

Session on Liquidity Risk and Contagion

Comments by Rafael Repullo

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Risk Measurement and Systemic Risk

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Paper 1

Morten Bech (FRBNY) and Rod Garratt (UCSB)

“Illiquidity in Interbank Payment System following Disruptions”

Paper 2

Johan Devriese (NBB) and Janet Mitchell (NBB)

“Liquidity Risk in Securities Settlement”

Paper 3

Rajkamal Iyer (INSEAD) and José Luis Peydró-Alcalde (ECB)

“Interbank Contagion: Evidence from Real Transactions”

Discussion on Bech and Garratt

Issues

- What are the effects of a disruption in payment system?
 - Disruption: Fraction of banks forced to delay payments
- What is the appropriate policy response?

Discussion on Bech and Garratt

Setup

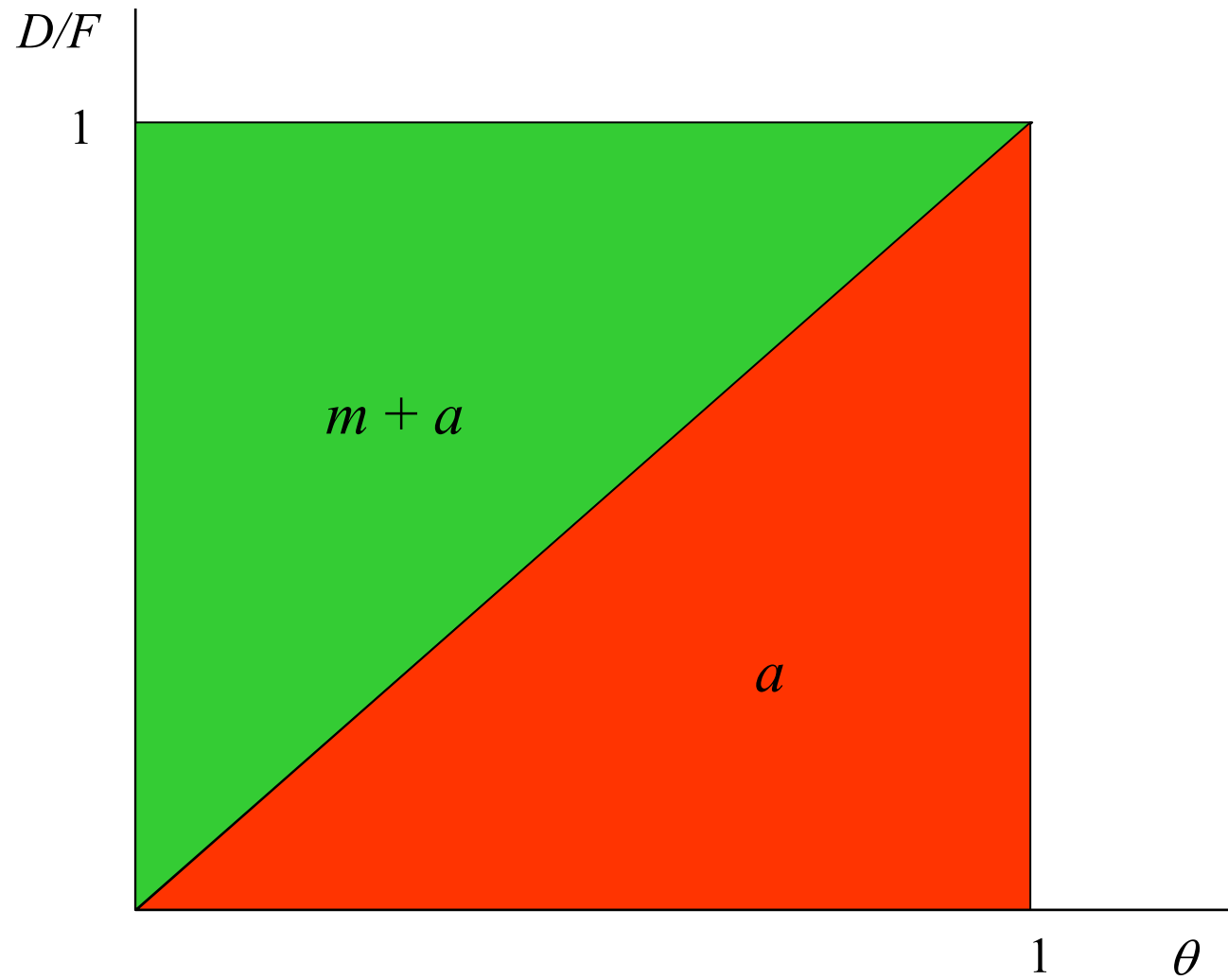
- Static game played by n identical banks
- Each bank has to pay 1\$ to all the other $n - 1$ banks
- Two strategies: Pay in morning (m) or pay in afternoon (a)
- Cost of delay D (per \$) + cost of overdraft F (per \$)
- Disruption: $n' = \theta n$ banks are forced to pay in afternoon
- Two possible (pure strategy) Nash equilibria:
 - m -equilibrium: $n - n'$ banks pay in morning
 - a -equilibrium: all n banks pay in afternoon

Discussion on Bech and Garratt

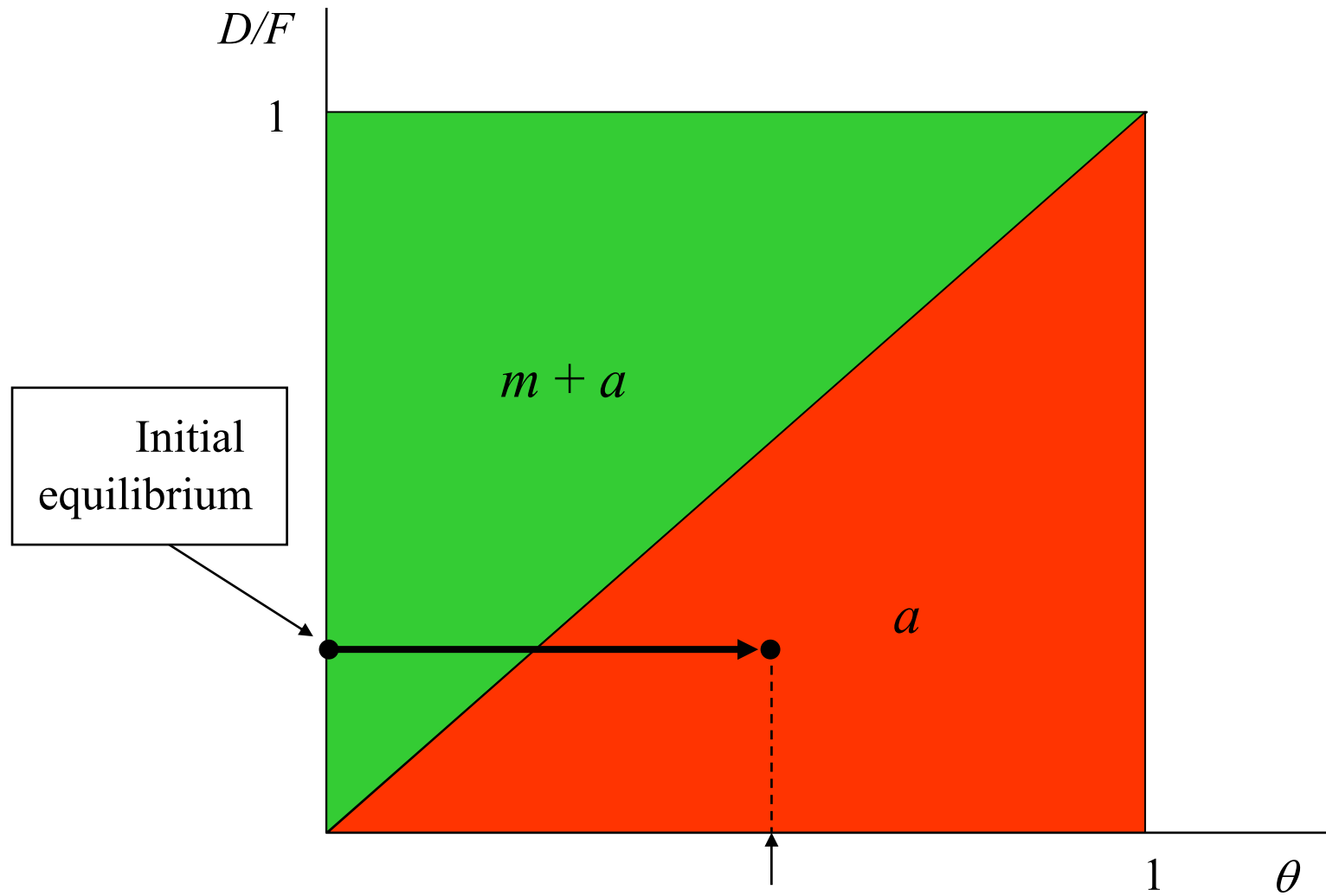
Main results

- m -equilibrium if and only if $\theta \leq D/F$
- a -equilibrium if and only if $D/F \leq 1$

Discussion on Bech and Garratt



Discussion on Bech and Garratt

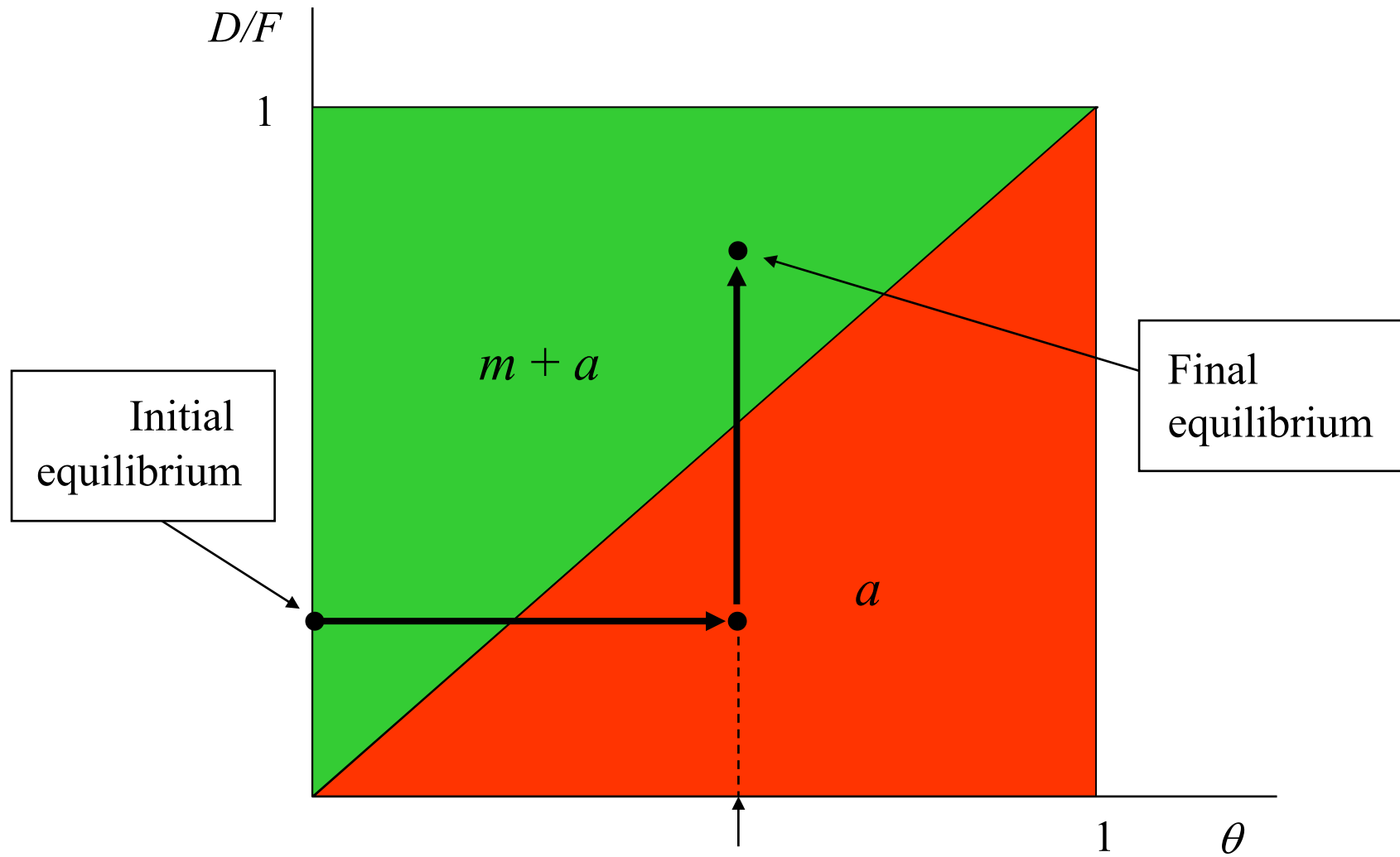


Discussion on Bech and Garratt

Policy response

- Reduce cost of overdraft F to restore m -equilibrium
→ Rationale for Fed action on 9/11

Discussion on Bech and Garratt

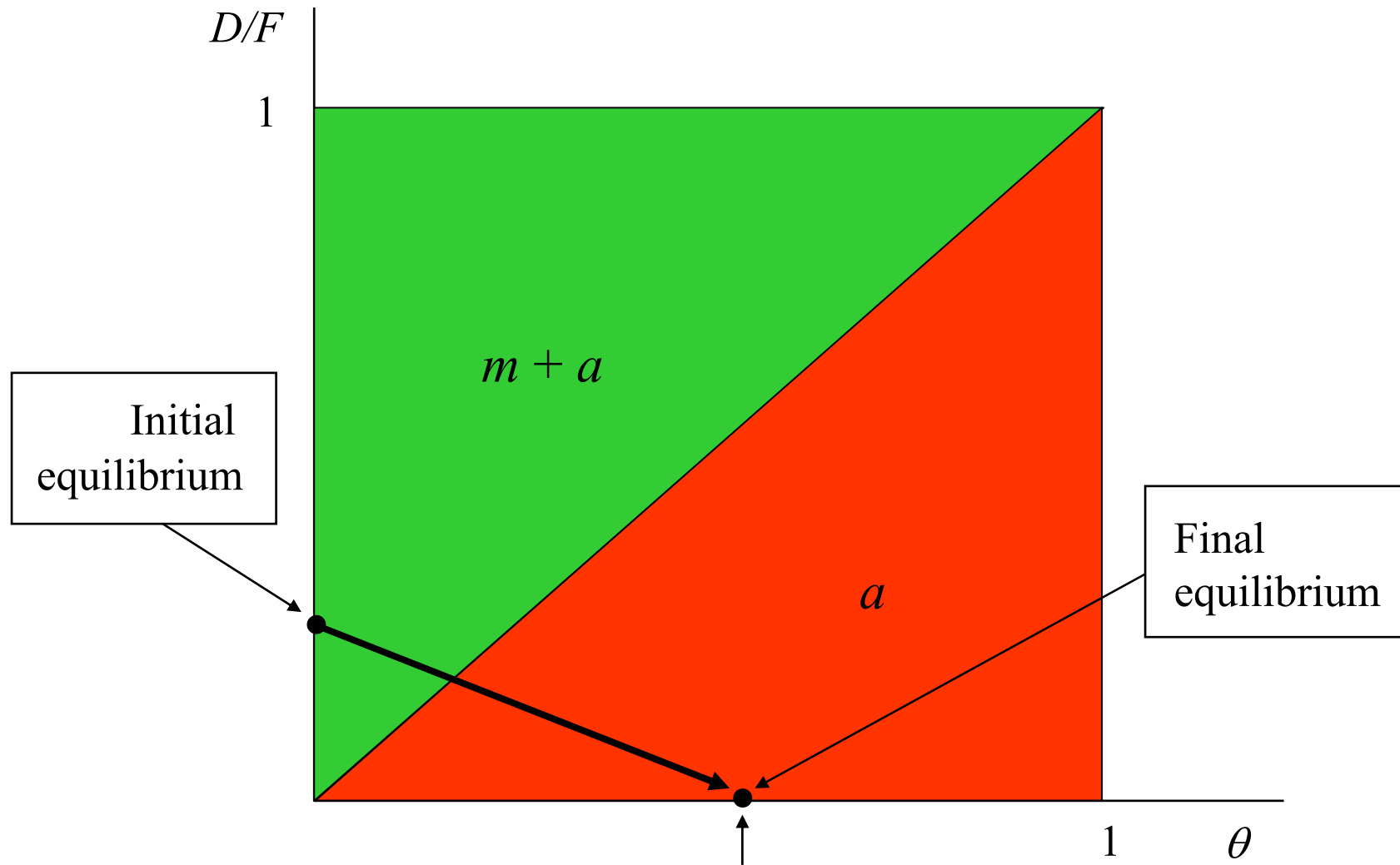


Discussion on Bech and Garratt

Main comment

- In a wide-scale disruption cost of delay D may go to zero
→ Reducing cost F will not restore m -equilibrium

Discussion on Bech and Garratt



Discussion on Bech and Garratt

Related comment

- What is the nature of the cost of delay D ? Why is $D > 0$?
→ Why banks pay in the morning?

Other comments

- Formal analysis is unnecessarily complicated
- No need to use potential function to characterize equilibrium
- Adjustment process is ad hoc

Discussion on Devriese and Mitchell

Issues

- What are the effects of a disruption in a SSS?
 - Disruption: Failure of largest participant to settle
- What is the appropriate policy response?

Discussion on Devriese and Mitchell

Setup

- Simulation model of a SSS with
 - Delivery-versus-payment (DVP) → no principal risk
 - Gross settlement with a 2-day lag
- N participants and K securities (+ cash)
- Initial random allocation of securities and cash
- Participants are paired randomly + trade randomly at $p = 1$
- No short selling or borrowing
- Settlement occurs in same order of trades

Discussion on Devriese and Mitchell

Analysis

- Assume largest trader fails to settle from day D onwards
- Compute direct and indirect effects from day D onwards
- Two measures of settlement efficiency (SE)
 - Total SE = settled trades / total trades
 - Indirect SE = settled trades / total trades excl. largest

Discussion on Devriese and Mitchell

Main results

- SE is decreases with
 - share of defaulting participant
 - net buy position of defaulting participant
- SE is lowest at date $D + 1$

Policy responses

- Allow negative cash positions (intra-day credit)
- Reduce lag between trading and settlement

Discussion on Devriese and Mitchell

Main comment

- Model doesn't analyze endogenous responses of participants
 - key for understanding second round effects
 - possible impact on prices

Discussion on Devriese and Mitchell

Other comments

- Calibrate simulation with parameters from a real market
→ relative size of participants, trades, etc.
- Summarize results with regression of SE on key parameters
- Analyze impact of failure of 2nd and 3rd largest participant
- Analyze impact of partial settlement of trades
- Allow for possible flows of cash in and out of the system

Discussion on Iyer and Peydró-Alcalde

Issues

- What are the contagion effects of a bank failure?
 - How important are interbank linkages?
- What is the appropriate policy response?

Discussion on Iyer and Peydró-Alcalde

Setup

- Indian co-operative bank (MMCB) failed
 - Bank run on 10-12 March 2001
 - Suspension of convertibility on 13 March 2001
- Data on 142 co-operative banks in same state
 - Deposits (D_{it}) at 31 March and 31 December 2001
 - Exposure with MMCB at 31 March 2001

Discussion on Iyer and Peydró-Alcalde

Estimated equation

$$\Delta \log D_{it} = \alpha + \beta(\text{controls})_i + \gamma(\text{exposure/assets})_i + e_i$$

Key variable



Discussion on Iyer and Peydró-Alcalde

Main results

- Coefficient γ is negative and significant
- Result is robust to introduction of many controls
- Support for information-based theories of bank runs
 - How depositors figured out exposure to MMCB?

Policy response

- Limit size of interbank exposures (to reduce contagion risk)

Discussion on Iyer and Peydró-Alcalde

Main comment

- No data over critical month (March 2001)
 - Need deposits before and after the crisis!

Discussion on Iyer and Peydró-Alcalde

Other comments

- Add quadratic term to capture possible non-linear effects
- Amplification results (via interbank connections) are weak

Final comment

- The average capital/assets ratio was only 1%!
 - These banks were extremely vulnerable to shocks
 - What happened before 31 March is especially relevant