

Payment System in a Theory a Banking

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Two Examples of the Payment Systems

Net Settlement System

- ▶ Banks to settle payments on a net basis.
- ▶ Chains of failures.

Real-time Gross Settlement System

- ▶ Settling interbank payments on an individual order basis across the books of a central bank.
- ▶ Insulate an individual payee from systemic risk
- ▶ Requires many times more central bank liquidity

This Paper

Diamond and Dybvig (1983)

- ▶ Maturity structure of bank assets.
- ▶ A theory of liquidity preference.
- ▶ Banks as insurance providers against liquidity shocks.
 - ▶ Depositors **withdraw** in need of liquidity
- ▶ Self-fulfilling runs by depositors.

This Paper on Diamond and Dybvig (1983)

- ▶ Payments can be settled down with deposits. **withdrawal is NOT necessary.**
 - ▶ Payment system: real-time gross settlement system.
 - ▶ Sequential liquidity needs
- ▶ Imperfect bank competition.

Key Mechanism

- ▶ Individual bank deposit: d .
- ▶ Total bank deposit: D .
- ▶ Liquidity shock: ηC .

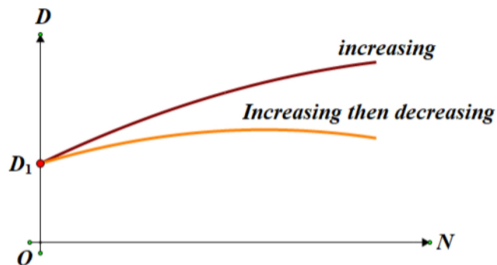
Without the payment system, the bank holds liquidity

$$\eta C$$

With the payment system, the bank holds liquidity

$$\eta C \frac{D - d}{D}$$

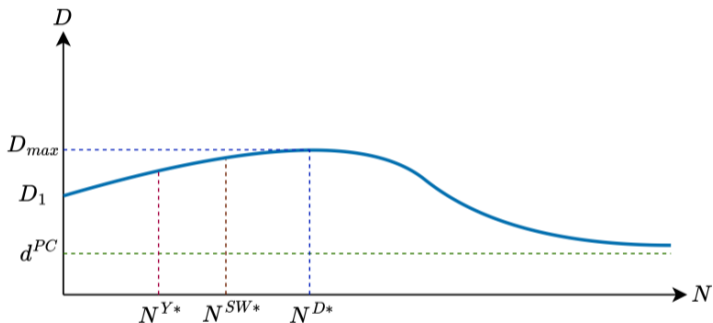
Model Predictions



- ▶ Conventional wisdom: aggregate deposit increases with the number of banks (red line)
- ▶ This paper: $N \uparrow \Rightarrow \frac{d}{D} = \frac{1}{N} \downarrow \Rightarrow$ liquidity need $\eta C \frac{D-d}{D} \uparrow \Rightarrow$ Asset return $\downarrow \Rightarrow r^d \downarrow \Rightarrow D \downarrow$
- ▶ Banking sector is imperfectly competitive even with free entry.

Model Predictions (Cont'd)

$$\text{When } d^{PC} r'_D(d^{PC}) \leq \frac{\eta(R-1)R}{1+\eta(R-1)},$$



- ▶ In all scenarios, $N^{Y*} < N^{SW*} < N^{D*}$.
- ▶ An increase of N may reduce output due to a lower probability of intrabank transfers.
- ▶ Welfare encompasses both output and the utility derived from perishable goods (liquidity).
- ▶ When deposit provision is insensitive to changes in market scale, policymaker should reduce bank concentration.

Comment One: Banking Solution in the Benchmark is NOT Efficient?

In Diamond and Dybvig (1983)

- ▶ Banking solution is constrained efficient.

Deposit Contract NOT State Contingent

- ▶ What is depositors' payoff when they withdraw at period 1?
- ▶ Optimally, it should be less than r^d ?

Why Do Buyers Always Withdraw All Their Deposits?

- ▶ Assuming this leads to **over-accumulation of liquidity**.
- ▶ The amount of perishable goods is given $(1 - \eta) \times 1$.
- ▶ Buyers can use return from investment opportunities to purchase perishable goods.
- ▶ What is the price of these perishable goods?
- ▶ Liquidity needs not necessarily increases with deposits.

Comment Two: Bank Risk-taking

Banks' Risk-taking Motives

- ▶ In the paper: banks always prepare enough liquidity to fulfill all of their payment obligations.
- ▶ But the worst thing for banks is to earn nothing (limited liability).
- ▶ Banks choose the amount of liquidity to maximize expected profit, given they are unsure of the sequence of liquidity demand.
- ▶ Trade-off: **higher default risk V.S. lower asset return.**
- ▶ Does this sequential settlement leads to higher prob. of bank default?
- ▶ Uncertainty on the sequence of payment is another source of inefficiency?

Self-fulfilling Bank Runs

- ▶ In Diamond and Dybvig (1983), banks are subject to runs.
- ▶ Payment systems allows banks to hold less liquidity.
- ▶ Does it lead to higher prob. of self-fulfilling run because of this?
- ▶ Again, what does the deposit contract look like when there is a bank run?

Other Minor Comments

- ▶ As a starting point, it would be good to compare welfare with and without the payment system.
- ▶ Interaction with (intra-day) monetary policy.
- ▶ I guess the marginal return of outside option $I(w)$ should be increasing and concave?

Conclusion

- ▶ Interesting and intuitive idea!
- ▶ Beautiful and neat model of payment system, liquidity, and bank competition.
- ▶ A very nice paper! I enjoyed reading it and learned a lot!

Good luck with publication.