Creditor Rights and Relationship Banking: Evidence from a Policy Experiment*

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Abstract

We examine the relation between creditor rights and relationship banking by exploiting natural variation in creditor rights induced by changes in law. In 2002, a change in bankruptcy law in India significantly increased creditor rights by letting lenders repossess collateral and auction it without court intervention. We argue that the increase in creditor rights reduces the value of soft information gathered by relationship banks, leading firms and banks to shift away from relationship banking. We find empirical evidence consistent with this view. Relationship lending declines after the increase in creditor rights. This shift is more pronounced for banks that may have greater informational advantage, small firms and those not belonging to established business groups, and in geographic areas with low bank competition.

Key Words: Bank Credit, Bankruptcy, Creditor Rights, Debt Recovery, Relationship Banking,

JEL Classification: G21, G28, G33

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I Introduction

We examine the interaction between creditor rights and relationship banking, exploiting natural variation induced by a law increasing creditor rights in India. Our study contributes to two distinct streams of work. One is the law and finance literature on creditor rights. The other is the traditional finance literature on relationship banking. To help place our study and economic hypothesis in perspective, it is useful to briefly overview the work in these two areas.

Creditor rights define the ability of the lenders to recover debts from borrowers. These rights are typically set by local laws, which set out how creditors can enforce the repayment of debt. Djankov, McLeish, and Shleifer (2007) score creditor rights across 129 countries and show that these rights depend on legal origin. The literature addresses the economic effects of creditor rights. Acharya and Subramaniam (2009) and Acharya, Amihud, and Litov (2011) point out that creditor rights increase the threat of liquidation, which can reduce risk-taking and innovation. Vig (2013) points out that liquidation threats can reduce leverage and borrowing. Lilienfeld-Toal, Mookherjee, and Visaria (2012) suggest that greater creditor rights can increase credit supply for wealthy borrowers while they can reduce the supply for small borrowers.[1]

Boot (2000) surveys relationship banking. A relationship lender invests in obtaining customer specific information, often proprietary and soft information that is not easily quantified (Petersen, 2004). This information is used by the relationship lender in multiple interactions with the same customer over time and/or across products. Relationship banking has both benefits and costs.The information obtained in relationship lending mitigates information asymmetry and provides greater credit access for borrowers especially if the information is reusable over time, and potentially across other similar borrowers, which lets lenders smooth and spread costs. Thus, relationships can lower credit costs and increase its supply.[2] Other spillover benefits include better access to capital market and credit services (James, 1986; Gopalan, Udell, and Yerramilli (2011)) and better monitoring and governance (Dass and Massa, 2009).

However, relationship banking also has a dark side. The superior information possessed by relationship banks confers them informational monopolies over borrowers and hold up, a point prominently made by, e.g., Rajan (1992). The easier renegotiability of contracts under relationship lending leads to soft budget constraints on borrowers (De-

[1] Other work in this area includes López de Silanes, La Porta, Shleifer, and Vishny (1998), Levine (1998), Levine (1999), Beck, Demirguc-Kunt, and Levine (2005), and Visaria (2009).

[2] See Diamond (1984), Petersen and Rajan (1995), Allen (1990), Hoshi, Kashyap, and Stein, 1991; Petersen and Rajan, 1994; Berger and Udell, 1995; Boot and Thakor (2000); Greenbaum and Thakor (2007), Bharath, Dahiya, Saunders, and Srinivasan, 2009.

watripont and Maskin, 1995; Bolton and Scharfstein (1996)). During difficult economic times, relationship banks may behave opportunistically by extracting higher rents from the borrowers (Santos and Winton (2008)). Finally, if relationship banking requires specialization, banks that form relationships with borrowers may not be able to meet the growing needs of the borrowing firms (Houston and James (1996)).

We examine the effect of increasing creditor rights in relationship banking. The empirical setting for this paper is the passage of the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act (SARFAESI) in India in 2002. The act eased the process of taking over collateralized assets by banks. In essence, the Act empowers banks to seize collateralized assets by issuing a notice to borrowers with non-performing loans and auction the pledged assets. This process substituted for an earlier default process that required assent from judiciary, which is a very slow process as Indian courts are clogged. By eliminating the need for court intervention, SARFAESI allowed lenders to enforce security interests promptly. SARFAESI enforcements have become quite popular. For instance, in 2013-2014, there have been 194,707 SARFAESI enforcement actions by banks, or about 7 times the 28,258 enforcement actions through debt recovery tribunals, the mechanism studied by Visaria (2009) and Lilienfeld-Toal, Mookherjee, and Visaria (2012).

A simple framework captures the essentials of SARFAESI and informs our empirical analysis. Following Rajan (1992), consider a relationship bank that has superior information and monitoring ability financing an opaque project. In states with negative NPV, the relationship bank can discontinue a project. However, the same skill and access can be used by this inside bank to hold up the borrower and extract rents in positive states. An arms-length ("transactional" or "outside") banker cannot prevent negative NPV investments but also does not hold up the borrower. We consider increasing creditor rights as enhancing the recoverable value of collateral for all lenders. In effect, such a provision reduces the disadvantage of the arms-length banker in the bad state. In turn, this shifts the margin at which arms-length banking becomes preferable to a greater set of firms.

The above discussion motivates our empirical analysis. We test the following hypotheses. First, what is the impact of a shock to creditor rights on relationship banking? Second, in case there is an impact, is it different for informationally opaque firms when compared to more transparent firms? Third, is the impact of a shock to creditor rights different for different types of lenders? Here, we use the fact that the Indian banking industry comprises of both public sector and private sector banks with differences in geographical coverage. Fourth, what is the impact on the flow of credit after an increase in creditor rights? Here, we distinguish between firms most affected by the increase in creditor rights and those that are less affected. Finally, we also examine the impact of

increased creditor rights on the interest rates charged to the borrowers.

Our empirical tests employ a conventional difference in difference approach in which we look at before-after differences for treatment and control groups. We form these two groups based on the likely impact of SARFAESI. In line with Vig (2013), we classify firms with a higher proportion of tangible assets as our treatment group and those with lower proportion of tangible assets as our control group. Firms with more tangible assets should experience greater effects from changes in creditor rights. We construct multiple measures of relationship banking. While we discuss the details later, the bottom line is straightforward. The measures of relationship banking decline by anywhere between 3.6% and 4.8% for treatment firms in the post-SARFAESI period when compared to the pre-SARFAESI period.

We conduct additional tests to better characterize the results. We divide the sample into two halves based on firms' asset values and test for continuation of relationships. Informational advantage is likely to be the most important basis for relationship banking in small firms. We test if the impact of increased creditor rights on relationship banking is higher for these firms. As expected, we find that in the sample of small firms, our measures of relationships show a decline in the post-SARFAESI period for treatment firms when compared to control group firms. The magnitude of decline ranges from 8.7% to 9.1%, which is higher than the impact on the overall sample.

We classify firms into those belonging to an established business group and those that do not. Banks lending to business group firms rely on soft collateral in the form of intra-group firm transfers (Gopalan and Seru, 2007). Relationship banking breakdown is concentrated among non-group firms where the collateral channel is more important. We then examine the impact of increased creditor rights on relationship banking in areas with different levels of banking competition. Banks have greater holdup powers when competition is low, so we expect that ruptures in relationship banking should be more likely in the high bank concentration areas. We find supportive evidence. The push away from relationship lending is more concentrated in areas that had lower level of banking competition before SARFAESI.

We next examine if the impact on relationship banking depends on the type of lenders. These tests are at the lender rather than the firm level. In the Indian context, public sector banks are older and have a wider reach than private sector banks (Cole (2009)). It is plausible that public sector banks specialize in information based relationship lending while private sector counterparts are transactional and focus on revenue generation through more efficient services. We hypothesize that the impact of breakdown in relationships should be higher among borrowers from public sector banks. In the post-SARFAESI period, the ratio of relationship borrowers to total borrowers is likely to fall by 6.1% for

public sector banks when compared to other type of lenders.

We also test if the impact of rupturing of relationship banking is more severe for rural banks when compared to urban banks. Rural banks are more likely to operate under relationship banking mode in the pre SARFAESI period given the opacity and lack of banking competition in rural areas. Therefore, we expect the impact to be higher for rural banks when compared to urban banks. We find our measure relationship banking falls by 4.4% for rural banks when compared to urban banks.

Finally, we examine the impact of increased creditor rights on the flow of credit and the cost of credit. Vig (2013) shows that increased creditor rights lead to reduction in borrowing in general. Ongena and Smith (2000) show the same in a different context. Our results are directionally similar. Expectedly, because of reduction in deadweight costs of credit enforcement, there is a fall in the cost of borrowing for the treatment group firms in the post SARFAESI period. The magnitude of reduction in interest cost ranges anywhere between 160 and 200 basis points. This figure is interesting because it is an indirect estimate of the deadweight costs imposed on the economy due to the lack of creditor rights.

We perform other robustness tests. We confirm the existence of parallel trend between treatment and control groups in the pre-treatment period (Bertrand, Duflo, and Mullainathan (2004)). We conduct placebo tests by considering dummy treatment years. The relationship break-up results are concentrated when the SARFAESI enactment year is used as the year of treatment. Finally, our baseline tests use 3 years as the minimum length of a lending relationship. We alter the required association to 5 years. Our results remain unchanged.

As Visaria (2009) points out, one step in reforming the bankruptcy process in India was the establishment of Debt Recovery Tribunals (DRTs) between 1993 and 1998. The mandate of the DRTs was the speedy completion of debt recovery trials. While there is potentially some effect of DRTs on relationship banking (as we verify), our view is that this test is less compelling. Over time, DRTs acquired most of the negative characteristics of mainstream courts with significant delays. In addition, DRTs have a time bound process but their scope is limited to certifying whether a debt is legally owed by a borrower. Thus, claims by debtors on any other issue or contractual matter requires rulings and dispensation from civil courts that DRTs were intended to circumvent. In addition, appeals of SARFAESI actions are far more punitive. Borrowers required to deposit a minimum of 25% of disputed amounts (going up to 75% at the discretion of the judge). This amount is a special challenge for borrowers under stress. Not surprisingly, close to 80% of all bankruptcy recoveries in India are through SARFAESI actions, the focus of our analysis.

The rest of the paper is organized as follows: Section II describes the Indian banking Industry. Section III provides a brief overview of the credit recovery mechanism in India and also explains the relevant provisions of the SARFAESI Act. Section IV describes the theoretical model. Section V details the data. Section VI describes the empirical methodology and also explains the empirical results. Sections VII and VIII contain additional robustness tests and material on debt recovery tribunals. Section IX concludes.

II Banking in India

Elements of the modern banking infrastructure in India were present even before her independence in 1947 (Cole (2009)). For nearly 22 years after independence, private sector banks co-existed with public sector in India. However, in 1969, 14 large private banks, which had assets in excess of INR 500 million (about $ 8 million) were nationalized. The exercise was again repeated in 1980, but this time the cutoff was INR 2 billion ($32 million). The reason for nationalization was the sense that credit was a scarce resource that needed to be rationed to serve public purposes and that private banks could not serve this purpose.

The commercial banking sector in India is served by public sector banks, private sector banks, and foreign banks. Even today, the Indian banking landscape is dominated by public sector banks, who account for 74% of bank credit in 2013. The private sector banks mostly emerged after 1993 in the wake of India's economic liberalization in 1991. The largest public sector bank in India, which accounts for about a third of the banking industry, is the former Imperial Bank of India (later renamed as State Bank of India). This bank was founded in the year 1935. ICICI Bank, the first new generation private sector bank licensed after 1991, is currently the second largest bank in India.[3]

Branching regulations have long existed in India to serve its rural population. In 1969, the Government of India obliged banks to open 4 branches in unbanked areas in order to get a license to operate in an area where a bank was already present. Berger, Klapper, Martinez Peria, and Zaidi (2008) show that the policy had a significant impact in terms of banking access to unbanked areas. This expansion also resulted in reduction of poverty in previously unbanked locations (Burgess, Pande, and Wong (2005)). The policy was reversed in 1991. At the time when the branching regulations were in place, banking in India was completely dominated by public sector banks. When new generation private sector banks emerged in India, the branching regulations were already repealed. Thus,

[3] A small portion of the credit is provided by smaller regional rural banks (RRBs), which were established by the Government of India for serving rural markets. There are also a number of small co-operative banks.

the private sector banks were not forced by fiat to open branches in unbanked areas.

III SARFAESI

To appreciate the importance of SARFAESI, it is useful to review the history of bankruptcy laws and their economic relevance around the time SARFAESI was enacted. As in the rest of the world, default is once again an important issue in India in 2015 as banks attempt to recapitalize themselves to meet international regulatory norms. This debate over credit risk is not new. The Indian banking industry has witnessed several periods of time when its high levels of non-performing assets (NPAs) attract attention and near-inevitable regulatory efforts at reform. The bankruptcy process has been historically slow and entrepreneurs exploit the slow moving legal bankruptcy apparatus in India in order to avoid repayment.[4] In a bank dominated economy such as India, the slow bankruptcy process impairs bank lending capacity. Thus, how to reform the bankruptcy process is critical to the health of the banking industry.

One effort to reform the process is the 1982 Sick Industrial Companies Act, which led to the creation of a Board of Industrial and Financial Reconstruction (BIFR). Companies entering BIFR were entitled to an automatic stay on all payments just like the Chapter 11 process in the U.S. However, there are important differences relative to the familiar U.S. setting. Critical among these is the definition of sick firms, which are defined as firms whose accumulated losses exceeded tangible equity. Another difference is the disregard to time limits for settlement. Our analysis reveals that only 20% of cases were settled in 5 years of reference to BIFR and 35% of cases remained unresolved even after 10 years of such reference. This delay in settlement of cases referred to BIFR places significant constraints on banks whose funds remain tied up.[5] Bank NPAs in India climbed to 14% of gross advances in the late 1990s.[6]

The government of India took a series of steps to strengthen credit recovery mechanism in the country. Notable among them are the establishment of Debt Recovery Tribunals in 1993 and the passage of the SARFAESI Act in 2002. Debt Recovery Tribunals (DRTs) are similar to fast track courts. They are created to deal exclusively with debt recovery cases. They were given certain procedural exemptions so that the cases could be settled quickly (Visaria (2009)). Despite the establishment of DRTs, NPAs continued to mount in the late nineties. The Government of India, appointed the Andhyarujina Committee

[4]See media reports such as http://expressindia.indianexpress.com/ie/daily/19990627/ibu27028.html or http://business.gov.in/closing_business/sica.php.

[5]It was estimated that State Bank of India, India's largest lender had more than INR 40 billion ($700 million) tied up in companies referred to BIFR in the year 2011.

[6]Source: Reserve Bank of India on Trend and Progress of Banking India 2002-2003

to suggest ways of further strengthening the legal framework for credit recovery in India. Based on the recommendation of the committee, the SARFAESI act was enacted.

SARFAESI empowered the banks and financial institutions to directly seize the assets pledged in cases of default without court proceedings. The act laid only two preconditions. The loan should have been classified as an NPA and the bank or a financial institution should give a 60 day notice post default. the most important provision was that the creditor could proceed with the recovery without waiting for courts. The creditor friendliness of the act was further strengthened by requiring borrowers to deposit at least 75% of the claim amount, which was reduced to a 25% minimum, in order to appeal against court verdicts. The act was applicable to existing loans as well.

SARFAESI is thus perhaps the most significant expansion in creditor rights as it sidesteps court processes. According to India's central bank, the Reserve Bank of India, SARFAESI turned out to be most effective in terms of recovering loans once written off as NPAs. In the financial year ending March 2014, 194,707 loans, which had approximately INR 1100 of outstanding amount were recovered by applying banker's rights under SARFAESI. The value of NPAs recovered using SARFAESI amounted to nearly 80% of all NPAs recovered by banks during the year.[7]

India also offers a good setting to study relationship banking. Regulations impose high entry barriers in the Indian banking Industry. In fact, since 2004, no new domestic bank has been licensed, which keeps the competition in the banking industry relatively low and relationship lending oriented.[8] Following Petersen and Rajan (1995), such an environment should lead to increased relationship banking. Second, the law enforcement mechanism in India works at a slow pace.[9] Thus, banks have to rely more on relationships than on contract enforcements in India. Thirdly, informal relationships matter. For instance, caste affiliation between loan officers and borrowers influence lending (Fisman, Paravisini, and Vig (2012)). Finally, accounting statements prepared by smaller firms (which are not listed) leave room for judgment, e.g., in classifying loads, advances, and investments in affiliated firms. Thus, bankers must rely to a large extent on soft information and relationships.

It is also useful to mention and note a shift towards hard information in the wake of the SARFAESI. Public sector bank lending in India is subject to discretionary ex-post audit by vigilance officials and the comptroller with unclear statute of limitations. Thus,

[7]See https://www.rbi.org.in/scripts/BS_SpeechesView.aspx?Id=938, a speech delivered by Mr. R. Gandhi, Deputy Governor on Jan 30, 2015

[8]A plain reading of the HHI index for the Indian banking sector is reasonable but treating all 27 public sector banks together makes the HHI tilt towards high concentration.

[9]World Bank's doing business gives a rank of 186 to India in terms of ease of doing business. As per the report, it takes 1420 days to enforce contracts. Seehttp://www.doingbusiness.org/data/exploretopics/enforcing-contracts

loan officers who have made loans 20 years ago may be scrutinized in cases where soft information is used. Tools such as these induce risk-aversion on the part of loan officers and make them insist on collateral for loans. To the extent collateral becomes more enforceable and valuable, this push towards vigilance and ex-post scrutiny pushes banks away from costly collection of soft information to collateral-based lending. Improving collectability of collateral is a further push towards this type of transactional lending rather than relationship lending. Our auxiliary tests examine whether such a bank level effect can be detected.

IV Model

We use the framework developed by Rajan (1992) to analyze the impact of increased creditor rights on relationship banking. A firm can potentially borrow from an informed relationship lender or from an arm's length lender. The chief advantage of borrowing from a relationship lender is the benefit that accrues to the firm due to increased monitoring. Relationship borrower cuts off funding in states of the world where the expected NPV of the project is negative and hence adds value to the firm. However, relationship banker also attempts to extract surplus from the firm in a good state and hence negatively impacts an entrepreneur's willingness to exert effort. An arm's length lender, on the other hand, does not add value by increased monitoring but does not hold up the entrepreneur in the good state as well. Thus the tradeoff between benefits of increased monitoring and the costs of hold up determine the type of banking relationship in Rajan (1992).

IV.A The Setting

Let q denote the probability of good state at $t = 1$.

Let p denote the probability of good state in $t = 2$ given that period $t = 1$ witnessed bad state.

Let X denote revenue in a good state and I the amount of initial investment required.

Let L1 denote the recoverable value of the pledged collateral at $t = 1$ and β denote the level of effort exerted by the entrepreneur.

It is also assumed that the probability of attaining good state q is a concave function of effort and the entire project is funded by debt. Liquidation of the project at $t = 1$ leads to losses. However, in a bad state, it is profiTable to liquidate the project rather

than continuing the same.

$$I > L1 > pX \tag{1}$$

In Rajan (1992), if the state at $t = 1$ is good, then the firm earns X at the end of $t = 2$. If the state at $t = 1$ is not good, then the firm can potentially earn X with a probability of p and 0 with a probability of $1 - p$. However continuing after a bad state leads to negative NPV

$$pX - I - \beta < 0 \tag{2}$$

The relationship banker learns about the state at $t = 1$. If the state is not good, then the relationship banker cuts off funding, liquidates the project and thereby limits the losses to I-L1. The entrepreneur, who enjoys the benefits of limited liability, prefers continuation of the project. However, as explained, in good state the relationship banker extracts a portion of the surplus $(X - I)$ in return for continuation of funding. In a competitive markets as ex-post rents are adjusted in the initial price so that all loans are zero NPV.

Given the above background, the utility from the project if the entrepreneur opts for bank funding can be represented as follows;

$$q_b^*(X - I) + (1 - q_b^*)(L - I) - \beta_b \tag{3}$$

β_b is the effort level that maximizes (3)

Similarly, the utility from a project funded by arm's length debt can be represented as follows;

$$q_a^*(X - I) + (1 - q_a^*)(pX - I) - \beta_a \tag{4}$$

where β_a is the effort level that maximizes (3). From (3) and (4), it is clear that the decision to opt for arms length or relationship financing depends on the following;

$$(1 - q_a^*) * (L - pX) - (q_a^* - q_b^*) * (I - L) - [(q_a^* - q_b^*) * (X - I) - (\beta_a - \beta_b)] \tag{5}$$

The first term represents the gain from liquidating the project under bank financing. The second term represents the increased loss of depreciation due to higher chance of reaching bad state under bank financing. The third term represents the loss of incremental revenue over incremental efforts caused by increased chance of bad state under bank financing. An entrepreneur chooses the source of funding based on her expected utility.

IV.B Change in Creditor Rights

Using the above framework, we analyze the impact of change in creditor rights. Increased creditor rights is likely to lead to increase in the recoverable value of assets (Visaria (2009)). It is easy to see that the chief advantage of relationship banking – avoiding continuation when the expected NPV is negative – gets diluted.

While increased creditor rights is likely to increase recoverable value both at $t = 1$ as well as $t = 2$, we assume that the increase is likely to be higher at $t = 2$ when compared to $t = 1$. This assumption is motivated by the possibility that risks to creditor interests via activities such as asset substitution, diversion, etc are higher in the long run as monitoring becomes difficult. Keeping track of pledged assets for a long time is also difficult. For the sake of simplicity, we normalize the increase in recoverable value at $t = 1$ at zero.

Under these assumptions increased creditor rights leave (3) unchanged. However (4) undergoes the following changes;

1. NPV of the project increases due to an increase in the recoverable value of assets. The banker is able to recover a higher amount. Now the utility of a project financed by arms length debt works out to be

$$q^*_{ac}(X - I) + (1 - q^*_{ac})(p * (X - I) + (1 - p)(L2 - I)) - \beta_a \tag{6}$$

   L2 here denotes amount recoverable from the pledged collateral in case of default at $t = 2$.

   Let q^*_{ac} denote the level of effort that maximise (6). It is easy to see that

$$(1 - q^*_a)(p * (X - I) + (1 - p)(L2 - I)) > (1 - q^*_a)(pX - I) \tag{7}$$

2. The increase in amount recoverable from the collateral in bad state, leads to reduction in loan amount to be repaid to the arms length creditor. This happens due to our competitive market assumption where all loans have to be essentially zero NPV loans.

   Let the amount to be repaid to arm's length creditor under no creditor rights be denoted as D

$$D = I/(q + p(1 - q)) \tag{8}$$

   As we have discussed, increased creditor rights ensure recovery of at least L2 in case of a bad state. The lender is expected to pass on all the ex-post rents. Thus

the repayment amount after increase in creditor rights is

$$D_c = L1 + (I - L1)/(q + p(1 - q)) \tag{9}$$

The change in the repayment amount post an increase in creditor rights can be denoted as

$$D - D_c = L2/(q + p(1 - q)) - L2 > 0 \tag{10}$$

3. A reduction in loan repayment has the consequence of increasing pay-offs in a bad state. Thus a side effect of a reduced loan repayment caused by increased creditor rights is the reduction in the optimal level of effort. Optimal effort with arm's length credit in a low creditor rights regime can be calculated by maximizing (4) with respect to β_a. The maximizing value turns out to be

$$1/X(1 - p) \tag{11}$$

It is clear from (11) that effort increases with the increase in project pay-off in good state and also with decrease in probability of success in a bad state. Optimal effort with arm's length credit in a high creditor rights regime can be calculated by maximizing (4) with respect to β_a. The maximizing value turns out to be

$$1/((X - L2)(1 - p) \tag{12}$$

As can be seen from (12), increase in recoverable value of assets caused by increased creditor rights leads to increase in the marginal effort at which total utility is maximized. Consequently, total effort gets reduced. Let q^*_{ac} denote the maximum level of effort under (12). From (11) and (12) it is clear that for all values of $L2 \geq 0$

$$q^*_a > q^*_{ac} \tag{13}$$

IV.C Net Impact of Increased Creditor Rights

Increase in creditor rights increases the utility from projects financed through arm's length finance by increasing the recoverable value of assets in a bad state. This reduces the value created by monitoring function exercised by the relationship banker. On the other hand, increased creditor rights reduces the utility from such projects by reducing the optimal level of effort and thereby leading to reduced probability of success. By comparing (5) and (6), it is possible show that increased creditor rights leads to increased

utility from arm's length borrowing if

$$L2 * (1-p) * (1-q_a^*) > [(X-I)(q_a^* - q_(^*ac)) - (\beta_a - \beta_{ac} + (q_a^* - q_(^*ac))(I - (PX + (1-p) * L2)) \tag{14}$$

The first term represents the gains from increased recovery from the collateral in a bad state. The term in the square bracket represents loss due to reduced probability of good state. Higher increase in L2 is likely to lead to a higher increase in the first term when compared to reduction in the second term. This is because lower probability of success is partly offset by lower optimal level of effort. Also due to the concave nature of relationship between effort and probability, decrease in effort is steep at higher probabilities of success.

IV.D Relationship Banking with Increased Creditor Rights

Under the regime of increased creditor rights, the comparison between relationship finance and arms length finance can be denoted as follows;

$$(1-q_{ac}^*) * (L - (pX + (1-p)L2) - (q_{ac}^* - q_b^*) * (I - L) - [(q_{ac}^* - q_b^*) * (X - I) - (\beta_{ac} - \beta_b)] \tag{15}$$

In cases where (14) holds relative (dis)advantage of arm's length finance over relationship finance is likely to increase (decrease).

IV.E Implications

1. The banking system, in general, is likely to become more transactional post an increase in creditor rights.
2. In cases where the increase in recoverable value of assets is very high under high creditor rights regime, existing banking relationships are likely to rupture.
3. Firms with high opacity where the arms length lenders would have assigned zero recovery value in case of default, are likely to be affected the maximum as increased creditor rights allows the lenders to recover value even after default. Thus smaller, younger and non-group firms are likely to transition away from relationship banking.
4. Since $D_c < D$, borrowing costs are likely to reduce
5. Moving away from relationship banking is also likely to reduce hold up, especially for small firms.

IV.F Related Work

Petersen and Rajan (1995) show that increased credit market competition is inimical to the formation of banking relationships. To build a credible banking relationship in the face of uncertain cash flows faced by fledging companies, a banker needs to invest considerably in understanding the business model of the borrower as well as in monitoring the borrower. However, it is not possible for the lender to recover all the costs in one period due to the possibility of moral hazard on the part of the borrower. Thus the banker resorts to inter-temporal sharing of surplus in such situations. An increase in competition reduces the possibility of such an arrangement between the borrower and the lender. This makes banking relationship less valuable to the borrowers, which then leads to rupturing of banking relationships.

As we have argued before, increase in creditor rights leads to increase in banking competition. Therefore, based on Petersen and Rajan (1995), we expect a decline in relationship banking after the increase in creditor rights. Given that investment in information production is higher for smaller firms as they tend to be opaque, we expect that the tendency of rupturing of bank relationships are likely to be higher among smaller firms. From the above theory, we also derive that rupturing of relationship banking is likely to be in areas that had low level of banking competition before the creditor rights reforms. This is because information superiority based relationship lending is likely to be more prevalent in such areas before the creditor rights reforms.

In Boot and Thakor (2000), increased banking competition leads to increase in the breadth of relationship banking and at the same time a reduction in its depth. In order to insulate themselves from price competition, bankers increasingly resort to relationship banking. However, competition blunts the depth of relationship banking and hence the value added per relationship declines. In other words, investment in information production or specialization per borrower declines. From this model we derive that an increase in creditor rights is likely to lead to reduced lending especially to the small borrowers. This is because banks could have added maximum value by building in-depth relationships with such firms.

Our findings are also in line with Jayaraman and Thakor (2014). They postulate that increased creditor rights reduce the need for bank monitoring. In their model bank monitoring is primarily induced by the equity shareholders of the bank. Their model predicts that an increase in creditor rights increases leverage by reducing the need to maintain equity capital. Interestingly, they find that the impact of change in creditor rights is higher for banks that make relationship based loans when compared to purely fee based banks. We complement this finding by showing that increased creditor rights

directly impact the operation of relationship lending based banks. The reduced need for monitoring could be one more reason for the increase in arms-length banking in a high creditor rights regime.

V Data and Summary Statistics

Our primary data source is the Prowess database maintained by the Center for Monitoring Indian Economy (CMIE). CMIE, a leading business information company in India, was established in the year 1976. The database has been used in other academic studies pertaining to creditor rights (Vig (2013), Visaria (2009), Lilienfeld-Toal, Mookherjee, and Visaria (2012)). It is important to note that Prowess provides information regarding large and medium-sized firms in India. Many of the small firms in India that do not maintain reliable accounting records are out of the purview of Prowess database. Prowess reports the data on about 27,000 Indian firms with assets ranging from INR 0.1 million to INR 3.1 trillion. The data spans a period between 1999 and 2005. We exclude government owned firms from our sample.

The Prowess database provides information about bankers to about 21,000 non-financial firms listed in the database. The information about the bankers of a firm is available in the "Associates and Subsidiary Company Name" sub-section in the "Query by Ownership Structure and Governance Indicators" section. Theis data is sourced from the annual reports of the borrowing firms. We cross verify the information provided by Prowess for a random sample of firms. Prowess also provides detailed information about company financials analogous to the U.S. COMPUSTAT database. This information is available in the "Annual Financial Statements" subsection in "Query by Financial Statements and Ratings" section. We use this information for testing the implications of higher creditor rights on relationship banking. Further, information about incorporation year, ownership type and industry classification of a firm are also available in the "Identity Indicators" section. From the ownership type, we can infer whether a firm belongs to an established business group such as the Tata group, Reliance group, etc. Detailed variable definitions are provided in Table 1.

V.A Variable Definitions

As Boot (2000) points out, repeated dealings between lenders and borrower either over time or across products form the basis of relationship lending. Banks obtain considerable hard and soft information about borrowers through these interactions (Ramakrishnan

and Thakor (1984)) and through ongoing monitoring (Diamond (1984); Rajan and Winton (1995)). We use the length of continuous engagement as a measure of relationship banking. For our main tests, we consider bank b as a relationship banker to firm i in year j, if the bank has lent to the firm i in year j as well as the previous two years.For robustness, we re-run our main results using 4 and 5 years of continuous engagement as a measure of relationship.

A question is how to measure the change from relationship banking to transaction banking and vice-versa. In all our tests, we use the following three measures;

1. Exclusively relationship banking: In this case, a firm i is considered to be involved in relationship banking in year j only if all of its bankers during year j are relationship bankers. Having even a single non-relationship banker in a year is counted as transition to transaction banking.

2. Proportion of relationship bankers: In this case, we calculate the proportion of relationship bankers to total number of bankers. This is a continuous measure. Any decrease in the ratio is considered as a movement towards transaction banking.

3. At least one relationship banker: In this case, a firm i is considered to be involved in relationship banking in year j as long as at least one of its bankers during year j is a relationship banker. Not having any relationship banker in a year is counted as transition to transaction banking.

The third definition is the most liberal of the three definitions used above. Interestingly, in terms of moving away from relationship banking, this definition becomes the most stringent. Here, a firm is said to have moved away from relationship banking only if it severs ties with all its existing relationship bankers.

V.B Summary Statistics

Table 2 presents summary statistics. Panel A of the Table reveals that firms borrowing significantly from relationship bankers. In fact all three measures of relationship banking that we use indicate that nearly three-fourths of all banking engagements covered in the database are relationship banking engagements. On average, each firm deals with 1.75 bankers in a year. We also report leverage (Debt/Assets) and profitability (EBIT/Assets) ratios for all the firms in the sample. In Panel B and Panel C, we report the numbers separately for pre-SARFAESI and post-SARFAESI period. It is interesting to note that all measures of relationship banking decrease on average in the post-SARFAESI period.

In Table 3, we report the results of before-after tests conducted for our treatment and

control groups separately. We also report results for the medium tangibility group but these results are for completeness rather than a hypothesis test. Firms belonging to the medium tangibility group are left out for the tests discussed below. The column titled as difference reports the coefficient for the before-after difference. For example, Column 2 of Table 3, reports the before-after difference in relationship banking measures and in other variables for low tangibility firms.

The results reported in Table 3, indicate that relationship banking declines in a difference-in-difference sense among treatment firms when compared to control firms. Our exclusive measure of relationship banking (reported in row 2 of Table 3) increases in the post period among the control group firms but the change is statistically insignificant among the treatment firms. In case of other two relationship measures (reported in rows 1 and rows 3 of Table 3), the increase is higher among control group firms when compared to treatment group firms. This finding also points out at a relative decrease.

In row 4 of Table 3, we report changes in relationship banking with public sector banks. We report the results for ratio measure of relationship banking for the public sector banks. We find that relationship banking with public sector banks increases by nearly 1.2% among control group firms whereas it declines by nearly 2.4% among the treatment group firms. Here, there is a decline in our treatment (high tangibility group). In row 5, we report results for change relationship with lenders from whom SARFAESI act is not applicable. Such lenders include inter-corporate lenders, Non-Banking Finance Companies (NBFCs).[10] Here, we find that the decline in relationship banking with non-SARFAESI lenders is higher among control group firms when compared to treatment group firms. All these results provide a preliminary indication regarding the movement of treatment group firms away from lenders for whom SARFAESI is applicable to lenders for whom it is not applicable.

In Panel B of Table 3, we look change in our relationship measures for small and large firms separately. We separately define the treatment and control groups within the sample of small and large firms. Among small firms, all our measures of relationship banking increase in control group firms in the post SARFAESI period, whereas the same measures decline for treatment group firms. The increases range between 7.9% to 8.5% and declines range between 1.1% and .07%. The above results indicate that, in line with our model's predictions, among small firms which are also likely to be opaque, high tangibility firms are likely to reduce relationship banking post an increase in creditor rights. Rows 4 to 6, report the same results for the treatment and control group firms in a sample of large firms. Here we do not find significant movements. We now move on

[10]The act became applicable to non-banking finance companies in the year 2011, which is out of our sample period

multivariate regression analysis in a DID framework.

VI Results

We employ DID methodology, which suits our quasi-experimental setting. However, this methodology requires us to define a "treatment" group and a "control" group. Ideally, borrowers for whom SARFAESI is applicable should form the treatment group and those for whom SARFAESI is not applicable should form the control group. SARFAESI is not applicable to only two categories of secured borrowers: agricultural borrowers and those who borrow less than INR100,000 (about $2,000). We do not have data for such borrowers.

As in Vig (2013), we use the fact that SARFAESI is likely to have a substantially higher impact on some firms compared to others.Firms that have more tangible assets are likely to be impacted more when compared to firms that do not. A bank is likely to find tangible assets much easier to value and monitor when compared to intangible assets. The SARFAESI Act eased the process of seizure and liquidation of collateral in case of default. Thus, it may be easier to obtain secured loans using tangible assets as collateral. It is also is easier to liquidate tangible assets when compared to intangible assets. Therefore, the impact of higher creditor rights is likely to be higher on firms with high tangible assets when compared to firms with low tangible assets. Following Rajan and Zingales (1995), we define tangibility as net fixed assets to total assets. We divide firms into terciles based on tangibility. Our "treatment" group consists of top tercile firms and our "control" group consists of bottom tercile firms. Following Rajan and Zingales (1995), we drop middle tercile firms. Following Vig (2013), we treat years 2002 and beyond as post SARFAESI years.

VI.A Baseline

The main question we examine is the relation between an increase in creditor rights and the nature and structure of relationship banking. Based on Section 4, our prior is that an increase in creditor rights leads to less relationship banking.

It is useful to qualify this prediction with other considerations. Post SARFAESI, all else equal, more banks should be willing to lend to a borrower. Therefore, directionally, the impact of higher creditor rights on relationship banking should be somewhat similar to the impact of increased competition in banking. There is no consensus on the potential sign of this effect. Petersen and Rajan (1995) and Chan, Greenbaum, and Thakor (1986)

argue that increased competition leads to reduced incentives to acquire information, because in a competitive environment there is a very high chance of borrower switching loyalties. Others such as Boot and Thakor (2000) argue that it could leads to more relationship banking if it is used as a tool for differentiation in a competitive market.

The likely impact of relationship banking on the re-negotiability of contracts could also matter. Thakor (1993), shows that, due its implicit long term nature, relationship banking adds an element of discretion in banking relationships. The discretion, thus added, facilitates easy re-negotiability of contracts should the need arise. Arms length lending contracts are typically incomplete as crucial aspects such as state of nature, effort level of borrowers. etc. cannot be contracted and enforced (Bolton 2000). Thus, in a scenario of increased creditor rights, the borrowers may be driven towards relationship banking, which offers a higher chance of re-negotiation should the need arise.

We let the data speak to the likely effects of creditor rights on banking relationships in a difference-in-difference (DID) framework. Specifically, we estimate the following specification

$$Y_{\text{ij}} = \alpha + \nu_i + \delta_j + \theta_{sj} + \beta_1 * \text{After} * \text{HighTan} + \beta_2 * \text{HighTan} + \beta_3 * \text{After} + \beta_4 * X_{ij} + \epsilon_{ijs} \tag{1}$$

The analysis is at firm year level. Here the dependent variable of interest Y_{ijs} refers to our measures of relationship banking . The independent variable *After* refers to years after 2001. δ_j refers to year fixed effects, ν_i refers to firm fixed effects and θ_{sj} refers to industry*year fixed effects to control for industry specific time-varying factors affecting relationship banking. X_{ijs} refers to vector of controls. We use EBIT/Assets to control for the impact of profitability and Log of Sales to control for the impact of size. As shown by Ongena and Smith (2000), it is possible that firms with high growth potential move away from relationships quickly. We use Tobin's Q as a measure of growth potential. To address concerns pertaining to auto-correlation (Bertrand, Duflo, and Mullainathan (2004)), we cluster the errors at the firm level.

Our main independent variable of interest is the interaction term, $After * HighTan$, which can be represented as;

$$\begin{aligned} \beta_1 \quad = \quad & (\overline{Y}_{\text{High Tangibility firms}} - \overline{Y}_{\text{Low Tangibility firms}})\big|_{\text{Post SARFAESI}} \\ & - (\overline{Y}_{\text{High Tangibility firms}} - \overline{Y}_{\text{Low Tangibility firms}})\big|_{\text{Pre SARFAESI}} \end{aligned} \tag{2}$$

For a firm i, this compares difference in intensity of relationship banking in the post-

SARFAESI period with the difference in the same intensity in the pre SARFAESI period. A negative sign for the coefficient β_1 would indicate a decline in relationship banking in a DID sense.

A crucial assumption for the validity of a DID estimation is the parallel trend assumption. As shown in Fig. 1-3, the parallel trend assumption holds for all the three measures of relationship banking. Thus, it confirms the validity of our DID estimator.

Our results are presented in Table 4. In columns 1 and 2, we use exclusive relationship banking definition to measure relationships. We find that this measure of relationship banking falls by statistically and economically significant 4.8% (without controls) and 3.6% (with controls) in the post SARFAESI period. In columns 3 and 4, we use the ratio measure of relationship banking. Here again we find that in, the post SARFAESI period, the relationship banking measure declines by 4.6% (without using additional controls) and 3.8% (using additional controls). In columns (5) and (6), we use the most liberal definition, where having even a single dealing with even one of the existing relationship banker is considered as continuation of relationship banking. Both economically as well as statistically, the results remain broadly unchanged. The measure of relationship declines by 4.1% or 3.6% depending on specification. Profitability, size and growth prospects do not seem to make any material difference. Thus, our results indicate that an increase in creditor rights lead to a movement away from relationship banking on the part of affected firms.

VI.B Bank Type

Following the discussion in Section 2, Indian banking Industry has been dominated by public sector banks especially prior to the early 1990s. Burgess and Pande (2004) and Burgess, Pande, and Wong (2005) show that RBI's bank branching norms led to an enormous increase in the public sector branch network. Public sector banks were forced to enter unbanked markets. Therefore, it is reasonable to assume that public sector banks would have an information monopoly on a significant chunk of borrowers.

Fisman, Paravisini, and Vig (2012) study the lending pattern of a public sector bank and show that a loan officer increases lending to borrowers belonging to the same social group as that of the loan officer. They show that such lending leads to desirable outcomes for the bank. Lending increases and default rate goes down. They attribute the findings to the loan officer's ability to collect soft information about borrowers belonging to the loan officers, the information from the social group. Private sector banks who have invested in information technology may also gain informational advantages to the extent that these generate special insights about borrowers not readily available to public sector

banks. A similar push to soft information likely exists for private with special presence in rural areas where lack of information forces banks to rely on soft information. A similar effect may exist for foreign banks, for instance, in their lending to their multinational customers (Berger, Klapper, Martinez Peria, and Zaidi (2008)).

Our model predicts that, increased creditor rights are likely to lead to reduction information based relationship banking. We test this proposition using the following regression specification;

$$Y_{\text{ij}} = \alpha + \nu_i + \delta_j + \theta_{sj} + \beta_1 * \text{After} * \text{HighTan} + \beta_2 * \text{HighTan} + \beta_3 * \text{After} + \beta_4 * X_{ij} + \epsilon_{ijs} \tag{3}$$

The analysis is at firm year level. Here the dependent variable of interest- Y_{ijs}- refers to our measures of relationship banking with public sector banks or other banks depending on the specification described above. Other controls remain same as before. In all our specifications, main independent variable of interest is the interaction between treatment group (high tangibility firms) dummy and the post 2002 dummy.

Results are reported in Table 5 for the max relationship measure (= 1 if at least one relationship banker). As can be seen in column (2), we see a 3.3% decline in our measure of relationship banking. In column(4), we measure the impact on relationship banking where a foreign bank is the relationship banker. Not surprisingly, we see a mild decline of 1% in our measure of relationship banking. The effect is, however, not significant.

In columns 5 and 6, we look at lenders for whom the SARFAESI act is not applicable. These include lenders in the inter-corporate lending market, debt venture capital funds, and Non Banking Finance Companies (NBFCs), etc. Here, we notice a 1.6% statistically significant increase in our relationship measure. At this stage, it is important to note that relationship lending is not the exclusive domain of banks (Carey, Post, and Sharpe (1998)). It has been shown that other lenders also engage in relationship lending. Thus, results in column 5 indicates that the affected borrowers are moving away from lenders for whom SARFAESI is applicable to lenders for whom it is not applicable. Our results do indicate at such a possibility.

In Panel B, we look at the impact on relationship banking with the type of bankers not covered in panel A. In columns (1) and (2), we report results for relationship cases where private banks are involved. The coefficient reported in column (2) is statistically not significant. In column (3) to (4), we look at impact on relationship banking with other type of lenders. These include co-operative banks[11] and public financial institutions.[12]

[11]These are banks formed by local communities. They are subject dual regulation from RBI as well as the concerned state governments (Iyer and Puri (2012).)

[12]Public financial institutions are long term infrastructural lenders notified as public financial institutions by the Companies Act of 1956.

We do not find any statistically significant results.

Next, we test the proposition by re-arranging the data by bank-years. The dependent variable here is the ratio between the number of relationship borrowers to total borrowers in a year. Here we define a relationship borrower as a borrower with whom the bank has had a lending relationship for at least 3 years. Specifically, we estimate the following model:

$$Y_{\text{ij}} = \alpha + \nu_i + \delta_j + \beta_1 * \text{After} * \text{Public} + \beta_2 * \text{Public} + \beta_3 * \text{After} + \beta_4 * X_{ij} + \epsilon_{ij} \quad (4)$$

Here the independent variable of interest in column 1 is the iteration between public bank dummy and the post SARFAESI period. Public bank dummy takes the value of one if the bank under consideration is a public sector bank and zero otherwise. We provide a list of Public Banks in Table A.1 in the Appendix section). We also include year and bank fixed effects. The results are reported in Table 5C. Our measure of relationship declines by 6.1% in the post SARFAESI period for public sector banks when compared to other banks. Similarly in column 2, we repeat the same exercise for comparing rural banks with others. Rural bank is a dummy that takes the value of 1 if the ratio of rural branches to total branches for a bank is above the median value of the said ratio for the entire banking system. Here, we expect the impact of creditor rights on relationship banking to be higher for rural banks for the same reasons mentioned in the case of public sector banks. In line with the above expectation, we find that our measure of relationship banking declined by 4.4% for rural banks when compared to urban banks in a difference in difference sense.

VI.C Borrower Size

Next, we analyze if the impact of creditor rights on relationship banking differs based on size of the borrowers. We divide the borrowers into small and large based on the average size values in the Pre-SARFAESI period. It is well known that small firms are informationally opaque (Berger, Klapper, and Udell (2001)). We, therefore, hypothesize that the banking relationships based on information monopoly is likely to be higher among small firms when compared to large firms. Consequently, the chances of inter-temporal smoothing of interest rates are also likely to be higher for small firms. Large firms, being less informationally opaque,[13] are likely to build banking relationships based on factors other than information. Hence, going by the predictions of our model, the SARFAESI act should have a higher impact on relationship banking where the borrower involved is

[13]Large firms , especially those which are listed in major exchanges, are subjected to stringent audit and disclosure standards. They are also close followed by a number of analysts and business media.

a small firm. We test this hypothesis by running equation (1) separately for small firms and large firms.

The results are reported in Table 6. In Panel A, we report the results for small firms. The dependent variable is our measure of relationship banking. In column (1) and (2), we use the exclusive relationship banking measure, in columns (3) and (4), we use the ratio measure and in columns (5) and (6), we use the relationship banking measure, which is based on at least one banker being a relationship banker. As can be seen from the Table all measures of relationships decline in the post SARFAESI period for the treatment group in a relative sense. The decline ranges between 6% to 8.8%, which is both economically and statistically significant.

In Panel B, we look at the impact on large firms. All three measures of relationship banking do not show any meaningful decline. Hence, we cannot reject the null hypothesis that the relationship measures remain unchanged. The coefficient for the interaction between post SARFAESI period and high tangibility firms is statistically insignificant. As we have hypothesized before, possession of proprietary information is unlikely to be the main basis for relationship banking in these cases. Hence, an increase in creditor rights is unlikely to have any impact on relationship banking.

VI.D Group versus Non-Group Firms

The Indian corporate sector comprises many large business groups such as the Tata Group or the Aditya Birla Group. Here, owners hold majority stakes in a number of companies. Banks may find it relatively easier to make decisions about lending to firms belonging to large business groups as information about the credibility and track record of the owners is available easily. The borrowers also have more reputation capital at stake as defaults in one firm may trigger stoppage of credit to other group firms, especially those in need of credit rather than the largest members of business groups. Such issues are not relevant to non-group firms where banks must make greater investments in information acquisition. The increase in creditor rights is likely to have greater effect on bank relationships for non-group firms.

We divide our sample into group and non-group firms based on the "ownership group" criteria in the "Identity Indicator" section of Prowess and run regression equation (1) separately on these samples. Results are reported in Table 7. Panel A reports the results for non-group firms and Panel B for group firms. Three measures of relationships are ordered in the same manner as in other Tables. In panel A, we see a significant decline in relationship banking among treatment group firms in the Post SARFAESI period. The magnitude of the decline ranges from 3.8% to 5.6%. These coefficients are economically

as well as statistically significant. Expectedly, in Panel B, which shows the results for the group firms, we do not find any significant differential decline in relationship banking among treatment firms in the post SARFAESI period.

VI.E Extent of Bank Competition

We next examine the impact of change in creditor rights in geographical areas with varied levels of banking competition. It appears reasonable to assume that areas with low banking competition before the enactment of higher creditor rights are also likely to be areas with higher banking relationships. If so, an increase in creditor rights is likely to have a higher impact on relationship banking carried on in areas with lower level of banking competition before such increase. Increased creditor rights increase the willingness of arms-length lenders to lend to firms with collateral. This impairs the ability of relationship banker to extract rents inter-temporally leading to rupturing of relationship banking. This is not likely to be the case in areas where banking competition already exists (Petersen and Rajan 1995) where there is a likely tilt towards transactional banking. Here, an increase in creditor rights is unlikely to have significant effects.

We report the results in Table 8. We define banking competition based on Vig et al. (2013). We report the results for low banking competition regions in Panel A and for high banking competition regions in panel B. As can be seen from the Table, all three measures of relationship banking decline anywhere between 6% to 10%. However, we do not observe such a pattern in regions where banking competition was high before the increase in creditor rights.

VI.F SARFAESI and Credit Flow

Ongena and Smith (2000), show that a move away from relationship banking is likely to worsen the availability of credit. Vig (2013) shows that increased creditor rights lead to reduction in leverage. These studies predict a decline in demand for bank credit post an increase in creditor rights. Houston, Lin, Lin, and Ma (2010) show that banks' willingness to take risks increases after increase in creditor rights. The increased risk taking should expand the supply of credit. Since the observed results are based on equilibrium outcomes, it is difficult to separate the impact of demand from supply.[14]

One possibility to tease out the impact of demand relative to supply arises if we can appeal to the fact that the Indian firms, especially small and medium enterprises, are

[14] Acharya, Amihud, and Litov (2011) also show that higher creditor rights are associated with reduced risk taking.

credit constrained (Banerjee and Duflo (2014)). Thus, any change in lending to small firms is more likely be supply driven rather than demand driven. This is plausible. Our data suggest that 18% of firms regularly use trade credit as a financing option. Using the methodology employed by Petersen and Rajan (1994), De and Singh (2011) estimate that the cost of trade credit in India exceeds 30%. Thus, in the face of pre-existing credit constraints and increased willingness to lend on the part of the banker, risk aversion on the part of the borrowers alone may not be sufficient to explain the reduction in leverage. Our model suggests that increased creditor rights leads to reduced investment in acquisition of information, which can explain the reduction in leverage, as the lenders are less informed.

To test the above proposition, first we confirm if there is a reduction in the usage of secured credit after SARFAESI among the treatment group borrowers. We run the following regression equation;

$$Y_{\text{ij}} = \alpha + \nu_i + \delta_j + \theta_{sj} + \beta_1 * \text{After} * \text{HighTan} + \beta_2 * \text{HighTan} + \beta_3 * \text{After} + \beta_4 * X_{ij} + \epsilon_{ijs} \tag{5}$$

The dependent variable here is the proportion of secured credit to total credit. The observations are organized at a firm year level. The independent variables have same meaning as in equation (1). The results are reported in Table 8. In columns 1 and 2 the dependent variable is the ratio between total secured borrowing and total assets and in column 3 and 4, it is the ratio of total debt to total assets. We see a decline in the usage of secured credit. The magnitude of the decline ranges from 11.8% to 19.2%.

VI.G Lending rates

Thakor et al. (2014) argue that increased creditor rights tilt the capital structure of a firm towards debt as emphasis on borrower monitoring goes down. Increased leverage leads to increased risk taking on the part of the bank. This in turn leads to increase in interest rates. However Vig (2008) argue the opposite. Reasons such as reduction in deadweight costs and reduction in hold up costs are likely to lead to a reduction in lending rates. Ongena and Smith (2000) show that moving away from a single bank relationship is a strong antidote for hold up costs. We test the conflicting hypothesis by estimating the following regression specification

$$Y_{\text{ij}} = \alpha + \nu_i + \delta_j + \theta_{sj} + \beta_1 * \text{After} * \text{HighTan} + \beta_2 * \text{HighTan} + \beta_3 * \text{After} + \beta_4 * X_{ij} + \epsilon_{ijs} \tag{6}$$

Here the dependent variable is the interest rate paid by a firm i in year j. Meaning of all other terms remain same as before. The results are reported in Table 9. We are interested in the coefficient estimates for the interaction between After and treatment firms. It is clear from the Table that, the effective cost of borrowing declines from between 160 basis points to 210 basis points for treatment firms when compared to control group firms.

VII Robustness

VII.A Placebo Time Periods

It can be argued that the results reported in Table 4, the reduction in relationship banking as a response to increased creditor rights, is a pre-existing trend and have not been caused by the passage of SARFAESI Act. To address this concern, we conduct placebo tests. We randomly chose different event windows outside (1997-2004) and test the results. We do not find these results in any other time period. We report the results for the event windows 1993-1999 with the year 1996 as the placebo event year and 2005-2010 with 2008 as the placebo event year. The results are reported in Table 9. Panel A reports the results for 1993-1999 period and Panel B reports the results for the 2005-2010 period. As can be seen from the Tables, we do not detect any statistically significant decline in relationship banking for the treatment group firms in the post SARFAESI period. In fact, in some cases, we document an increase in credit.

VII.B Change in number of continuous years of banking to qualify as relationship banking

As explained in Section 6, we treat a banking engagement as a relationship banking if the same pair of borrower and banker deal with each other for at least 3 years. The idea here is that the banker learns about the borrower through repeated interactions. We test the robustness of our results by replacing three years with four years and five years. We run regression equation (1) with changed definition of relationship banking. We report the results in Table 11. Panel A uses 4 year definition and Panel B uses 5 year definition. As can be seen from the Table, results remain unchanged.

VIII Effect of Debt Recovery Tribunal (DRTs)

In order to provide external validity to our results, we exploit another institutional feature that increased the creditor rights in India - the establishment of Debt Recovery Tribunals (DRTs). The DRTs were introduced as a part of package of financial sector reforms in the 1990s. The DRT Act came into effect on June 24, 1993. The Act allows the Government of India to establish debt recovery tribunals "for expeditious adjudication and recovery of debts due to banks and financial institutions"[15].

The establishment of DRTs in different states was not a smooth and unhindered process. The Delhi Bar Association, in July 1994, challenged the DRT law in the Delhi High Court. In August 1995, the Delhi High Court questioned the validity of the Act and directed the Delhi DRT to stay its operation. In the final verdict on March 10, 1995, it ruled that SRTs violated the independence of judiciary and the executive. The government went to the Supreme Court against the judgement. In an interim order, on March 18, 1996, the Supreme Court ruled that, notwithstanding any stay order passed in any writ petitions, DRTs should resume functions. The break in DRT establishment caused by the 1995 Delhi high court ruling suggests that DRTs set up after 1996 were more effective than those set up before 1996, as the early DRTs functioning might have been affected by the uncertainty about their legality and the fact that they were new. Following Visaria (2009), we split the states into two groups based on the date of DRT establishment. Group 1 states are the ones where DRTs were established before the 1995 Supreme Court ruling and Group 2 include the ones where DRTs were established after the ruling (See Appendix Table A.2).

We run the same regression specification as in equation (1). Here, the After dummy is 1 for all the years after the DRT establishment in the respective states. We report the results for Group 1 states in Panel A and for Group 2 states in panel B. As can be seen from the Table, ratio and at least one relationship banker measures of relationship banking decline anywhere between 4.9% to 6.2%. The "All" relationship banking measure also declines but is insignificant. However, we do not observe such a pattern in Group 1 states where the effectiveness of DRT is under questioningn.

IX Conclusion

We study the effect of creditor rights on banking relationships. The empirical setting is a policy experiment in India where the passage of a law, SARFAESI, substantially

[15]Please review Visaria (2009) for a detailed review of the DRT Act and the institutional aspects of it.

increased creditor rights by allowing lenders to seize collateral without access to a slow and clogged court system. We find a decline in relationship banking when creditor rights increase. The reduction in relationship banking is greater among smaller firms, among firms that do not belong to a business group, among public sector banks and in geographically concentrated banking markets, where the (positive and negative) role of the inside bank is likely greater.

Our findings provide support to the joint hypothesis that borrower capture is an important element of relationship banking and that it declines when countries increase creditor rights. This substitution from bank relationships to transactional banking lowers the incidence of relationship banking, and thus both its benefits and its costs. The aggregate welfare and redistributive effects of such a shift are harder to pin down and represent an interesting avenue for future research.

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Table 1: Variable Definitions

This Table reports the definitions and sources of the key variables of interest.

Item no	Variables
1	Sales
2	Depreciation
3	Amortisation
4	PBDITA
5	Total Assets
6	Plant and machinery, computers and electrical assets, net
7	Furniture, social amenities and other fixed assets
8	Land and Buildings

Derived Indicators

Item no	Variables	Description
9	Relationship bank*	A bank having a banking transaction with a firm for more than or equal to three years in a continuous spell
10	Transaction bank*	A bank having a banking transaction with a firm for less than three years in a continuous spell
11	Ratio	Ratio of relationship banks to total banks in a given firm-year pair
12	Min Dummy	is equal to1 if all banks in a given firm-year are relationship type and 0 otherwise
13	Max Dummy	is equal to1 if at least one bank in a given firm-year is relationship type and 0 otherwise
14	EBIT	Earnings before Income and Taxes (= Item 4 - Item 2 - Item 3)
15	Tangibility	Tangibility is defined as (Item 6 + Item 7 + Item 8)/Item 5
16	Tangibility 2	Tangibility 2 is defined as (Item 8)/Item 5
17	Tobin's Q	Tobin's Q is defined as Market value of Assets/ Book Value of Assets

* Source -Query by Ownership Structure & Governance Indicators
Section - Associates & Subsidiary Company Name

Variable reconciliation

This Table reports the number of observations for each data item and the reasons for any omission

Variables	obs	Missing entries	Reason
Number of banks	45218		
Total Assets	44833	385	Missing Total Assets
Log(Assets)	44821	12	Zero Total assets
EBIT/Assets	44821	0	
Sales	37036	7785	Missing sales info
log(Sales)	37030	6	Zero Sales
Debt	34866	2164	Missing Debt
Debt/ Total Assets	34750	116	Missing Debt/Assets - 116; due to zero/missing total assets
Ratio of relationship banks/ Total banks	28142	6608	Firms with missing bank relationship data
Dummy (=1) if all relationship banks	28142	0	
Dummy (=1) if at least one relationship bank	28142	0	
Secured borrowings/ Total assets	26394	1748	Missing secured borrowing data
Tobin's Q	18801	7593	Missing Market value
top and medium tercile	9672	9129	Due to removal of middle tercile data

Table 2: Summary Statistics

In this Table, we report the summary statistics of the key variables. Panel A reports the statistics for the entire period of study (1999-2005). Panel B and C reports the summary statistics for the pre-SARFAESI (1999-2001) and post-SARFAESI period (2002-2005) separately.

Variable	Obs	Mean	Median	S.D.	Min	Max
Ratio of relationship banks/ Total banks	28142	0.79	1	0.38	0	1
Dummy (=1) if all relationship banks	28142	0.73	1	0.44	0	1
Dummy (=1) if at least one relationship bank	28142	0.83	1	0.38	0	1
Number of banks	45218	1.72	1	2.37	0	43
Sales	37036	1305.68	163.8	9466.23	0	8.90E+05
Secured borrowings/ Total assets	26394	0.53	0.27	5.48	0	555.33
Debt/ Total Assets	34750	0.89	0.36	9.06	0	847.33
Log(Assets)	44821	4.8	4.98	2.4	-2.3	13.75
Total Assets	44833	1297.52	145.3	10181	0	9.30E+05
log(Sales)	37030	4.64	5.1	2.75	-2.3	13.7
EBIT/Assets	44821	0.03	0.04	2.7	-325.67	193.33
Tobin's Q	18801	1.35	0.71	7.59	0.02	449.12

Panel A: Pre-SARFAESI period 1999-2001

Variable	Obs	Mean	Median	S.D.	Min	Max
Ratio of relationship banks/ Total banks	11286	0.82	1	0.36	0	1
Dummy (=1) if all relationship banks	11286	0.76	1	0.43	0	1
Dummy (=1) if at least one relationship bank	11286	0.85	1	0.35	0	1
Number of banks	15339	2.02	1	2.38	0	26
Sales	13474	1138.4	192.85	7047.04	0	4.50E+05
Secured borrowings/ Total assets	10725	0.4	0.28	0.71	0	34.97
Debt/ Total Assets	12909	0.56	0.37	1.43	0	55.67
Log(Assets)	15231	5.25	5.26	2.02	-2.3	13.25
Total Assets	15232	1290.27	192.9	8066.98	0	5.70E+05
log(Sales)	13472	4.87	5.26	2.48	-2.3	13.03
EBIT/Assets	15231	0.03	0.04	0.81	-32	72.5
Tobin's Q	8327	0.99	0.65	1.57	0.02	35.05

Panel B: Post-SARFAESI period 2002-2005

Variable	Obs	Mean	Median	S.D.	Min	Max
Ratio of relationship banks/ Total banks	16856	0.78	1	0.39	0	1
Dummy (=1) if all relationship banks	16856	0.72	1	0.45	0	1
Dummy (=1) if at least one relationship bank	16856	0.81	1	0.39	0	1
Number of banks	29879	1.56	1	2.34	0	43
Sales	23562	1401.34	147.55	10603.4	0	8.90E+05
Secured borrowings/ Total assets	15669	0.62	0.25	7.08	0	555.33
Debt/ Total Assets	21841	1.08	0.35	11.37	0	847.33
Log(Assets)	29590	4.57	4.78	2.54	-2.3	13.75
Total Assets	29601	1301.25	119.3	11113.34	0	9.30E+05
log(Sales)	23558	4.51	5	2.88	-2.3	13.7
EBIT/Assets	29590	0.03	0.04	3.27	-325.67	193.33
Tobin's Q	10474	1.64	0.75	10.06	0.02	449.12

Table 3: Univariate Analysis

This Table reports the univariate analysis of some key variables used in the study. We have split the sample into terciles based on the measure of tangibility. Standard errors are reported in the parenthesis. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

	Mean		Low tangibility		Medium tangibility		High tangibility	
Variables	before	difference	before	difference	before	difference	before	difference
				Panel A				
Ratio of relationship banks/Total banks	0.792***	0.028***	0.682***	0.064***	0.825***	0.027***	0.832***	0.005*
	(0.002)	(0.002)	(0.005)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
Min relate	0.734***	0.022***	0.616***	0.056***	0.762***	0.025***	0.786***	-0.002
	(0.002)	(0.002)	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)
Max rel dum	0.826***	0.027***	0.727***	0.063***	0.862***	0.024***	0.857***	0.008***
	(0.002)	(0.002)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Ratio of public relationship banks/Total banks	0.611***	-0.009***	0.479***	0.012***	0.638***	-0.008***	0.672***	-0.024***
	(0.002)	(0.002)	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)
Ratio of non-SARFAESI relationship institutions/ Total banks	0.004***	-0.002***	0.004***	-0.003***	0.004***	-0.002***	0.003***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tangibility ratio	0.324***	-0.024***	0.060***	0.026***	0.292***	-0.021***	0.621***	-0.075***
	(0.002)	(0.001)	(0)	(0.001)	(0.001)	(0.001)	(0.004)	(0.002)
Secured borrowing/Assets	0.379***	0.167***	0.273***	0.148***	0.296***	0.075***	0.514***	0.264***
	(0.005)	(0.02)	(0.015)	(0.023)	(0.004)	(0.011)	(0.007)	(0.047)
Interest cost (%)	10.753***	-3.292***	8.094***	-1.903***	12.459***	-3.741***	11.581***	-4.139***
	(0.047)	(0.042)	(0.1)	(0.086)	(0.076)	(0.073)	(0.06)	(0.059)
Log(Sales)	4.841***	0.185***	3.947***	0.200***	5.425***	0.167***	4.992***	0.189***
	(0.014)	(0.007)	(0.027)	(0.015)	(0.02)	(0.01)	(0.022)	(0.01)
Tobin's Q	0.988***	0.408***	1.043***	0.243***	0.924***	0.287***	0.997***	0.701***
	(0.005)	(0.033)	(0.011)	(0.035)	(0.007)	(0.027)	(0.009)	(0.089)
EBIT/Total Assets	0.143***	0.016	0.193***	-0.073***	0.117***	0.018***	0.118***	0.103***
	(0.012)	(0.013)	(0.034)	(0.034)	(0.003)	(0.005)	(0.002)	(0.019)
				Panel B				
Small firms								
Ratio of relationship banks/Total banks	0.752***	0.029***	0.634***	0.085***	0.779***	0.023***	0.801***	-0.007*
	(0.003)	(0.003)	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)	(0.004)
Min relate	0.711***	0.027***	0.601***	0.079***	0.739***	0.024***	0.769***	-0.011**
	(0.004)	(0.003)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)
Max rel dum	0.783***	0.026***	0.697***	0.083***	0.811***	0.016***	0.825***	-0.007**
	(0.003)	(0.003)	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
Large firms								
Ratio of relationship banks/Total banks	0.843***	0.022***	0.760***	0.021***	0.860***	0.030***	0.868***	0.013***
	(0.002)	(0.002)	(0.007)	(0.006)	(0.003)	(0.003)	(0.004)	(0.004)
Min relate	0.770***	0.015***	0.674***	0.009*	0.781***	0.027***	0.808***	0.005
	(0.003)	(0.003)	(0.008)	(0.007)	(0.004)	(0.004)	(0.005)	(0.004)
Max rel dum	0.879***	0.023***	0.807***	0.019***	0.899***	0.029***	0.893***	0.019***
	(0.002)	(0.002)	(0.007)	(0.006)	(0.003)	(0.003)	(0.004)	(0.004)

Table 4: Effect of strengthening of creditor rights on relationship banking

This Table reports the regression results for the regression of different measures of relationship banking on firm characteristics. In columns 1 and 2, the dependent variable is the dummy that equals to one for a firm-year if all the banking transactions of the firm are relationship types. Here the relationship is defined as the banking transaction with a firm of more than or equal to three continuous years. In column 3-4, the dependent variable is the ratio of relationship banks to total banks for a firm-year. In columns 5-6, the dependent variable is a dummy that equals to one if atleast one banking transaction is a relationship type. After dummy is one for the post- SARFAESI period, that is, equal to one for the years 2002, 2003, 2004 and 2005. Firms are divided into three bins based on pre-treatment (before 2002) values of tangibility. Here tangibility is defined as the ratio of total tangible assets to total assets. The top tercile is the treatment group while the bottom tercile is the control group. Tobins Q is defined as the market to book value of the stock. Profitability is measured using Earnings before interest and taxes to total assets and log of sales proxies for size. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.048***	-0.036*	-0.046***	-0.037***	-0.041***	-0.035***
	(0.018)	(0.018)	(0.013)	(0.013)	(0.013)	(0.013)
After dummy	0.061***	0.051**	0.060***	0.054***	0.053***	0.053***
	(0.023)	(0.024)	(0.017)	(0.017)	(0.016)	(0.017)
Log(Sales)		-0.002		0.003		0.006
		(0.006)		(0.005)		(0.004)
EBIT/Assets		0.002		-0.000		-0.001
		(0.004)		(0.003)		(0.003)
Observations	15,584	14,417	15,584	14,417	15,584	14,417
R-squared	0.607	0.602	0.734	0.734	0.760	0.761
Adj R-squared	0.495	0.486	0.659	0.656	0.692	0.692
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Effect of SARFAESI on different bank types and their relationship lending

This Table reports the results for the regression of ratio of different types of relationship banks to total banks on firm characteristics. In Panel A, reports the results for public, foreign and Non-SARFAESI institutions (private financial institutions where SARFAESI Act is not applicable). Panel B reports the results for private, cooperative and other banks. The dependent variable is the ratio of the number of specific type of relationship banks to total banks for a firm-year. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Public		Foreign		Non-SARFAESI	
After * High tangibility	-0.033**	-0.033**	-0.013	-0.010	0.014***	0.016***
	(0.015)	(0.015)	(0.012)	(0.013)	(0.005)	(0.006)
After dummy	0.017	0.022	0.023	0.018	-0.015***	-0.018***
	(0.020)	(0.020)	(0.015)	(0.016)	(0.005)	(0.006)
Log(Sales)		0.004		0.007**		0.001
		(0.005)		(0.004)		(0.002)
EBIT/Assets		0.001		-0.002		0.001
		(0.004)		(0.003)		(0.001)
Observations	15,584	14,417	15,584	14,417	15,584	14,417
R-squared	0.779	0.781	0.823	0.828	0.671	0.665
Adj R-squared	0.717	0.717	0.773	0.778	0.577	0.567
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Private		Cooperative		Others	
After * High tangibility	-0.013	-0.002	-0.002	-0.004	0.007	0.007
	(0.015)	(0.016)	(0.007)	(0.008)	(0.007)	(0.007)
After dummy	0.134***	0.121***	-0.007	-0.000	-0.013	-0.013
	(0.020)	(0.021)	(0.010)	(0.011)	(0.008)	(0.009)
Log(Sales)		0.015***		-0.001		0.002
		(0.005)		(0.002)		(0.002)
EBIT/Assets		-0.005		-0.002		-0.002
		(0.004)		(0.002)		(0.002)
Observations	15,584	14,417	15,584	14,417	15,584	14,417
R-squared	0.804	0.806	0.832	0.834	0.765	0.759
Adj R-squared	0.748	0.749	0.784	0.786	0.698	0.690
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 5C: Effect of SARFAESI on relationship lending from banks side

This Table looks from the banks side. The dependent variable is the ratio of relationship borrowers to total borrowers. The public bank dummy is one for PSU banks. The specification includes bank and year fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

	(1)	(2)
VARIABLES	Ratio of relationship borrowers/ Total borrowers	
After dummy	0.178***	0.136***
	(0.033)	(0.024)
After * Public Bank dummy	-0.061*	
	(0.036)	
After * Rural dummy		-0.044**
		(0.021)
Observations	2,045	365
R-squared	0.597	0.809
Adj R-squared	0.423	0.767

Table 6: Effect of SARFAESI on relationship lending for Large v/s Small firms

This Table reports the regression results for the regression of different measures of relationship banking on firm characteristics for large and small firms separately. Large firms are the firms which are above median in terms of their size (calculated as the sum of total assets and sales), while small firms are those that are below median. In columns 1 and 2, the dependent variable is the dummy that equals to one for a firm-year if all the banking transactions of the firm are relationship types. Here the relationship is defined as the banking transaction with a firm of more than or equal to three continuous years. In column 3-4, the dependent variable is the ratio of relationship banks to total banks for a firm-year. In columns 5-6, the dependent variable is a dummy that equals to one if atleast one banking transaction is a relationship type. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A: Small firms

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.090***	-0.089***	-0.090***	-0.087***	-0.091***	-0.089***
	(0.027)	(0.028)	(0.022)	(0.022)	(0.021)	(0.022)
After dummy	0.068**	0.077**	0.083***	0.094***	0.089***	0.104***
	(0.034)	(0.036)	(0.027)	(0.028)	(0.026)	(0.027)
Log(Sales)		0.001		0.004		0.006
		(0.008)		(0.006)		(0.006)
EBIT/Assets		0.011		0.002		-0.005
		(0.018)		(0.017)		(0.019)
Observations	6,594	6,135	6,594	6,135	6,594	6,135
R-squared	0.636	0.648	0.732	0.746	0.753	0.768
Adj R-squared	0.521	0.528	0.648	0.659	0.675	0.689
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Large firms

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.009	-0.006	-0.007	-0.006	0.002	0.001
	(0.022)	(0.022)	(0.014)	(0.015)	(0.014)	(0.014)
After dummy	0.046	0.049	0.033	0.033	0.018	0.018
	(0.030)	(0.030)	(0.021)	(0.021)	(0.020)	(0.020)
Log(Sales)		-0.008		0.001		0.004
		(0.010)		(0.008)		(0.007)
EBIT/Assets		0.000		-0.000		0.000
		(0.001)		(0.001)		(0.001)
Observations	8,986	8,898	8,986	8,898	8,986	8,898
R-squared	0.543	0.541	0.700	0.699	0.738	0.737
Adj R-squared	0.430	0.426	0.626	0.623	0.673	0.672
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Effect of SARFAESI on relationship lending for Group v/s Non-group firms

This Table reports the regression results for the regression of different measures of relationship banking on firm characteristics for the Group vis--vis Non-Group firms. In columns 1 and 2, the dependent variable is the dummy that equals to one for a firm-year if all the banking transactions of the firm are relationship types. Here the relationship is defined as the banking transaction with a firm of more than or equal to three continuous years. In column 3-4, the dependent variable is the ratio of relationship banks to total banks for a firm-year. In columns 5-6, the dependent variable is a dummy that equals to one if atleast one banking transaction is a relationship type. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A: Non-group firms

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.067***	-0.055**	-0.052***	-0.044**	-0.042**	-0.038**
	(0.023)	(0.024)	(0.018)	(0.018)	(0.017)	(0.018)
After dummy	0.064**	0.057*	0.064***	0.060***	0.054**	0.055**
	(0.029)	(0.030)	(0.022)	(0.023)	(0.021)	(0.022)
Log(Sales)		0.004		0.007		0.010*
		(0.007)		(0.006)		(0.005)
EBIT/Assets		0.002		-0.013		-0.022*
		(0.018)		(0.014)		(0.013)
Observations	9,779	8,932	9,779	8,932	9,779	8,932
R-squared	0.618	0.614	0.732	0.732	0.756	0.758
Adj R-squared	0.504	0.495	0.652	0.650	0.684	0.684
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Group Firms

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.026	-0.013	-0.037*	-0.024	-0.038**	-0.025
	(0.028)	(0.029)	(0.020)	(0.020)	(0.019)	(0.019)
After dummy	0.068*	0.052	0.061**	0.051*	0.058**	0.053**
	(0.036)	(0.038)	(0.026)	(0.026)	(0.025)	(0.025)
Log(Sales)		-0.008		-0.001		-0.000
		(0.010)		(0.008)		(0.007)
EBIT/Assets		0.001		0.002		0.003
		(0.004)		(0.004)		(0.004)
Observations	5,703	5,370	5,703	5,370	5,703	5,370
R-squared	0.593	0.587	0.745	0.743	0.775	0.775
Adj R-squared	0.481	0.471	0.675	0.671	0.713	0.712
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Effect of SARFAESI on relationship lending for Low v/s High competition areas

This Table reports the regression results for the regression of different measures of relationship banking on firm characteristics for firm incorporated in low and high competition areas. In columns 1 and 2, the dependent variable is the dummy that equals to one for a firm-year if all the banking transactions of the firm are relationship types. Here the relationship is defined as the banking transaction with a firm of more than or equal to three continuous years. In column 3-4, the dependent variable is the ratio of relationship banks to total banks for a firm-year. In columns 5-6, the dependent variable is a dummy that equals to one if atleast one banking transaction is a relationship type. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A: Low Competition Areas

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.099***	-0.082***	-0.089***	-0.072***	-0.079***	-0.065***
	(0.029)	(0.030)	(0.023)	(0.023)	(0.023)	(0.022)
After dummy	0.058*	0.045	0.075***	0.063**	0.082***	0.071***
	(0.031)	(0.032)	(0.025)	(0.025)	(0.024)	(0.024)
Log(Sales)		-0.006		-0.002		-0.000
		(0.010)		(0.008)		(0.008)
EBIT/Assets		0.008		-0.002		-0.006
		(0.013)		(0.013)		(0.013)
Observations	6,608	6,257	6,608	6,257	6,608	6,257
R-squared	0.606	0.606	0.727	0.733	0.751	0.760
Adj R-squared	0.497	0.495	0.652	0.658	0.682	0.693
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: High Competition Areas

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.028	-0.006	-0.032	-0.018	-0.027	-0.016
	(0.028)	(0.029)	(0.020)	(0.020)	(0.019)	(0.019)
After dummy	0.060**	0.050*	0.057***	0.052**	0.053***	0.052**
	(0.028)	(0.030)	(0.021)	(0.021)	(0.020)	(0.020)
Log(Sales)		-0.008		-0.002		0.002
		(0.009)		(0.006)		(0.005)
EBIT/Assets		-0.003		-0.002		-0.000
		(0.003)		(0.002)		(0.001)
Observations	5,134	4,652	5,134	4,652	5,134	4,652
R-squared	0.591	0.581	0.729	0.728	0.757	0.759
Adj R-squared	0.479	0.461	0.655	0.649	0.690	0.690
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: Effect of SARFAESI on credit in the post period

This Table reports the regression results for the regression of different measures of credit on firm characteristics. In columns 1 and 2, the dependent variable is the ratio of secured bank borrowings to total assets. In column 3-4, the dependent variable is the ratio of secured borrowings to total assets for a firm-year. In columns 5-6, the dependent variable is the ratio of Debt/Total assets which is a measure of leverage. After dummy is one for the post- SARFAESI period, that is, equal to one for the years 2002, 2003, 2004 and 2005. Firms are divided into three bins based on pre-treatment (before 2002) values of tangibility. Here tangibility is defined as the ratio of total tangible assets to total assets. The top tercile is the treatment group while the bottom tercile is the control group. Tobins Q is defined as the market to book value of the stock. Profitability is measured using Earnings before interest and taxes to total assets and log of sales proxies for size. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

	(1)	(2)	(3)	(4)
VARIABLES	log(Secured borrowing)		log(Debt)	
After * High tangibility	-0.313***	-0.330***	-0.250***	-0.242***
	(0.057)	(0.058)	(0.050)	(0.051)
After dummy	0.357***	0.371***	0.332***	0.353***
	(0.085)	(0.084)	(0.073)	(0.074)
Log(Sales)		0.149***		0.137***
		(0.021)		(0.017)
EBIT/Assets		-0.217***		-0.022
		(0.082)		(0.024)
Observations	14,077	13,240	17,986	15,883
R-squared	0.915	0.916	0.921	0.926
Adj R-squared	0.890	0.890	0.899	0.904
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes

Table 10: Effect of SARFAESI on cost of credit in the post SARFAESI period

This Table reports the regression results for the regression of cost of credit on firm characteristics. Here, the dependent variable is the average interest cost (in percentage) of borrowings for a firm-year. After dummy is one for the post- SARFAESI period, that is, equal to one for the years 2002, 2003, 2004 and 2005. Firms are divided into three bins based on pre-treatment (before 2002) values of tangibility. Here tangibility is defined as the ratio of total tangible assets to total assets. The top tercile is the treatment group while the bottom tercile is the control group. Tobins Q is defined as the market to book value of the stock. Profitability is measured using Earnings before interest and taxes to total assets and log of sales proxies for size. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

	(1)	(2)	(3)	(4)
VARIABLES		Interest cost (%)		
After * High tangibility			-1.880***	-1.429***
			(0.311)	(0.357)
After dummy	-4.504***	-5.036***	-3.636***	-4.287***
	(0.357)	(0.394)	(0.405)	(0.462)
Log(Sales)		0.994***		0.996***
		(0.119)		(0.119)
EBIT/Assets		-0.428		-0.403
		(0.281)		(0.269)
Observations	20,767	17,632	20,767	17,632
R-squared	0.650	0.652	0.652	0.653
Adj R-squared	0.554	0.549	0.557	0.551
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes

Table 11: Falsification tests

This Table tests the robustness of our results by testing the same specification in the pre-SARFAESI period (1993-1999) and post-SARFAESI period (2005-2010). This Table reports the regression results for the regression of different measures of relationship banking on firm characteristics. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A: Falsification test using pre SARFAESI Period (1993 - 1999) assuming that act passed in 1996

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.022	-0.016	-0.018	-0.014	-0.015	-0.012
	(0.021)	(0.022)	(0.015)	(0.016)	(0.014)	(0.015)
After dummy	0.185***	0.175***	0.152***	0.140***	0.136***	0.122***
	(0.033)	(0.033)	(0.025)	(0.025)	(0.024)	(0.025)
Log(Sales)		0.009		0.014**		0.016**
		(0.008)		(0.007)		(0.007)
EBIT/Assets		-0.007		-0.011		-0.015
		(0.020)		(0.015)		(0.017)
Observations	10,850	10,254	10,850	10,254	10,850	10,254
R-squared	0.567	0.559	0.681	0.668	0.702	0.687
Adj R-squared	0.450	0.438	0.595	0.578	0.622	0.602
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Falsification test using pre SARFAESI Period (2005 - 2010) assuming that act passed in 2008

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	0.011	0.002	-0.007	-0.005	-0.020	-0.009
	(0.022)	(0.026)	(0.017)	(0.019)	(0.016)	(0.018)
After dummy	-0.046*	-0.042	-0.019	-0.030	-0.016	-0.036*
	(0.027)	(0.031)	(0.020)	(0.022)	(0.019)	(0.021)
Log(Sales)		0.005		0.010*		0.010*
		(0.007)		(0.005)		(0.006)
EBIT/Assets		-0.000		-0.000		-0.000
		(0.000)		(0.000)		(0.000)
Observations	15,426	13,847	15,426	13,847	15,426	13,847
R-squared	0.592	0.586	0.736	0.735	0.769	0.767
Adj R-squared	0.468	0.458	0.656	0.653	0.699	0.695
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 12: Robustness tests: Definition of a relationship bank

This Table reports the robustness results for the regression of different measures of relationship banking on firm characteristics. Here the relationship is defined as the banking transaction with a firm of more than or equal to four (Panel A) or five (Panel B) continuous years. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A: Relationship defined as at least 4 years of continuous transaction with the same bank

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.053***	-0.040**	-0.050***	-0.039***	-0.053***	-0.044***
	(0.019)	(0.020)	(0.014)	(0.014)	(0.014)	(0.014)
After dummy	0.052**	0.038	0.063***	0.054***	0.068***	0.063***
	(0.024)	(0.025)	(0.018)	(0.018)	(0.017)	(0.018)
Log(Sales)		-0.006		0.003		0.009**
		(0.006)		(0.005)		(0.004)
EBIT/Assets		0.000		-0.001		-0.001
		(0.001)		(0.001)		(0.001)
Observations	15,584	14,417	15,584	14,417	15,584	14,417
R-squared	0.668	0.665	0.790	0.790	0.811	0.813
Adj R-squared	0.573	0.568	0.730	0.729	0.757	0.759
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Relationship defined as at least 5 years of continuous transaction with the same bank

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.048**	-0.036*	-0.051***	-0.040***	-0.050***	-0.040***
	(0.019)	(0.020)	(0.014)	(0.014)	(0.013)	(0.013)
After dummy	0.063***	0.048*	0.085***	0.071***	0.091***	0.078***
	(0.023)	(0.025)	(0.017)	(0.018)	(0.018)	(0.018)
Log(Sales)		0.003		0.012***		0.018***
		(0.006)		(0.005)		(0.004)
EBIT/Assets		-0.004		-0.001		-0.001
		(0.002)		(0.001)		(0.001)
Observations	15,584	14,417	15,584	14,417	15,584	14,417
R-squared	0.718	0.716	0.829	0.830	0.849	0.853
Adj R-squared	0.638	0.633	0.780	0.781	0.806	0.811
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 13: Effect of DRT on relationship lending for Group 1 and Group 2 states

This Table reports the regression results for the regression of different measures of relationship banking on firm characteristics for firms incorporated in Group 1 and Group 2 states. In columns 1 and 2, the dependent variable is the dummy that equals to one for a firm-year if all the banking transactions of the firm are relationship types. Here the relationship is defined as the banking transaction with a firm of more than or equal to three continuous years. In column 3-4, the dependent variable is the ratio of relationship banks to total banks for a firm-year. In columns 5-6, the dependent variable is a dummy that equals to one if atleast one banking transaction is a relationship type. The specification includes firm, year and industry fixed effects. Standard errors reported in the parentheses are robust to heteroscedasticity and are clustered by firms. ***, **, * represents statistical significance at the 1%, 5% and 10% levels.

Panel A: Group 1 States

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.032	-0.038	-0.041*	-0.048**	-0.055***	-0.061***
	(0.029)	(0.029)	(0.022)	(0.023)	(0.021)	(0.021)
After dummy	-0.003	-0.004	0.030	0.030	0.052**	0.051**
	(0.033)	(0.033)	(0.022)	(0.023)	(0.021)	(0.021)
Log(Sales)		-0.005		0.007		0.012
		(0.010)		(0.008)		(0.007)
EBIT/Assets		0.059**		0.044*		0.044
		(0.030)		(0.026)		(0.028)
Observations	6,416	6,262	6,416	6,262	6,416	6,262
R-squared	0.395	0.398	0.471	0.475	0.471	0.476
Adj R-squared	0.303	0.304	0.390	0.393	0.390	0.394
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Group 2 States

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Min Dummy		Ratio		Max Dummy	
After * High tangibility	-0.028	-0.022	-0.032	-0.018	-0.031	-0.015
	(0.046)	(0.047)	(0.040)	(0.041)	(0.040)	(0.041)
After dummy	0.097*	0.096*	0.065*	0.060	0.068*	0.063*
	(0.052)	(0.052)	(0.038)	(0.038)	(0.038)	(0.038)
Log(Sales)		0.008		0.007		0.004
		(0.014)		(0.012)		(0.012)
EBIT/Assets		0.025		0.015		0.001
		(0.022)		(0.013)		(0.011)
Observations	4,428	4,298	4,428	4,298	4,428	4,298
R-squared	0.404	0.401	0.477	0.479	0.480	0.481
Adj R-squared	0.303	0.298	0.389	0.389	0.392	0.391
Industry*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Figure 1: Ratio of relationship bankers to total bankers.

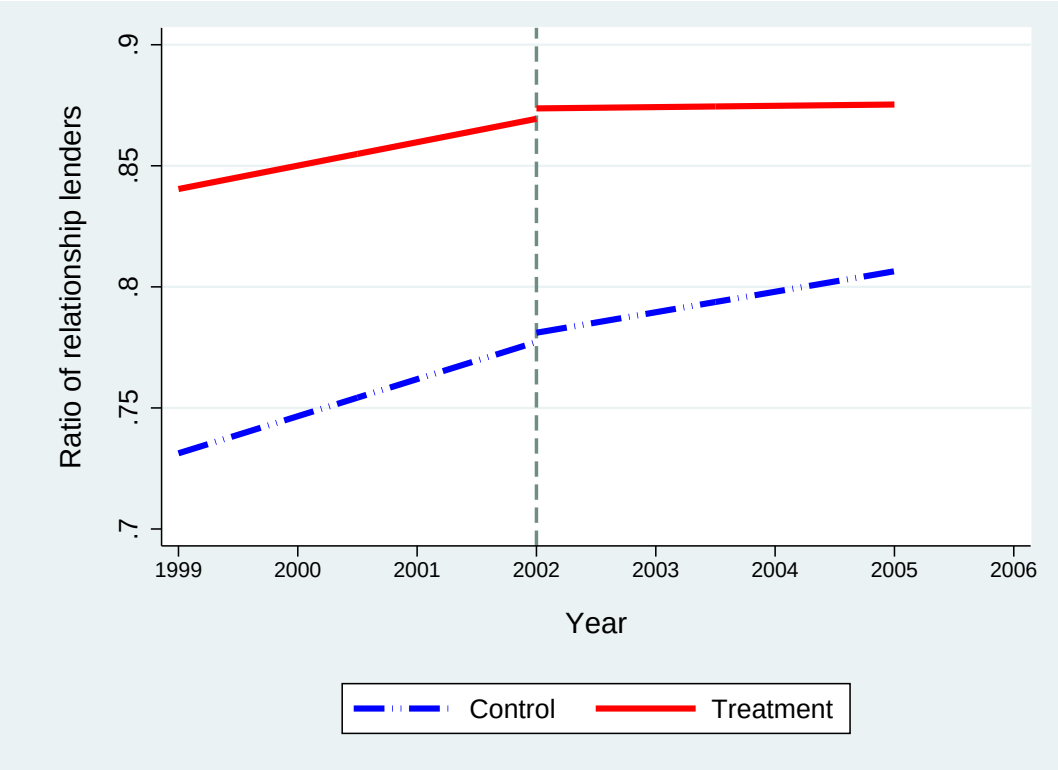


Figure 2: Min Dummy: =1 if **all** bankers are relationship type, 0 otherwise

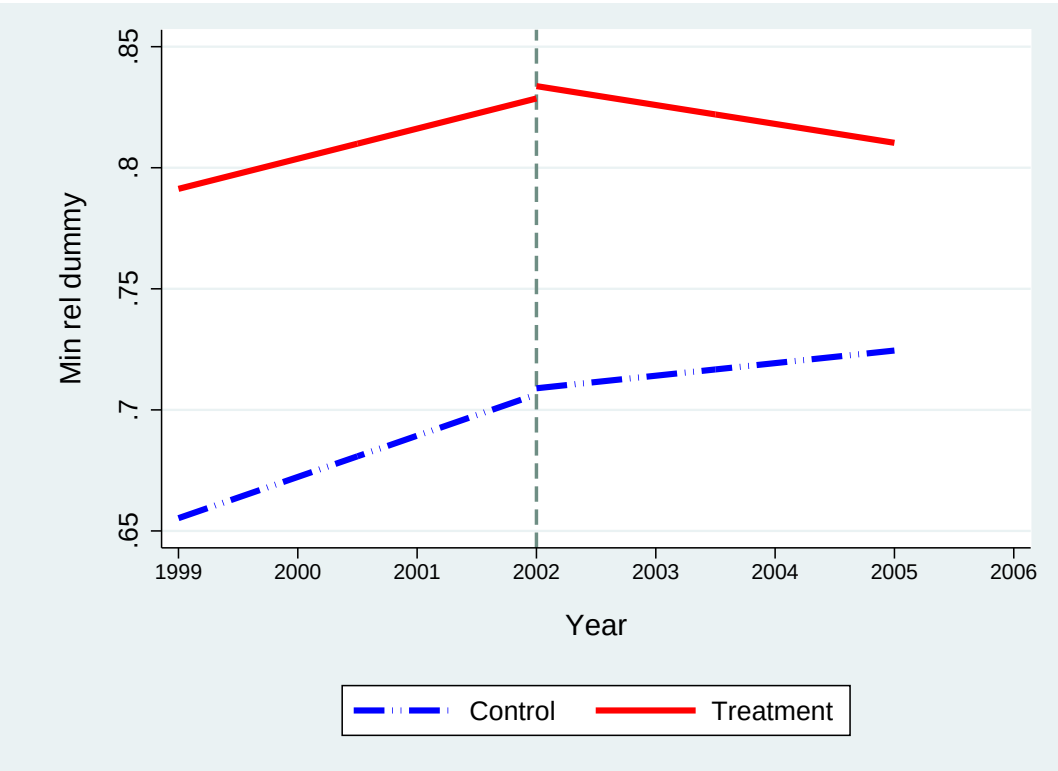
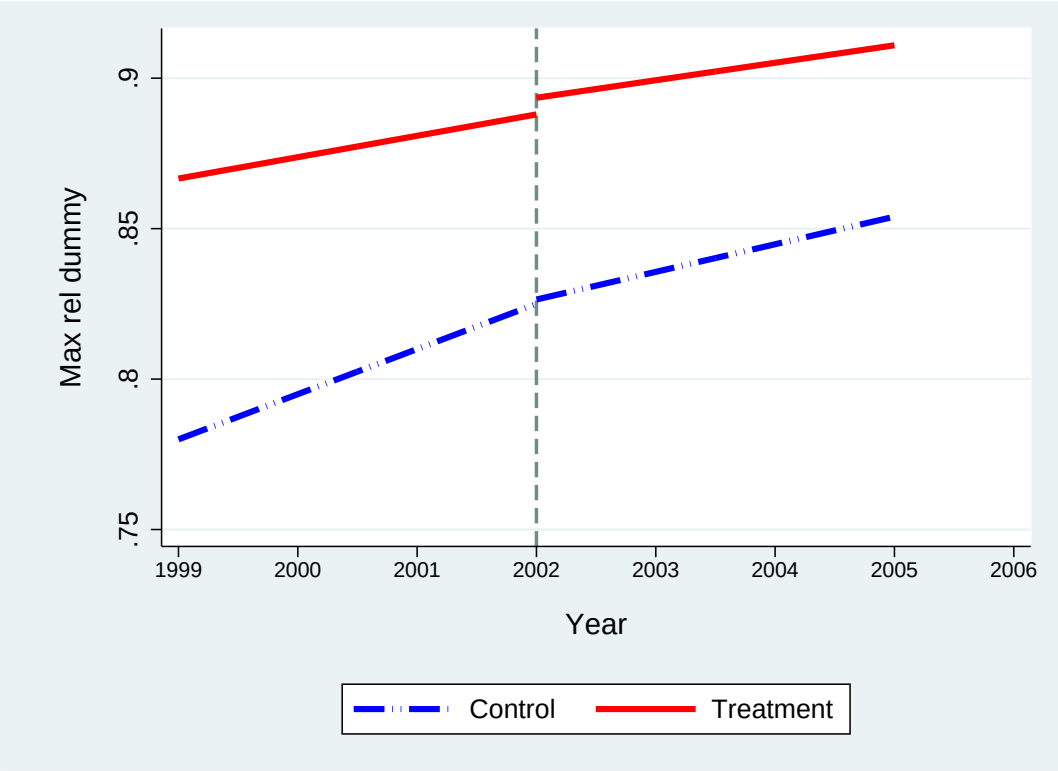


Figure 3: Max Dummy: =1 if **at least** one banker is relationship type, 0 otherwise



Appendix

List of public and private banks

Public Banks	Private Banks
Allahabad Bank	Axis Bank Ltd.
Andhra Bank	Bank Of Karad Ltd.
Bank Of Baroda	Bank Of Madurai Ltd.
Bank Of India	Bank Of Punjab Ltd.
Bank Of Maharashtra	Bank Of Rajasthan Ltd.
Canara Bank	Bareilly Corporation Bank Ltd.
Central Bank Of India	Benares State Bank Ltd.
Corporation Bank	Bharat Overseas Bank Ltd.
Dena Bank	Catholic Syrian Bank Ltd.
I D B I Bank Ltd.	Centurion Bank Of Punjab Ltd.
Indian Bank	City Union Bank Ltd.
Indian Overseas Bank	Commerce Bank
New Bank Of India [Erstwhile]	D C B Bank Ltd.
Orient Bank Of Commerce	Dhanlaxmi Bank Ltd.
Oriental Bank Of Commerce	Federal Bank Ltd.
Punjab & Sind Bank	Ganesh Bank Of Kurundwad Ltd.
Punjab National Bank	Global Trust Bank Ltd.
State Bank Of Bikaner & Jaipur	H D F C Bank
State Bank Of Hyderabad	I N G Bank N V
State Bank Of India	I N G Vysya Bank Ltd.
State Bank Of Indore	I C I C I Bank
State Bank Of Mysore	Indbank Merchant Banking Services Ltd.
State Bank Of Patiala	Indusind Bank Ltd.
State Bank Of Saurashtra [Merged]	Industrial Bank Ltd.
State Bank Of Sikkim	Industrial Investment Bank Of India Ltd.
State Bank Of Travancore	Jammu & Kashmir Bank Ltd.
Syndicate Bank	Karnataka Bank Ltd.
Uco Bank	Karur Vysya Bank Ltd.
Union Bank Of India	Kotak Mahindra Bank Ltd.
United Bank Of India	Lakshmi Vilas Bank Ltd.
Vijaya Bank	Lord Krishna Bank Ltd.
	Nainital Bank Ltd.
	National Westminster Bank Group
	Nedungadi Bank Ltd.
	Ratnakar Bank Ltd.
	S B I Commercial & International Bank Ltd.
	Sangli Sahakari Bank Ltd.
	South Indian Bank Ltd.
	Tamilnad Mercantile Bank Ltd.
	Times Bank Ltd.
	United Industrial Bank Ltd.
	Yes Bank Ltd.

Dates of DRT Establishment

City of DRT	Date of establishment	Jurisdiction
Group 1 states		
Kolkata	27-Apr-94	West Bengal, Andaman and Nicobar Islands
Delhi	5-Jul-94	Delhi
Jaipur	30-Aug-94	Rajasthan, Himachal Pradesh, Haryana, Punjab, Chandigarh
Bangalore	30-Nov-94	Karnataka, Andhra Pradesh
Ahmedabad	21-Dec-94	Gujarat, Dadra & Nagar Haveli, Daman and Diu
Group 2 states		
Chennai	4-Nov-96	Tamil Nadu, Kerala, Pondicherry
Guwahati	7-Jan-97	Assam, Meghalaya, Manipur, Mizoram, Tripura, Arunachal Pradesh, Nagaland
Patna	24-Jan-97	Bihar, Orissa
Jabalpur	7-Apr-98	Madhya Pradesh, Uttar Pradesh
Mumbai	16-Jul-99	Maharashtra, Goa

Industry Groups

Industry group	GICS
Abrasives	Industrials
Automobiles	Consumer Discretionary
Bakery Products	Consumer Staples
Beer & Alcohol	Consumer Staples
Caustic Soda	Materials
Cement	Industrials
Ceramics	Industrials
Cocoa	Consumer Staples
Coffee	Consumer Staples
Construction	Industrials
Consumer Electronics	Consumer Discretionary
Cosmetics, Toilets	Consumer Staples
Daily Products	Consumer Staples
Diversified	Utilities
Domestic Appliances	Consumer Discretionary
Drugs & Pharmaceuticals	Health Care
Dry Cells, Books And Jewellery	Consumer Discretionary
Dyes & Pigments	Materials
Ferrous Metals	Materials
Fertilizers	Materials
Financial Services	Financials
Floriculture	Consumer Staples
Granite	Industrials
Inorganic Chemicals	Materials
Irrigation	Utilities
Leather	Consumer Discretionary
Machinery	Industrials
Marine Foods	Consumer Staples
Miling Products	Consumer Staples
Mineral Products	Materials
Misc Manufacturing	Industrials
Non-Ferrous	Materials
Organic Chemicals	Materials
Other Agricultural Products	Consumer Staples
Other Chemicals	Materials
Other Construction	Industrials
Paints	Materials
Paper Manufacturing	Materials
Pesticides	Materials
Petroleum Products	Energy
Plastic Products	Materials
Polymers	Materials
Poultry & Meat Products	Consumer Staples
Power Generation	Utilities
Processed Food	Consumer Staples
Refractories	Industrials
Rubber Products	Consumer Discretionary
Services	Consumer Discretionary
Soda Ash	Materials
Starches	Consumer Staples
Sugar	Consumer Staples
Tea	Consumer Staples
Textiles	Consumer Discretionary
Tobacco Products	Consumer Staples
VegeTable Products & Oils	Consumer Staples
Wires And Cables	Telecommunications
Wood	Materials

List of prominent companies that break bank relationships after SARFAESI Act

Company Name
Aditya Mills Ltd.
Asya Infosoft Ltd.
Blue Rock Dyes & Chemicals Ltd. [Merged]
Gujarat Foils Ltd.
Kanha Vanaspati Ltd.
Premier Ltd.
R S Petrochemicals Ltd.
S R M Energy Ltd.
Stelco Strips Ltd.
Care Institute Of Medical Sciences Ltd.
Jyothy Consumer Products Mktg. Ltd.
M Y M Technologies Ltd.
Rathi India Ltd.
Shah Construction Co. Ltd.
Smilax Industries Ltd.
Suraj Holdings Ltd.