Legal Reform and Loan Repayment: The Microeconomic Impact of Debt Recovery Tribunals in India*

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Abstract

This paper investigates the micro-level link between judicial quality and economic outcomes. It uses a loan-level data set from a large Indian bank to estimate the impact of a new quasi-legal institution, Debt Recovery Tribunals, which are aimed at accelerating banks' recovery of non-performing loans. I use a differences-in-differences strategy based on two sources of variation: the monetary threshold for claims to be eligible for these tribunals, and the staggered introduction of tribunals across Indian states. I find that the establishment of tribunals reduces delinquency in loan repayment by between 3 and 11 percent. The effect is statistically significant within loans as well: for the same loan, installments that become due after the loan becomes treated are more likely to be paid up on time than those that become due before. Furthermore, interest rates on loans sanctioned after the reform are lower by 1.4-2 percentage points. These results suggest that legal reform and the improved enforcement of loan contracts can reduce borrower delinquency, and can lead banks to provide cheaper credit. Thus the paper illustrates a microeconomic mechanism through which improvements in legal institutions might affect credit market outcomes.

1 Introduction

It is common in India for people to age considerably while they wait for the courts to resolve their legal disputes. The notorious Bofors gun scandal is an illustration. The scandal broke in 1987 but is far from resolved even today. In the meanwhile, two of the key accused: India's defense secretary at the time of the deal, and the Indian agent of the Bofors company, have died (of natural causes). Former prime minister Rajiv Gandhi was chargesheeted in 1997; six years after he had been assassinated. His name was cleared seven years later, in 2004. While the Bofors case is complex and high-profile, it is indicative of a widespread phenomenon: in the Indian system most types of legal suits take very long to resolve. In fact, the quality of formal judicial institutions is poor in many developing countries, transition economies, and even some developed countries. Cases in court are regularly subject to long delays, judges and court officials are corrupt, or the courts are captured by the elite.

In this paper I try to examine what effect this has on market outcomes. Previous studies have found that across countries, an index of judicial quality can predict entrepreneurial investment and economic growth. However, a specific policy measure in India allows me to examine a particular micro-level mechanism at work. In 1993, the Indian government passed a national act allowing the establishment of Debt Recovery Tribunals (DRTs) across India. These tribunals are a new quasi-legal institution set up to process legal suits filed by banks against defaulting borrowers. They follow a streamlined legal procedure that emphasizes speedy adjudication of cases and swift execution of the verdict.

Two aspects of this reform allow the identification of its effects. One, the monetary threshold for claims to be filed in a DRT is Rupees 1 million (approximately US$ 20,000). Two, there is variation in the timing of tribunal establishment in different states. Neither the monetary threshold nor the timing of DRT placement appears to be correlated with other factors which may influence the ability or willingness of borrowers to repay their loans. My data consist of loan level records collected from a large private sector bank with a national presence. They contain detailed information about the contractual terms of the loans, their repayment schedule and actual

repayment in each quarter when an installment becomes due. Loans that are late on repayment of more than Rupees 1 million at the time of the legal reform are potentially treated by DRTs. Therefore I compare the change in the repayment behavior of these loans after DRTs are established, to the change in the repayment behavior of other loans (those with less than Rupees 1 million overdue). For loans with more than Rupees 1 million overdue, the establishment of a tribunal increases the likelihood that an installment is paid on time. Furthermore, this effect holds within loans as well: for the same loan, installments that become due after a tribunal is established are more likely to be paid up on time than installments that become due before. Several robustness checks reinforce these findings: the effects remain significant even after controlling for state-level time-varying unobservable factors (by including state $\times$ quarter fixed effects), and allowing different time-varying unobservables for loans above and below the Rupees 1 million threshold.

As evidence of the economic impact of this reform, I find further that the establishment of a DRT leads to a change in the contractual terms of new loans given out subsequently. While the size of an average loan does not change significantly, the interest rate on new loans tends to be lower than that on comparable older loans by 1 to 2 percentage points. This suggests that improved repayment behavior lowers the risk of default and allows the bank to provide cheaper credit.

The rest of the paper is organized as follows. Section 2 situates the paper within the existing literature. Section 3 discusses the background against which the DRT Act was introduced. Section 4 describes in detail the institution of DRTs: their main features, and the manner in which the DRT act was implemented. It also provides some suggestive evidence on the effectiveness of DRTs. Section 5 presents a simple theoretical framework to explain the phenomenon studied here. Section 6 describes the data, section 7 presents the empirical strategy, and sections 8 and 9 present the empirical results. Section 10 concludes the paper.

2 Literature

Recent empirical work has shown that institutional quality is an important determinant of economic development (Acemoglu *et al.* 2001, Banerjee & Iyer 2003). For

example, legal systems that protect shareholders and creditors lead to lower concentrations of share-holding (La Porta *et al.* 1998). The enforcement of these rules is important as well. Demirgüç-Kunt & Maksimovic (1998) find that in countries with efficient judiciaries, firms are more likely to get external funds for long-term investment. Further, the nature of the rules can affect the quality of their implementation: procedural formalism can make judicial processes cumbersome, and entrepreneurs perceive systems with simpler, less bureaucratic procedures as providing better service (Djankov *et al.* 2003). This paper is also concerned with the procedural aspect of judicial quality. It focuses on one dimension of judicial quality, viz. the time taken to resolve (debt recovery) suits, and examines how this affects behavior of borrowers and lenders in the credit market. A recent policy reform in India provides a setting to identify these effects relatively cleanly. The paper thus illustrates a micro-economic mechanism through which the quality of the judiciary can affect economic outcomes.

3 Background

The Indian court system is notorious for the time taken to resolve cases. In his case study of two district courts in northern India, Moog (1997) remarks that the most effective method of dispute resolution in these courts may well be the out-of-court settlements, withdrawals and compromises by litigants attempting to avoid the inefficiencies in processing legal suits. Cases in both district and high courts are subject to long delays. In 1985, the high courts had roughly 570,000 original civil suits pending, of which 36 percent had been pending longer than three years. The situation was disproportionately bad for civil cases of asset liquidation: 40 percent had been pending longer than eight years (Law Commission of India 1988).[1]

While legal scholars point to various reasons for the inefficiency of the court system, it is widely acknowledged that procedural loopholes are an important factor. Civil courts follow the Code of Civil Procedure (1908). This code allows for numerous applications, counter-applications and "special leaves" by both the plaintiff and

[1]Note that the life of a civil suit is likely to be even longer, since there are multiple appeals possible. Even after a final judgment is arrived at and all appeals are exhausted, the execution of the verdict can also be contested, and that ruling can be appealed as well.

the defendant. Evidence must be presented orally, and hearings tend to be long.[2] Judges have wide latitude in determining whether hearings should be adjourned or new claims added to the plaint (Köhling 2002). Although both central and state legislatures have attempted to reform the Code by enacting amendments to it, the general consensus is that these attempts have been unsuccessful.

Judicial inefficiency could affect various sectors of the economy; in this paper we focus on the effect on the market for corporate bank debt. To understand the motivation for Debt Recovery Tribunals, I provide below a brief background on non-performing loans in the Indian banking system.

3.1 Non-performing Loans

In newly independent India, policy-makers set an agenda for the banking sector: it was to extend credit to various sectors of the economy and promote economic development. This objective overrode concerns about the financial health of banks. Poorly performing public sector banks could expect to be recapitalized by the government. Private sector banks were also heavily regulated.[3]

This led to a high volume of non-performing loans in the banking system. In 1996, 18.1 percent of the gross loans of public sector banks were non-performing. Private sector banks, which have only about 20-25 percent of the assets in the banking sector, reported 10 percent of their gross loans as non-performing. When India began the liberalization of its financial sector in the early 1990s, the Narasimham Committee on the Financial System (Government of India 1991) argued that unless proactive measures were taken, these bad loans could jeopardize the entire financial system. The Reserve Bank of India responded with several measures. In 1992, it provided an objective classification system for banks' assets. Whereas earlier banks could use a subjective Health Code system, now a loan would be classified as non-performing if payment of interest or repayment of installment of principal or both

[2] Law Commission of India (1988) provides a vivid account. Four judges of the Supreme Court spent all of 1981 hearing oral arguments in *two* cases. Arguments in the first case began on December 9, 1980 and continued until April 30, 1981. The court was closed for summer recess from the first week of May to the third week of July. The second case was heard from August 4 until November 16. For the rest of 1981 the judges prepared their judgments.

[3] All commercial banks were required to make 40 percent of their loans to the "priority sector": agriculture and allied activities, small scale industries and minority communities.

had remained unpaid for a certain pre-specified period or more.[4] It also imposed stricter accounting standards and greater reporting requirements and required that banks hold in reserve larger proportions of the value of outstanding loans to cover themselves against possible default.

These changes created incentives for banks to reduce the volume of their non-performing loans. Whereas in the short term, banks can achieve this by restructuring the loan or writing off the unrecoverable part, a true improvement in the bank's balance sheet requires that money be recovered from the defaulting borrower. Since most bank loans in India are secured by collateral, this requires that the collateral be liquidated.[5]

3.2 Debt Recovery and Judicial Quality

To recover a non-performing loan, secured or not, a bank must first obtain a court order. Before 1994, this involved filing a legal suit in the civil court system. In this suit, the bank must state the particulars of the case, and request that the court direct the borrower to pay the money to the bank (the directive is termed a money decree). If the loan is unsecured the bank must request that the court liquidate the firm's assets ("wind up" the firm) and distribute the proceeds from liquidation among all creditors according to the priority of their claim. If the loan is secured, it must request that the court enforce its security interest, i.e. allow the sale of collateral so that the bank may recover its dues.

In this setting, the benefit from filing a legal suit against a defaulting borrower has been low, and the cost has been high. The bankruptcy procedure for firms has also been time-consuming, and bankers complain that it creates incentives for borrowers to mismanage funds.

[4]This pre-specified period was fixed at four quarters for the financial year ending on March 31, 1993. It was to be decreased to three quarters in 1994 and to two quarters (180 days) in 1995 and thereafter (Reserve Bank of India 1999; 2003). A further notification since then has decreased it to one quarter (90 days) beginning 2004.

[5]Pistor & Wellons (1999) report that 90 percent of bank loans in India are secured.

4 Debt Recovery Tribunals

In 1981 the Tiwari Committee investigated the legal difficulties faced by banks and recommended the establishment of special tribunals for the recovery of debt. It suggested that these tribunals use a simple procedure guided only by the principles of natural justice. The Narasimham Committee endorsed this proposal in 1991, leading the Government of India to pass a new act in 1993, known as the "Recovery of Debts due to Banks and Financial Institutions Act" (DRT Act).

4.1 The DRT Act

The act came into force on June 24th, 1993.[6] It allows the Government of India to establish debt recovery tribunals (DRTs) "for expeditious adjudication and recovery of debts due to banks and financial institutions", and to specify their territorial jurisdiction.

A debt recovery suit against a borrower can be filed in a DRT only if the claim is larger than Rupees 1 million (approximately $20,000). The rationale for this stipulation appears to have been as follows. First, by restricting the size of the claim that would be eligible for DRTs, this avoids overcrowding the DRTs. Second, given the large fixed cost of litigation, the larger non-performing loans are also most attractive to recover. The DRTs were envisioned as helping banks recover bad loans from the larger corporate borrowers. The exact threshold appears to have been chosen because it was a convenient round number. There is no evidence to suggest that there were any economic reasons for this choice.[7]

Debt Recovery Tribunals are a quasi-legal institution dealing exclusively with debt recovery cases: cases where the bank or financial institution claims money is to be recovered from a borrower. They are "quasi-legal" in that they are established by the executive arm of the government and fall under the purview of the Ministry of Finance, unlike civil and criminal courts which are part of the judiciary. However,

[6] The records of parliamentary proceedings from the period show that the bill was introduced into the lower house of parliament (Lok Sabha) on May 13, 1993. It appears to have met with no opposition in parliament, and was passed on August 10, 1993. It came into effect retrospectively.

[7] An amendment bill is currently pending in the Lok Sabha to reduce the monetary threshold to Rupees 500 thousand.

the substantive laws governing debt recovery cases remain the same as they were before. Also, the judge in a DRT (called the presiding officer) must be qualified to be a district judge in the judicial system, and the same lawyers who are qualified to appear in civil courts are also qualified to argue in DRTs.

As the act envisions it, the main distinction between DRTs and civil courts is that DRTs follow a streamlined "summary" procedure. This procedure demands faster processing and greater accountability by the litigants. The defendant has only thirty days to respond to summons; he must present a written defense at or before the first hearing and counter-claims against the bank must be made at the first hearing.[8] The act also gives tribunals more power than civil courts had. DRTs are allowed to make interim orders before the final judgement, so as to prevent defendants from transferring or disposing of the assets in question. It also provides for swift execution of the verdict. The "recovery officer" has the authority to attach and sell the property of the defendant, arrange for a "receiver" to manage the property of the defendant, or arrest the recalcitrant defendant and detain him in prison. Consistent with the civil court system the DRT act allows for appeals against a judgement: either party can appeal against a DRT's ruling in the Debt Recovery Appellate Tribunal (DRAT). However the defendant must deposit 75 percent of the awarded amount with the DRAT before the hearing can take place. The deposit is returned to him if the DRAT rules in his favor.

4.2 Response to the Debt Recovery Tribunals

Although welcomed by bankers as well as economists, the act also met with opposition. DRTs had begun to be established in 1994. Soon after Delhi received a DRT in July 1994, the Delhi Bar Association filed a suit in the Delhi High Court, challenging the DRT Act as unconstitutional.[9] In August 1994 the Delhi High Court

[8]The original DRT Act 1993 did not allow counter-claims. These were introduced in the 2000 Amendment, described in detail in the next sub-section.

[9]They made their case on the following grounds: (i) since the presiding officers of DRTs were appointed by the Ministry of Finance, the act violated the Directive Principle of State Policy that the executive and judiciary be independent; (ii) the act was discriminatory because it did not allow borrowers to make counter-claims against banks; (iii) there was no rationale for making suits admissible on the basis of their pecuniary claim; and (iv) the Constitution did not allow the legislature to establish tribunals for the purpose of debt recovery.

stated that it was of the prima facie view that the act may not be valid, and required the Delhi DRT to stay its operations pending the final verdict. In its final verdict delivered on March 10th 1995, it accepted the Delhi Bar Association's argument that the act was unconstitutional because it violated the independence of the judiciary from the executive. It also ruled that the act had other flaws: the lack of provisions for counter-claims and transfer of cases from one DRT to another.[10]

The central government moved the Supreme Court against this judgement in a special leave petition.[11] On March 18th 1996 the Supreme Court issued an interim order that notwithstanding any stay order passed in any writ petitions, DRTs should resume functions. It also asked the central government to amend the act to address certain legal anomalies. The DRT Amendment Act in 2000 not only increased the legitimacy of DRTs in the eyes of the judiciary, but also clarified certain procedures.[12] The Supreme Court delivered its final ruling on this issue on March 14th 2002. It stated that the DRT Act was constitutional, and the act as it stood amended was to be allowed. At this time all pending cases about the constitutional validity of the act were dismissed.

4.3 Pattern of DRT Establishment

The opposition to the DRT Act led to a particular pattern of establishment of DRTs which is useful for the empirical strategy. Note first that the DRT Act is a national law and applies to all states of India, with the sole exception of Jammu & Kashmir. Thus, at least in theory, states cannot choose whether or not to establish these tribunals. Second, the authority to establish the tribunals lies with the national government, which can choose when to give a particular state access to a DRT. (Later in the paper

[10] On the other hand, it stated that the legislature *did* have the authority to pass this act. However it took exception to another aspect: whereas before the DRT was established all claims between Rupees 100,000 and 50,000 had been in the jurisdiction of the Delhi High Court, the act gave DRTs jurisdiction over higher valued claims, viz. Rupees 1 million and above. And yet the judge of a DRT was only required to have the qualifications of a district court judge. Thus DRTs had been placed on a higher pedestal than high courts, which was considered unacceptable.

[11] Separate from this, both the Guwahati and Karnataka High Courts ruled against the act, in 1999 and 2001 respectively. However according to Article 141 of the Constitution an order of the Supreme Court is binding on all courts of the country and hence these rulings could not have been implemented.

[12] *Inter alia*, to maintain the independence of the judiciary from the executive, it required that the Chief Justice of India be the ex-officio Chair of the selection committee for presiding officers.

I discuss in detail the concern that state-level factors may have influenced the timing of DRT establishment.)

As mentioned before, the central government began establishing DRTs in 1994. Its objective appears to have been to provide access to tribunals in as much territory as quickly as possible. Five tribunals were set up in quick succession beginning in April 1994. Appendix A.1 lists the dates of establishment of DRTs. In many cases, access was maximized by requiring neighboring states to share the services of a single tribunal.[13] However the ruling of the Delhi High Court brought this process of establishment to a halt, and no new DRTs were established in 1995. It was only after the interim order of the Supreme Court in 1996 that DRTs began to be established again. All the remaining states received DRTs after this, and by 1999 all states of India had access to a Debt Recovery Tribunal.[14]

4.4 Performance of DRTs

By March 31st 2003, DRTs had disposed claims worth Rupees 314 billion (amounting to roughly 4 percent of total bank credit to the commercial sector in 2002-03) and recovered Rupees 79 billion (Government of India 2003). As a first step I ask whether DRTs were truly more effective at processing debt recovery cases than civil courts. In the absence of any official information on case processing times, I collected information on a small random sample of debt recovery cases. These cases were filed by the same bank whose loan-level data will be used later to estimate the impact of DRTs. I collected detailed information on the date when the case was filed, the venue it was first filed in (civil court or DRT), the various stages through which the case had passed, and the dates on which each case-related event had taken place. Due to logistical considerations, I could only collect data on cases filed in the Maharashtra jurisdiction, hence all cases were filed in the Bombay high court or the Mumbai or Pune DRTs. This does not allow me to separate a secular trend towards lower case

[13] In the empirical work, I classify the states into clusters: groups of states which shared a DRT.

[14] Following that, new DRTs continued to be established and earlier jurisdictions sub-divided among the new and the old, thus reducing the number of cases each DRT would handle. In the empirical strategy, however, I exploit the fact that at any point in time, a loan always faces only one DRT. Therefore I define treatment as a binary variable which switched from 0 to 1 when a loan went from no exposure to DRTs to exposure to a DRT.

processing times across the judiciary, from reductions in case processing times that are DRT-specific; this caveat must be borne in mind. Note however, that DRTs can only process claims worth Rupees 1 million or above, whereas civil courts had no such monetary restriction. This feature will be exploited in the empirical strategy. It is interesting that the DRTs do not out-perform the Bombay high court on *all* dimensions, although on several important ones they do.

Before discussing the summary statistics in Table 1, I describe briefly the various steps through which a case could pass. A case is filed in a court or DRT by submitting an original application or a plaint. This states the particulars of the case, and a request to the court/tribunal for remedial action. The bank can also file an urgent application, and request "interim relief", which is usually an injunction preventing the borrower from disposing off its assets while the matter is sub-judice. In the Bombay high court there was also the practice of appointing a court receiver, who could seize the defendant's assets. Once the application has been filed, the court issues summons to the defendant, specifying a date when he/she should appear in court. The defendant appears in court, and replies to the summons by presenting his side of the case and/or filing a counter-claim against the borrower. At each such appearance, the court sets a date for the next hearing. Either party may not appear on this date, in which case the hearing is postponed; it is possible that several dates are set before a hearing actually takes place. Over the course of these hearings, both applicant and defendant submit evidence and make oral arguments before the judge or presiding officer. At any point, the process could end: the borrower could agree to consent terms, or settle with the bank.[15] Alternately, the borrower could file an application with the Board of Industrial and Financial Reconstruction (BIFR) or its appellate authority, the AAIFR. This effectively freezes the case in court, until the

[15]If he agrees to consent terms, the court issues a consent decree, and the terms are be executed privately. If either party reneges on this decree, the aggrieved party can approach the court again. Settlements occur "out of court".

BIFR makes a decision.[16]

After all arguments have been heard, the judge arrives at a verdict. He or she could either rule against the bank, or rule that the firm owes the bank a certain sum. Either party can appeal this decision in the higher court or the appellate tribunal. If there is no appeal, in a DRT, a recovery certificate is issued, and the recovery officer starts the process of recovering this sum. In a civil court, the final verdict is executed by the court receiver. This involves independent valuation of the assets, proclamation of sale, and actual sale through auction. The proceeds of the sale (up to the amount in the verdict) are then transferred to the bank.

It is an empirical question whether DRTs did actually cut down case processing times. Unfortunately, official data are not available to make this comparison. Instead, I use here a random sample of 50 cases collected from the law firm handling debt recovery cases for my sample bank. These include currently open cases as well as cases that have been closed. The summary statistics in Table 1 provide suggestive evidence. Of the 50 cases, 18 had been filed in a high court and were transferred to a DRT longer than one year after the case was filed. The other 32 had been filed in a DRT. Note that the median claim size is not much different in the two venues, although the mean is substantively larger. It is not obvious why this is the case. It is possible that during the high court regime the time taken in processing was so long that the bank chose to predominantly file large cases. Once DRTs were introduced and the cost of litigation decreased the distribution may have become less skewed in response.

Next, we look at some of the steps through which a case passes. Note first that since the civil court in question is the Bombay high court, filing a case there requires invoking the Letters Patent (which grants high courts in the presidency towns original jurisdiction over cases) and therefore a first hearing often takes place before the summons are issued. In a DRT, summons to the defendant are issued before the

[16]Under the Sick Industrial Companies Act, a company that has accumulated losses greater than its net worth can apply to the BIFR: a body of experts who may appoint an "operating agency" which determines whether the company is sick. While the BIFR is considering the case no debt recovery claims can be made against the firm. The BIFR must give all concerned parties an opportunity to be heard, and even if it decides in favor of liquidation, it can only make a recommendation to a High Court, which has the authority to order the "winding up" of the company.

first hearing. Yet in both events, the DRTs are faster than the civil court: the DRT issues summons about 4.5 months after the case is filed, and has the first hearing at 211 days (7 months). The civil court took more than a year to issue summons.

When it comes to granting interim relief, the judge in the Bombay high court was more likely to grant interim relief than the presiding officer in the DRT. The bank could use this facility to prevent the borrower from disposing of the asset in question and appears to have been used vigorously in the Bombay high court: interim relief had been granted in 67 percent of high court cases but only 47 percent of the DRT cases.

Next are the statistics on start of arguments, and filing of evidence by each party. In all three, these events take place sooner in the DRTs than in the civil court: on average arguments started seven years later, whereas in the DRT arguments took less than half that much time to start. Moreover, note that since in DRTs evidence is filed in writing, it was on average filed before arguments started, and hence hearings can be expected to take a shorter amount of time. Unfortunately since cases can end in so many different ways, there is no consistent way to measure the time taken to finish a case.

Finally, looking at the current status of the cases: a verdict in favor of the bank was issued in 27.8 percent of cases filed in the high court, and 18.8 percent of cases filed in the DRT. Consent decrees were less likely in the high court, but out-of-court settlements were more likely in the high court; in the DRTs consent decrees were more likely. Hearings were more likely to be currently on in the high court, although the cases were on average filed earlier in time. DRT cases were more likely to be stuck at the BIFR. This resonates with a complaint of bank officials: borrowers have started filing with the BIFR more often, in order to avoid the DRT. About 6 percent of DRT cases were also in appeal at the DRAT (filed by the bank), whereas high court cases were never in appeal.

The small sample size and the fact that all these cases were being fought in Maharashtra prevents a definitive statement that DRTs were more efficient than the civil courts. However, they provide suggestive evidence that DRTs may have cut down the time taken to go through various steps of the judicial process.

5 Theoretical Framework

As described, once a DRT has been established, banks who file suits against defaulting borrowers can expect to liquidate collateral sooner than before. Equivalently, they can expect to liquidate a larger fraction of the collateral. Below I incorporate this phenomenon in a model of moral hazard with involuntary default.[17] The model could be enriched by allowing voluntary (or strategic) default, or by allowing the bank to observe a noisy signal about the borrower's actions. However this simple model delivers the basic theoretical implications of the legal reform being studied in this paper.

Consider a model with the following elements. There are many banks and many borrowers, and the market is perfectly competitive. All agents are risk-neutral. The representative borrower requires funds of magnitude 1 to invest in a project. The earnings from the project are stochastic. There are two states of nature. In the high state the project yields output R, where $R > 1$. In the low state, the project yields output zero. The value of the borrower's outside option is W, where $R > W \geq 0$. The high state occurs with probability $\pi(a)$ and the low state with probability $1 - \pi(a)$, where $a \in [0, 1]$ denotes the effort level of the borrower. The function $\pi(a)$ is assumed to be concave: $\pi'(a) > 0, \pi''(a) < 0$. The borrower incurs a cost of effort given by $D(a)$, which is convex in the effort level: $D'(a) > 0$, $D''(a) > 0$. The borrower must repay the bank the amount i, where $i \leq R$. The bank's opportunity cost of funds is ρ, which is lower than the return earned in the high state. Thus $1 \leq \rho \leq R$. The borrower's expected utility from investing in the project is given by

$$U(i, a) = \pi(a)(R - i) - D(a)$$

The bank's expected return is given by

$$\Pi(i, a) = \pi(a)i$$

[17] This section builds on a standard model of developing country credit markets as presented in Bardhan & Udry (1999).

5.1 Contractible effort: The first-best case

First we consider the benchmark case where the borrower's effort level can be verified by a third party and hence can be contracted upon. In this case, the equilibrium loan contract (i_1, a_1) satisfies the following conditions.

$$U(i_1, a_1) \geq W \tag{1}$$

$$\Pi(i_1, a_1) \geq \rho \tag{2}$$

There does not exist any other pair (i', a') :

$$U(i, a) > U(i', a') \text{ and } \Pi(i, a) \geq \rho \tag{3}$$

It can be shown that in in equilibrium, the effort level a_1 satisfies (under the zero-profit condition):

$$\pi'(a_1)R = D'(a_1) \tag{4}$$

The equilibrium level of effort a_1 equates the marginal benefit from exerting effort to the marginal cost; it is socially efficient.

The bank's zero profit condition gives:

$$\pi(a)i = \rho \tag{5}$$

$$\Rightarrow i_1 = \frac{\rho}{\pi(a_1)}$$

5.2 Incontractible effort and imperfect property rights

Next consider a variant of this model, where the effort level is not contractible. Now the borrower offers collateral of value C. Assume that $C < 1$. In the event of default, the bank liquidates the collateral. However there are delays in the legal process, and considerable time passes before the bank receives the proceeds of the collateral. Effectively the bank receives fraction ϕ of the proceeds, where $0 < \phi < 1$. As the legal process becomes speedier, ϕ increases and banks receive a larger fraction of the collateral.

The borrower's utility function is now given by

$$U(i, a) = \pi(a)(R - i) - (1 - \pi(a))(\phi C) - D(a)$$

The bank's expected return is

$$\Pi(i, a) = \pi(a)i + (1 - \pi(a))(\phi C)$$

Since the bank can not contract upon the effort level a, in addition to the three equilibrium conditions above, the equilibrium (i_2, a_2) must satisfy an incentive compatibility constraint:

$$a_2 = \arg\max U(i, a)$$

Since the borrower's utility function is differentiable and strictly concave, a necessary and sufficient condition for this problem is

$$\pi'(a_2)(R - i_2 + \phi C) - D'(a_2) = 0$$

Therefore, we have

$$D'(a_2) = \pi'(a_2)(R - i_2 + \phi C) \tag{6}$$

Compare equation (4) with (6). Since $i_2 > \phi C$, we have that

$$\begin{aligned} i_2 - \phi C > 0 \Rightarrow D'(a_2) &< D'(a_1) \\ &\Rightarrow a_2 < a_1 \end{aligned}$$

The information asymmetry leads the borrower to exert a lower effort level than is socially efficient. As a result, $\pi(a)$ is lower, i.e. default is more likely.
Next, from the bank's zero profit condition we can see that

$$\begin{aligned} \pi(a)i + (1 - \pi(a))\phi C &= \rho \qquad (7) \\ a_2 < a_1 \Rightarrow \pi(a_2) &< \pi(a_1) \\ i > \phi C \Rightarrow i_2 &> i_1 \end{aligned}$$

When the effort level is incontractible, the borrower will charge a higher interest rate than in the benchmark case. Next, we consider the effects of increased enforceability of the loan contract, i.e. an increase in the level of ϕ. The following comparative statics results follow. The proofs are described in Appendix A.2.

Hypothesis 1 *Improved judicial quality leads the borrower to exert higher effort.*

$$\frac{\mathrm{d}a}{\mathrm{d}\phi} > 0$$

Hypothesis 2 *Improved judicial quality leads the bank to lower the interest rate.*

$$\frac{\mathrm{d}i}{\mathrm{d}\phi} < 0$$

6 Data

In the following sections of the paper I use a loan-level data set and present evidence on these hypotheses. The data come from loan records of a large Indian bank with a national presence. This bank was established in 1994 as a wholly-owned subsidiary of a public sector development finance institution, which specialized in long-term and medium-term project financing of business enterprises. In 2002 the bank bought its parent institution and inherited its portfolio of loans. The bank continues to manage the old project loans and sanction new ones.

In the summer of 2003 I collected detailed records of the history of project loans from the bank's accounting database. These are loans given to corporate borrowers for various long-term purposes such as the setting up of new projects, expansion and modernization of pre-existing projects, diversification of business and guarantees. They also include some long-term loans given to rehabilitate firms, or adjust over-runs on previous loans. According to the bank's policy, project lending is always in the form of secured senior debt, that is, in the event of firm liquidation it would have high priority among creditors in receiving a share of the proceeds.

The process of issuing a project loan is as follows. A client must submit a loan application to its relationship manager, who is a loan manager in the relevant region or business group. If the bank "sanctions" the loan, the loan information enters the bank's database, and a loan agreement is sent to the borrower. The borrower must sign the agreement, provide all documents and information requested and post the collateral.[18] After this, the loan is made accessible to the borrower, by making a

[18]This is done by creating a legal charge on the security. Depending on the nature of collateral and the agreement between borrower and bank, the collateral could be given in the form of a mortgage, equitable mortgage, hypothecation or pledge.

"commitment".[19] (I will use the words "commitment" and "loan" interchangeably in what follows.) Next, the money is disbursed to the borrower in installments. The interest rate is determined at the time of the disbursement. Corresponding to each disbursement is a repayment schedule. After a certain pre-determined moratorium period has elapsed, the borrower begins to receive bills (known as invoices) from the bank. Invoices are sent at quarterly intervals. When the borrower sends in a payment, the amount outstanding is adjusted downwards accordingly. When the entire invoice amount has been paid, the amount outstanding becomes zero, and the accounts officer enters the date of final settlement. In the data I observe the detailed repayment accounts. At each due date in the entire repayment schedule, I know the amount billed, the amount currently outstanding, and the date of final settlement if the entire amount has been settled. A positive number outstanding indicates that the entire amount had not been paid at the time of data collection.

I use this information to calculate for each invoice, how many days elapsed between the date when the invoice was sent and the date when the payment was received. Then I compute the following dependent variables at the loan-quarter level:

1. allpaid: a binary variable that takes value 1 if for all invoices issued in quarter t pertaining to loan i, repayment has occurred within 180 days of due date, and takes value 0 otherwise.

2. dayslate: a continuous variable left-censored at zero, defined only if allpaid=0, which measures the average number of days that elapsed between date of invoice and payment, on the invoices pertaining to loan i in quarter t.[20]

6.1 Descriptive Statistics

Table 2 presents descriptive statistics. The data consist of a total number of loans taken by 1831 firms. The average number of loans sanctioned to a borrower is 3.14.

In order to identify the effect of debt recovery tribunals on the repayment behavior of loans, I restrict the analysis to sanctions that occurred before the DRT Act was

[19] Although in principle a sanction can be broken into multiple commitments, in these data most sanctions are committed in one installment.

[20] Appendix A.2 describes the change in the bank's database system in September 2000, the bias this may lead to, and how I select the sample to avoid the bias.

enforced, i.e. before June 24th, 1993. It is possible that after the DRT Act was enforced, the pool of borrowers who demanded loans changed or the bank modified its lending behavior. Hence loans made after this date may be systematically different from those made before. By restricting the sample in this way I isolate the impact of this institutional change on repayment behavior on pre-existing loans (moral hazard) and avoid confounding it with the possibility that new loans are made to better borrowers (adverse selection).[21] This reduces the sample to 798 loans, given to 439 distinct borrowers. The average year of sanction is 1989. The average sanction is for Rupees 24 million. The majority of loans were issued for new projects. A significant number of the sanctions were for expansion, modernization and diversification of plant and machinery. Overruns were another important reason for the sanction. We observe repayment on commitments for an average of 19 quarters.

The data also confirm that the bank has a national presence. The projects for which the loans were taken were located in several different states of India. Andhra Pradesh and Tamil Nadu in the south accounted for 26.2 percent of the loans, Maharashtra and Gujarat in the west accounted for 23.9 percent, Madhya Pradesh in central India accounted for 7.9, and Rajasthan and Uttar Pradesh in the north accounted for 16.5 percent.

Recall that the prudential norms specify that a loan which has payment overdue for longer than two quarters (180 days) is non-performing. In 65 percent of the loan-quarters, invoices are paid up within 180 days. This number varies from 55 percent in loan-quarters when there is no DRT in the state, to 71 percent when a DRT does exist. The other dependent variable measures days late, and is only defined for commitment quarters where not all invoices are paid within 180 days. It is a measure of how late repayment is, *conditional* on being late; thus it captures the extent of delinquency of the delinquent loans. Note that the theoretical predictions for the two outcome variables are somewhat different. We expect that borrowers respond to Debt Recovery Tribunals by reducing the probability that they become delinquent on a loan and therefore increase allpaid. On the other hand, dayslate refers to payments

[21] In Section 8 I relax this restriction and use all the loans, then decompose the effects into moral hazard and adverse selection.

that *do not* occur on time. In these loan-quarters, borrowers may either have decided not to pay on time, in which case dayslate may be unaffected by DRTs; or they may be switching from being late on all loans to paying some loans on time but becoming more delinquent on others, in which case dayslate could increase; or they may be attempting to meet the 180 day limit but not succeeding, in which case dayslate should fall.

7 Empirical Strategy

This section describes the identification strategy and the regressions used to estimate the effect of Debt Recovery Tribunals.

7.1 Definition of Treatment

A judicial system creates incentives for all entities that fall under its jurisdiction, even if they do not actually avail of its services. Once a DRT was established in a location, banks could begin to file debt recovery claims there. Furthermore, once a DRT is set up, all debt recovery cases with claims above Rupees 1 million pending in that jurisdiction's civil courts are required to be transferred to it. Therefore, I define all loans that fall in the jurisdiction of a DRT as treated in the quarters occurring after the DRT was established.

I assign loans to DRTs based on the state cluster where the project is located. This assignment is derived from the rule in the DRT Act, which states that a claim can be filed in the location where the cause of action arises, or where the defendants reside. The data on the state of project location is more complete than the information on borrower location.[22]

7.2 Estimation and Identification

As described earlier, the empirical strategy in this paper relies on two features of the DRT Act and its implementation. One is the threshold of Rupees 1 million, since only claims above this amount can be filed in a Debt Recovery Tribunal. Therefore, a loan for which more than Rupees 1 million is overdue, is susceptible to have a DRT

[22] Using state of location instead gives qualitatively similar results.

case filed against it. The second feature is the timing of tribunal establishment. A DRT case cannot be filed until there exists a DRT whose jurisdiction this loan falls under. Different regions received tribunals at different times. This creates variation at the level of region × time × claim size, which can be utilized to estimate the effect of DRTs. This is done by estimating the following regression equation:

$$y_{ijt} = \beta_0 + J_j + T_t + \beta_1 DRT_t^j + \beta_2 Above_{ij}^{\tau} + \beta_3 (DRT_t^j \times Above_{ij}^{\tau}) + \gamma X_{ijt} + \epsilon_{ijt} \quad (8)$$

Here y_{ijt} is the dependent variable which measures the time taken to pay the invoices sent in quarter t for commitment i located in state j, J_j and T_t are vectors of state and quarter dummies, DRT_t^j is an indicator for quarters occurring after a DRT was introduced to state j, and $Above_{ij}^{\tau}$ is an indicator for whether an amount larger than Rupees 1 million was overdue on this sanction at the time when the DRT Act was enforced (1993:Quarter 2). The vector X_{ijt} represents other borrower and sanction level controls such as cash flow, year of sanction and the borrower's industry.

The identification of the effects depends on the exogeneity of the sources of variation. As discussed earlier, the monetary threshold of Rupees 1 million appears to have been picked because it was a convenient round number, and does not appear to have been driven by economic considerations. We might worry that once the national act was passed in 1993, borrowers may have anticipated that DRT establishment would follow in the future, and may have sorted their loans to be below the threshold, by paying up invoices strategically. To avoid this endogenous sorting, the variable $Above_{ij}^{\tau}$ is measured at the time when the DRT Act was enforced, rather than when the state DRT was established.[23]

The timing of DRT establishment across states also has a plausibly exogenous element. As described earlier, initially the government set up DRTs very quickly: within a space of eight months, five DRTs had been established. The Reserve Bank

[23]One may still be concerned that loans may have sorted endogenously between the time that borrowers learned of the impending DRT act and it was actually enforced. Note first that the act was passed within a few months of its introduction in Parliament. Density plots of amount overdue confirm this (see Figure A.5). In the quarter just before and just after 1993:Q2 the distribution of loans with amounts above Rupees 1 million overdue did not change significantly. However, even if this strategic sorting of loans had occurred, it too would have been an effect of the debt recovery tribunals. Since the bank could file a DRT suit at *any time* after the DRT was established, to avoid being eligible for the DRT the borrower must improve repayment behavior in subsequent quarters.

of India's report on debt recovery tribunals reports that this process received a setback because of the Delhi High Court's interim order of 1995 (Reserve Bank of India 1998), and establishment was interrupted. Without this interruption, it seems likely that all DRTs would have been established very soon, providing almost no difference in timing. We may worry that national or state governments may have influenced the Delhi high court ruling or the Supreme Court stay order. Although both the high courts and Supreme Court are independent of the executive, it is indeed possible that state-level opposition to DRTs influenced the Delhi High Court's decision, or national level sentiment in favor of such reform influenced the Supreme Court to uphold the Act. What seems less likely, however, is that the timing of these verdicts could have been micro-managed by the national government or the states which had not yet received a DRT.

We may worry also that the timing of DRT establishment was driven by states lobbying the national government for DRTs at certain times. The time line of DRT establishment in Appendix A.1 and the map of India in Figure A.1 indicate that the central government assigned common tribunals to groups of adjacent states (what I call state clusters). Therefore for DRTs to have been assigned in response to lobbying, neighboring states would have to have colluded. While this is indeed possible, it would have been costly and difficult, given that Indian states are distinct geographical and political entities and often competitors for resources from the national government, rivals for the use of natural resources, and so on. In Table A.1 (discussed later) I present results from regressions of the timing of DRT establishment on state-level factors.

Note also that even if state-level unobservable factors driving repayment behavior also influenced DRT establishment, there is no a priori reason to believe that they varied around the Rupees 1 million threshold. Thus if these state-level factors were common to all loans within the state, then variation in loan repayment behavior around the Rupees 1 million threshold should only have been introduced by DRTs.

8 Results on Repayment Behavior

Here I describe the results from the empirical strategy described above, robustness checks and further results on the behavioral response to DRTs.

8.1 Main Results

We begin with the results in Table 3A. The sample consists of 15034 observations, which correspond to loans sanctioned before the DRT Act date. Columns (1)-(4) correspond to the dependent variable allpaid which measures the probability that payment on an invoice occurs within 180 days of the invoice date. Columns (5)-(7) correspond to the dependent variable dayslate, which measures the number of days that payment takes if allpaid=0. Columns (1) and (5) report the results for differences-in-differences equation (8), for allpaid and dayslate respectively. The coefficient on State DRT $\times$ Above corresponds to β_3 in equation (8), and is the parameter of interest.[24] Column (1) shows that when a DRT was established, loans which had more than Rupees 1 million overdue were 11% more likely to pay up subsequent invoices within 180 days. Column (5) shows that even loans which did not pay up within 180 days, did reduce the time taken to pay by 265 days.

Since amount overdue is a continuous variable, it is possible to validate this result by addressing the following potential concern. Loans with much more than Rupees 1 million overdue might behave systematically differently from those with much less than Rupees 1 million overdue. Any other state-level changes that coincide with the establishment of DRTs and affect loans with large dues differentially could be driving the results in columns (1) and (5). By restricting the sample to loans with dues close to the 1 million mark, we observe loans which are more homogeneous on all other dimensions. If DRTs have an impact, then loans with dues just above Rupees 1 million should pay invoices faster that those with dues just below. Therefore, in columns (2)-(4) and (6)-(7) I estimate the same regression, but only for the subsamples that fall within narrow bands around Rupees 1 million. Columns (2) and

[24] Standard errors in Tables 3-5 are block bootstrapped by clusters of states that shared a DRT to correct for correlated errors within these clusters (Moulton 1990), and serial correlation over time (Bertrand *et al.* 2004).

(6) start with a band of Rupees 1 million ± 150000, i.e. when the amount overdue falls in the interval [850000, 1150000]. Subsequent bands are narrower sequentially. Although the standard errors increase due to smaller sample size, the signs of the coefficients remain the same and the magnitude even increases.

The larger magnitude of the effects in the bands relative to the entire sample, is interesting. It suggests that loans with much larger amounts overdue reacted less strongly to the DRTs. When we consider the context of this reform, this seems plausible. Loans which are highly delinquent may be "too far gone" to respond to the threat of litigation.

Figures A.2 and A.3 depict these effects with smoothed data. In Figure A.2, the sample is all loans with amount overdue in the interval [70000, 130000]. The vertical axis measures the probability that an invoice will be paid within 180 days. The horizontal axis measures the amount overdue in 1993:Q2 (the potential claim size). The line with the circles represents allpaid after the state DRT was established, and that with the triangles represents allpaid before the DRT was established. Note first that after the DRT is established all loans are more likely to pay invoices on time. Also, as the amount overdue increases, the probability that an invoice will be paid on time falls. The two lines are roughly parallel for claim sizes below Rupees 1 million. However as claim size approaches and goes beyond Rupees 1 million the lines diverge. Before DRTs were established, allpaid continues to fall as amount overdue increases. However after DRTs were established, loans with claim size above Rupees 1 million decrease allpaid at a slower rate, flattening out as it approaches Rs. 1300000. The same phenomenon can be seen by looking at the gap between these two lines (A.3). The difference tends to be roughly constant for loans with claim size below Rupees 1 million but increases as the claim size approaches and exceeds 1 million. This difference in the change in repayment behavior after DRT establishment is represented by the results in Table 2A.

8.2 Controlling for Unobservables

A potential concern in using state-level DRT placement to define treatment is whether time-varying state-level factors could have driven repayment to improve at the same

time as DRTs were established. As described above, it appears that the timing of DRT establishment was driven by interruptions in establishment due to legal challenges to the act. We may still worry that states could have influenced the placement of DRTs to some extent. The influence could be correlated with state-level observable factors or unobservable factors. I examine first if state-level observables can predict the timing of DRT establishment across states. Table A.1 presents results of this exercise. I use cross-sectional OLS and probit regressions, as well as fixed effects regressions where the group variable is the cluster of states which shared a DRT. All regressions contain year dummies to account for national changes in the probability that DRTs would be established. To explore the hypothesis that placement is driven by economic factors, in columns (1)-(4) I alternately include as explanatory variables state GDP per capita, its growth rate, state credit per capita and its growth rate. (Note that credit per capita is highly correlated with GDP per capita.) Next I include the number of cases pending per capita, to test whether states with poor quality judiciaries receive DRTs sooner. On their own, none of these variables appear to affect the timing of DRT establishment. Next, I include the number of High Court judges per capita as a measure of the strength of the High Court in a state. I find that when states have a higher number of judges per capita, the probability of receiving a DRT is lower. This might be due to a smaller need for a DRT, or because of the opposition of state high courts to DRTs. Finally, in column (7) I include dummy variables for the political party of the state government and a dummy variable for whether the state government was an ally of the party in power at the center.[25] None of these political variables appear to drive the timing of DRT establishment. In column (9) all variables are included simultaneously in an OLS regression, and in column (10) in a probit regression. It now appears that the states were more likely to receive a DRT if they had low numbers of judges per capita, and had an ally of the Janata party in power. However, once the state clusters are controlled for in the fixed effects regression (column 11), these variables are no longer significant.

[25]Note that although the period being considered here is only the five years from 1995 to 1999, the two political variables are not perfectly correlated. During 1995-1999 India had three different central governments. The coalition governments during this period were heavily reliant on support from smaller regional parties, and state political parties are likely to have had considerable influence on the actions of the central government during this period.

Could state-level factors be driving the results in Table 3A? Note first that all time-invariant state-level factors (observable and unobservable) are controlled for by putting in state dummies. The fact that loans are only eligible for DRTs if the claim size is above Rupees 1 million also allows us to control for time-varying state-level unobservables. Given that the number 1 million appears to have been picked arbitrarily, there is no reason to believe that these state-level factors would change differentially for loans with more than Rupees 1 million overdue. In addition, columns (1) and (5) of Table 2B present an additional check. The regression estimated here is the same as in Table 2 columns (1) and (5), but with the additional controls of dummies for state clusters interacted with the quarter. Therefore all factors that change over time within a state are controlled for. Despite this, in column (1), the coefficient on State DRT $\times$ Above is significant at 9 percent. Thus even after controlling for state-level unobservables, we continue to find an effect of DRT establishment.

In columns (2) and (6) of Table 3B I address another concern. It could be argued that borrowers began improving repayment on loans with more than Rupees 1 million overdue when the national DRT Act was enforced in 1993. Thus a trend could have begun for loans with dues larger than 1 million to repay faster, and the effect being picked up by the State DRT $\times$ Above variable may actually be a state-level differential response to the national act. Here I include an additional control, National DRT $\times$ Above. Although loans with more than 1 million overdue did improve repayment beginning in 1993 as well, the coefficient of State DRT $\times$ Above remains at 8 percent and significant. State DRT establishment has had a robust effect over and above the national act.

Columns (3) and (7) present an even stricter robustness check. I allow all loans with dues above 1 million to respond differentially in each quarter. Dummies for Above interacted with the quarter pick up any nation-wide changes in the behavior of treated loans from quarter to quarter. If in addition, there is a differential response across states coincidental with the state DRT establishment, then that response is very likely to be due to the DRT. In column (3) although the coefficient drops to 0.06, it is still highly significant. In column (7) the magnitude actually increases.

Finally, in columns (4) and (8) I check whether, in states which received a DRT

before the 1995 interruption, the response is different from states which received it after establishment resumed. I call all states that received access to a DRT before 1995, Group 1 states. All other states are Group 2 states.[26] In column (4) the coefficient on Group 2 state × State DRT × Above is not significantly different from zero, indicating that in levels, the effect of DRTs on allpaid is not different in group 2 states compared to group 1 states. In column (8) we see however, that group 2 state DRTs have a smaller effect on dayslate than group 1 DRTs. Thus dayslate responds by less in states which received DRTs after the interruption.

8.3 Behavioral Explanation

Based on results in Table 3A, the average invoice was repaid faster after the state DRT was set up. Table 2B suggests that this effect was not driven by the national DRT act, by state-level time-varying unobservables, or by time-varying patterns specific to loans exposed to DRTs. It also appears that the effect of state DRT on the average invoice was no different in group 1 states than in group 2 states.

The effect of state DRT on the average invoice does not necessarily tell us whether individual loans were paid back faster after DRTs than before DRTs. It is possible that the results in Tables 3A and 3B are driven by compositional changes: invoices sent out after DRTs were set up might have been for a different set of loans than invoices sent before. The loan fixed effects results in Table 4 shed light on this issue. In column (1), the coefficient on State DRT × Above is 0.03 and significant at the 5% level. This can be interpreted as follows. Consider a loan which had more than Rupees 1 million overdue in 1993. When it received an invoice after the state DRT was established, it was 3 percent more likely to pay that invoice within 180 days than one it received before the state DRT was established. The establishment of a DRT led to improved repayment for the *same* loan.

In columns (2) and (3) I estimate the same regression within subsets of the sample, corresponding to observations in group 1 and group 2 states respectively. The results indicate that in group 1 states, the DRTs do not lead to improved repayment within loan, however in group 2 states they do. Thus in group 1 states the effect of DRTs

[26] See Appendix A.1 for the time line of DRT establishment across states.

was compositional, but in group 2 states individual loans were affected. This is borne out in the borrower fixed effects results as well (columns 4-6): in group 2 states the *same* borrower paid back loans faster after DRTs were established.

It is not easy to understand why this is the case. However it is consistent with the earlier discussion on the Supreme Court's 1996 ruling overturning the verdict of the Delhi High Court. By ruling that DRTs should resume their functions, the Supreme Court may have suggested that it would uphold the act. Borrowers in group 2 states might have responded to DRTs more strongly than those in group 1 states.

9 Results on Future Lending Behavior

Next I ask if the contractual terms of the new loans issued after DRTs were established are significantly different from those issued before. Specifically, I consider the size of the sanction and the interest rate. The identification strategy is different from the one employed in the previous sections: the analysis relies on the differential timing of DRT establishment across states. The regression estimated is of the form:

$$y_{ijt} = \beta_0 + J_j + T_t + \beta_1 DRT_t^j + \gamma X_{ijt} + \epsilon_{ijt} \tag{9}$$

Here y_{ijt} measures either the size of the sanction or the interest rate on the disbursement. The right hand side include state dummies, year dummies and controls at the loan level as well as borrower level. The coefficient of interest β_1 which captures the effect of state DRT establishment. Note here that identification relies on the exogeneity of the timing of DRT placement across states.

9.1 Size of loan sanctioned

The model described in section 4 could be extended to allow for a variable size of investment, say L. Then if we assume that output is a concave function of loan size, $R = R(L)$ where $R' > 0, R'' < 0$, then the complementarity between effort and investment may lead to under-investment. As the borrower's loan size and consequently debt burden increases, his benefit from the high state of nature decreases. Due to limited liability, his loss from the low state remains constant at zero. Therefore he is more likely to default. This makes each additional unit of lending more costly to the

bank and so the loan size may be capped at a sub-optimal level (known as micro-rationing; Bardhan & Udry 1999). An increase in judicial quality will increase the value of the collateral to the bank and hence increase its gains from the high state. This may induce the bank to increase the size of the loan offered. Additionally, larger loans are more likely to fall over the Rs. 1 million overdues threshold and therefore potentially treated by DRTs. Therefore banks may become more likely to offer them. On the other hand, borrowers may prefer smaller loans precisely to avoid this threat of DRTs. Therefore the net effect of the reform is not easy to predict. It is tested empirically in Table 5.

The observations in this Table (and in Table 6) consist of all loans in the sample, i.e. loans sanctioned before the DRT Act as well as after. In columns (1)-(3) I estimate cross-sectional regressions and in columns (4)-(6) borrower fixed effects regressions. The dependent variable is the logarithm of loan size. In all regressions I control for state dummies, year dummies, type of project for which the loan was taken, currency of loan and state of project location. In addition in the cross-sectional regressions I control for the firm's industry, and its asset size. As we see, the effect of state DRT establishment is not significantly different from zero in any of the columns. It appears that the reform has not led to larger loan size.[27]

9.2 Interest rates

In Table 6, I test the model's prediction for interest rates: when contract enforcement improves, the equilibrium interest rate decreases. Once again I start with cross-sectional regressions and then move to borrower fixed effects. Since the interest rate is determined at the time of disbursement, an observation here is a disbursement. The dependent variable is the interest rate on the disbursement. In all columns the same covariates are controlled for as in Table 5; in addition I also control for the size of the loan and the timing of the sanction and commitment.

In column (1) it appears that the establishment of DRTs caused loans sanctioned subsequently to charge an interest rate that is 2.2 percentage points lower than loans

[27]Figure A.4 plots the coefficients on Post state DRT for decile regressions, together with the point-wise confidence interval. The coefficient is not significantly different from zero in any of the deciles.

sanctioned before. National changes in the interest rate are controlled for with year dummies. However, just as before, we may worry that interest rates in different states responded differently to the national DRT act. So in column (2) I put in a dummy for observations occurring after 1993 Quarter 2. The national-level decrease in interest rates is not significant, and it does not change the coefficient on state DRT. Column (3) shows that in group 1 states the interest rate decreased by 2.7 percentage points, whereas in group 2 states it decreased by a smaller 1.4 percentage points.

In the borrower fixed effects regressions (columns 4-6), the results are not significant. That is, when we look at borrowers who received loans both before and after, they do not seem to receive lower interest rates after the DRTs were set up. This could be for a variety of reasons. Repeat borrowers are a select group of borrowers who probably get repeated loans because they have proved their creditworthiness. The DRTs appears to have done little to enhance the creditworthiness of these higher-quality borrowers. Thus the average new borrower who gets a loan after the state DRT may get a cheaper loan than the average borrower before the DRT, but the repeat borrower may already be receiving a cheaper loan, which does not become *even* cheaper after DRTs are established.

Finally, there is the question of what the lower interest rates on the average new loan signifies. I do not observe loan applications which are not approved by the bank. Therefore it is not possible to separate the effects of this reform on the demand versus the supply of loans. Furthermore, we cannot infer the supply of credit to borrowers who do not get project loans after the reform. One may worry also that new loans are given for less risky projects than before, which allows interest rates to be lower. In all regressions in Table 6, I control for observable characteristics of the loans that may be correlated with riskiness: borrower industry, type of project, and size of loan. However to the extent that the riskiness of a project is unobservable, it cannot be controlled for.

There is also the question of the effect of this reform on credit throughout the banking system. To interpret this as a move down the demand curve for credit, we need evidence not just on interest rates but also on the volume of credit. We have found no evidence of increase in average loan size given by this bank, in this loan

category. It is in principle possible that as these loans became cheaper, other loans unaffected by DRTs became more expensive instead. This burden may have fallen on the same class of borrowers if they also use these loans, or on an entirely different set of borrowers. Unfortunately I do not have data on all loans given by this bank, or all loans in the banking system in general. Therefore it is outside the scope of this paper to analyze these effects.

10 Conclusion

This paper has used a micro data set on project loans to examine the effect of a reform aimed at speeding up the legal process to resolve disputes between banks and defaulting borrowers. The results show that the establishment of the new Debt Recovery Tribunals reduces delinquency by 3-11 percent. Furthermore, new loans sanctioned after DRT establishment are charged interest rates that are lower by 1.4-2 percentage points.

The type of judicial reform studied here is relevant for developing economies for various reasons. Debt Recovery Tribunals were established as the Indian government's attempt to improve the legal channels for loan recovery, without overhauling the entire judicial system. By accommodating the opposition without diluting the intent of the act, the government successfully implemented the reform. This is a reasonable representation of judicial reform as it might be carried out in developing countries.

Descriptive evidence suggests that these DRTs have reduced the time taken to process debt recovery cases. The results indicate that they have also led to reduced delinquency in loan repayment. Given that banks in several emerging market economies have high volumes of non-performing loans such judicial reform can have important consequences. As these economies transition towards greater reliance on market forces, the banks rely on the legal and judicial framework to enforce contracts. Since bank credit tends to form a large share of total credit in these economies, the performance of the banking sector has implications for macroeconomic stability. It has also been argued that financial depth is important for economic growthKing & Levine (1993). By improving the efficiency of banking intermediation such reform

can promote higher growth rates for these economies.

This paper also demonstrates a mechanism through which this reform may affect the credit market. The establishment of DRTs appears to have led this bank to charge lower interest rates on new project loans, holding constant *inter alia* type of project, borrower industry, project location, and size of loan. If these new projects are not different from previous ones in terms of riskiness, then this can be interpreted as a cheapening of credit, which is likely to spur entrepreneurial activity.

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Appendix A.1 Pattern of DRT Establishment

City of DRT	Date of est.	Jurisdiction
		GROUP 1 STATES
Kolkata	Apr 27 1994	West Bengal, Andaman & Nicobar Islands
Delhi	Jul 5 1994	Delhi
Jaipur	Aug 30 1994	Rajasthan, Himachal Pradesh, Haryana, Punjab, Chandigarh
Bangalore	Nov 30 1994	Karnataka, Andhra Pradesh
Ahmedabad	Dec 21 1994	Gujarat, Dadra & Nagar Haveli, Daman & Diu
		GROUP 2 STATES
Chennai	Nov 4 1996	Tamil Nadu, Kerala, Pondicherry[a]
Guwahati	Jan 7 1997	Assam, Meghalaya, Manipur, Mizoram, Tripura, Arunachal Pradesh, Nagaland[b]
Patna	Jan 24 1997	Bihar, Orissa
Jabalpur	Apr 7 1998	Madhya Pradesh, Uttar Pradesh
Mumbai	Jul 16 1999	Maharashtra, Goa

[a]The Chennai DRT's jurisdiction was expanded to include Lakshadweep on Dec 5 1997.
[b]The Guwahati DRT's jurisdiction was expanded to include Sikkim on Dec 5 1997.

Figure A.1: Map of India

Appendix A.2 Proof of Hypotheses

Hypothesis 1

The equilibrium condition (6) is

$$D'(a_2) = \pi'(a_2)(R - i_2 + \phi C)$$

$$\Rightarrow \frac{\pi'(a_2)}{D'(a_2)} = \frac{1}{R - i_2 + \phi C}$$

When ϕ increases, the left hand side of this equation must decrease. Since $\pi''(a) < 0$ and $D''(a) > 0$, this requires that a should increase.

Hypothesis 2

The bank's zero profit condition (7) gives us

$$i = \frac{\rho - \phi C + \pi(a)\phi C}{\pi(a)}$$

Therefore,

$$\frac{\mathrm{d}i}{\mathrm{d}\phi} = \frac{\pi(a)\frac{\mathrm{d}a}{\mathrm{d}\phi}[-(1-\pi(a))C + \pi'(a)\phi C] - \pi'(a)\frac{\mathrm{d}a}{\mathrm{d}\phi}[\rho - (1-\pi(a))\phi C]}{[\pi(a)]^2}$$

We know that $C < 1 \leq \rho$. This gives us

$$\frac{\mathrm{d}i}{\mathrm{d}\phi} < 0.$$

Appendix A.3 Data Cleaning

Database Transfer

In September 2000, the bank moved its project loan database from an old database system to a new one. Only loans that were active at the time of migration were transferred to the new system. All loans sanctioned after the date of migration are in the new system. For any active loan the entire repayment schedule is available and hence can be used to reconstruct the history of repayment as described above. My data consist of all loans that existed in the new database at the time of data collection (May 2003), currently active or not. However, the removal of currently inactive loans at the time of database migration causes the following problem due to systematic attrition in the data.

The objective of this paper is to examine delinquency, or delays in loan repayment. If a loan is delinquent, the account will remain active for longer since the bank will employ various methods to obtain the payment until the payment is made, or else the loan is written off the books. Therefore at any point in time if we look only at active loans, they are disproportionately likely to be delinquent. Thus the loans transferred to the new system are likely to have disproportionately large number of delinquent loans. However we observe the entire population of loans sanctioned after the database migration, thus these loans have the correct proportion of delinquent loans. This biases the data in favor of finding that delinquency has decreased over time.

To remove this problem, I restrict my sample to loans whose last invoice date was scheduled to occur after the date of migration. Barring pre-payment, all of these loans would have to be in the new database regardless of past performance.[a]

Survival

The snapshot nature of the data also introduce the issue of survival probabilities. When computing the variable dayslate for invoices that were not repaid by the time of data collection I can only say that repayment is *at least* x number of days late, but cannot accurately measure the actual number of days late. Since newer loans begin issuing invoices later in the time period, the variable dayslate will tend to show that their payment is less late than for older loans. In all specifications I include the year of sanction as a control. In addition to picking up cohort effects, it controls for the problem that newer sanctions that are delinquent have systematically different dayslate than older delinquent sanctions.

[a] Among the loans sanctioned since the date of migration, very few invoices are pre-paid. This suggests that the absence of prepaid invoices should not bias the results appreciably.

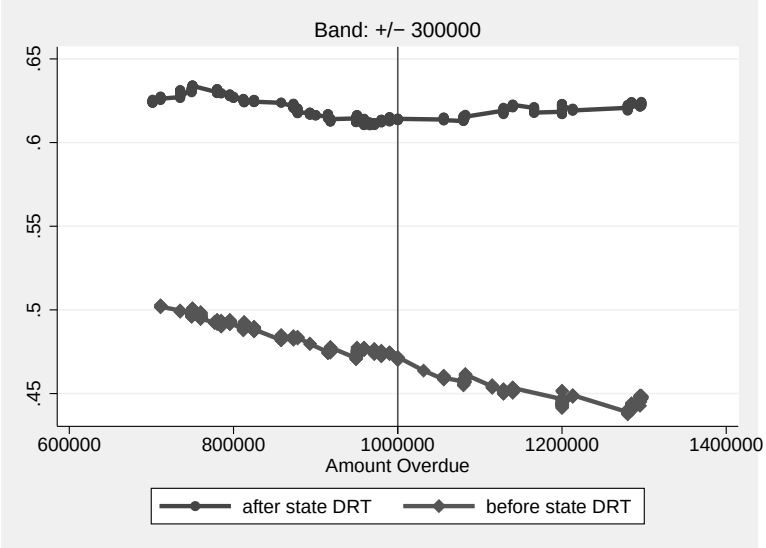

Figure A.2: Probability that invoices are paid within 180 days

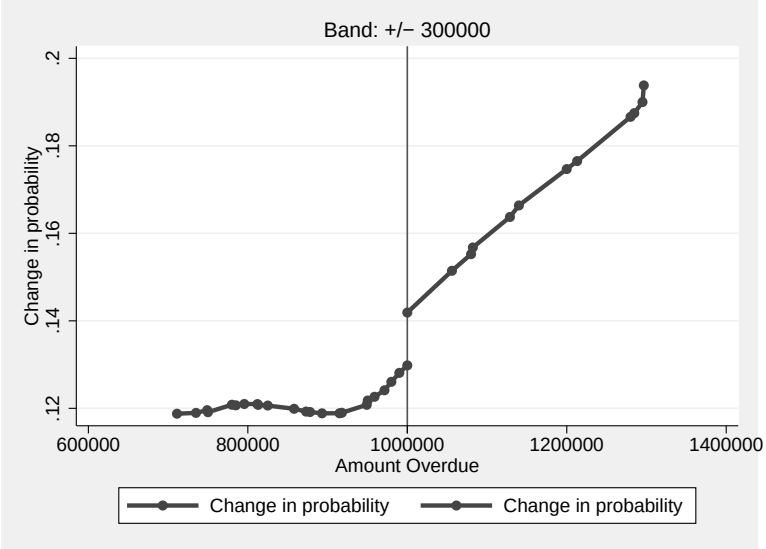

Figure A.3: Change in probability of repayment after the state DRT was established

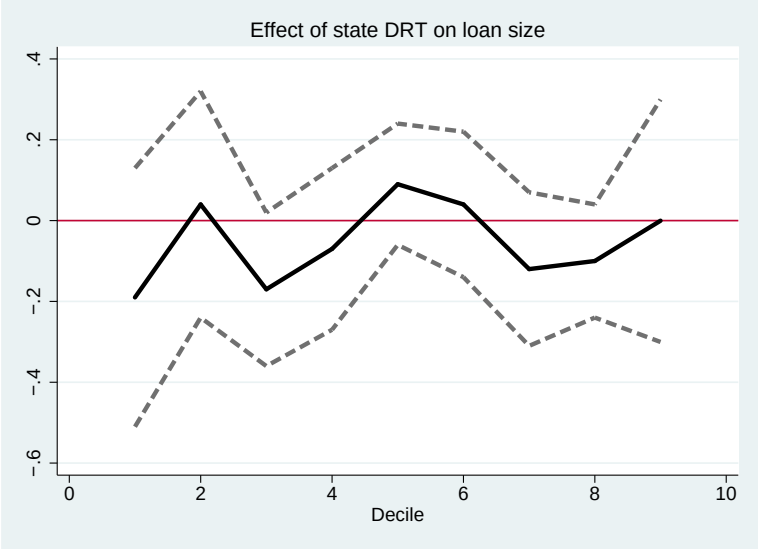

Figure A.4: Effect of state DRT on loan size

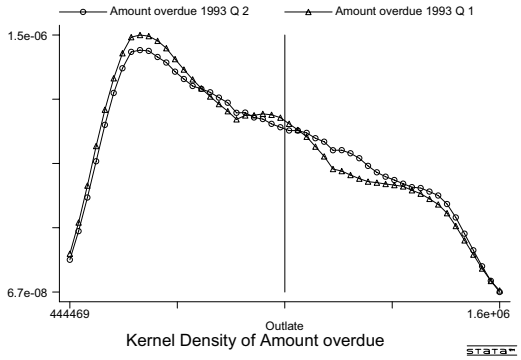

Figure A.5: Density of loans around Rupees 1 million overdue in 1993:Q1 and 1993:Q2

Table 1: Summary statistics about case processing in Bombay High Court versus Mumbai DRTs

		Filed in HC	Filed in DRT
Number		18	32
File date	Mean	January 1997	August 2002
	Median	March 1998	May 2003
Claim size	Mean	Rs. 820 million	Rs. 189 million
	Median	Rs. 120 million	Rs. 126 million
Time to summons		393 days	136 days
		(916 days)	(244 days)
Time to first hearing		335 days	211 days
		(687)	(295)
Time to applicant's evidence		2628 days	802 days
		(775)	(457)
Time to defendant's evidence		2981 days	696 days
		(794)	(153)
Time to arguments starting		2623 days	1095 days
		(557)	(548)
Interim relief granted	(probability)	0.67	0.47
		(0.49)	(0.51)
Type of resolution	(percentages)		
Recovery certificate		27.8	18.8
Consent decree		0.0	9.4
Settled		16.7	3.1
Hearings on		38.9	28.1
Stuck at BIFR		16.7	24.4
In appeal at higher forum		0.0	6.3
Finished	(percentages)	44.4	31.3

Standard errors in parentheses.

Table 2: Descriptive statistics

	Mean	Standard Deviation	N
Size of loan *(millions of Rupees)*	24.2	43.7	798
Interest rate *(percent)*	15.31	5.68	798
Year of sanction	1989.29	2.93	786
Borrower's cash flow *(millions of Rs.)*	1859.68	591.03	15034
Borrower's assets *(millions of Rs.)*	25718.01	147870.6	15034
State DRT	0.62	0.49	15034
Above	0.27	0.45	15034
State DRT X Above	0.14	0.35	15034
All paid within 180 days	0.65	0.48	15034
if State DRT = 0	*0.55*	*0.50*	*5787*
if State DRT = 1	*0.71*	*0.45*	*9247*
Days late if not paid in 180 days	889.17	667.05	5327
if State DRT = 0	*976.53*	*728.29*	*2621*
if State DRT = 1	*804.55*	*589.75*	*2706*

Table 3A: Effect of DRT establishment on repayment behavior of loans sanctioned before June 24th, 1993 -- Baseline Effect

	All paid within 180 days				Days late if not paid within 180 days			
		Bands around Rupees 1 million				Bands around Rupees 1 million		
		150000	100000	85000		150000	100000	85000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
State DRT	-0.02	-0.40***	-0.31***	-0.32***	207.01***	542.88*	842.14***	842.14***
	(0.01)	(0.04)	(0.05)	(0.07)	(35.65)	(286.09)	(194.80)	(194.23)
Above	-0.15***	-1.61**	-6.52***	0.00	179.17***	261.82	-3392.24***	-1020.58
	(0.01)	(0.88)	(0.49)	(0.00)	(27.94)	(291.27)	(1633.62)	(1189.14)
State DRT X Above	0.11***	0.35***	0.25***	0.27*	-264.89***	-324.99	-578.62***	-578.62***
	(0.01)	(0.16)	(0.10)	(0.14)	(34.30)	(292.83)	(221.83)	(221.18)
Observations	*15034*	*527*	*352*	*325*	*5327*	*233*	*172*	*171*
R-squared	*0.20*	*0.65*	*0.74*	*0.72*	*0.26*	*0.70*	*0.76*	*0.75*

Controls include year of sanction, age of sanction, borrower's cash flow, and dummies for borrower's industry, state where project is located, and quarter when invoice was issued. Columns (2) and (6) also contain a quadratic polynomial, and columns (3), (4), (7) and (8) contain a linear term in the amount overdue.

Standard errors are in parentheses. In columns (1) and (5) they are block bootstrapped, and in the remaining columns they are clustered by groups of states that share a DRT.
*: significant at 10%; ** significant at 5%; *** significant at 1%

Table 3B: Effect of DRT establishment on repayment behavior of loans sanctioned before June 24th, 1993 – Controlling for other unobservables

	All paid within 180 days				Days late if not paid within 180 days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
State DRT		-0.02	-0.01	-0.03		171.61***	214.89***	200.71***
		(0.01)	(0.01)	(0.02)		(36.40)	(38.29)	(36.23)
Above	-0.14***	-0.21***	0.41	-0.15***	155.52***	312.79***	2213.73***	181.68***
	(0.02)	(0.02)	(0.32)	(0.01)	(30.26)	(40.55)	(864.72)	(27.99)
State DRT X Above	0.09***	0.08***	0.06**	0.10***	-221.09***	-173.12***	-349.90***	-291.13***
	(0.02)	(0.02)	(0.03)	(0.02)	(37.81)	(42.27)	(61.98)	(39.06)
National DRT X Above		0.08***				-232.34***		
		(0.02)				(82.68)		
Group 2 state X State DRT				0.01				-120.30***
				(0.02)				(39.94)
Group 2 state X State DRT X Above				0.01				81.97**
				(0.02)				(44.68)
Additional fixed effects	state cluster X quarter		Above X quarter		state cluster X quarter		Above X quarter	
Observations	*15034*	*15034*	*15034*	*15034*	*5327*	*5327*	*5327*	*5327*
R-squared	*0.21*	*0.20*	*0.20*	*0.20*	*0.32*	*0.26*	*0.28*	*0.26*

Controls include year of sanction, age of sanction, borrower's cash flow and dummies for borrower's industry, state where project is located and quarter.

Standard errors are in parentheses are block bootstrapped by clusters of states that share a DRT.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Fixed effects

	All paid within 180 days						Days late if not paid within 180 days					
	Loan fixed effects			Borrower fixed effects			Loan fixed effects			Borrower fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
State DRT	0.01	-0.10*	-0.04**	0.02	-0.10**	-0.03*	78.29**	-176.82	80.56*	81.46**	-144.06	89.55*
	(0.01)	(0.05)	(0.02)	(0.01)	(0.05)	(0.02)	(35.19)	(126.95)	(48.25)	(32.65)	(125.86)	(46.11)
State DRT X Above	0.03*	0.01	0.05**	0.01	-0.01	0.04**	46.81	115.37*	-86.05*	13.45	30.31	-64.14
	(0.02)	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)	(44.30)	(67.42)	(49.58)	(26.47)	(33.90)	(44.64)
Observations	*15030*	*7822*	*7208*	*15030*	*7822*	*7208*	*5327*	*3004*	*2323*	*5327*	*3004*	*2323*
R-squared	*0.56*	*0.58*	*0.54*	*0.54*	*0.56*	*0.52*	*0.67*	*0.69*	*0.65*	*0.64*	*0.67*	*0.60*

In columns (1), (4), (7) and (10), the regression was run over the entire sample. In columns (2), (5), (8) and (11) it was run only for states in group 1, and in the remaining columns only for states in group 2. Controls include year of sanction, age of sanction and dummies for project location in columns (4)-(6) and (10)-(12), and borrower's cash flow and quarter dummies in all columns.

Standard errors are in parentheses and are block bootstrapped by clusters of states that share a DRT.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Size of loans sanctioned after DRTs established

	Levels			Borrower fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Post state DRT	-0.14	-0.13	-0.23	-0.08	-0.04	-0.20
	(0.21)	(0.21)	(0.24)	(0.56)	(0.56)	(0.61)
Post National DRT		0.64			1.99**	
		(0.39)			(0.87)	
Group 2 X Post state DRT			0.33			0.44
			(0.23)			(0.56)
Observations	*2018*	*2018*	*2018*	*2018*	*2018*	*2018*
R-squared	*0.43*	*0.43*	*0.43*	*0.70*	*0.70*	*0.70*

The dependent variable is log(loan size). Controls include year of sanction, firm's assets, dummies for project type, loan currency and state of project location in all columns, and additionally dummies for borrower's industry in columns (1)-(3).
Standard errors are in parentheses and are bootstrapped by clusters of states that shared a DRT.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Interest rates on disbursements occurring after DRT establishment

	Levels			Borrower fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Post state DRT	-2.15*	-2.14*	-2.69**	-0.94	-0.94	-0.75
	(1.19)	(1.18)	(1.19)	(1.34)	(1.34)	(1.48)
Post National DRT Act		-0.68			-0.68	
		(0.72)			(1.28)	
Group 2 X Post state DRT			1.34**			-0.44
			(0.58)			(1.13)
Observations	*2179*	*2179*	*2179*	*2179*	*2179*	*2179*
R-squared	*0.34*	*0.34*	*0.34*	*0.71*	*0.71*	*0.71*

Other controls include the log of sanction size, type of project, currency, dummies for state of project location and year, dummies for whether the commitment and sanction occurred after DRT establishment, and quadratic trends in timing of commitment and sanction in all columns, and additionally borrower's assets and dummies for borrower's industry in columns (1)-(3).

Standard errors are in parentheses and are block bootstrapped by clusters of states that share a DRT.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A.1: Predicting the pattern of DRT incidence, dependent variable = 1 if state *i* had a debt recovery tribunal in year *t*.

	Cross-sectional OLS									Probit	Court FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
GDP per capita	-0.05										
	(0.05)										
GDP growth rate		-0.00							0.00	0.04	-0.00
		(0.00)							(0.00)	(0.03)	(0.00)
Credit per capita			-0.00								
			(0.00)								
Credit growth rate				-0.00							
				(0.00)							
Cases pending per capita					0.00				0.00	0.08	-0.01
					(0.00)				(0.01)	(0.08)	(0.03)
Judges per capita						-9.28**			-10.75**	-81.39***	-4.22
						(3.74)			(4.80)	(29.41)	(5.85)
State government											
Congress & allies							0.00		0.09	0.75	0.05
							(0.07)		(0.09)	(0.60)	(0.09)
Janata & allies							0.09		0.11	1.39**	0.06
							(0.08)		(0.10)	(0.68)	(0.13)
Communist party							0.11		0.12	1.09	0.06
							(0.08)		(0.09)	(0.68)	(0.12)
Regional party							0.10		0.11	0.95	-0.02
							(0.07)		(0.09)	(0.58)	(0.13)
Center's ally								-0.07	-0.03	-0.54	-0.06
								(0.05)	(0.07)	(0.48)	(0.07)
Observations	*192*	*168*	*192*	*192*	*192*	*192*	*192*	*192*	*168*	*96*	*168*
R-squared	*0.73*	*0.68*	*0.72*	*0.72*	*0.72*	*0.74*	*0.73*	*0.73*	*0.71*	*0.41*[a]	*0.79*

Robust standard errors in parentheses. Year dummies in all columns not reported. Observations correspond to 8 years of data (1993-2000) for 24 states. GDP growth rates are not available for 1993. Union territories are excluded. The court fixed effects regression is run for groups of states which share a high court.
* significant at 10%; ** significant at 5%; *** significant at 1%.
a: Pseudo R-squared.