

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, 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 10 percent. The effect is 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 1-2 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 stimulate economic growth.

# 1 Introduction

In many developing countries and transition economies, the quality of formal judicial institutions is poor. Cases in court are subject to long delays, judges and court officials are corrupt, or the courts are captured by the elite.<sup>1</sup> As a result, economic agents cannot depend on courts for the protection of their property rights, leading to high transactions costs and other contracting problems (Williamson 1985). A large and growing body of theory suggests that in such situations some welfare-improving transactions will not be undertaken (Mookherjee 1999).

Improving the quality of formal judicial institutions and more generally “getting the institutions right” (North 1990) may thus allow the achievement of superior economic outcomes. For instance, it has been shown that entrepreneurs’ confidence in a country’s institutions, including the judicial system, predicts levels of investment and rates of economic growth (Knack & Keefer 1995, Mauro 1995), and that the nature of a country’s laws and the efficiency of its judiciary can explain the concentration of share-holding and the extent of external long-term financing that firms receive (Demirgüç-Kunt & Maksimovic 1998, La Porta *et al.* 1998). However the literature provides very little evidence of the micro-level mechanisms through which judicial quality influences economic development.<sup>2</sup> This paper seeks to contribute in filling that void.<sup>3</sup>

This paper investigates the effects of a particular improvement in the judicial institutions that process debt recovery cases in India. In 1993 the Indian government passed a national act that allowed for 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

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<sup>1</sup>See Moog (1997), Buscaglia & Ulen (1997), Lambert-Mogiliansky *et al.* (2003) for studies of judicial quality in India, Latin America and Russia respectively.

<sup>2</sup>Two recent papers present micro evidence of the impact of judicial quality: Chemin (2004) estimates the effect of Indian state court efficiency on firm-level outcomes, and Jappelli *et al.* (2002) study Italian district courts and their effect on the volume of credit and credit rationing.

<sup>3</sup>This paper is also part of a growing literature that studies the impact of institutional quality by using within-country variation in institutions across space or over time (Besley & Burgess 2002, Banerjee & Iyer 2003, Burgess & Pande n.d., Field 2003; 2004).

the verdict. By March 31st 2003 they had disposed claims worth Rupees 314 billion (roughly 4 percent of total bank credit to the commercial sector in 2002-03) and recovered Rupees 79 billion (Government of India 2003).

Two aspects of this reform are particularly relevant. 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. Therefore these two features allow a differences-in-differences strategy to identify the effects of the DRTs.

The data used to implement this strategy consist of loan level records that I collected from a large private sector bank with a national presence. I observe detailed information about the contractual terms of the loans, their repayment schedule and actual repayment in each quarter when an installment becomes due. I utilize the two sources of variation described above to examine the effect of DRTs on borrowers' repayment behavior.

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). The difference can be attributed to the DRTs. To address possible concerns that other factors may be driving these results, I conduct several robustness checks. I control for state-level time-varying unobservable factors (by including state  $\times$  quarter fixed effects), and allow different time-varying unobservables for loans above and below the Rupees 1 million threshold. I find robust evidence that 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.

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 paper is organized as follows. Section 2 provides some background on the factors leading to the DRT Act, and details of the act and its implementation. Section 3 presents a theoretical framework to explain the phenomenon studied here. Section 4 describes the data. Section 5 presents the empirical strategy. Sections 6, 7 and 8 present the empirical results. Section 9 concludes the paper.

## **2 Institutional Background**

As mentioned earlier, Debt Recovery Tribunals are specialized tribunals set up to expedite the resolution of debt recovery cases. This section describes the background against which these tribunals were introduced.

### **2.1 India's Banking Sector**

In independent India the banking sector was expected to fulfill development objectives by extending credit to various sectors of the economy. 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.<sup>4</sup>

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 embarked upon economic reforms and financial sector liberalization 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

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<sup>4</sup>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.

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 had remained unpaid for a certain pre-specified period or more.<sup>5</sup> It also imposed stricter accounting standards, 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.<sup>6</sup>

## 2.2 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.

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

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<sup>5</sup>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.

<sup>6</sup>Pistor & Wellons (1999) report that 90 percent of bank loans in India are secured.

inefficiencies in the processing of a legal suit. 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).<sup>7</sup>

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 the defendant. Evidence must be presented orally, and hearings tend to be long.<sup>8</sup> 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. In this setting, the benefit from filing a legal suit against a defaulting borrower has been low, and the cost has been high. In addition, the bankruptcy procedure for firms is time-consuming, and bankers complain that it creates incentives for borrowers to mismanage funds.<sup>9</sup>

### 3 Debt Recovery Tribunals

The Tiwari Committee established in 1981 investigated the legal difficulties faced by banks and recommended the establishment of special tribunals for the recovery of debt. It suggested that these tribunals not use the Code of Civil Procedure, but

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<sup>7</sup>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.

<sup>8</sup>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.

<sup>9</sup>Under the Sick Industrial Companies Act, a company that has accumulated losses greater than its net worth can apply to the Board of Industrial and Financial Reconstruction (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.

instead use a simple procedure guided only by the principles of natural justice. The Narasimham Committee also 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).<sup>10</sup>

### 3.1 The DRT Act

The act came into force on June 24th, 1993.<sup>11</sup> 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.<sup>12</sup>

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, 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

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<sup>10</sup>I am grateful to Sanjay Reddy for drawing my attention to Debt Recovery Tribunals.

<sup>11</sup>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.

<sup>12</sup>An amendment bill is currently pending in the Lok Sabha to reduce the monetary threshold to Rupees 500 thousand.

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; counter-claims against the bank must be made at the first hearing.<sup>13</sup> 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. The act 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. The defendant can appeal the DRT’s ruling in the Debt Recovery Appellate Tribunal (DRAT). However he must deposit 75 percent of the awarded amount with the DRAT before the hearing can take place, a provision that is likely to reduce the probability of “frivolous” appeals. The deposit is returned to him if the DRAT rules in his favor.

### **3.2 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 and asking that it be declared unconstitutional.<sup>14</sup> In August 1994 the Delhi High Court 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

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<sup>13</sup>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.

<sup>14</sup>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.

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.<sup>15</sup>

The central government moved the Supreme Court against this judgement in a special leave petition.<sup>16</sup> 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.<sup>17</sup> 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.

Anecdotal evidence suggests that DRTs have effectively reduced the delays in debt recovery cases. 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).

### **3.3 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.

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<sup>15</sup>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.

<sup>16</sup>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.

<sup>17</sup>*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.

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.<sup>18</sup> 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.<sup>19</sup>

## 4 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.<sup>20</sup> 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

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<sup>18</sup>In the empirical work, I classify the states into clusters: groups of states which shared a DRT.

<sup>19</sup>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.

<sup>20</sup>This section builds on a standard model of developing country credit markets as presented in Bardhan & Udry (1999).

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  $\rho$ , 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

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

#### 4.1 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 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:

$$\begin{aligned} \pi(a)i &= \rho \\ \Rightarrow i_1 &= \frac{\rho}{\pi(a_1)} \end{aligned} \tag{5}$$

## 4.2 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  $\phi$  of the proceeds, where  $0 < \phi < 1$ . As the legal process becomes speedier,  $\phi$  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

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

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  $\phi$ . 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.*

$$\frac{da}{d\phi} > 0$$

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

$$\frac{di}{d\phi} < 0$$

## 5 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 overruns on previous loans. According to the bank's policy project lending always takes 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.<sup>21</sup> After this, the loan is made accessible to the borrower, by making a "commitment".<sup>22</sup> (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

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<sup>21</sup>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.

<sup>22</sup>Although in principle a sanction can be broken into multiple commitments, in these data most sanctions are committed in one installment.

$t$  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  $\text{allpaid}=0$ , which measures the average number of days that elapsed between date of invoice and payment, on the invoices pertaining to loan  $i$  in quarter  $t$ .<sup>23</sup>

## 5.1 Descriptive Statistics

Table 1 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 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).<sup>24</sup> 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 ac-

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<sup>23</sup>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.

<sup>24</sup>In Section 8 I relax this restriction and use all the loans, then decompose the effects into moral hazard and adverse selection.

counted 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 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.

## 6 Empirical Strategy

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

### 6.1 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.<sup>25</sup>

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 defendant(s) reside, or where the cause of action arises. The data on the state of project location is more complete than the information on borrower location. Where information on both is available, 70 percent of the loans are for projects located in the same state cluster where the company is located.

## 6.2 Estimation and Identification

As described earlier, the empirical strategy in this paper relies on two features of the DRT Act and its implementation. of variation. 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 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  $\times$  time  $\times$  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.

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<sup>25</sup>Given a fixed cost of litigation, it is more profitable to file suits for loans of larger value. Therefore DRTs are especially pertinent for the large project loans held by this bank.

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.<sup>26</sup>

The timing of DRT establishment across states also has an exogenous element. As described earlier, initially the government set up DRTs very quickly: within a space of eight months, five DRTs had been established. 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. Given that the judiciary is independent of the executive, and that high courts in India command significant authority, it is unlikely that the timing of this ruling was influenced by the national government or state governments or could even have been predicted by them. However once the High Court issued the order, the national government was forced to stop establishment of new DRTs. Therefore states which did not receive a DRT before the ruling did not get one until after the Supreme Court order that the High Court's order be stayed.

It also appears unlikely that the timing 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

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<sup>26</sup>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. This is unlikely because borrowers had little time to react: the act was passed within a few months of its introduction in Parliament. Density plots of amount overdue confirm this (see Figure A.4). 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 pay invoices on time in each quarter.

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. Given that Indian states are distinct geographical and political entities, such collusion would have been costly and difficult.

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.

## 7 Results on Repayment Behavior

This section describes the results from the empirical strategy described above, robustness checks and further results on the behavioral response to DRTs.

### 7.1 Main Results

We begin with the results in Table 2A. 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). The coefficient on `State DRT × Above` corresponds to  $\beta_3$  in equation (8), and is the parameter of interest.<sup>27</sup> Column (1) shows that when a DRT was established, loans which had more than Rupees 1 million overdue were 10% 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 263 days.

The fact that the amount overdue is a continuous variable allows me to validate this conclusion and address the following potential concern. Loans with much more

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<sup>27</sup>Standard errors in Tables 2-4 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).

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 found 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 than those with dues just below. Therefore, in columns (2)-(4) and (6)-(7) I estimate the same regression, but only for the sub-samples that fall within narrow bands around Rupees 1 million. Columns (2) and (6) start with a band of Rupees 1 million  $\pm$  200000, i.e. (800000, 1200000) and 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.

Figures A.2 and A.3 present smoothed data which depict these effects. In Figure A.2, 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 observations 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 for claim sizes above 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. This difference in the change in repayment behavior after DRT establishment is represented by the results in Table 2A. In figure A.3, the same phenomenon is represented by the difference in the height of these two lines. The difference tends to be roughly constant for loans with claim size below Rupees 1 million but increases after the claim size exceeds 1 million.

## 7.2 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. However we may still worry that states could have influenced the placement of DRTs to some extent. To examine this issue, I check 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, I include the state GDP per capita (or state credit per capita, which is highly correlated with GDP) as an explanatory variable. Next I include the number of cases pending per capita, to test whether states with poor quality judiciaries receive DRTs sooner. Given the opposition of the state High Courts to DRTs described earlier, I include the number of High Court judges per capita as a measure of the strength of the High Court in a state. Finally, 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.<sup>28</sup> Although the year dummies (not reported) are always highly significant, none of the state-specific explanatory variables predicts the probability that a state will receive access to a Debt Recovery Tribunal. Thus, these observable factors do not appear to be driving DRT establishment.

The fact that loans are only eligible for DRTs if the claim size is above Rupees 1

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<sup>28</sup>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. For example, the AIADMK and DMK parties are both important parties in Tamil Nadu but have no political presence elsewhere. However in 1999 by withdrawing support to the BJP-led central government the 18 AIADMK members of the 543-seat Lok Sabha (the lower house) forced the Prime Minister to resign and made way for an alternative coalition.

million also allows us to control for state-level unobservables affecting loan repayment. Given that the number 1 million appears to have been picked arbitrarily, there is no reason to believe that these state-level factors would affect loans with more than Rupees 1 million overdue differentially. 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), with the additional controls of dummies for state clusters interacted with the quarter. Therefore any observable and unobservable factors that change over time within a state are controlled for. Despite this, the coefficient on State DRT  $\times$  Above is significant at 8 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 2B 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. Now I include dummies for Above interacted with the quarter, thus allowing all loans with dues above 1 million to respond differentially in each quarter. Any nation-wide changes in the behavior of loans above 1 million from quarter to quarter will be picked up by these dummies. 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 0.05, it is still significant at the 5% level. 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.<sup>29</sup> In column (4) the coefficient on Group 2 state  $\times$  State DRT  $\times$  Above is not significantly different from zero, indicating that in levels, the effect of DRTs is not different in group 2 states compared to group 1 states. In column (8) however, group 2 state DRTs have a smaller effect than group 1 DRTs. Thus dayslate responds by less in states which received DRTs after the interruption.

### 7.3 Behavioral Explanation

So far the results provide evidence that after DRTs were established, loans that had more than Rupees 1 million overdue showed better invoice payment behavior than loans with dues below 1 million. This result is robust to the checks described above. Thus it is not being driven by state level changes over time, or national changes in the repayment behavior of loans above 1 million. Next I examine whether this effect is also found in fixed effects regressions. The results are presented in Table 3.

For each dependent variable I estimate both loan fixed effects and borrower fixed effects. In column (1), the explanatory variables are State DRT (a dummy for quarters occurring after the state DRT was established) and State DRT  $\times$  Above (a dummy for quarters occurring after the state DRT was established for loans which had more than Rupees 1 million overdue). The coefficient on State DRT  $\times$  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. If it received an invoice after the state DRT was established, it was 3 percent more likely to pay it within 180 days than if it received an invoice 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.

Next we turn to the borrower fixed effects. Since the same borrower has multiple loans, in column (4) the coefficient on State DRT  $\times$  Above now has a slightly different

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<sup>29</sup>See Appendix A.1 for the time line of DRT establishment across states.

interpretation. For a given borrower, consider the average loan that is above Rupees 1 million overdue. Column (4) indicates that when a state DRT is established, the invoice payment for that loan is no more likely to be on time. However once again, columns (5) and (6) indicate that although repayment does not improve in Group 1 states, it does in Group 2 states. After a Group 2 state receives a DRT, repayment improves by 4 percent for the average treated loan belonging to the same borrower. Columns (7)-(12) perform the same exercise for dayslate. Within loan or within borrower, treated invoices that are not paid within 180 days do not respond to the establishment of DRTs.

In conclusion, we find evidence that within the average loan, delinquency declined as a result of DRT establishment. Although it appears that in Group 1 states the positive and negative effect of DRTs offset each other, in Group 2 states, DRT establishment led the average borrower to decrease delinquency. This 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.

## 8 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. This analysis relies on the differential timing of DRT establishment across states. Thus the identification strategy is different from the one employed in the previous sections. The regression estimated is of this form:

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

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 as well as borrower level. The coefficient of interest is  $\beta_1$ , which captures the effect of state DRT establishment. Note here that identification relies on the

exogeneity of the timing of DRT placement across states.

### 8.1 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 loan size. I test this hypothesis in Table 4.

The observations in this exercise (and in Table 5) 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. 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. This reform has not led the bank to issue larger loans to its borrowers.

### 8.2 Interest rates

In Table 5, 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. 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. The price of a loan may depend on its size.

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 sanctioned before. We may worry however that this is being driven by national changes in interest rates caused by the economic reforms of the early 1990s. In column (2) I put in a dummy for observations occurring after 1993 Quarter 2. We find that the national-level decrease in interest rates is not significant. In column (3) I check if this effect is different in Group 1 and Group 2 states. In Group 2 states the effect is smaller than in Group 1 states.

In the borrower fixed effects regressions, the results are no longer significant. The same borrower who had an older loan (in the sample) does not get a significantly lower interest rate on a new loan sanctioned after the DRT was established. Thus the cheaper loans seem to go to different borrowers than before. This suggests that the effect of DRTs on interest rates is based on compositional changes in the type of borrowers who get loans after DRTs were established.

On the whole, while the legal reform did not increase the size of loans, the interest rate on new loans appears to be lower. Returning to the theoretical model, the lower interest rate moves the equilibrium closer to the first-best solution. Note however, that 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 loans after the reform took place.

## 9 Results on Adverse Selection

In section 6, I have concentrated on estimating whether DRTs reduce the incidence of moral hazard. It is also interesting to examine if they decrease the incidence of adverse selection. Loans sanctioned after the DRT Act was enforced might be systematically different from those sanctioned before. The bank could be lending to a different pool of borrowers, or to inherently worse or better projects. Therefore the repayment behavior on loans sanctioned after 1993 exhibits a combination of the

moral hazard and adverse selection effects.

To disentangle these effects I estimate a regression similar to that used in Table 2, but with the entire sample of loans, including both those sanctioned before and sanctioned after the DRT Act was enforced. The results are in Table 6. Unlike earlier where Above was measured at the time of the DRT Act, it is now measured at the time of state DRT establishment. Thus loans are now considered treated, if they have more than Rupees 1 million overdue at the time of state DRT establishment. Now the coefficient on State DRT  $\times$  Above is the moral hazard effect on loans sanctioned before 1993:Q2. The coefficient on Sanctioned after 1993  $\times$  State DRT  $\times$  Above asks if the loans sanctioned after 1993 reacted to DRTs differently from those sanctioned before. In this sense it captures the adverse selection effect. In column (1) the coefficient is insignificant. This is suggestive evidence that the major impact of the DRTs has been to change the behavior rather than the type of borrowers or projects. Future work will investigate this phenomenon further.

In column (2) this regression is run for the variable dayslate. Here the negative and significant coefficient does suggest that loans sanctioned after 1993 react differentially to DRTs than those sanctioned before. Thus loans sanctioned after 1993 that remained delinquent (i.e. did not pay the invoice within 180 days) did reduce their delinquency by more than those that were sanctioned before 1993.

## 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 3-10 percent. Furthermore, new loans sanctioned after DRT establishment are charged interest rates that are lower by 1.5-2 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.

Anecdotal evidence suggests that these DRTs have reduced the time taken to process debt recovery cases. The results in this paper 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 must 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. Also a growing literature starting with King & Levine (1993) has shown that financial depth is important for economic growth. 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 might lead to superior economic performance. More effective courts give borrowers a greater incentive to repay. When the chances of recovery improve, banks face a lower default risk. They can then charge lower interest rates. Cheaper credit together with lower collateral requirements is likely to spur entrepreneurial activity and stimulate growth.

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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 <sup>a</sup>
Guwahati	Jan 7 1997	Assam, Meghalaya, Manipur, Mizoram, Tripura, Arunachal Pradesh, Nagaland <sup>b</sup>
Patna	Jan 24 1997	Bihar, Orissa
Jabalpur	Apr 7 1998	Madhya Pradesh, Uttar Pradesh
Mumbai	Jul 16 1999	Maharashtra, Goa

<sup>a</sup>The Chennai DRT's jurisdiction was expanded to include Lakshadweep on Dec 5 1997.

<sup>b</sup>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

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

When  $\phi$  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,

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

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

$$\frac{di}{d\phi} < 0.$$

## 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.<sup>a</sup>

### 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.

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<sup>a</sup>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.

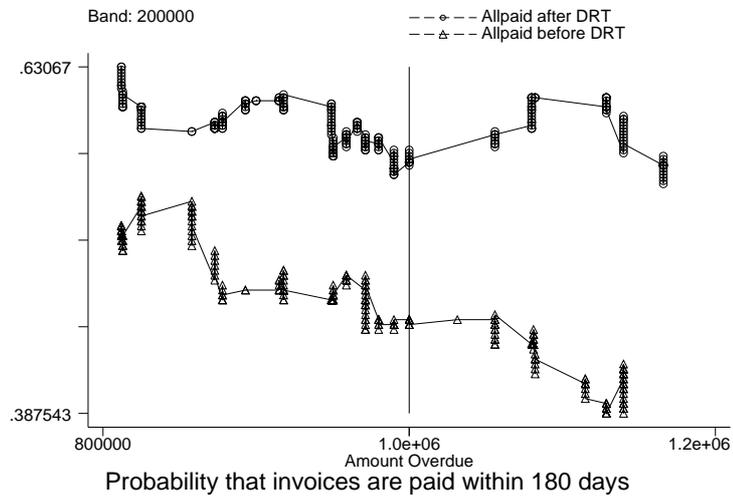


Figure A.2: Probability that invoices are paid within 180 days

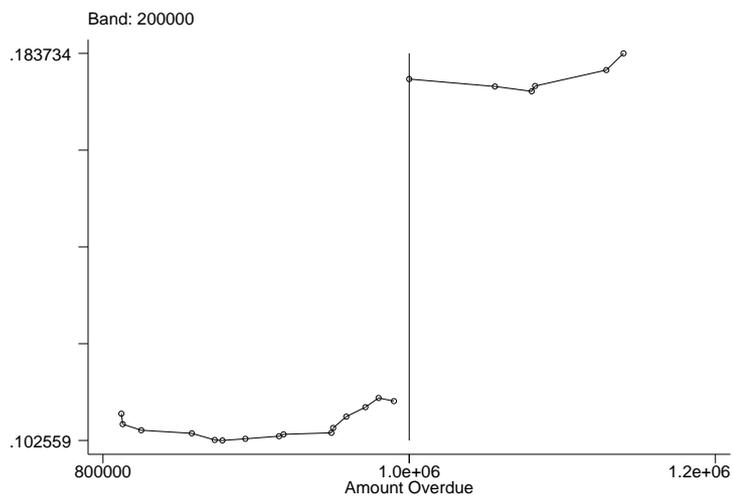


Figure A.3: Change in probability of repayment after the state DRT was established

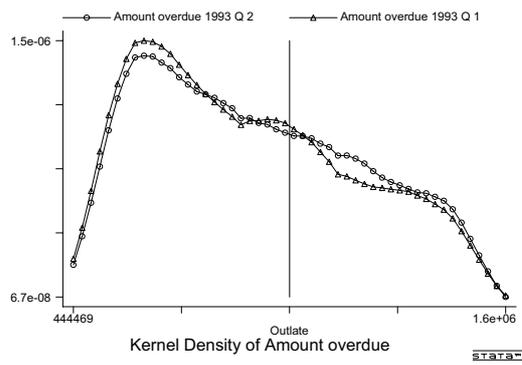


Figure A.4: Density of loans around Rupees 1 million overdue in 1993:Q1 and 1993:Q2

Table 1: Descriptive statistics

	Mean	Standard Deviation	N
Size of loan ( <i>millions of Rupees</i> )	24.2	43.7	798
Interest rate ( <i>percent</i> )	15.31	5.68	798
Year of sanction	1989.29	2.93	786
Borrower's cash flow ( <i>millions of Rs.</i> )	1859.68	591.03	15034
Borrower's assets ( <i>millions of Rs.</i> )	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
<i>if State DRT = 0</i>	0.55	0.50	5787
<i>if State DRT = 1</i>	0.71	0.45	9247
Days late if not paid in 180 days	889.17	667.05	5327
<i>if State DRT = 0</i>	976.53	728.29	2621
<i>if State DRT = 1</i>	804.55	589.75	2706

Table 2A: 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			
	(1)	Bands around Rupees 1 million			(5)	Bands around Rupees 1 million		
		200000	100000	85000		200000	100000	85000
	(2)	(3)	(4)	(6)	(7)	(8)		
State DRT	-0.02 (0.03)	-0.32*** (0.09)	-0.32*** (0.06)	-0.33*** (0.07)	198.95*** (68.42)	719.35*** (275.28)	735.27*** (200.37)	735.27*** (199.79)
Above	-0.16*** (0.04)	-0.16 (0.22)	-6.18** (0.66)	0.10 (0.24)	193.52*** (60.86)	378.05 (579.47)	-4287.06 (785.93)	-1524.55*** (291.48)
State DRT X Above	0.10** (0.04)	0.24 (0.18)	0.28** (0.11)	0.30** (0.15)	-263.48*** (69.83)	-607.52*** (304.09)	-558.57*** (207.68)	-558.57*** (207.07)
<i>Observations</i>	15034	651	352	325	5327	272	172	171
<i>R-squared</i>	0.19	0.48	0.74	0.72	0.27	0.63	0.76	0.76

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. Columns (2) and (6) also contain a quadratic polynomial and columns (3), (4) and (7) contain a linear term in amount overdue.

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 2B: 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)	-0.01 (0.01)	-0.02 (0.01)		162.89*** (35.77)	205.74*** (37.08)	192.43*** (35.56)
Above	-0.14*** (0.01)	-0.21*** (0.02)	0.44 (0.31)	-0.16*** (0.01)	168.57*** (28.03)	329.50*** (37.23)	2150.52** (858.63)	196.15*** (26.54)
State DRT X Above	0.08*** (0.02)	0.08*** (0.02)	0.05** (0.03)	0.10*** (0.02)	-216.85*** (37.31)	-170.08*** (42.18)	-342.79*** (57.10)	-290.69*** (38.18)
National DRT X Above		0.08*** (0.03)				-236.32*** (51.46)		
Group 2 state X State DRT								
Group 2 state X State DRT X Above				0.02 (0.02)				84.94** (41.64)
Additional fixed effects	state cluster X quarter		Above X quarter		state cluster X quarter		Above X quarter	
<i>Observations</i>	15034	15034	15034	15034	5327	5327	5327	5327
<i>R-squared</i>	0.21	0.19	0.20	0.19	0.33	0.27	0.29	0.27

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 and are block bootstrapped by clusters of states that share a DRT.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 3: 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 (0.01)	-0.10* (0.05)	-0.04** (0.02)	0.02 (0.01)	-0.09* (0.05)	-0.03* (0.02)	76.95** (34.28)	-177.51 (125.85)	78.41* (46.49)	80.66** (31.88)	-143.70 (127.07)	88.59* (46.46)
State DRT X Above	0.03** (0.02)	0.01 (0.03)	0.05** (0.02)	0.01 (0.01)	-0.01 (0.02)	0.04** (0.02)	47.44 (42.67)	119.29* (65.71)	-85.12 (52.98)	13.60 (26.48)	32.57 (33.81)	-65.41 (42.79)
<i>Observations</i>	15030	7822	7208	15030	7822	7208	5327	3004	2323	5327	3004	2323
<i>R-squared</i>	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 state of 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 4: Size of loan sanctioned after date of DRT Establishment

	Levels			Borrower fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Post state DRT	-36.87 (47.38)	-36.82 (47.48)	-40.47 (37.41)	171.08 (172.45)	174.52 (173.49)	98.04 (115.57)
Post National DRT		7.67 (100.59)			173.38 (319.90)	
Group 2 X Post state DRT			12.47 (90.63)			257.70 (235.46)
<i>Observations</i>	2018	2018	2018	2018	2018	2018
<i>R-squared</i>	0.17	0.17	0.17	0.73	0.73	0.73

Controls include dummies for state of project location interacted with year of sanction, dummies for project type and loan currency, and additionally firm'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 5: Interest rates on disbursements occurring after DRT establishment

	Levels			Borrower fixed effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Post State DRT	-2.22*** (1.00)	-2.20*** (1.00)	-2.66*** (1.04)	-1.20 (1.46)	-1.20 (1.16)	-1.06 (1.19)
Post National DRT Act		-0.98 (0.55)			-1.21 (0.99)	
Group 2 X Post state DRT			1.15*** (0.55)			-0.07 (0.79)
<i>Observations</i>	2606	2606	2606	2606	2606	2606
<i>R-squared</i>	0.31	0.31	0.31	0.70	0.70	0.70

Other controls include size of sanction, 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 6: Moral Hazard vs. Adverse Selection

	All paid within 180 days (1)	Days late if not paid within 180 days (2)
State DRT	-0.05*** (0.01)	182.72*** (30.12)
Above <sub>s</sub>	-0.12*** (0.01)	208.85*** (22.39)
State DRT X Above <sub>s</sub>	0.06*** (0.01)	-119.79*** (28.26)
Sanctioned after X State DRT X Above <sub>s</sub>	-0.00 (0.01)	-133.45*** (29.19)
<i>Observations</i>	34185	7712
<i>R-squared</i>	0.19	0.30

Above<sub>s</sub> takes the value 1 if the loan has more than Rupees 1 million overdue at the time the state DRT was established. 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 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 establishment, dependent variable = 1 if state  $i$  had a debt recovery tribunal in year  $t$ .

	Cross-sectional OLS									Probit		Court fixed effects	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GDP per capita	0.000 (0.001)												
Credit per capita		0.000 (0.000)					0.001 (0.000)	-0.000 (0.001)	-0.001 (0.001)	-0.002 (0.005)	-0.005 (0.005)	-0.004 (0.003)	-0.003 (0.003)
Cases pending per capita			-0.006 (0.013)				-0.015 (0.016)	0.014 (0.026)	0.027 (0.024)	0.062 (0.099)	0.113 (0.093)	0.035 (0.053)	0.021 (0.049)
Judges per capita				52.860 (55.903)									
<i>State government</i>													
Congress & allies					-0.095 (0.127)			-0.020 (0.133)		-0.096 (0.422)		-0.049 (0.128)	
Janata & allies					0.140 (0.163)			0.185 (0.165)		0.727 (0.582)		0.236 (0.362)	
Communist party					0.095 (0.142)			0.157 (0.151)		0.753 (0.584)		0.047 (0.193)	
Regional party					0.094 (0.127)			0.162 (0.131)		0.760 (0.474)		-0.141 (0.177)	
Center's ally						-0.092 (0.073)			-0.068 (0.074)		-0.259 (0.274)		-0.079 (0.066)
Constant	0.426*** (0.142)	0.457*** (0.132)	0.492*** (0.144)	0.408** (0.191)	0.379*** (0.142)	0.415*** (0.109)	0.513*** (0.146)	0.366* (0.190)	0.411*** (0.155)	-0.511 (0.567)	-0.325 (0.459)	0.427* (0.233)	0.491** (0.227)
<i>Observations</i>	123	139	139	131	125	125	139	115	115	115	115	115	115
<i>R-squared</i>	0.28	0.23	0.22	0.23	0.34	0.31	0.23	0.32	0.29			0.49	0.48
<i>Groups</i>												17	17

Robust standard errors in parentheses. Year dummies in all columns not reported. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%