

Understanding Bank Runs: Do Depositors Monitor Banks?

Rajkamal Iyer (MIT Sloan), Manju Puri (Duke Fuqua)
and Nicholas Ryan (Harvard)



"Scuse me, Buddy, is this the bread-line or a run on a bank?"

Bank Runs



Bank Runs

- Bank runs were a prominent feature of the Great Depression era; prompted introduction of deposit insurance. Fear of bank runs behind much of capital adequacy standards.
- Bank capital structure mismatched: short-term (demandable liabilities and long-term assets. Fragile by nature (Diamond and Dybvig, 1983).
- Why are banks structured in this way? Can depositors and policy-makers mitigate fragility?

Literature

- Leading theories of banking emphasize the importance of fragility as a commitment mechanism for banks
 - Calomiris and Kahn, 1991- Informed depositors monitor and trigger a run if bank faces solvency risk
 - Diamond and Rajan, 2001- depositors punish ex post by running on the bank than monitor actively
- Empirical work:
 - Several papers have examined whether extent of depositor runs are larger for banks with weaker fundamentals (Saunders and Wilson, 1994; Calomiris and Mason, 1997) -providing support for information based theories
 - However even in case of a solvent bank there is some amount of panic
 - Iyer and Puri (2012) examine micro level depositor data for a solvent bank that experienced a panic
 - Uninsured depositors are more likely to panic
 - Depositors with loan linkages less likely to panic

Empirical Questions

- When a bank faces solvency shock are some types of depositors more likely to run?
- What is the timing of their withdrawals?
- Do depositors behave in the same way or differently in fundamental and non-fundamental shocks?
- Can depositors distinguish shocks to bank solvency from noise?

Empirical Hurdles

- Shock to solvency of the bank when the economy is doing well
- Detailed depositor level data along with depositor characteristics
- Another non-fundamental shock to compare the behavior of depositors

Our Setting

- Study bank run in India precipitated by a shock to bank solvency - fundamental shock.
- The bank experienced large non-payment of dues which led to a build up of bad loans
- The build up is followed by a central bank audit that is private information
- This audit is followed, after a month, by public regulatory action wherein the central bank imposes severe restrictions on the bank's activity
- Finally after a few months the bank is placed in receivership

Institutional details

- Study a community bank in India

- Similar to community bank in the U.S.
- 30000 Depositors, 8 branches
- Depositors do not have to own shares

- Regulated by the Central Bank

- Reserve Bank of India
- Deposit Insurance, \$2000 (Rs. 100000)
- Delays in implementation of Deposit Insurance

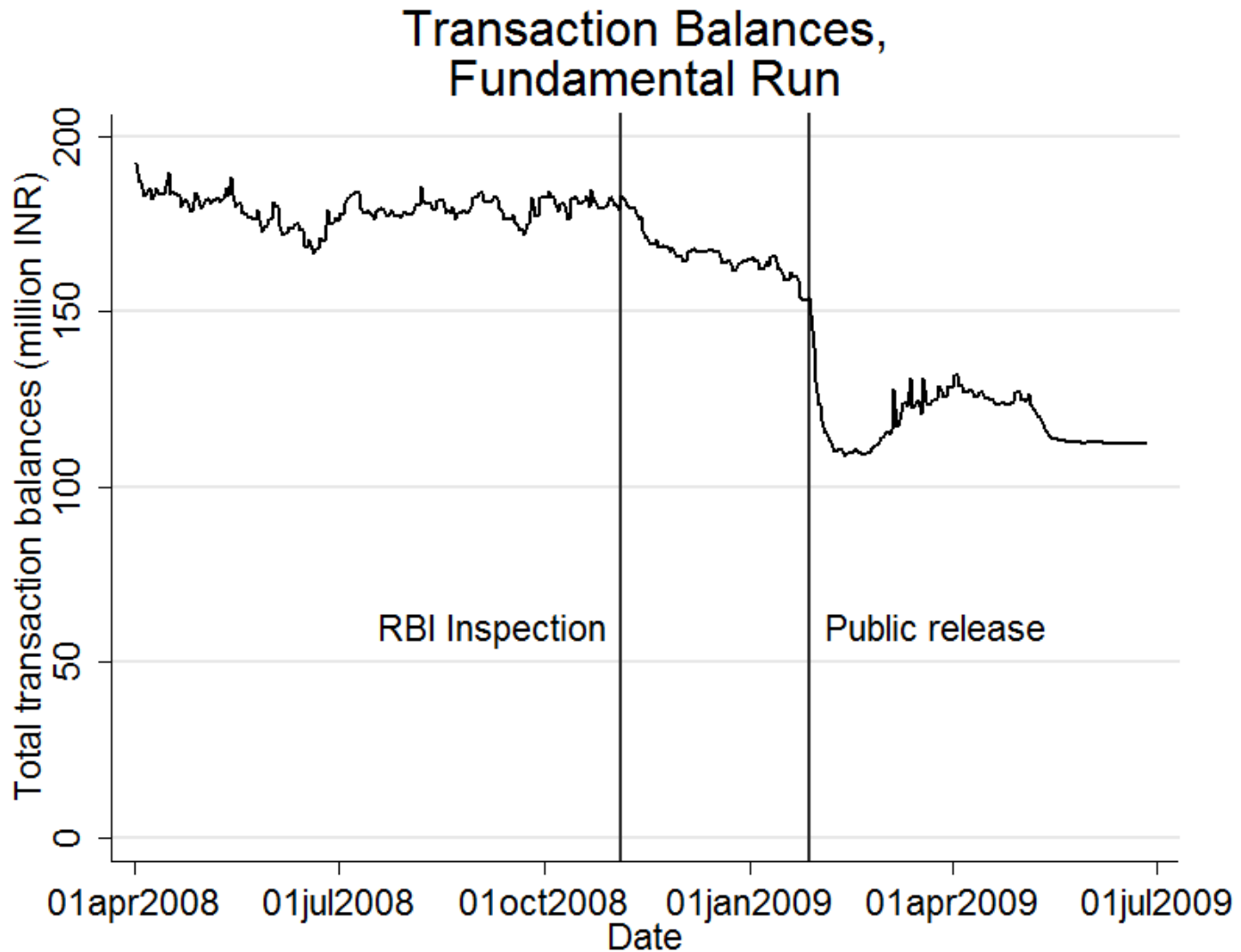
- Conditions of the Economy

- Economy doing well
- Other banks gaining deposits
- Previous failure where uninsured depositors were not made whole

Micro-level depositor and borrower data

- All deposit balances, transactions and loans from January 2000 through December 2005 and from April 2007 through June 2009.
- Liquidation generally defined as the withdrawal of 50% of current account balances during the run week.
- Covariates on transaction history, family, staff status and loan linkages.
- Depositor introducer networks from those signing on behalf of new depositors.
 - Define network as anyone who introduced depositor, was introduced by the same person that introduced depositor, or whom depositor introduced.

Evolution of Transaction accounts



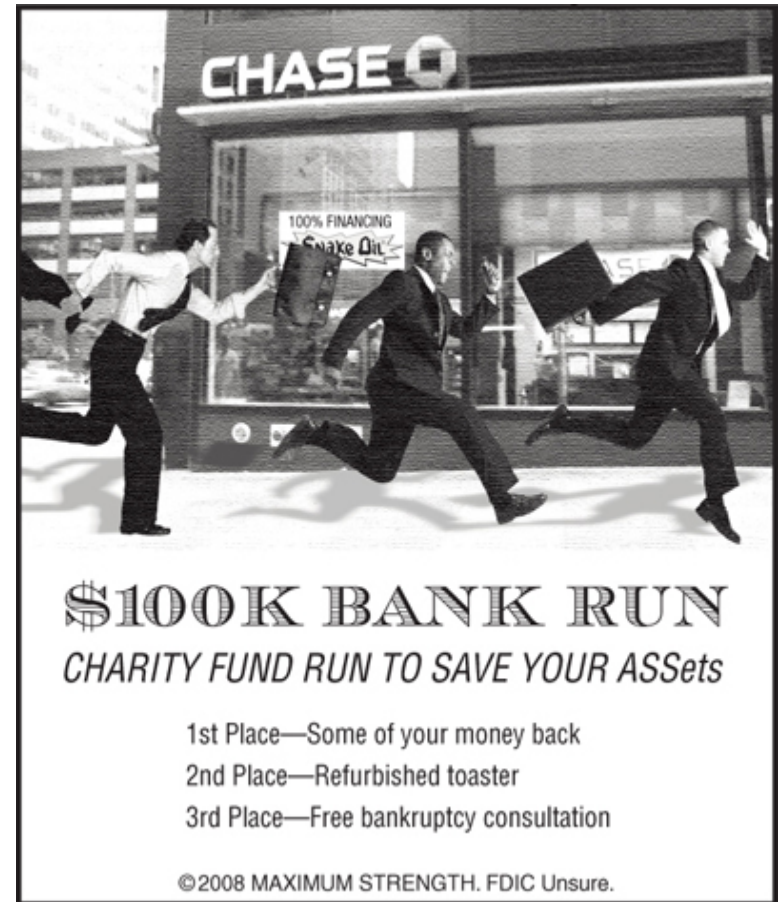
Uninsured depositors withdraw at much higher rates

Table 2: Liquidation by Balance Bin, Fundamental Shock

	Initial transaction balance		
	lt Rs 1k	in Rs [1k,100k)	ge Rs 100k
<i>Panel A. During Run Week (Public release to 7 days after)</i>			
Liquidation (Withdraw 50%=1)	0.01	0.09	0.29
Withdrawal (Amount)	32.25	1,701.56	54,283.26
<i>Panel B. Including Pre-period (90 days before to 7 days after)</i>			
Liquidation (Withdraw 50%=1)	0.01	0.17	0.65
Withdrawal (Amount)	-146.20	1,672.06	155,146.08
Observations	29852		

Empirical Analysis

- First examine what classes of depositors run when there is a public release of information regarding regulatory action.
 - Uninsured
 - Length of relationship with the bank
 - Loan linkages
 - Networks
 - Insiders
- Then examine behavior of depositors before the public release of information.
- Then compare behavior of depositors in fundamental shock versus non-fundamental shock.



Who runs after public disclosure of regulatory action? Model for Liquidation, Fundamental

Table: Models for Liquidation, Fundamental

	(1) LPM	(2) LPM
Depositor or family has loan (d)	0.044** (0.020)	0.038* (0.020)
Age of account in years at run	-0.0066*** (0.0010)	-0.0043*** (0.0010)
Depositor or family is staff (d)	0.022** (0.0091)	0.027*** (0.0091)
Mean daily trans. dummy, year prior	0.90*** (0.055)	0.82*** (0.053)
Trans. balance, '000s, 90 days prior	0.00055*** (0.00014)	
Bal in Rs [1k,100k) (d)		0.053*** (0.0028)
Bal ge Rs 100k (d)		0.17*** (0.030)
Observations	29852	29852

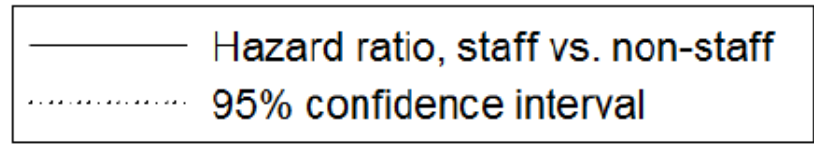
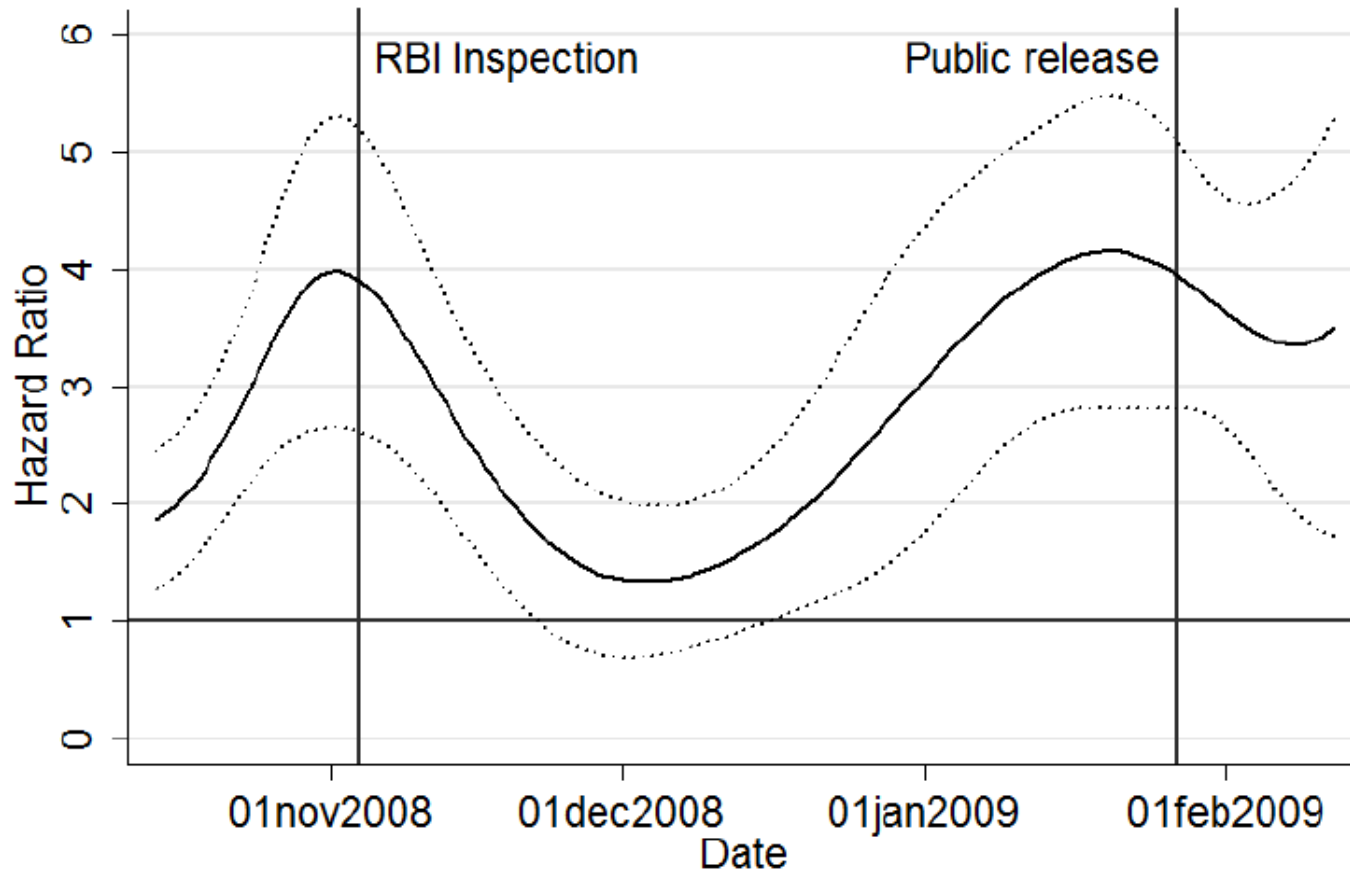
Who runs?

- **Deposit Insurance:**
 - Depositors over insurance coverage limit are more likely to withdraw
 - Below limit, higher account balance increases likelihood of withdrawal
- **Relationships:**
 - Higher the age of account lower the likelihood of withdrawal
 - Loan linkages: Increases likelihood of withdrawal
- **Insiders (Staff) are more likely to run**
- **Results unchanged with inclusion of branch (8 branches) or neighborhood (292 neighborhoods) fixed effects**

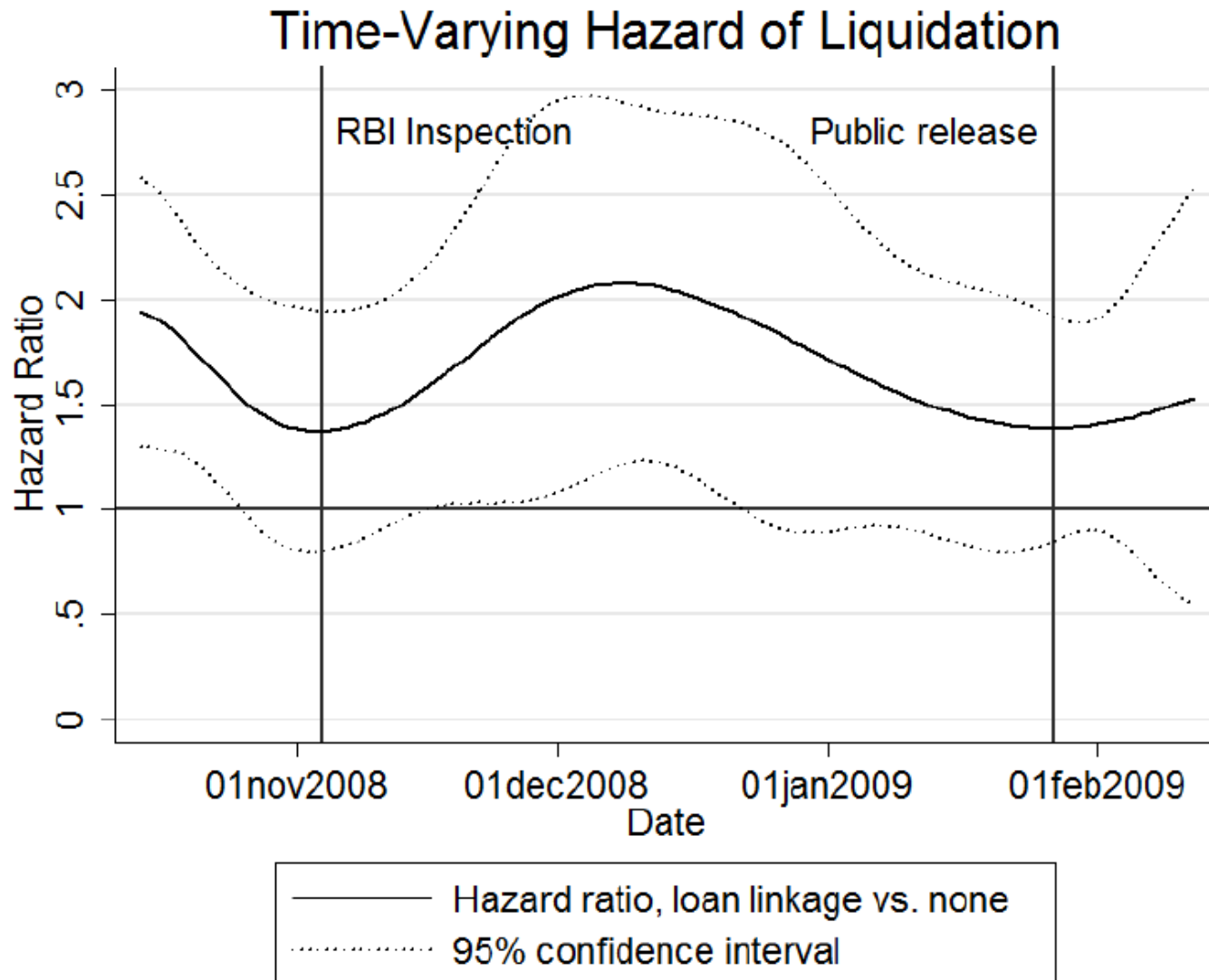
Timing of runs: Who runs prior to the public information release?

Hazard ratio: Staff vs Non-Staff

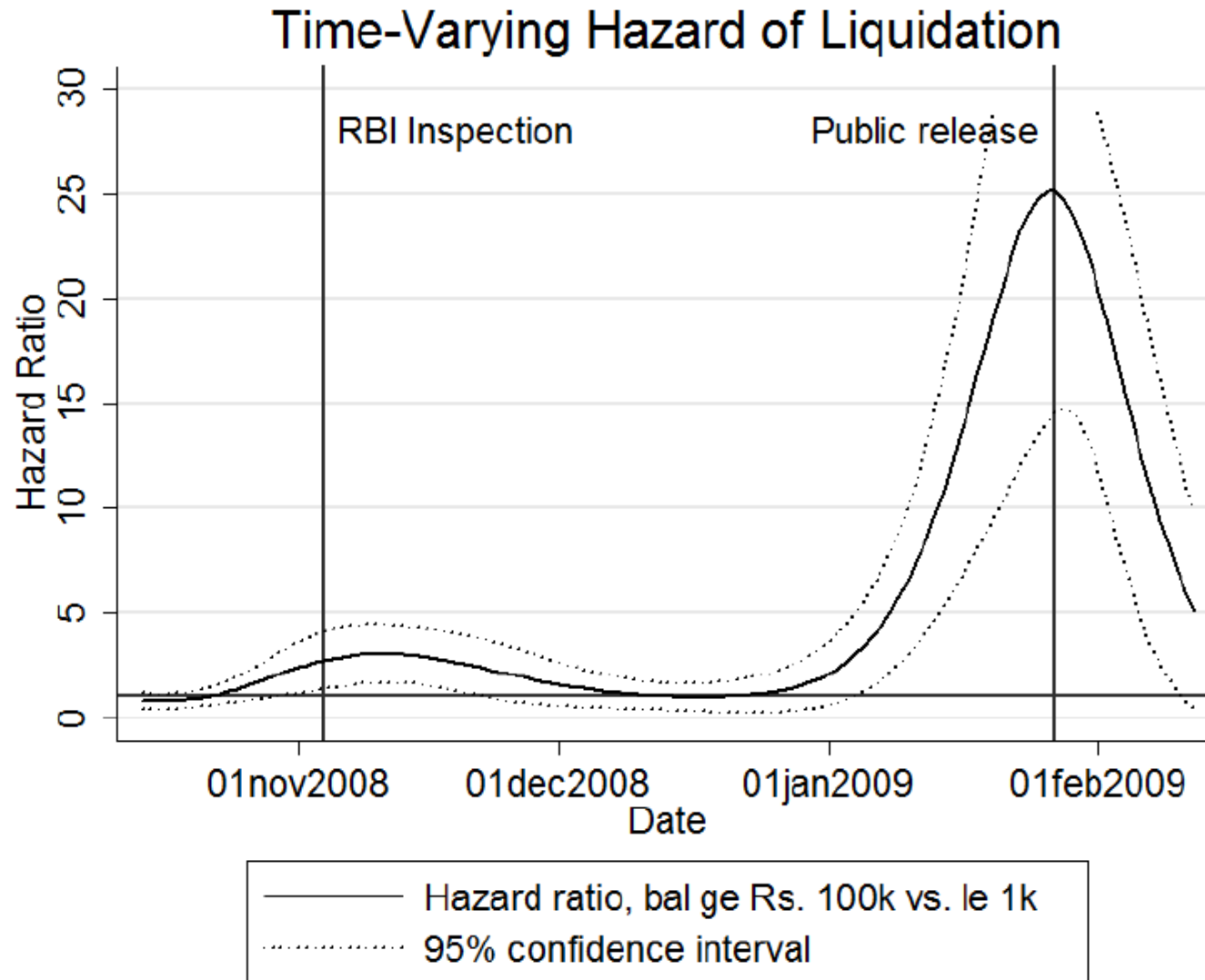
Time-Varying Hazard of Liquidation



Hazard Ratio: Loan linkage vs None



Hazard Ratio: Uninsured vs Insured



Results: Runs before the public release of information

- Staff are the first to respond
- Uninsured depositors are also more likely to withdraw prior to the public information release
- Depositors with loan linkages also exhibit a tendency to withdraw earlier (less stark)
- Network member running associated with higher hazard of liquidation

Do Depositors run before the central bank audit (based on fundamentals)?

- We examine withdrawal behavior around the time the balance sheet for year ended March 31, 2008 is released on 2 Sept 2008.
- Redo our analysis around these dates.
- Find no evidence of abnormal withdrawals by depositors (insured or others) except for staff.
- Did depositors not withdraw earlier because they were compensated for risk by getting higher interest rates? No evidence of this.

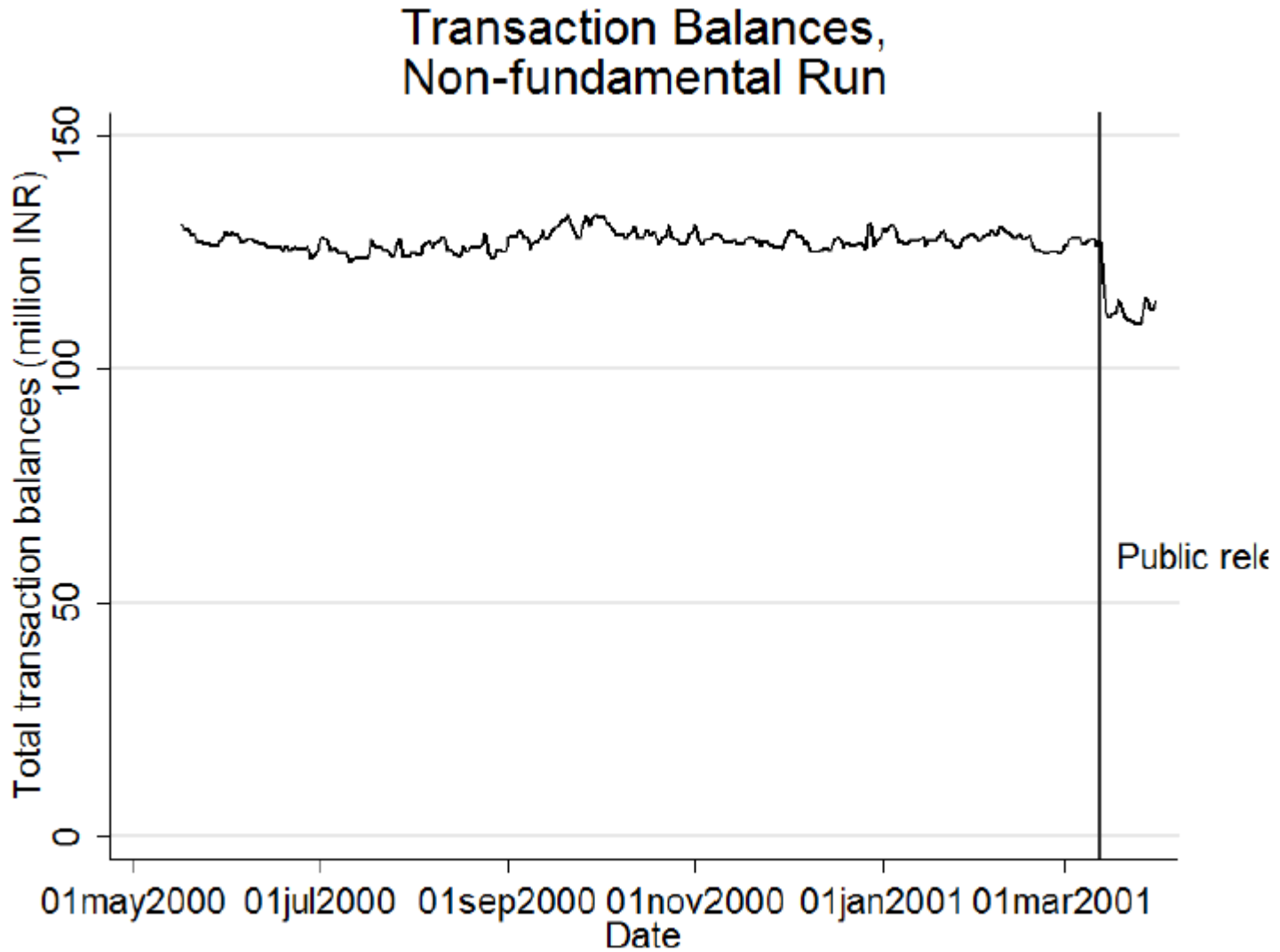
Interpretation

- Uninsured depositors and depositors with loan linkages coordinate their actions around the regulatory audit.
- The information from the audit is privately accessed by these depositors potentially through loan officers and/or other bank staff.
- Existing models do not have a regulator monitoring the bank
- Results suggest that in the presence of a regulator, depositors rely primarily on regulatory signals to coordinate their actions.

Do Uninsured Depositors always run at the first sign of trouble?

- Policy implications: very different if uninsured depositors always withdraw at the slightest hint of trouble
- Ideally: Compare how uninsured depositors behave in a fundamental versus non-fundamental shock.
- Implications for design of deposit insurance policies

Transaction Balances, Non-Fundamental Run



Comparison of magnitude of runners: fundamental vs panic

Liquidation run week	Bal lt Rs 1k	Bal in Rs (1k,100k)	Bal ge Rs 100k
Fundamental shock	0.01	0.09	0.29
Non-fundamental shock	0.02	0.11	0.17

Creation of a “constant” sample

- We create a sample of depositors who were present in both runs.
- Compare differential way that these depositors run in fundamental and non-fundamental shock.

Constant Sample

	Pooled	Fixed Effects
Depositor or family has loan	-0.013 (0.0090)	-0.0053 (0.012)
Age of account in years	-0.0022*** (0.00058)	-0.0024*** (0.00077)
Depositor or family is staff	-0.022 (0.020)	0.017 (0.036)
Mean daily trans. dummy , year prior	1.39*** (0.095)	1.28*** (0.15)
Bal in Rs [1k,100k)	0.070*** (0.0053)	0.074*** (0.0080)
Bal ge Rs 100k	-0.013 (0.044)	0.013 (0.062)
Loan linkage X fund. shock	0.039 (0.028)	0.080** (0.032)
Account Age X fund. shock	0.00080** (0.00040)	0.00010 (0.00049)
Staff X fund. shock	0.031 (0.024)	0.030 (0.032)
Bal in Rs [1k,100k) X fund.	-0.029*** (0.0064)	-0.020*** (0.0069)
Bal ge Rs 100k X fund.	0.20*** (0.065)	0.24*** (0.081)
Constant	0.011*** (0.0023)	0.011*** (0.0039)
Observations	21728	21728

Summary of Results

- Uninsured depositors response is higher in fundamental shock.
- Depositors with loan linkages also react more in a fundamental shock.

Conclusion

- Our results suggest some kinds of depositors (uninsured) “monitor” banks.
- However, need to be careful in inference
- For small banks the form of “monitoring” by uninsured depositors appears to be of regulatory actions. Suggests that for small community banks depositors rely on regulators to take the lead in monitoring and follow.
- There can be differences in depositors of large and small banks. E.g, Rajan have argued that small banks may have less sophisticated depositors who behave differently.

Regulatory Implications

- Narrow banking: Depositors with loan linkages run more in fundamental shock and are less likely to run in non-fundamental shock
- Benefits to having deposit taking and lending under the same institution
- Basel III- Stable deposits: analysis helps shed light on behavior of different types of depositors, age of the account, loan linkages are much more stable.
- Regulatory signals play an important role in coordinating depositor runs
- Improving the quality of regulation and proper disclosure of regulatory information is important.
- For smaller banks where the role of public markets is minimal, regulator plays a very important role in monitoring and it is difficult to place the burden on uninsured depositors.

Thank You!

