

Payments, Reserves, and Financial Fragility

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July 13, 2023

Key Intuition

- Econ 101:
money as a unit of account, a means of payment, **and** a store of value.

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- Econ 101:
money as a unit of account, a means of payment, **and** a store of value.
- This paper: to determine the fragility of payments,
money as a means of payment **versus** a store of value...

Payments, the Value of Reserves, and Rewards

- A payment = transfer of reserves in return for a reward z
- (Non-payment) value of reserves: κ if I hold on to them.
 - E.g., Markus wires USD to Arvind to buy an Apple
 - Reserves = USD deposits
 - Reward = Markus's value for the apple
 - Non-payment value = Markus's USD savings
 - E.g., Bank A sends interbank payments to Bank B
 - Reserves = central bank reserves
 - Reward = fees earned by Bank A
 - Non-payment value = IOR + improved regulatory ratios for Bank A

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When reserves are more scarce/valuable relative to rewards, $\frac{z}{\kappa} \downarrow$

→ payer loses more from sending payments that are not reciprocated

→ Fragility in payments more likely

Reserve Scarcity \rightarrow Payment Fragility

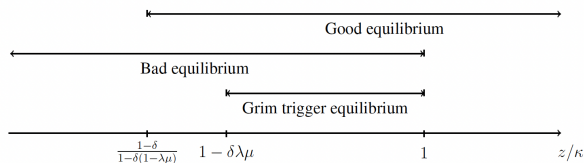


Figure 4: Relationship between the good, bad, and grim trigger equilibria

- 1 Reserve scarcity renders payments inherently fragile
 - \neq not enough reserves to pay when reserves are scarce
 - \neq pay “a bit” less than before when reserves are scarce
 - = Multiple equilibria: sudden payment halts
 - = Grim-trigger equilibria: payment delays
 - = Set of history-dependent equilibria
- 2 Improved payment technology cannot resolve payment fragility

Main contributions:

- Points out fundamental conflict between the payment function and the non-payment value that causes payment fragility
- Develops a general theory applicable to a wide range of contexts
- Predicts what matters for efficient payment systems in the future

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Three main comments:

- 1 Willingness to accept payments
- 2 Private money creation
- 3 Effect of Technology

1. Willingness to Accept Payments

- Focus is on the sender of payments and her willingness to send
- e.g. Condition for the good equilibrium:

Reward from sending payment $>$ Non-payment value of reserves sent¹

- The receiver is assumed to always accept payments that are sent
- Is that necessarily the case?

¹= Cost of giving up reserves today + PV of cost of not receiving reserves back in the future when opponent always chooses to pay

1. Willingness to Accept Payments

- Intuitively, the receiver would only want to accept the payment if
 $\text{Cost from sending payment} < \text{Non-payment value of reserves received}$
- That is, the receiver is more likely to accept payment when the value of reserves is not too low, in contrast to the sender
- E.g., Markus wires USD to Arvind to buy an Apple
 - Markus is more likely to send the payment/buy the apple if his USD deposits are less scarce/valuable
 - Arvind is more likely to sell the apple/receive the payment if USD deposits are more scarce/valuable
- Efficient payment crucially relies on acceptance by receivers as well.



Markets

Cash is king in Lebanon as banks atrophy

By Maya Gebeily

January 31, 2023 7:46 AM EST · Updated 5 months ago



Cash is now king in Lebanon, where a three-year economic meltdown has led the country's once-lauded financial sector to atrophy.

Zombie banks have frozen depositors out of tens of billions of dollars in their accounts, halting basic services and even prompting some customers to hold up tellers at gunpoint to access their money.

People and businesses now operate almost exclusively in cash. The local currency in circulation ballooned 12-fold between Sept. 2019 and Nov. 2022, according to banking documents seen by Reuters.

Most restaurants and coffeeshops have hung apologetic signs stating that credit cards are not accepted but that dollars are, at the fluctuating parallel market rate.

MARKETS

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More customers are having to pay negative rates as savings have surged amid the pandemic

By [Patricia Kowsmann](#) [Follow](#)

March 1, 2021 5:30 am ET



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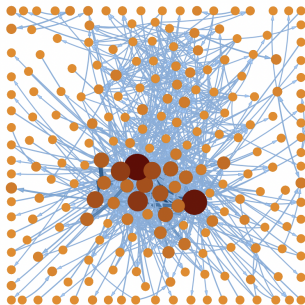
Division of Surplus

- The current set-up implicitly assumes that the sender receives the net reward and has full bargaining power
- E.g., Markus wires USD to Arvind to buy an Apple
 - Net Reward =
Markus's value for the apple – Arvind's cost for producing the apple
 - Markus pays if Net Reward $>$ non-payment value of reserves
 - However, if Arvind demands more than his cost of production
→ Markus will get less than the entire net reward
- Receiver bargaining power changes the cutoffs for different equilibria
→ good equilibrium requires higher $\frac{z}{\kappa}$
- Suggest to incorporate receiver decision/bargaining power
 - Subtlety: how is the division of surplus achieved

Payment Networks

- More generally, bargaining power and surplus division depend on the payment network structure...but this is better for another paper

Figure: Fed Funds Trading Network (Bech and Klee 08)



2. Private Money Creation

- Assumes reserve volume to be determined outside of the model
 - Reserve volume is normalized
- Applicable to interbank payments because central bank reserves are in fixed supply by the central bank
- E.g., Bank A sends interbank payments to Bank B
 - Reserves = central bank reserves
 - Reward = fees earned by Bank A
 - Non-payment value = IOR + improved regulatory ratios for Bank A

2. Private Money Creation

- Private forms of payment involve endogenous private money creation
- In particular, deposits > central bank reserves
- Private money creation reduces the scarcity of reserves but may also lead to risks, especially with liquidity transformation
- SVB crisis
 - More reserves and even more deposits contributed to deposit runs
 - E.g., Acharya and Rajan 22, Acharya, Chauhan, Rajan, and Steffen 23, Jiang, Matvos, Piskorsi, and Seru 23
- Too much (private) money creation could have adverse effects
 - Lower the non-payment value too much
 - Deposits of an insolvent bank would not be acceptable as payment
- Suggest: consider the interaction between payments and (private) money creation → optimal range of reserve scarcity?

3. Effect of Technology

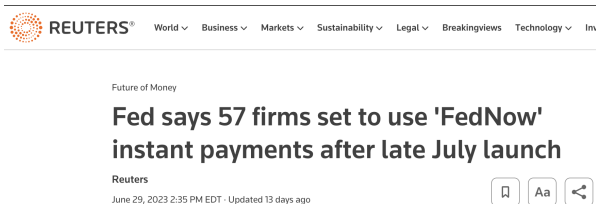
- For a payment to be successfully sent
 - ① Payer receives a payment request
 - ② Payer chooses to pay
 - ③ Payment goes through = technology
- Probability of the bad equilibrium does not change with technology
 - I won't make payments if I believe that no one chooses to make return payments, regardless whether the payments made will go through
 - *"Technology improvement may not necessarily resolve the lack of trust"*

3. Effect of Technology

- Are there **other technologies** that could “improve trust”?
- For a payment to be successfully sent
 - 1 Payer receives a payment request
 - 2 Payer chooses to pay → is **technology** effective?
 - 3 Payment goes through → technology is not effective
- Need: a **technology** that automatically and instantly enforces payment upon receiving a payment request

Instant Payment Systems

- A version of this **technology** is inherent in instant payment systems that have been recently introduced
 - E.g. PIX in Brazil in November 2020
 - E.g. FedNow in the US in late July 2023
 - 24/7/365
 - Operated by the central bank
 - Instantaneous → **removes banks' ability to delay**



The screenshot shows the Reuters website header with navigation links: World, Business, Markets, Sustainability, Legal, Breakingviews, Technology, and Im. Below the header, the article title is "Fed says 57 firms set to use 'FedNow' instant payments after late July launch". The sub-headline is "Future of Money". The author is "Reuters" and the date is "June 29, 2023 2:35 PM EDT · Updated 13 days ago". There are three icons at the bottom right of the article: a bookmark icon, a font size icon (Aa), and a share icon.

Instant Payment Systems

- Instant payment systems may help to coordinate the equilibrium

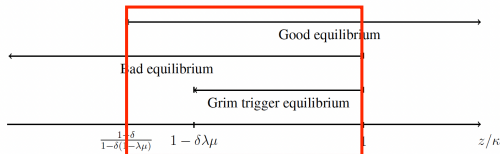


Figure 4: Relationship between the good, bad, and grim trigger equilibria

- However, unconditional instant payments could be suboptimal

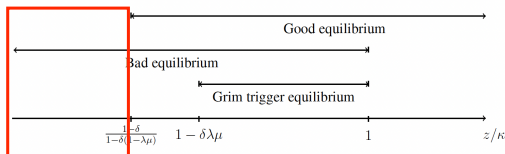


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- Could combine with smart contracts?

Conclusion

Very interesting paper with important implications:

- Points out fundamental conflict between the payment function and the non-payment value that causes payment fragility
- Develops a general theory applicable to a wide range of contexts
- Predicts what matters for efficient payment systems in the future

Suggestions:

- 1 Consider the willingness to accept payments/the division of surplus
- 2 Explore the interaction with money creation
- 3 Analyze the implications of different kinds of technology