asset yields a return $\tilde{R} \in \{0, R\}$ + Private benefit to Bank A : $\tilde{b} \in \{0, b\}$.
 - No refinancing $\Rightarrow \tilde{R} = \tilde{b} = 0$.
 - Refinancing + No monitoring $\Rightarrow \Pr(\tilde{R} = R) = p_L$ and $\tilde{b} = b$.
 - Refinancing + Monitoring $\Rightarrow \Pr(\tilde{R} = R) = p_H > p_L$ and $\tilde{b} = 0$.
- Assumption: Refinancing is efficient only if A monitors:

$$p_H R > \rho > p_L R \quad \text{and} \quad (p_H - p_L) R > b.$$

Liquidity Transfers

- Liquidity can be provided by borrowing against collateral or selling assets.

Asset Sales/Business Stealing:

- At $t = 1$, transfer P .
- At $t = 2$, $\Pr(\tilde{R} = R) = p_B$.
- Problem: Assets are A -specific \Rightarrow Not as valuable if owned by B

$$p_H R > p_B R > \rho$$

Borrowing (e.g. against collateral):

- At $t = 1$, transfer L .
- At $t = 2$, if $\tilde{R} = R$, repay r (0 otherwise).
- Problem: Moral hazard in monitoring \Rightarrow Bank A monitors iff :

$$r \leq (R - R_b) \quad \text{with} \quad R_b \equiv b / (p_H - p_L)$$

- \Rightarrow Borrowing capacity:

$$p_H (R - R_b)$$

Outcome

- Banks A and B negotiate the means and terms of a liquidity transfer ($\beta \equiv$ Bank B 's power).
- Trade-off:
 - Asset sales are inefficient: $p_H > p_B$
 - But can raise more funds than borrowing: $p_B R > p_H (R - R_b)$
- Outside options X_A and X_B .
 - X_A : Borrow from outsiders (e.g. non-banks \Rightarrow higher $b \Rightarrow$ lower borrowing capacity), etc.
 - X_B : Expand market share, etc.
- Arrangement arrived at through bargaining consists of a combination of:
 - borrowing
 - sales (a fraction α of assets)
 - and transfer of liquidity

Inefficient Liquidity Transfers

Benchmark: *Under perfect competition ($\beta = 0$),*

- *If the borrowing capacity exceeds funding needs, no asset sales ($\alpha = 0$).*
- *Otherwise, “top up” with asset sales ($\alpha > 0$).*

Intuition:

- Asset sales are inefficient.
- But less than excessive borrowing (due to monitoring incentives).
- Note: Efficiency decreases with the fraction of assets sold α .

Result: *Efficiency decreases with Bank B’s market power:*

$$\frac{\partial \alpha}{\partial \beta} > 0$$

Intuition:

- Market power \Rightarrow Bank B increases interest rate charged to Bank A .
- If interest is too large, no monitoring \Rightarrow More efficient to sell some assets.
- That is, the liquid bank’s market power in liquidity provision allows it to buy illiquid banks’ assets at fire sale prices, and/or increase market share at the expense of illiquid banks.

Result: *Efficiency increases with Bank A's outside option*

$$\frac{\partial \alpha}{\partial X_A} < 0$$

Intuition:

- Bank A's payoff must increase.
- Most efficient way to do so: Leave it more assets.

Result: *Efficiency decreases with Bank A's need for funds*

$$\frac{\partial \alpha}{\partial \rho} > 0$$

Intuition:

- Borrowing capacity is less likely to suffice.
- If not, need to sell more assets to top it up.

- Note: A crisis situation may combine these effects
 - Large liquidity need ρ
 - Liquidity concentrated among few banks
 - Weak outside option X_A

Extensions

Outside markets:

- Can lend against (some of) Bank A 's assets, but not as well as Bank B : $b_o > b$
- Can manage (some of) Bank A 's assets, but not as well as Bank B : $p_o < p_B$

Asset characteristics:

- Assets characteristics θ makes them more or less:
 - Specific to Bank A .
 - Specific to banks (i.e., A and B)
- Assume both characteristics are correlated:

$$\frac{\partial p_o(\theta)}{\partial \theta} > \frac{\partial p_B(\theta)}{\partial \theta} > 0$$

Corollary: *Efficiency increases (i.e. $\alpha \downarrow$) when:*

- *Outsiders' ability to monitor loans to Bank A improves ($b_o \downarrow$)*
- *Outsiders ability to manage loans improves ($p_o \downarrow$).*
- *Assets are less specific.*

Central Banks as Lenders-of-Last Resort (LOLR)

- Central bank's role as LOLR:
 - Stands ready to transfer liquidity to Bank A .
 - \Rightarrow Improves Bank A 's outside option X_A .
 - \Rightarrow Limits Bank B 's market power.
 - \Rightarrow More efficient outcome (i.e., less asset sales).

- “Virtual and virtuous” role:
 - CB would not actually have to lend.
 - But needs to be a credible alternative.
 - \Rightarrow Debate about the use of the discount window.

Questions:

- Form of the liquidity transfer?
- Type of collateral?
- Credibility issue?

Future Research

- **Optimal Regulation:** Theory must include limits to CB intervention:
 - Asymmetric information.
 - Limited enforcement.
 - Stigma.

- **Organization of the Interbank Market for Liquidity**
 - Tiering system \Rightarrow Asymmetry between banks.
 - “Relationship banking” amongst banks.

- **Ex ante effects:**
 - Liquidity insurance and liquidity hoarding.
 - Ex post liquidity provision \Rightarrow Excessive risk taking or free up liquidity?