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# Interbank Contagion: Evidence from Real Transactions

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The views that we express here today are our own and do not necessarily reflect the views of the ECB

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# Motivation

- Fear of systemic risk posed by interbank connections.

- U.S. Comptroller of Currency:

“Had Continental failed and been treated in a way in which depositors and creditors were not made whole, we could very well have seen a national, if not an international financial crisis, the dimensions of which were difficult to imagine. None of us wanted to find out.”

- To what extent is this fear justified?
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# Questions

- Do balance sheet connections among banks propagate a crisis?

In particular:

- Are depositors able to discern and run based on linkages?
  - Given a shock, how do interbank market interactions affect the unfolding of a crisis?
- How does disclosure of information affect the unfolding of a crisis?
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# Problems

- Vast amount of theoretical work (Allen and Gale, 2000; Dasgupta, 2005; Iyer and Peydró-Alcalde, 2005)
- Lack of data on interbank linkages
- Most of the existing literature is based on simulations
- Simulations ignore depositor reactions
- Equity market reactions (lack linkages)

In sum, there are models about contagion in the interbank market but there was no paper with an actual failure of a bank and linkages in the interbank market

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# Event description & Data

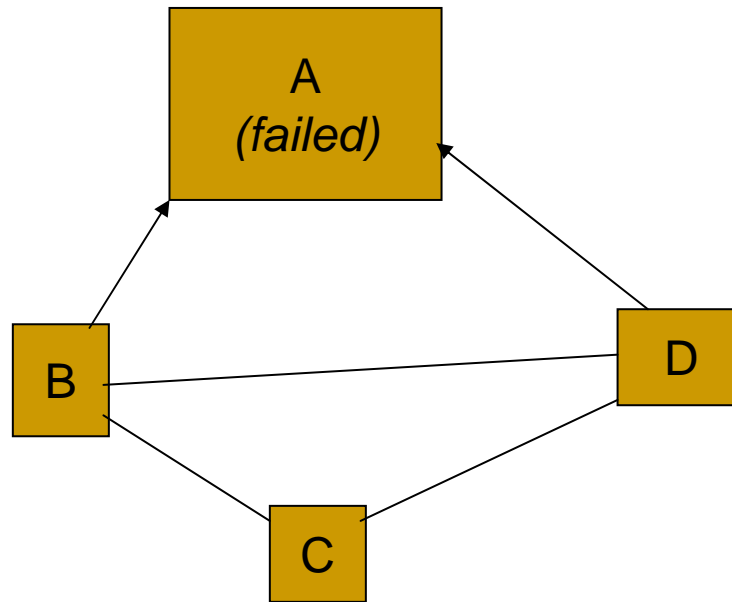
- We use the failure (due to fraud) of a bank in India.
  - We use the balance sheet linkages of banks with the failed bank to test for initial contagion of the shock.
  - Apart from linkages of each bank with the failed bank, we also have aggregate data on linkages of each bank with/from other banks in the system.
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# Time Line



# How do we test for Contagion?

Shock: Failure of a bank with large number of interbank connections.



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# Indian Banking System

- Co-operative banks
  - Depositors are not shareholders
  - Deposit insurance, but lags in implementation
  - Interbank market: Direct placement of deposits by banks and overnight market for funds
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## Summary Statistics

	Obs	Mean	Std. Dev.
Deposit change	142	-0.04	0.12
Exposure	142	0.03	0.05
Return on asset	142	0.01	0.01
Capital ratio	142	0.01	0.008
Credit ratio	142	0.63	0.16
Borrowing ratio	142	0.03	0.05
From_other	124	0.008	0.02
With_other	121	0.02	0.05
Size	142	9.16	0.77

# Effect of exposure with the failed bank on deposit flow (1)

	1	2	3	4
Exposure	-0.44** (0.20)	-0.63*** (0.23)	-0.71*** (0.23)	-0.63*** (0.24)
Return on asset		2.65* (1.38)	3.29** (1.36)	2.12** (0.91)
Size		-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Media		-0.19*** (0.05)	-0.19*** (0.04)	-0.19*** (0.06)
Weak		-0.07* (0.04)	-0.07* (0.03)	-0.07 (0.04)
Credit ratio			-0.17* (0.09)	
Borrowing ratio				-0.07 (0.36)
Capital ratio		-0.46 (1.21)	0.51 (1.39)	-0.42 (1.22)
cons	-0.03*** (0.01)	0.14 (0.17)	0.16 (0.17)	0.14 (0.17)
district controls	no	yes	yes	yes
No.of Obs	142	142	142	142
Adj R-squared	0.03	0.25	0.28	0.24

## Effect of exposure with the failed bank on deposit flow (2)

	1	2	3
Exposure	-0.74*** (0.28)	-0.66*** (0.20)	0.003 (0.25)
Return on asset	3.27** (1.34)	1.93** (1.00)	-0.81 (1.07)
Size	-0.01 (0.01)	-0.02 (0.01)	-0.03 (0.02)
Media	-0.19*** (0.04)	-0.19*** (0.05)	0.05 (0.04)
Weak	-0.07* (0.03)	-0.07* (0.03)	-0.13*** (0.04)
Credit ratio	-0.18* (0.09)		0.03 (0.08)
Borrowing ratio		0.002 (0.31)	
Capital ratio	0.42 (1.39)	-0.81 (0.99)	-1.48 (1.87)
MNCB banker	0.01 (0.01)		
Distance		0.00 (0.00)	
cons	0.19 (0.17)	0.16 (0.17)	0.30 (0.21)
district controls	yes	no	yes
No.of Obs	142	142	70
Adj R-squared	0.28	0.29	0.31

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# Initial Result

- Strong support for *contagion due to financial linkages*. In particular,

➔ Level of exposure of each bank with the failed bank is an important predictor of depositor runs.

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# Effect of outstanding interbank market claims (excluding the failed bank) on deposits

	1	2	3	4
Exposure	-0.66** (0.28)	-0.60** (0.29)	-0.65** (0.28)	-0.60** (0.27)
Return on asset	3.16* (1.61)	3.42** (1.52)	3.16* (1.62)	3.18** (1.65)
Size	-0.006 (0.01)	-0.014 (0.01)	-0.006 (0.01)	0.000 (0.01)
Media	-0.16*** (0.05)	-0.17*** (0.05)	-0.17*** (0.05)	-0.16*** (0.05)
from_other	-0.47 (0.48)		-0.16 (0.94)	-0.03 (0.38)
With_other		-0.13 (0.15)		
Interaction			- 0.34 (1.07)	
Interaction_1pct				-2.67*** (0.58)
Credit ratio	-0.10 (0.06)	-0.11 (0.07)	-0.10 (0.06)	-0.08 (0.06)
Weak	-0.08 (0.05)	-0.07 (0.04)	-0.08 (0.05)	-0.08* (0.05)
Capital ratio	-0.09 (1.47)	-0.20 (1.43)	-0.08 (1.47)	-0.63 (1.42)
cons	0.08 (0.18)	0.16 (0.18)	0.08 (0.18)	-0.08 (0.16)
district controls	yes	yes	yes	yes
No of obs	124	121	124	124
Adj R-squared	0.34	0.32	0.33	0.38

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# Main Results

- Strong support for *contagion due to financial linkages*:
    - Level of exposure of each bank with the failed bank is an important predictor of depositor runs.
    - Outstanding claims among banks in the interbank market intensify the impact of the initial shock conditional on the exposure with the failed bank.
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## Characteristics of banks that released information on their exposures

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Exposure	-5.93** (2.37)
Return on asset	-4.80 (13.68)
Size	0.53** (0.21)
Media	-1.36** (0.59)
MNCB banker	1.11*** (0.25)
Weak	-0.31 (0.40)
Capital ratio	20.26 (15.88)
Credit ratio	-0.87 (0.79)
cons	-5.42** (2.13)
Pseudo R2	0.18
No. of obs	142

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## Effect of information release on deposit flow

	1	2
Exposure	-0.72*** (0.27)	-0.68** (0.33)
Return on asset	3.28** (1.37)	4.9*** (1.56)
Size	-0.01 (0.01)	-0.01 (0.01)
Media	-0.19 *** (0.04)	-0.17*** (0.05)
Weak	-0.07* (0.03)	-0.03 (0.03)
Credit ratio	-0.17* (0.09)	-0.20 (0.14)
Information	-0.002 (0.02)	
Capital ratio	0.54 (1.45)	-0.30 (2.2)
cons	0.18 (0.17)	0.17 (0.19)
district controls	yes	yes
No.of Obs	142	97
Adj R-squared	0.27	0.27

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# Conclusions

- Linkages are important to transmit shocks (even though the level of transparency is low)
  - Outstanding interbank claims increase the sensitivity of the initial shock in the system conditional on exposure with the failed bank.
  - We analyze the release of public information during a crisis.
    - Destabilizing effects of media.
    - We shed light on voluntary release of information by banks.
  - Important policy implications:
    - Ex-post (Crisis Management: LoLR and forbearance of bail-outs)
    - Ex-ante (limits in interbank exposure).
  - In high transparency settings with higher sophistication of the participants, random transmission of crises should be even lower.
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