

Who Runs? The Importance of Relationships in Bank Panics

Rajkamal Iyer[&] and Manju Puri[£]

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Abstract

Do individual depositor characteristics matter in bank runs? We use a unique data set that provides exhaustive details on individual depositor characteristics in conjunction with a bank run to study if cross-selling, relationships, social networks and distance affect depositor behavior in times of panic. We find that depositors that have availed of loans from a bank have a lower likelihood of withdrawing during a panic, suggesting that cross-selling acts not just as a revenue generator but also as a complementary insurance mechanism for the bank. Further, we find that depositors with longer duration of relationship with a bank are less likely to panic. Finally, we find that the ethnic status of depositors affects depositor panic. Our results suggest that relationships with a bank play an important role in influencing depositor panic and in turn hold important policy implications.

[&] University of Amsterdam, Department of Finance, Roetersstraat 11, 1018 WB, Amsterdam, Netherlands. Email: R.J.Iyer@uva.nl

[£] Fuqua School of Business, Duke University, 1 Towerview Drive, Durham NC-27708, and NBER. Email: mpuri@duke.edu

1. Introduction

Bank runs are situations where depositors withdraw their deposits from banks for the fear of the safety of their deposits. Most of the existing theoretical literature assumes that depositors are homogeneous except in terms of the timing of their liquidity needs (Diamond and Dybvig, 1983). However, depositors could differ on many dimensions, some of which might be important for bank runs. Some potential factors, among others, are the length and breadth of the relationship with the bank; the impact of social networks; physical proximity of the depositor. Hence an interesting question is whether depositor characteristics matter during bank panics; in particular do they affect depositors' incentive to run. Given the large costs associated with bank failures understanding the factors that affect depositor behavior in a crisis is of utmost importance.¹

There are several possible reasons why depositor characteristics could matter during a bank panic. A large literature suggests that bank-firm relationships are beneficial to firms (see e.g., Petersen and Rajan, 1995). A growing literature expands on the importance of cross-selling multiple products to the same firm for increased revenue generation (Drucker and Puri, 2005; Bharath et al., 2006). The length and depth of the relationship of depositors with the bank could mitigate depositor incentive to run. Social network of depositors could also play an important role in bank runs as it could act like a channel for word of mouth contagion (Kelly and O' Grada, 2000). With regard to geography, on the one hand geographical proximity could reduce information asymmetry and therefore reduce depositor incentive to run (Mian, 2005); on the other hand geographical proximity could increase depositor incentive to run as it lowers the shoe-leather costs of running.

Despite the importance of understanding the factors that affect depositor behavior during a crisis, empirical research has been hampered due to lack of detailed data at depositor level. In this paper, we overcome this hurdle by using a unique data set from India that provides us with exhaustive details of accounts at depositor level for a bank. To conduct the analysis, we use this data set in conjunction with a shock that triggered a run on the bank. The shock, which triggered

¹ Even if there is no failure, loss in deposits could lead banks to cut down on loans, which could impose high costs on borrowers in the presence of information asymmetry.

the run, was caused by the failure of a large bank due a fraud. The bank that we use for this study had no fundamental linkages with the failed bank in terms of interbank linkages or loans outstanding with the failed bank. Furthermore, the bank that we use for this study faced depositor withdrawals for a few days after the date of failure of the large bank. There were hardly any significant withdrawals in the following period with activity returning to pre-panic levels.

Using the depositor level data, we first create proxies for different dimensions across which depositors differ. We proxy for depositor relationships with the bank using two measures. The first is the age of the account which measures the length of the relationship. The second is whether the depositor avails of loans from the bank, suggesting the relationship is multi-pronged or has more depth than as suggested by simply holding an account. We identify social networks of depositors based on his/her ethnic group. We sort depositors primarily into two categories Minority (Muslims) and Non-Minority (Hindus) using the last name of the depositor.² Finally, we also create a measure for the geographical proximity of the depositor to the bank using the address of the depositor. To identify depositors that run, we categorize a depositor as panicker if he/she liquidated more than 75% of his/her deposits in the three days following the date of the failure of the large bank.³ The deposit insurance limit in India is Rs 100000 (\$2000). We additionally test how significant the effect of the deposit insurance limit is in bank panics.

We find that longer the duration of the deposit account lower the likelihood of a withdrawal during the panic. Interestingly, we find that depositors that have a loan linkage with the bank are less likely to panic. We do not any effect of geographical distance on depositor behavior. The ethnic status of the depositor also has an effect on the likelihood of a withdrawal. Depositors belonging to the minority community are more likely to panic during a crisis. We also find that depositors with accounts that have outstanding balance over the deposit insurance limit are more likely to withdraw. Finally, even if we consider accounts below the deposit insurance limit, we find that account balance positively influences the likelihood of a withdrawal.

² From the last name of the depositor we identify if he/she is a Hindu or Muslim.

³ We also use other thresholds like 50% and find that none of the results of the paper are altered.

To further examine the importance of loan linkages, we investigate whether depositors who have deposits above the deposit insurance limit and have loan linkages, differ in their behavior. Surprisingly, we find that while depositors holding balances above the deposit insurance limit are more likely to panic, depositors with loan linkages holding balances above the deposit insurance limit are in fact less likely to panic. We also find depositors with loan linkages that belong to the minority community are less likely to panic, while other minority community depositors are more likely to panic.

Why are depositors with loan linkages less likely to withdraw? There are several possibilities: 1) Even though, by regulation banks are not allowed to set-off deposits outstanding with the bank against loans outstanding in the event of failure, depositors with loan linkages might perceive a set-off and therefore might be less likely to panic. 2) Depositors with loan linkages could be subject to a hold-up problem, as they may fear that in case they withdrew their deposits and the bank survives the crisis, the bank could pull back on their credit in future. 3) Depositors with loan linkages could have better relationships with the bank, more trust in the bank's safety and soundness, and therefore are less likely to panic. 4) Finally, depositors with loan linkages might differ from other depositors in terms of education, wealth etc that might make them less likely to panic.

To further disentangle the effect, we investigate the behavior of depositors that had availed of a loan in the past but have no loan currently outstanding. Interestingly, we find that even depositors that had availed of a loan in the past are also less likely to panic. This suggests that the behavior of depositors with loan linkages is not driven by the perceived set-off (natural hedge). Also, the hold-up by the bank is unlikely to be a concern of depositors with past loan linkages.

As it could be possible that depositors with loan linkages might differ as compared to other depositors in unobservable dimensions (which could be the driver of the results), we look at the behavior of depositors who originate their first loan relationship after the crisis. As it is likely that these depositors are similar in unobservable dimensions to depositors with loan linkages, if unobservable characteristics are the main driver, depositors that started their loan relationship after the crisis should also be less likely to panic. We do not find any difference in the behavior

of depositors with future loan linkages as compared to other depositors. These findings suggest the behavior of depositors with loan linkages is most likely a product of relationship.

We further examine importance of minority community affiliation by investigating whether depositors of the minority community that share the same last name as the board of directors of the bank differ in their behavior. Interestingly, we find that depositors of the minority community that do not share the same last name as the board of directors are more likely to panic as compared to other non-minority depositors. This finding further highlights the importance of relationships.

We also find that the effects of the panic are long lasting. Of the depositors that withdrew during the crisis, only in a fraction of the cases does the account balance return to pre-crisis levels even after two months of the crisis. Further, we do not find that the aggregate level of deposits of the bank return to the pre-crisis levels in the short run.

Our paper contributes to the existing literature in a number of ways. First, our paper finds evidence on the the importance of relationship banking in influencing depositor behavior during a panic. We find that cross-selling of products by a bank to depositors reduces depositor panic. While the importance of cross-selling has largely been thought to be in revenue generation (Drucker and Puri, 2005; Bharath et al., 2006), our evidence suggests that cross-selling of products by a bank is important in protecting the downside risk as it acts as a complementary insurance mechanism. Second, our paper contributes to the literature that highlights the importance of coexistence of deposit taking and lending (Kashyap et al., 2002) by pointing towards the benefits of tying deposits and loans to the same depositor. Third, our paper also adds to literature that studies the real effects of bank failures as we find that effects of panics are long lasting are not reversed in the short run. Our paper also speaks to the role of depositor insurance in banking panics by highlighting the costs associated with delays in implementation of deposit insurance. Finally our results also highlight the importance of social networks.

The remainder of the paper is organized as follows. Section 2 describes the institutional setting. Section 3 provides details of the event. Section 4 describes the data set. Section 5 presents the results. Section 6 concludes.

2. Institutional Details

Before we proceed further, a brief summary of the institutional setting is helpful to set things in perspective. The Indian banking system primarily constitutes of three types of banks: public sector banks, private banks and cooperative banks. The cooperative banks in each state have a three tier structure. At the top of the chain is the state cooperative bank, followed by the local district central cooperative bank, and then the urban cooperative banks.⁴ Cooperative banks' deposit base primarily constitutes of small depositors. Given the emphasis of cooperative banks for rural development, it is mandatory for cooperative banks to lend at least 60% of their loan portfolio to the 'priority' sector.⁵

The main regulatory authority of the banking system in India is the Reserve Bank of India (RBI). Cooperative banks, however, come under dual regulation, i.e. they are supervised by the RBI as well as by the local state government. The RBI is responsible for monitoring the banks portfolios while the state government is responsible for governance issues. The insurance cover granted under the deposit insurance scheme is Rs. 100,000 (approximately 2,000\$) for each account.⁶ Though deposit insurance is present, there are several delays in processing the claims of depositors, as the central bank first suspends convertibility when a bank approaches failure. After suspension of convertibility, the central bank takes a decision of whether to liquidate a bank or arrange a merger with another bank. During this period depositors are allowed a one time nominal withdrawal up to a maximum amount that is stipulated by the central bank.⁷ An important point to take note off is that in case of failure of a bank, the deposits held by a

⁴ The state co-operative bank and district central co-operative bank can be considered as public banks as they are under control by the local governing body of the state.

⁵ The priority sector constitutes primarily of small scale industries. It is not mandatory for banks directly to lend to the priority sector. Another way banks can fulfill this mandate is by placing their money in other government institutions that are engaged in priority sector lending. For a detailed discussion on priority sector lending see Banerjee and Duflo (2002).

⁶ The deposit insurance is based on a flat premium. See www.dicgc.org.in.

⁷ In most cases, depositors are allowed a one time withdrawal of up to Rs. 5,000 (100\$) per account.

depositor are not allowed to be adjusted against loans outstanding. The stipulated cash reserve ratio and statutory liquidity ratio to be maintained by the banks are 5.5% and 25% respectively.⁸ One point to take note of is that depositors of cooperative banks are not required to hold an equity claim in the cooperative bank. Thus the cooperative structure of the banks does not lead to significant differences in characteristics of depositors as compared to banks with other ownership structures. Also, shareholders of cooperative banks have limited liability.

3. Event Description

We now turn to the description of the event that we use in this paper. The whole episode started with a fraud in the largest cooperative bank named Madhavpura Mercantile Cooperative Bank (hereafter referred to as MNCB) in the state of Gujarat.⁹ MNCB had granted loans to stock brokers without appropriate collateral in contravention of the guidelines prescribed by the central bank.¹⁰ The amount of loans given to stock brokers amounted to nearly 80% of the deposit base (Rs. 10 billion were advanced as industrial loans to stock brokers without appropriate collateral). In early March 2001, as the stock market experienced a major downward trend, rumors were floating around that MNCB was experiencing liquidity problems due to over-stretched lending to stock brokers. This led to a run on the bank on 10th, 11th, and 12th of March 2001. As the bank failed to repay depositors on the 13th of March 2001, the central bank temporarily suspended convertibility and restrained the bank from making payment to depositors beyond Rs. 1,000 per account.¹¹ The failure of MNCB triggered runs across other cooperative banks in the state. An important aspect of the MNCB failure (apart from the fact that MNCB was the biggest cooperative bank in the state) was that it had a significant number of banks connected to it via interbank transactions. Out of the total deposit base of Rs. 12 billion, deposits from other banks constituted about Rs. 6 billion. The primary reason for a large number of connections was due to

⁸ Statutory Liquidity Ratio (SLR) is the one which every banking company shall maintain in India in the form of cash, gold or unencumbered approved securities, an amount which shall not, at the close of business on any day be less than such percentage of the total of its demand and time liabilities in India as on the last Friday of the second preceding fortnight.

⁹ See www.manupatra.com/downloads/JPC/part%201.pdf.

¹⁰ Co-operative banks were not allowed to have direct exposure to stock market or lend to stock brokers. They were, however, allowed to lend to an individual against collateral of shares up to Rs. 1 million if the shares are in physical format, and up to Rs. 2 million if the shares are in demat (electronic) format.

¹¹ See the report of the Joint Parliamentary Committee at www.manupatra.com/downloads/JPC/part%201.pdf

the fact that MMCB had a status of a scheduled bank, allowing it to carry out multi-state operations.¹²

After the collapse of MMCB there was a huge debate whether MMCB should be bailed out. The revival scheme was organized in terms of a privately arranged bailout. However, the revival scheme was a non-starter.

4. Data

We obtain data from a cooperative bank that was located in the same city as the failed bank. After the failure of the large cooperative bank this bank faced runs in the subsequent days. In terms of deposits, the total deposit base of this bank was approximately, Rs 300 million. More importantly for our analysis, this bank hardly had any exposure to the failed bank. The exposure was 0.001% of the total assets. Also, this bank did not have any correspondent banking relationship with the failed bank.

Firstly, we obtain all the transactions for the depositors that have an account at the head quarters of the bank (the bank had 2 branches with the bulk of the deposits in the head office). The transaction data provides us details of every transaction undertaken by a depositor in the period between January 2000 and January 2002. For each transaction, we can also identify whether it is a deposit or withdrawal. We also have the opening balance of each account at the beginning of the month. This enables us to compute the total balance in each account and also the daily inflow and outflow in each account. For each deposit account we also have details of the date on which the account was opened along with information about the name of the depositor and the address of the depositor. Apart from the details of deposit accounts, we also have information on the loans that have been made by the bank. For the loan accounts also we can identify the name of the person who has taken the loan, the address, the type of loan and the amount of loan availed. One important point to take note of is that any person can avail of loans

¹² Co-operative banks have branching restrictions similar to those which existed in the United States. A scheduled bank status is granted by the central bank if the bank meets certain norms in terms of deposit base and capital adequacy

from the bank as long as he/she meets the requirements.¹³ For the fixed deposit accounts, we have information on the name, address, the initial amount of the term deposit, the maturity amount, maturity date and the date at which the term deposit was liquidated. Our data set also allows us to identify the mode of each transaction undertaken. For instance, if on any of the days there is a withdrawal made from an account, we can identify if the withdrawal was made in person or through a cheque that was processed through the clearing house or through an internal transfer. An important point to note is that the bank did not have any automatic teller machines (ATM's).

To construct the variables that we use in this paper, we first use the data on daily transactions and compute the outstanding balance in an account on a daily basis. Thus for each account we compute the balance at the close of each day. The difference in the daily balances provides us information on whether there is a net inflow or net outflow from the account for the interval. To make sure that the algorithm we use to compute daily balances is correct, we compare the balance that we obtain at the end of the month using our algorithm with the monthly closing balance for each account provided by the bank. We do not find any difference in these two variables. We also compute the length of the days the account has been active by computing the difference between the opening date of the account and the 13th of March, 2001. Note that as computerization of the bank data occurred only in April, 1995, for some accounts the information on the opening date is not filled. These accounts had been opened before the 1st of April 1995. We assume the opening date of these accounts to be 1st of April 1995 for computation. This provides us with the duration of each account as on the 13th of March, 2001. To obtain the total number of transactions undertaken by an account, we count the number of transactions for an account beginning the 1st of January 2000 till the 13th of March 2001. For example, if an account had 4 transactions in the period between 1st of January and 13th of March, 2001, we record the total transaction count as 4 for that account.

To determine if there are loan linkages associated with an account, we first match all the accounts by the name and address associated with the account. Thus for each account we have two separate matches. The name match indicates whether there is another account with the same

¹³ The bank was set up with an objective to foster local development.

name. The address match indicates whether there is another account that has the same address. The name and address match algorithm that we use provides a unique number to two accounts that have the same name and similarly another unique number if two accounts have the same address. We then use these matches, to create a unique identifier for accounts that are associated either by name or address. As a validity check, we also randomly picked some matches obtained using the algorithm and manually checked them. This identifier acts as indicator of accounts that belong to the same household. As loans could be taken by any member of the household, we define an account to have a loan linkage if any member of the household has/had a loan outstanding with the bank. Thus, loan linkage is a dummy variable that takes the value of one for an account if any member of the household has/had a loan outstanding with the bank on/before the 13th of March 2001. In defining the loan linkages we exclude loans that are taken against fixed deposits with the bank. as these also have restrictions in terms of liquidation of deposits.

To determine the ethnic status of a depositor, we first use an algorithm that sorts depositors based on their last names. The two main ethnic groups which depositors belong to are Muslims and Hindus (Gujarati). In most of the cases it is very easy to identify the ethnic profile of a depositor based on the last name. However, since we do not have an exhaustive of last names that are associated with Muslims or with Gujaritis', we manually categorize the ethnic status of each depositor. The manual procedure always helps in correctly categorizing depositors that could have the same surname as a Hindu depositor but have a very distinctive Muslim first name. For example, 'Patel' is a last name that is used by both Hindus and Muslims. However, from the first name it is easy to categorize a depositor with the name 'Ahmed Patel' as a Muslim as against 'Vaibhav Patel'. Thus, we create a minority dummy that takes the value of one if the ethnic group of the depositor is Muslim and zero otherwise.

We also create a variable called vicinity that takes the value of one if the depositor lives in the same pin code as that of the bank. To capture the effect of past deposits and past withdrawals, we generate two variables. The variable 'change in deposits' is defined as the fraction of balance outstanding as on the 12th of March, 2001 that is deposited with the bank in the interval between the 12th and the 13th of March. The variable change in deposits takes the value of zero if there are no deposits. Similarly, the variable 'change in withdrawals' is defined as the fraction of

balance outstanding as on the 12th of March, 2001 that is withdrawn from the bank in the interval between the 12th and the 13th of March. We also create a dummy variable called ‘above insurance cover’ that takes the value of one if the opening balance as on the 13th of March, 2001 is greater than the deposit insurance level. Finally, we generate a variable called ‘opening balance’ that is the log of the opening balance in an account as on the 13th of March, 2001 if the account is below the deposit insurance level.

5. Empirical Results

Before presenting the summary statistics, a look at the graphs helps highlight the magnitude of the runs faced by the bank. Graph 1 presents the amounts that were liquidated from the fixed deposit accounts for the month of March, 2001. As be seen from the graph, there is a sharp spike in the liquidations beginning the 13th of March, 2001 up to the 15th of March. This coincides with the date of failure of the large cooperative bank. Also, one can clearly see that after a few days the runs subside and there is no further spike in liquidations in the subsequent period. Graph 2 presents the evolution of the transaction accounts for the month of March. Again a similar picture unfolds. As can be seen from the graph, there were runs to the extent of 10% of the deposits outstanding in the transaction accounts. Thus, these graphs highlight the extent of runs faced by the bank in the period subsequent to the failure of the large bank.

Table 1a presents the summary statistics for fixed deposit accounts. As on the 13th of March 2001, there are 4935 fixed deposit accounts active at the head office of the bank. Out of these accounts only 5% of the accounts have an account balance more than the deposit insurance level (\$2000). This shows that the majority of depositors are small depositors. We can also see that 5% of accounts have/had some loan linkage with the bank as on the 13th of March 2001. In terms of the ethnic profile of depositors, 28% of the depositors belong to the minority community.

Table 1b presents the summary statistics for the transaction accounts (savings and current accounts). As on the 13th of March, 2001, there are 10772 transaction accounts that are active at the head office of the bank. Out of these accounts, only 0.8% of the accounts have an account

balance that is more than the deposit insurance level. The extent of accounts with loan linkage is similar to that of fixed deposit accounts (7.5%). The average number of transactions per account is 14.57 over the interval between 1st of January, 2000 and 13th of March, 2001. In terms of the ethnic profile of the depositors, 23% of the depositors belong to the minority community. We can also see that for the accounts that deposited cash with the bank in the day prior to the crisis, the average deposit is 14%. On the other hand for the accounts that withdrew cash in the day prior to the crisis, the average withdrawal is 0.5%.

To analyze the characteristics of depositors that panicked during the crisis, we conduct the analysis separately for fixed deposit accounts and transaction accounts. It is necessary to separate the analysis as there are higher costs to liquidation of fixed deposits as against withdrawals from savings accounts. Splitting the analysis also provides an additional robustness to the strength of the findings. For the fixed deposit accounts, we construct a dummy variable that takes the value of one if the more than 75% of the amount outstanding in the fixed deposit account is liquidated in the period between the 13th and the 15th of March, 2001. For the transaction accounts, we categorize a depositor as a panicker if the depositor withdraws more than 75% of the deposit outstanding as on the 13th of March, 2001.

To determine the factors that influence depositor panic, we run a probit, the results of which are reported in table 2. We find that longer the duration of the account lower the likelihood that the account is liquidated. We also find that accounts with deposit balance over the deposit insurance levels are more likely to liquidate their deposits. Interestingly, we find that accounts that have a loan linkage with the bank are less likely to panic during a crisis. Note that loan linkages do not include overdrafts taken against fixed deposits. Thus loan linkages do not capture the mechanical effect that could arise due to an overdraft.¹⁴ We also find that the minority dummy is significantly positive in explaining depositor panic. Depositors belonging to the minority community are more likely to panic as compared to other depositors. We do not find that depositors that live in the vicinity of the bank (same pin code as that of the bank) are more likely to panic. We also find that even for accounts below the deposit insurance level, the higher the account balance, higher

¹⁴ Depositors that have taken an overdraft against a fixed deposit cannot liquidate their deposit. Thus including overdrafts in the definition of loan linkages could mechanically lead to a negative coefficient.

the likelihood of panic. For the savings account we also look at the importance of the number of transactions with the bank in the past.¹⁵ We do not find any significant effect of higher number of transactions on the likelihood of withdrawal. Finally, we also find that depositors that made higher percentage of deposits in the day before the crisis and higher percentage of withdrawals the day before the crisis are more likely to panic.

We further investigate the importance of loan linkages by categorizing accounts that belong to the minority community and accounts that are above the insurance level based on whether there are loan linkages associated with these accounts. Thus, we categorize minority depositors into two groups, ones that have loan linkages and ones that do not have loan linkages. Similarly, we divide accounts above the insurance level into ones that have loan linkages and ones that do not have any linkage. As results in table 3 show, there is a striking difference in the behavior of depositors with loan linkages. In fact there is complete switch in the signs. For instance, minority depositors that do not have loan linkages are more likely to panic, while behavior of minority depositors with loan linkages is no different from other depositors. We also find that accounts above the insurance coverage level without loan linkages are likely to panic while accounts above the insurance level with loan linkages are less likely to panic. These results are especially starker given the findings in table 2, that accounts that have deposits above the insurance level have very high likelihood of panicking.

The findings in table 2 and 3 show that loan linkages have a significant effect on the likelihood of panicking. This raises the question: why are depositors with loan linkages less likely to panic? There are several potential explanations: 1) Even though, by regulation banks are not allowed to set-off deposits outstanding with the bank against loans outstanding in the event of failure, depositors with loan linkages might perceive a set-off and therefore might be less likely to panic.¹⁶ 2) Depositors with loan linkages could be subject to a hold-up problem, as they may fear that in case they withdrew their deposits and the bank survives the crisis, the bank could pull back on their credit in future. 3) Depositors with loan linkages could have better relationships

¹⁵ As term deposit accounts by their very nature have very few transactions, we do not report transaction count for fixed deposit accounts.

¹⁶ Only, under exceptional circumstances, with the permission of the Central bank, set-offs could be allowed. Even in those cases, the recovery of assets and the payment to depositors are carried out independently as separate procedures.

with the bank and therefore less likely to panic. 4) Finally, depositors with loan linkages might differ from other depositors in terms of education, wealth etc that might make them less likely to panic.

To further disentangle the effect of the loan linkages on depositor panic, we first look at whether accounts that had loan linkages in past but currently have no outstanding loan linkages differ in their behavior as compared to other depositors. Interestingly, we find that depositors with loan linkages in the past are also less likely to panic (table 5). We find that both depositors that had a loan linkage in the past and depositors that have a loan currently outstanding are less likely to panic. As depositors with loan linkages in past are less likely to face a hold up problem by the bank and also do not have the benefit of any set-off in case of failure, the results above suggest that the behavior of depositors with loan linkages could be a product of relationship with the bank. However, as stated before another possible explanation could be that depositors with loan linkages are different in other dimensions like education that we do not capture.

We first check whether accounts with loan linkages differ significantly in observable dimensions as compared to other deposit accounts. As reported in table 4, we do not find any significant ex-ante differences in terms of duration of account. We cannot reject the null that there is no ex-ante difference in deposit accounts using a t-test of difference in means between the two groups. However, when we look at account balance, we find that accounts with loan linkages have significantly higher account balance as compared to other accounts. Though, we control for these variables in the probit, it could be possible that there are other dimensions in which depositors with loan linkages differ from other depositors that could be driving the results.

We try to address this concern by looking at depositors who started a loan relationship with the bank after the crisis. These depositors do not have any loan linkage with the bank in the past or any loan that is currently outstanding but availed of a loan from the bank after the crisis. We first check whether there are any ex-ante differences between the depositors that availed of loan linkages after the crisis and depositors that have/had loan linkages with the bank as on the date of the crisis. As results in table 7, show we do not find any significant differences between the two groups. Thus, if we assume that the loan criteria of the bank was not altered much by the shock, a

noticeable difference at the time of the crisis is that one group had a relationship with the bank while the other did not. As results in table 6, show we only find that only depositors who have/had loan linkages with the bank as on the date of the crisis are less likely to panic. In contrast, we do not find any significant difference in the behavior of depositors that originated a loan relationship with the bank after the crisis as compared to other depositors. In sum, the results taken together suggest that the effect of loan linkages on deposit behavior is most likely to be a result of relationship with the bank.

We further look at the effect of loan linkages on depositor panic by looking at the effect of number of different types of loans availed by a depositor. We also explore the effect of the amount of loan availed from the bank on depositor panic. Table 8, presents the results. We find that more the number of different types of loans availed from the bank lower the likelihood of panic. We also find that higher the amount of loan availed from the bank (both the past and currently outstanding), lower is the likelihood of panicking.

From table 2, apart from the effect of loan linkages on depositor panic, we also find that depositors who belong to the minority community are more likely to panic. There could be several reasons why depositors from minority community are more likely to panic: 1) The presence of stronger social networks among minority depositors could lead to contagion due to word of mouth communication 2) As the board of the bank was primarily composed on directors belonging to the non-minority community, panic among minority depositors could also be due to lack of relationships with the bank. 3) Depositors that belong to minority community might differ from other depositors in terms of wealth and education, which could be the main driver of panic.

To further disentangle the reasons for differences in the behavior of minority depositors, we categorize depositors from the minority community based on their last names. We create a dummy that takes the value of one if a minority depositor has the same last name as one of the board of directors of the bank and zero otherwise. Note that out of 10 members on the board of the bank; only 3 belong to the minority community. Thus the bank is pre-dominantly run by members of the non-minority community. Interestingly, as results in table 9 show, we find that

minority depositors that have the same last name as the directors have no difference in their behavior as compared to other depositors. However, we find that minority depositors that do not share the same last name as the board of directors are more likely to panic as compared to other depositors. In terms of ex-ante characteristics, we do not find that the two groups of minority community depositors differ. These results further hint at the importance of relationships.

While so far our analysis focuses on the importance of individual characteristics in depositor panic, an interesting question that arises is how long lasting are the effects of the panic. More precisely, do depositors that panic re-deposit their money in the bank after an interval of time? To address this question, we first take all the savings accounts that withdrew during the crisis. For these accounts, we compute the number of accounts for which the deposit balance returns to the pre-crisis levels two months following the crisis. Surprisingly, we only find a handful of accounts (1% of depositors that panicked, i.e., 6 accounts) where the account balance returns to the pre-crisis levels. Thus, it does appear that depositors that panic do not return back to the bank. We also find that even after two months following the crisis, the total level of deposits in the bank does not recover to the pre-crisis. This suggests that the effects of the panic are not reversed in a short interval of time.

6. Conclusion:

This paper presents a detailed micro level analysis of the individual characteristics of depositors that affect depositors' incentive to run. We use a shock that triggered panic among bank depositors to study what are the factors that affect depositor behavior. We find that longer the duration of an account with the bank, lower the likelihood of depositor panic. We also find that accounts that have loan linkages are less likely to panic. Our analysis also shows that depositors belonging to the minority community behave differently (more likely to panic) as compared to other depositors. Furthermore, we find that even for accounts below the deposit insurance level, the size of the deposit balance affects the incentive to withdraw. Finally, we also find the effects of the panic are long lasting.

These results highlight the importance of relationships with a bank in influencing depositors' incentive to run. Our results also suggest that cross-selling of deposits and loans to depositors can act as a complementary insurance mechanism. This in turn further adds to the rationale for coexistence of deposit taking and lending. In terms of policy implications, our results suggest that allowing banks to provide an umbrella of products could help strengthen the relationship with the depositor, which in turn could help reduce fragility. Our analysis also raises the issue of the long lasting effects of panics. These could impose high social costs especially when we take into account opaqueness of borrowers and their reliance on bank financing. Finally, the analysis also points to the ineffectiveness of deposit insurance mechanism due to delays in implementation.

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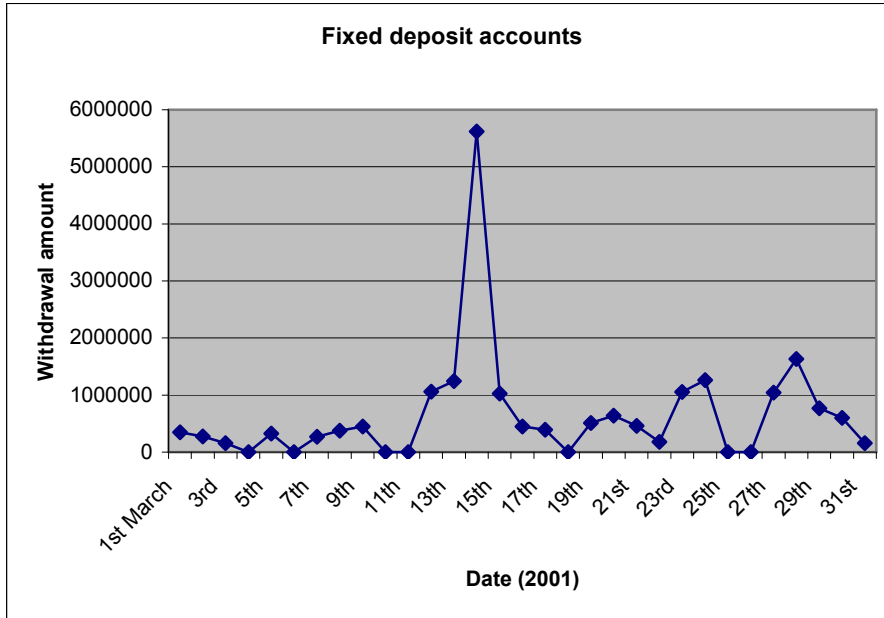
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Graph 1: Withdrawals from Fixed deposit a/c over March 2001



| March 13-15, 2001 | | |
|-----------------------|-------------------|-----------------------|
| | Fixed deposit A/c | Savings & Current A/c |
| No of Withdrawals>75% | 207 | 308 |
| No of Withdrawals>50% | 225 | 405 |

Graph 2: Savings a/c for the month of March 2001

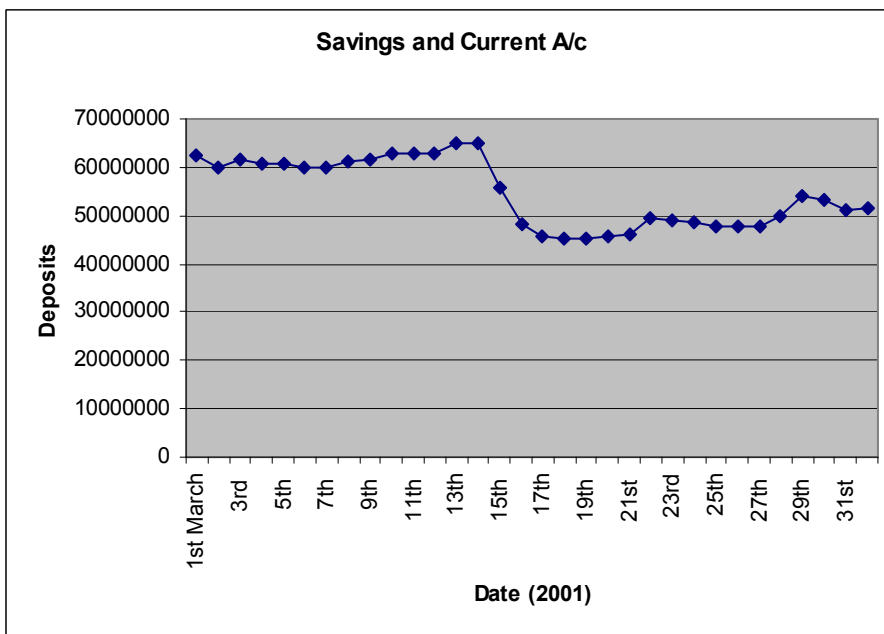


Table 1 A
Summary statistics (Fixed Deposit Account)

Minority community is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Opening balance* is the log of opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. *Loan linkage* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001.

| Variable | Observation | Mean | Std. Dev | Min | Max |
|-----------------------|-------------|-------|----------|-----|--------|
| Minority community | 4935 | 0.279 | 0.448 | 0 | 1 |
| Above Insurance Cover | 4935 | 0.056 | 0.231 | 0 | 1 |
| Opening balance | 4935 | 8.996 | 2.499 | 0 | 11.511 |
| Age of account | 4935 | 6.689 | 0.950 | 0 | 8.933 |
| Loan linkage | 4935 | 0.056 | 0.231 | 0 | 1 |

Table 1 B
Summary statistics (Savings & Current Account)

Minority community is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Change in deposits* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an inflow and is zero otherwise. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Opening balance* is the log of opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. *No of transactions* is the total number of transactions (deposits, withdrawals, transfers) associated with an account between the 1st of January 2000 and 13th of March, 2001. *Loan linkage* is dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001.

| Variable | Observation | Mean | Std. Dev | Min | Max |
|-----------------------|-------------|--------|----------|--------|--------|
| Minority community | 10772 | 0.233 | 0.422 | 0 | 1 |
| Above Insurance cover | 10772 | 0.008 | 0.091 | 0 | 1 |
| Change in deposits | 10772 | 0.140 | 5.689 | 0 | 428.08 |
| Change in withdrawals | 10772 | 0.005 | 0.062 | 0 | 0.994 |
| Opening balance | 10772 | 6.617 | 1.676 | -0.941 | 11.510 |
| Age of account | 10772 | 7.556 | 0.711 | 2.079 | 9.719 |
| No of transactions | 10772 | 14.571 | 50.046 | 0 | 1421 |
| Loan linkage | 10772 | 0.075 | 0.264 | 0 | 1 |

Effect of Depositor Characteristics on Panicking
Table 2

This table presents results of probit models. The dependent variable is an indicator variable that takes the value of one if the account holder withdraws more than 75% of the opening balance as on the 13th of March, 2001, in the period between the 13th and the 15th of March, 2001. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Minority* community is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Opening balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Loan linkage* is dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March 2001. *No of transactions* is the total number of transactions (deposits, withdrawals, and transfers) associated with an account between the 1st of January 2000 and 13th of March 2001. *Vicinity of the bank* is a dummy variable that takes the value of 1 if the account holder lives in the same zip code as that of the bank. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Change in deposits* is the percentage change in deposits between the 12th of March 2001 and 13th of March 2001 if there is an inflow and is zero otherwise. *Savings a/c* is a dummy variable that takes the value of 1 if the account is a savings a/c. All dummy variables are 0 otherwise. White heteroscedasticity consistent standard errors are reported in parentheses. The symbols ***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

| | Fixed Deposit accounts | | Savings & Current accounts | |
|-----------------------|------------------------|----------------------|----------------------------|----------------------|
| | Withdrawals>75% | | Withdrawals>75% | |
| | (1) | (2) | (3) | (4) |
| Minority community | 0.244*** (0.068) | 0.206*** (0.077) | 0.179** (0.073) | 0.150* (0.081) |
| Above Insurance cover | 0.674** (0.292) | 0.668** (0.294) | 5.869*** (0.225) | 5.818*** (0.228) |
| Opening balance | 0.090*** (0.024) | 0.090*** (0.024) | 0.528*** (0.020) | 0.524*** (0.020) |
| Loan linkage | -0.754*** (0.360) | -0.745** (0.361) | -0.556*** (0.181) | -0.557*** (0.183) |
| Age of account | -0.155*** (0.026) | -0.151*** (0.026) | -0.112*** (0.036) | -0.114*** (0.036) |
| No of transactions | | | | 0.0004 (0.0003) |
| Vicinity of the bank | | 0.091 (0.075) | | 0.012 (0.069) |
| Change in withdrawals | | | 0.613* (0.356) | 0.587* (0.355) |
| Change in deposits | | | 0.056*** (0.024) | 0.057*** (0.024) |
| Savings a/c | | | | 0.145* (0.082) |
| Constant | -1.642*** (0.302) | -1.684*** (0.305) | -5.355*** (0.338) | -5.432*** (0.344) |
| N | 4935 | 4935 | 10772 | 10772 |
| Pseudo R2 | 0.034 | 0.035 | 0.3700 | 0.3712 |

The probability of panicking for depositors with loan linkages belonging to Minority community and above insurance coverage limit

Table 3

This table presents results of probit models. The dependent variable is an indicator variable that takes the value of one if the account holder withdraws more than 75% of the opening balance as on the 13th of March, 2001 in the period between the 13th and the 15th of March, 2001. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Minority community* is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Minority with loan link* is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community and has a loan linkage with the bank. *Minority with no loan link* is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community and has no loan linkage with the bank. *Above Insurance with loan link* is a dummy variable that takes the value of 1 if the account balance is over the deposit insurance limit and the account has a loan linkage with the bank. *Above Insurance with no loan link* is a dummy variable that takes the value of 1 if the account balance is over the deposit insurance limit and the account has no loan linkage with the bank. *Opening balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Loan linkage* is dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. *No of transactions* is the total number of transactions (deposits, withdrawals, and transfers) associated with an account between the 1st of January 2000 and 13th of March, 2001. *Vicinity of the bank* is a dummy variable that takes the value of 1 if the account holder lives in the same zip code as that of the bank. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Change in deposits* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an inflow and is zero otherwise. Savings a/c is a dummy variable that takes the value of 1 if the account is a savings a/c. White heteroscedasticity consistent standard errors are reported in parentheses. The symbols ***, **, * indicate significance levels of 1%, 5%, and 10% respectively. The symbol **** indicates perfect prediction of failure.

| | Withdrawals>75% | | | Withdrawals>75% | |
|----------------------------|----------------------|----------------------|-----------------------------------|----------------------|----------------------|
| | Fixed Deposit | Savings & Current | | Fixed Deposit | Savings & Current |
| | (1) | (2) | | (3) | (4) |
| Minority with loan link | 0.720 (0.548) | **** | Minority community | 0.197** (0.077) | 0.150* (0.081) |
| Minority with no loan link | 0.190** (0.077) | 0.163** (0.081) | Above Insurance with loan link | **** | **** |
| Above Insurance cover | 0.667** (0.295) | 5.834*** (0.229) | Above Insurance with no loan link | 0.679** (0.295) | 5.862*** (0.230) |
| Opening balance | 0.089*** (0.025) | 0.525*** (0.020) | Opening balance | 0.089*** (0.025) | 0.523*** (0.020) |
| Loan linkage | -0.912*** (0.340) | -0.472*** (0.183) | Loan linkage | -0.702*** (0.262) | -0.486*** (0.175) |
| Age of account | -0.154*** (0.026) | -0.113*** (0.036) | Age of Account | -0.154*** (0.026) | -0.117*** (0.036) |
| No of transactions | | 0.0004 (0.0003) | No of transactions | | 0.0004 (0.0003) |
| Vicinity of the bank | 0.095 (0.076) | 0.016 (0.069) | Vicinity of the bank | 0.094 (0.076) | 0.014 (0.069) |
| Change in withdrawals | | 0.573 (0.354) | Change in withdrawals | | 0.617* (0.347) |
| Change in deposits | | 0.057** (0.024) | Change in deposits | | 0.056** (0.024) |
| Savings a/c | | 0.145* (0.082) | Savings a/c | | |
| Constant | -1.642*** (0.305) | -5.451*** (0.346) | Constant | -1.648*** (0.305) | -5.411*** (0.343) |
| N | 4935 | 10702 | N | 4893 | 10767 |
| Pseudo R2 | 0.0391 | 0.3714 | Pseudo R2 | 0.0368 | 0.3724 |

Ex-ante differences in characteristics of depositors with loan linkages as compared to depositors without loan linkages

Table 4

This presents the comparison of means for accounts with loan linkages versus accounts without loan linkages. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Accounts with loan linkages* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001. *Account Balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. ***, **, * indicates significantly different than zero at the 1%, 5%, and 10% level, respectively, in a two-sided t-test of the mean of accounts without linkages versus accounts with loan linkages.

| | Fixed deposit a/c | | Savings & Current a/c | |
|---|-------------------|--------------|-----------------------|--------------|
| | Account Balance | Account days | Account Balance | Account days |
| Accounts without loan linkages | | | | |
| Mean | 9.677 | 6.691 | 6.704 | 7.555 |
| Standard Error | (0.019) | (0.013) | (0.016) | (0.007) |
| N | 4654 | 4654 | 9955 | 9955 |
| Accounts with Loan Linkages | | | | |
| Mean | 9.882 | 6.654 | 6.896 | 7.575 |
| Standard Error | (0.090) | (0.058) | (0.053) | (0.024) |
| N | 281 | 281 | 817 | 817 |
| Tests of Differences between Means (t-statistics) | -2.5229** | 0.6217 | -3.218*** | -0.7898 |

The Effect of Past loan linkages on Panicking
Table 5

This table presents results of probit models. The dependent variable is an indicator variable that takes the value of one if the account holder withdraws more than 75% of the opening balance as on the 13th of March, 2001 in the period between the 13th and the 15th of March, 2001. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Minority community* is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Opening balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Outstanding loan linkage* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has a loan account with the bank as on 13th of March 2001. *Past loan linkage* is a dummy variable that takes the value of 1 if any member of the household (associated with the account) had a loan account with the bank before 13th of March 2001 and there is no outstanding loan linkage. *Change in deposits* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an inflow and is zero otherwise. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Vicinity of the bank* is a dummy variable that takes the value of 1 if the account holder lives in the same zip code as that of the bank. *No of transactions* is the total number of transactions (deposits, withdrawals, and transfers) associated with an account between the 1st of January 2000 and 13th of March, 2001. *Savings a/c* is a dummy variable that takes the value of 1 if the account is a savings a/c. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols ***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

| | Fixed Deposit accounts | | Savings & Current accounts | |
|--------------------------|------------------------|----------------------|----------------------------|----------------------|
| | Withdrawals>75% | | Withdrawals>75% | |
| | (1) | (2) | (3) | (4) |
| Minority community | 0.206*** (0.077) | 0.197** (.077) | 0.159** (0.081) | 0.151* (0.081) |
| Age of account | -0.151 *** (0.026) | -0.154*** (0.026) | -0.114*** (0.036) | -0.114*** (0.036) |
| Above Insurance cover | 0.668** (0.294) | 0.665** (0.294) | 5.824*** (0.229) | 5.817*** (0.228) |
| Opening balance | 0.090*** (0.024) | 0.089*** (0.025) | 0.525*** (0.020) | 0.523*** (.020) |
| Outstanding loan linkage | | -0.725** (0.361) | | -0.702** (0.320) |
| Past loan linkage | -0.745** (0.361) | -0.756** (0.361) | -0.462** (0.226) | -0.476** (0.225) |
| Change in deposits | | | 0.057** (0.024) | 0.057** (0.024) |
| Change in withdrawals | | | 0.517 (0.344) | 0.602 (0.355) |
| Vicinity of the bank | 0.091 (0.075) | 0.094 (0.076) | 0.075 (0.074) | 0.012 (0.069) |
| Number of transactions | | | 0.0004 (0.0003) | 0.0004 (0.0003) |
| Savings a/c | | | 0.144* (0.082) | 0.146* (.082) |
| Constant | -1.684*** (0.305) | -1.649*** (0.305) | -5.461*** (0.345) | -5.429*** (0.344) |
| N | 4935 | 4935 | 10772 | 10772 |
| Pseudo R2 | 0.035 | .0386 | .3686 | .3713 |

The Effect of Future Loan Linkages on Panicking
Table 6

This table presents results of probit models. The dependent variable is an indicator variable that takes the value of one if the account holder withdraws more than 75% of the opening balance as on the 13th of March, 2001 in the period between the 13th and the 15th of March, 2001. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Minority community* is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Opening balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Loan linkage* is a dummy variable that takes the value of 1 if any member of the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001. *Outstanding loan linkage* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has a loan account with the bank as on 13th of March 2001. *Past loan linkage* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) had a loan account with the bank before 13th of March 2001 and there is no outstanding loan. *Future loan linkage* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) had no loan account with the bank before/on the 13th of March 2001 but availed of a loan from the bank in the future. *Change in deposits* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an inflow and is zero otherwise. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Vicinity of the bank* is a dummy variable that takes the value of 1 if the account holder lives in the same zip code as that of the bank. *Number of transactions* is the total number of transactions (deposits, withdrawals, and transfers) associated with an account between the 1st of January 2000 and 13th of March, 2001. *Savings a/c* is a dummy variable that takes the value of 1 if the account is a savings a/c. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols ***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

| | Fixed Deposit accounts | | Savings & Current accounts | |
|--------------------------|------------------------|----------------------|----------------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| Minority community | 0.195** (0.077) | 0.196** (0.077) | 0.148* (0.081) | 0.149* (0.081) |
| Age of account | -0.154*** (0.026) | -0.154*** (0.026) | -0.114*** (0.036) | -0.113*** (0.036) |
| Above Insurance cover | 0.690** (0.295) | 0.691** (0.295) | 5.820*** (0.228) | 5.818*** (0.228) |
| Opening balance | 0.090*** (0.025) | 0.090*** (0.025) | 0.524*** (0.020) | 0.523*** (0.020) |
| Loan linkage | -0.748*** (0.258) | | -0.559*** (0.183) | |
| Outstanding loan linkage | | -0.731** (0.361) | | -0.704** (0.320) |
| Past loan linkage | | -0.763** (0.361) | | -0.479** (0.226) |
| Future loan linkage | -0.344 (0.290) | -0.345 (0.290) | -0.190 (0.443) | -0.190 (0.443) |
| Change in deposits | | | 0.057** (0.024) | 0.057** (0.024) |
| Change in withdrawals | | | 0.584* (0.355) | 0.599* (0.355) |
| Vicinity of the bank | 0.094 (0.076) | 0.094 (0.076) | 0.013 (0.069) | 0.013 (0.069) |
| No of transactions | | | 0.0004 (0.0003) | 0.0004 (0.0003) |
| Savings a/c | | | 0.147* (0.082) | 0.148* (0.082) |
| Constant | -1.656*** (0.305) | -1.656*** (0.305) | -5.432*** (0.345) | -5.429*** (0.345) |
| N | 4935 | 4935 | 10772 | 10772 |
| Pseudo R2 | 0.0395 | 0.0395 | 0.3713 | 0.3714 |

Ex-ante differences in characteristics of depositors with loan linkages as compared to depositors with loan linkages in the future

Table 7

This presents the comparison of means for accounts with loan linkages versus accounts without loan linkages. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Accounts with loan linkages* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001. *Accounts with future loan linkage* is a dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) had no loan account with the bank before/on the 13th of March 2001 but availed of a loan from the bank in the future. Account Balance is the log of the opening balance (amount) in an account as on the 13th of March 2001. Age of account is the log of the length of time, for which the account has been open as on the 13th of March, 2001. ***, **, * indicates significantly different than zero at the 1%, 5%, and 10% level, respectively, in a two-sided t-test of the mean of accounts with linkages versus accounts with future loan linkages.

| | Fixed deposit accounts | | Savings & Current a/c | |
|---|------------------------|--------------|-----------------------|--------------|
| | Account Balance | Account days | Account Balance | Account days |
| Accounts with Loan Linkage | | | | |
| Mean | 9.882 | 6.654 | 6.896 | 7.575 |
| Standard Error | 0.090 | 0.058 | 0.053 | 0.024 |
| N | 281 | 281 | 817 | 817 |
| Accounts with future loan linkage | | | | |
| Mean | 10.08 | 6.666 | 6.815 | 7.446 |
| Standard Error | 0.157 | 0.081 | 0.239 | 0.112 |
| N | 99 | 99 | 86 | 86 |
| Tests of Differences between Means (t-statistics) | -1.1612 | -0.1024 | 0.4418 | 1.518 |

The effect of different loan types and different loan amounts on panicking

Table 8

This table presents results of probit models. The dependent variable is an indicator variable that takes the value of one if the account holder withdraws more than 75% of the opening balance as on the 13th of March, 2001 in the period between the 13th and the 15th of March, 2001. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Minority community* is a dummy variable that takes the value of 1 if the account belongs to a depositor from the minority community. *Above Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Opening balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *No of loan types* for a deposit account is the number of different types of loans availed by a household (associated with the account) till the date of the crisis (13th of March, 2001). *Loan amount* for a deposit account is the total amount of loans availed by the household (associated with the account) till the date of the crisis (13th of March, 2001). *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. *No of transactions* is the total number of transactions (deposits, withdrawals, and transfers) associated with an account between the 1st of January 2000 and 13th of March, 2001. *Vicinity of the bank* is a dummy variable that takes the value of 1 if the account holder lives in the same zip code as that of the bank. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Change in deposits* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an inflow and is zero otherwise. *Savings a/c* is a dummy variable that takes the value of 1 if the account is a savings a/c. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols ***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

| | Fixed Deposit accounts | | Savings & Current accounts | |
|------------------------|------------------------|----------------------|----------------------------|----------------------|
| | Withdrawals | Withdrawals | Withdrawals>75% | Withdrawals>75% |
| | (1) | (2) | (3) | (4) |
| Minority community | 0.196** (0.077) | 0.191** (0.077) | 0.149* (0.080) | 0.150* (0.080) |
| Above Insurance cover | 0.669** (0.294) | 0.669** (0.295) | 5.824*** (0.228) | 5.812*** (0.228) |
| Opening balance | 0.089*** (0.025) | 0.089*** (0.025) | 0.524*** (0.020) | 0.522*** (0.020) |
| No of loan types | -0.657*** (0.228) | | -0.446*** (0.165) | |
| Loan Amount | | -0.084*** (0.030) | | -0.034** (0.015) |
| Age of account | -0.154*** (0.026) | -0.154*** (0.026) | -0.114*** (0.036) | -0.113*** (0.036) |
| Number of transactions | | | 0.0004 (0.0003) | 0.0004 (0.0003) |
| Vicinity of the bank | 0.093 (0.076) | 0.097 (0.076) | 0.015 (0.069) | 0.014 (0.069) |
| Change in withdrawals | | | 0.573 (0.352) | 0.568 (0.352) |
| Change in deposits | | | 0.056** (0.024) | 0.057** (0.024) |
| Savings a/c | | | 0.146* (0.082) | 0.146* (0.082) |
| Constant | -1.645*** (0.306) | -1.643*** (0.306) | -5.429*** (0.344) | -5.426*** (0.344) |
| N | 4935 | 4935 | 10772 | 10772 |
| Pseudo R2 | 0.0393 | 0.0406 | 0.3714 | 0.3704 |

The Effect of Minority community depositors with the same last name as directors of the bank Table9

This table presents results of probit models. The dependent variable is an indicator variable that takes the value of one if the account holder withdraws more than 75% of the opening balance as on the 13th of March, 2001 in the period between the 13th and the 15th of March, 2001. The analysis is conducted separately for fixed deposit accounts and transaction accounts (savings and current a/c). *Minority with director last name* is a dummy that takes the value of 1 if a depositor belongs to the minority community and has the same last name as one of the directors of the bank. *Minority with other last name* is a dummy that takes the value of 1 if a depositor belongs to the minority community and does not have the same last name as one of the directors of the bank. Above *Insurance cover* is a dummy variable that takes the value of 1 for an account if the opening balance as on the 13th of March, 2001 is above the deposit insurance coverage limit. *Opening balance* is the log of the opening balance (amount) in an account as on the 13th of March 2001 if the opening balance is below the deposit insurance coverage limit. *Loan linkage* is dummy variable that takes the value of 1 for a deposit account if the household (associated with the account) has/had a loan account with the bank as on 13th of March 2001. *Age of account* is the log of the length of time, for which the account has been open as on the 13th of March, 2001. No of transactions is the total number of transactions (deposits, withdrawals, and transfers) associated with an account between the 1st of January 2000 and 13th of March, 2001. *Vicinity of the bank* is a dummy variable that takes the value of 1 if the account holder lives in the same zip code as that of the bank. *Change in withdrawals* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an outflow and is zero otherwise. *Change in deposits* is the percentage change in deposits between the 12th of March, 2001 and 13th of March, 2001 if there is an inflow and is zero otherwise. *Savings a/c* is a dummy variable that takes the value of 1 if the account is a savings a/c. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols ***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

| | Withdrawals.>75% | |
|----------------------------------|----------------------|----------------------|
| | Fixed Deposit | Savings & Current |
| | (1) | (2) |
| Minority with director last name | 0.100 (0.154) | 0.021 (0.164) |
| Minority with other last name | 0.212*** (0.081) | 0.175** (0.085) |
| Above Insurance cover | 0.660** (0.294) | 5.813*** (0.228) |
| Opening balance | 0.089*** (0.025) | 0.523*** (0.020) |
| Loan linkage | -0.742*** (0.257) | -0.553*** (0.183) |
| Age of account | -0.155*** (0.026) | -0.116*** (0.036) |
| No of transactions | | 0.0004 (0.0003) |
| Vicinity | 0.096 (0.075) | 0.011 (0.069) |
| Change in withdrawals | | 0.578 (0.355) |
| Change in deposits | | 0.056** (0.024) |
| Savings a/c | | 0.146* (0.082) |
| Constant | -1.641*** (0.305) | -5.415*** (0.345) |
| N | 4935 | 10772 |
| Pseudo R ² | 0.0389 | 0.3715 |

