The Distributive Impact of Reforms in Credit Enforcement: Evidence from Indian Debt Recovery Tribunals

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April 10, 2017

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Introduction

- We have seen in many instances so far that weak enforcement of credit contracts restricts the functioning of credit markets.
- If a borrower cannot credibly commit to honouring the credit contract, lender risk rises, increasing the cost of credit and leading to credit rationing.
- Institutional change that improves enforcement should reduce credit rationing and improve welfare. However, this argument is a partial equilibrium argument and does not take into account possible general equilibrium effects from the supply side.

Introduction...

- This paper argues that strengthening credit enforcement does not always lead to a Pareto improvement.
- If the credit supply curve is upward sloping, the increase in demand from improved enforcement is also associated with a rise in interest rates that might have a dampening effect on any possible welfare improvement.
- If borrowers are heterogeneous with respect to wealth or collateral, such changes might change have redistributive impacts.

Introduction...

- This paper proposes a model to capture partial equilibrium and general equilibrium effects .
- The demand for credit is modeled as the solution to an optimal contracting problem that maximizes borrowers' payoffs subject to the borrowers' incentive compatibility constraint and the lender's participation constraint.
- Under this formulation, the change in enforcement institution does not shift the supply curve- The demand curve shifts according to the comparative statics from the optimal contracting problem.
- Examination of the effect of establishment of Debt Recovery Tribunals in India leads to the conclusion that increasing enforcement leads to credit reallocation from small to large borrowers.

The Model

- Economy populated by risk neutral agents, heterogeneous with respect to collaterizable (fixed) assets W.
- W is distributed according to cumulative distribution function G over support $[\underline{\Omega}, \overline{\Omega}]$.
- Each borrower seeks to invest in a project of size $\gamma \geq 0$.
- A project of size γ requires up-front investments of γI.
- The project generates returns of $yf(\gamma)$, where $y \in \{y_s, y_f\}$ is a borrower-specific productivity shock and $f(\gamma)$ is an increasing, continuously differentiable, S-shaped function.
- $\frac{f(\gamma)}{\gamma}$ is rising until $\gamma = b$ and falling thereafter. $f'(\gamma)$ is rising over some initial range $(0, b')$ and falling thereafter, with $b' < b$.

- Assumption: the borrower does not have any liquid wealth to pay for the up-front investments.
- The probability of success ($y = y_s$) is given and denoted by e. The expected value of y is given by:

$$\bar{y} = ey_s + (1 - e)y_f \tag{1}$$

Credit Contracts

- A loan contract stipulates the amount borrowed (γI) and the amount T_k to be repaid in each state.
- Realization of the state is costlessly verifiable.
- Contracts are complete: T_k can vary with state $k \in \{s, f\}$.
- T_s can be thought of as the payment corresponding to the stated interest rate that the borrower is to pay in the event of success.
- In the event of failure the repayment is adjusted to reflect the borrower's reduced capacity to repay. This adjustment is anticipated in advance by both parties.

Credit Contracts...

- Each borrower has the option of not honouring the loan agreement ex-post.
- Assumption: the borrower either decides to repay the entire interest obligation or none of it.
- Should the borrower default, lenders can take the borrower to court, and thereafter expect to seize a fraction (θ) of ex post assets owned by the borrower.
- The enforcement institution is represented by θ, incorporating delays and/or uncertainties in the legal process. The main focus of the paper is on the effects of increasing θ.

Credit Contracts...

- Ex post assets equal $W + \nu y_k f(\gamma)$ Where $(1 - \nu)$ is the extent to which the returns from the project can be diverted by the entrepreneur.
- Assumption: ν is small. In particular, $\nu < \frac{I}{\overline{y}\theta f'(b')}$.
  That is, the extent to which the returns from the project itself can serve as collateral is limited.

Credit Contracts...

The payoff to a borrower from honouring the loan contract in state $k \in \{s, f\}$ is given by:

$$W + y_k f(\gamma) - T_K \quad (2)$$

and the payoff from disagreement is given by:

$$(1-\theta)[W + \nu y_k f(\gamma)] + (1-\nu) y_k f(\gamma) - d \quad (3)$$

where d is a deadweight loss from being dragged to court (could include legal costs, loss of reputation, etc.).
The borrower honours the loan agreement in state k if and only if

$$T_k \leq \theta[W + \nu y_k f(\gamma)] + d \quad (4)$$

Credit Contracts...

- With complete contracting, the loan agreement is always honoured: the parties never actually go to court on the equilibrium path. If they do, a Pareto improvement can always be generated with lower repayment burdens that incentivize the borrower to honour the loan agreement and not incur the deadweight loss.
- The enforcement institution affects the actual contract by determining the ex post outside option of the borrower.

Supply of Loans

- ”Competitive” supply of loans, represented by an upward sloping supply curve $L_s(\pi)$ of loanable funds, where π denotes the lender’s expected return per rupee loaned.
- Assumption: $L_s(\pi) = 0$ if $\pi < \alpha$, $L_s(\pi) > 0$ if $\pi > \alpha$. Here α is a non negative minimum rate of return that the lenders must be assured for there to be some non zero supply of credit.
- Assumption: $\bar{y}f(b)/b > I(1+\alpha)$ - some projects will be funded in the absence of any enforcement problems.

Supply of Loans...

- The elasticity of supply is crucial to the subsequent analysis and is treated as an empirical matter.
- If globalized financial markets guarantee an infinitely elastic supply of capital to any given economy, $L_s = \infty$ for $\pi > \alpha$ and the profit rate is pegged at α.
- If factors like infrastructure and local knowledge limit the supply of credit, $L_s(\pi)$ will have finite elasticity and π will be endogenously determined.

Demand for Loans

Benchmark:
Denote the first-best demand $\gamma^F(\pi)$, which solves:

$$\max_{\gamma} \quad [\bar{y}f(\gamma) - \gamma I(1+\pi)] \tag{5}$$

where $\bar{y} = ey_s + (1-e)y_f$.

The first-best is not always implementable due to the no-default incentive constraint. The relevant demand thus takes these constraints into account.

Demand for Loans...

DEFINITION 1: In a π incentive compatible loan contract, a borrower with assets W demands credit $\gamma(W, \theta, \pi)$, which solves:

$$\max_{\gamma} \quad e[W + y_s f(\gamma) - T_s] + (1 - e)[W + y_f f(\gamma) - T_f] \tag{6}$$

Subject to

$$T_k \leq \theta[W + \nu y_k f(\gamma)] + d, \quad k = s, f \tag{7}$$

and

$$eT_s + (1 - e)T_f \geq \gamma I(1 + \pi) \tag{8}$$

Aggregate incentive compatible demand for credit is then given by:

$$L_d(\theta, \pi) = \int \gamma(W, \theta, \pi) d\mu(W) \tag{9}$$

where $\mu(W)$ is the distribution of W in the population of firms.

Demand for Loans...

Constraints 7 and 8 imply that a project size γ is implementable if and only if

$$\theta[W + \nu\bar{y}f(\gamma)] + d \geq \gamma l(1 + \pi) \tag{10}$$

This can be written as:

$$\theta W + d \geq \gamma l(1 + \pi) - \theta\nu\bar{y}f(\gamma) \tag{11}$$

The assumption $\nu < \frac{l}{\bar{y}\theta f'(b')}$ implies that the right-hand side of the above equation is increasing in project size γ.

That is, since the returns on the project do not serve as a substantial source of collateral, larger project scales are more difficult to implement.

A borrower with given wealth W will face a credit ceiling uniquely defined by the value of γ that solves the equality version of equation.

Demand for Loans...

DEFINITION 2:

- First best asset threshold is $W^F(\pi) \equiv \{\gamma I(1+\pi) - d\}/\theta - \nu \bar{y} f(\gamma^F)$
- Maximum project size $\gamma^H(W, \theta, \pi)$, which solves $\theta W + d = \gamma I(1+\pi) - \theta \nu \bar{y} f(\gamma)$
- Minimum project size $\gamma^L(\pi)$ is the smallest solution to $\bar{y} f(\gamma)/\gamma = I(1+\pi)$
- Minimum viable asset threshold $W_L(\pi, \theta)$ solves $\gamma^H(W, \theta, \pi) = \gamma^L(\pi)$.

Demand for Loans...

- At a given profit rate π, a firm operates and gains access to a loan only if its maximum project size γ^H exceeds the minimum viable project scale γ^L .All borrowers wealth below W_L are excluded from the credit market.
- Borrowers with sufficiently high wealth (above the first-best asset threshold, W^F) operate at a scale equal to the first-best scale and are not rationed.
- The remaining borrowers, who have assets between W_L and W^F, obtain a loan but are rationed.

Demand for Loans...

LEMMA 2.1: The incentive-constrained demand function for credit is:

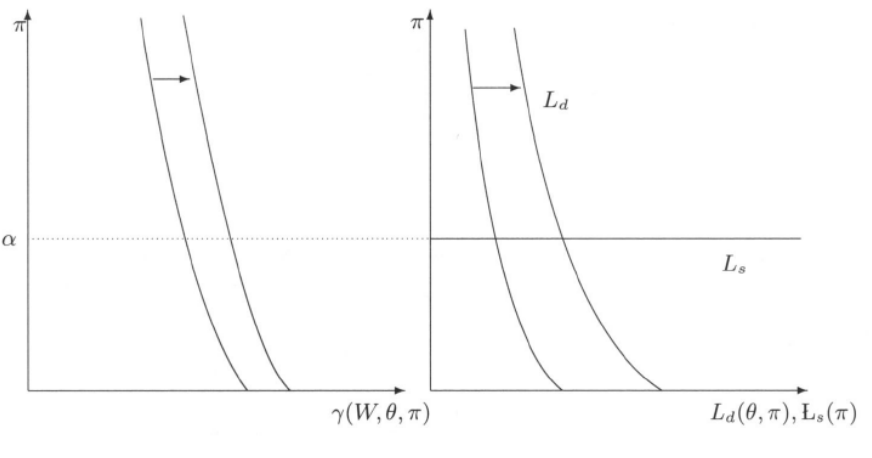
$$\gamma(W, \pi; \theta) = \begin{cases} 0 & \text{if } W < W_L(\pi, \theta) \\ \gamma^H(W, \theta, \pi) & \text{if } W_L(\pi, \theta) < W < W^F(\pi) \\ \gamma^F(\pi) & \text{if } W > W^F(\pi) \end{cases}$$

Market Equilibrium

DEFINITION 3: An incentive-constrained Walrasian allocation is a credit allocation in which each borrower receives his incentive-constrained demand corresponding to a profit rate π^* that has the property that the supply of loans at π^* equals incentive-constrained demand at π^* aggregating across all borrowers.

Effect of Increase in θ with no GE Effects

- Consider a perfectly elastic supply of loans.
- When θ increases, incentive constraints are relaxed, which permits expansion of credit ceilings for all borrowers.
- The proportion of firms excluded from the market falls, since the minimum project size does not change with θ.
- Borrowers who were previously credit-constrained obtain larger credit and thus attain higher payoffs. Lenders and borrowers who were not credit constrained are unaffected.
- The result is a Pareto improvement, with favourable distributional impact.


π
α
γ(W, θ, π)
π
L_d
L_s
$L_d(\theta, \pi), L_s(\pi)$

Effect of Increase in θ with GE Effects

Nearly Perfect Elasticity of Credit Supply (sufficiently weak GE effects):

Proposition 2.2: Consider an increase in θ from θ to $\overline{\theta} > \theta$. Suppose elasticity of the credit supply function at any $\pi > \alpha$ is finite but bounded below by some $\underline{\epsilon}$. If $\underline{\epsilon}$ is sufficiently large, there are three scenarios:

- The proportion of firms excluded from the market falls (i.e., the minimum asset threshold W_L falls).
- The first-best project scale (and hence credit allocated to sufficiently wealthy borrowers) falls.
- For borrowers with intermediate asset sizes, the credit allocated rises.

Effect of Increase in θ with GE Effects...

- The equilibrium rate of profit rises as the demand curve shifts out as a result of the increase in θ. However, this increase in the equilibrium profit rate can be made arbitrarily small if $\underline{\epsilon}$ is sufficiently large.
- Sufficiently small rise in the profit rate implies that the project ceiling γ^H for all borrowers due to the rise in θ, while rise in the minimum viable project scale γ^L will be small.
- Hence the expansion of the credit ceiling (for borrowers near the minimum asset threshold W_L) outweighs the increase in the minimum viable project scale, thus reducing exclusion and increasing the credit ceiling for all active borrowers.
- First-best project size declines due to the rise in the equilibrium profit rate.

Effect of Increase in θ with GE Effects...

Distributive Impacts:

Though the results appear to be similar to the case where GE effects are completely absent, increase in θ no longer leads to a Pareto improvement. There is a distributional shift in favour of poorer borrowers and away from wealthy borrowers. Poorer borrowers who now gain access to credit are better off while the wealthiest borrowers are worse off due to a fall in the first-best project size. The effect on intermediate-sized borrowers is ambiguous: while they experience a rise in credit ceilings, they now have to pay higher interest on their loans.

Effect of Increase in θ with GE Effects...

Perfectly inelastic credit supply

Assumptions:

- $\nu = 0$. The results hold for positive but sufficiently small values of ν.
- The upper bound of the wealth distribution is low enough that no borrower attains the first-best project scale.

The project ceiling for a borrower with wealth W is:

$$\gamma^H(W, \theta, \pi) = \frac{\theta W + d}{I(1 + \pi)} \quad (12)$$

Suppose θ rises to θ' and the corresponding equilibrium profit rate rises from π to π'. Define:

$$\Delta W = \gamma^H(W, \theta', \pi') - \gamma^H(W, \theta, \pi) \quad (13)$$

Observe: if $\Delta W \geq 0$ for some W, it must be the case that $\Delta W' > 0$ for all $W' > W$.

Effect of Increase in θ with GE Effects...

Proportion of borrowers that are excluded rises.

Suppose not. That is, W_L remains constant or falls.Since we know that γ^L has risen, the borrowers at the previous minimum threshold W_L must have experienced a rise in the project ceiling.$\Rightarrow$ All borrowers with wealth levels above W_L must have also experienced a rise. $\Rightarrow$ No borrower is wealthy enough to achieve first-best, so credit allocated to every active borrower has risen. However, this is not possible in equilibrium, Since the total supply of funds is fixed.

There must be a rise in the incidence of exclusion at the bottom end of the asset distribution and those borrowers must be worse-off. Aggregate supply of funds is fixed, so there must be wealthier borrowers who receive a larger supply of funds. $\Rightarrow \ni \hat{W}$ such that $\Delta\hat{W} = 0$. Credit expands for borrowers with Wealth level above $\hat{W}$

Rise in θ leads to regressive redistribution of wealth.

Effect of Increase in θ with GE Effects...

Interest rate is defined as the rate that the firm is obliged to pay as per contract in the successful state. That is,

$$T_s = \gamma I(1 + r) \tag{14}$$

From the lender's participation constraint and the borrowers' incentive compatibility constraints, we get:

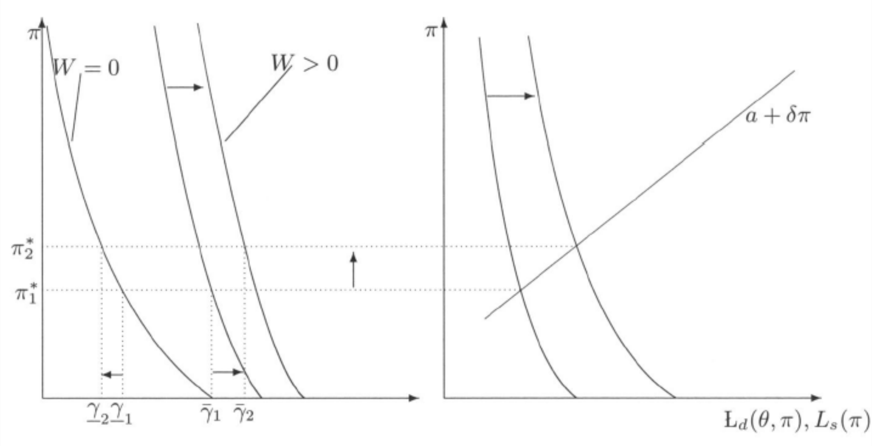
$$r = \pi + \theta \frac{\nu}{I} \frac{f(\gamma)}{\gamma} (y_s - \bar{y}) \tag{15}$$

Interest rates vary across borrowers with the average returns from the project $f(\gamma)/\gamma$.
When $\nu = 0$, the interest rate does not vary across firms or with the state of the world.

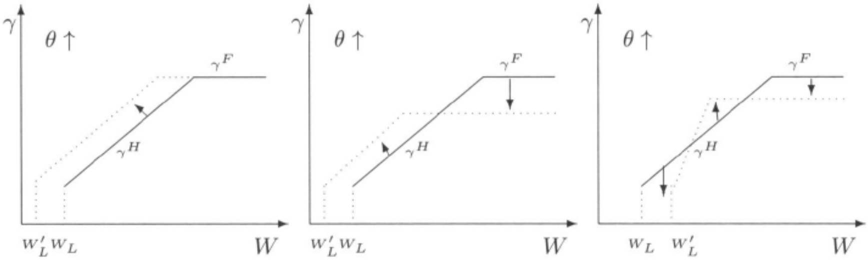
Effect of Increase in θ with GE Effects...

PROPOSITION 2.3: Suppose the upperbound of the wealth distribution $\underline{\Omega}$ is lower than $W(\pi(1))$, so all firms are credit constrained. In addition, suppose that $\nu = 0$ and supply is perfectly inelastic. If θ increases, the profit rate, the interest rate and the proportion of borrowers excluded rises. Moreover, there exists threshold asset size $\hat{W}$ such that the following holds:
(a) If $W < \hat{W}$, credit falls and the borrower is worse off.
(b) If $W > \hat{W}$ credit size rises.
Results (a) and (b) also obtain when ν is positive but small enough, the supply curve is upward sloping , and the production function is such that no borrower is excluded from the market.

Effect of Increase in θ with GE Effects...



Effect of Increase in θ with GE Effects...



A: No GE-effect B: Weak GE effect C: Strong GE effect

Effect of Increase in θ with GE Effects...

- Panel A: No GE effects.The stronger credit enforcement shifts the π-incentive compatible demand out for all borrowers who at their credit ceiling. Exclusion is reduced. Large borrowers are unaffected because interest rates do not change. The new equilibrium is a Pareto improvement.
- Panel B: Weak GE effects. The credit ceiling is shifted and exclusion is reduced. All credit-constrained borrowers receive more credit. For them, the effect of the rise in interest rates is outweighed by the increase in credit access. Wealthiest borrowers are worse off because of a rise in the interest rates and a fall in the first best project size. There is progressive redistribution of wealth.

Effect of Increase in θ with GE Effects...

- Panel C: Strong GE effects.The rise in interest rates is large enough to increase the incidence of exclusion at the bottom of the wealth distribution. Poorer credit constrained firms experience a fall in credit ceilings, making them worse off. Credit access increases for comparatively wealthier credit-constrained borrowers.

The relevance of a particular case in any situation depends on two factors: the strength of the GE effects and the distribution of assets or collateral in the population of firms.

The Empirical Context: Indian Debt Recovery Tribunals

The model's predictions are tested by examining the effects of an Indian judicial reform that strengthened the enforcement of credit contracts.

- In the wake of the financial sector reforms of the early 1990's, the central bank established new rules requiring banks to reduce their non-performing loans.
- To aid the banks in this process, in 1993 the government of India passed a national law establishing new specialized courts to process debt recovery cases. This law allowed the national government to establish new debt recovery tribunals (DRTs) across the country, where banks and financial institutions could file suits for claims larger than rupees 1 million.

The Empirical Context: Indian Debt Recovery Tribunals...

- Before the establishment of DRTs, all cases were tried in civil courts, which was associated with very long periods of delay.
- The establishment of DRTs reduced the processing times for the cases while all major legal procedures remain unchanged. Visaria (2009) presents empirical evidence that bolsters this claim.
- The introduction of a DRT in a state is interpreted as a uniform increase in the parameter θ for all borrowers in that state.

The Empirical Context: Indian Debt Recovery Tribunals...

- State governments were not given any formal authority to influence the process of establishment of DRTs. Five states received tribunals in 1994, immediately after the law was passed.
- This process was by a legal challenge to the law. DRT establishment resumed in 1996, when the Supreme Court ruled in favour of the DRT law. By 1999, most Indian states had received a DRT.
- The timing of DRT establishment seems to have been driven by reasons plausibly exogenous to firms' borrowing behavior across different states.

The Empirical Context: Indian Debt Recovery Tribunals...

To investigate the possibility that state-level factors also influenced the timing of establishment of DRTs, the authors run Cox hazard rate regressions of the time to DRT adoption, on state-level economic, judicial, and political variables. The results show that none of these state-level observables correlates with the timing of DRT adoption. However, there still might be state-level unobservable factors affecting firm outcomes that were correlated with DRT adoption. results. To alleviate this concern, we control for state-specific time trends, firm-size-specific time trends, and state-year targets set by the Reserve Bank of India for bank lending to small firms.

The Empirical Context: Indian Debt Recovery Tribunals...

TABLE II

SURVIVAL ANALYSIS OF DRT ADOPTION[a]

	(1)	(2)	(3)	(4)	(5)	(6)
Not Time Varying						
Bank credit (1990–1992 avg.)	−0.000			−0.000		
	(−0.604)			(−0.939)		
Firm assets (1990–1992 avg.)		−0.384			0.848	
		(−0.392)			(0.649)	
Firm profits (1990–1992 avg.)			−0.261			−0.403
			(−0.942)			(−0.612)
Time Varying						
Growth rate of state GDP				−0.009	−0.027	−0.022
				(−0.167)	(−0.512)	(−0.441)
Per capita credit				0.009	0.002	0.002
				(0.864)	(0.109)	(0.138)
SSI share in total bank credit				2.331	8.824	3.942
				(0.485)	(0.647)	(0.300)
Growth rate of SSI share of bank credit				−0.094	−6.407	−5.273
				(−0.103)	(−0.928)	(−0.851)
Pending high court cases per capita				−0.009	−0.054	−0.072
				(−0.077)	(−0.400)	(−0.544)
Sitting high court judges per capita				−7.621	2000.640	1539.482
				(−0.087)	(1.418)	(1.264)
Congress party & allies				0.048	−0.219	0.305
				(0.049)	(−0.212)	(0.231)
Janata party & allies				0.806	0.334	−0.079
				(0.650)	(0.274)	(−0.053)
Communist party & allies				0.860	1.251	1.153
				(0.701)	(1.042)	(0.971)
Regional parties				0.942	1.146	0.976
				(0.805)	(1.037)	(0.909)
Centre's ally				0.424	−0.530	−0.795
				(0.502)	(−0.479)	(−0.579)
Observations	80	56	56	76	56	56

[a] t statistics are given in parentheses. A Cox proportional hazards model is fitted to the time taken to establish a DRT in a state. As indicated, explanatory variables include the 1990–1992 averages of total bank credit, firm assets, and firm profits in this state, state GDP, its growth rate, per capita total bank credit, the share of small scale industries (SSI) in total bank credit, the growth rate of this share, per capita pending high court cases, number of high court judges per capita, dummies for political party in the state government, and a dummy for whether the political party in state government was allied with the party in the national government. In results not shown, each of these variables is also entered separately, without any significant effects. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Data

- The main dataset used is the Prowess data base constructed by the Centre for Monitoring the Indian Economy (CMIE).
- This contains firm-level information for all firms listed on India's major stock exchanges, as well as other smaller firms.
- There is detailed information from balance sheets and income statements, total outstanding credit from all sources, and total outstanding bank borrowing from all banks as well as detailed information about the firms' production, sales, and inputs used.
- State-owned enterprises that are not subject to commercial norms or incentives are excluded for the analysis.
- A dataset consisting of detailed loan records obtained from a large private bank is India and referred to as the private bank dataset is also used in some cases.

Empirical Specification

- Firms are assigned to DRT jurisdictions on the basis of their registered office addresses.
- The DRT variable is a categorical variable at the state-year level, which takes value 1 in years when the jurisdiction had a DRT in place.
- Focusing on the case with $\nu = 0$ leads to a linear expression for borrowing.
- The ”true” specification corresponds to $\nu > 0$ but close to zero. This generates a nonlinear borrowing regression that allows the interest rate to vary across firms, but not by a substantial amount. Both linear and nonlinear specifications are estimated.
- The key element of heterogeneity of firms is presumed to be the collateralizable earnings or wealth (W) of their owners, which is unobserved.
- All firms are assumed to be credit-constrained. The set of firms is assumed to consist of active but credit-constrained firms.

Borrowing and Capital Stock

- Assumption: capital is the sole factor of production,output $f(\gamma)$ or capital stock γ can be used interchangeably to represent firm size.
- In a static setting, capital stock is proportional to borrowing, γ can be used to represent either capital stock or firm borrowing.

In the case where $\nu = 0$, using equation we obtain the following linear equation for capital stock in terms of entrepreneurial wealth W:

$$\gamma = \alpha(\theta) + \beta(\theta)W \tag{16}$$

where $\alpha(\theta) = \frac{d}{l(1+\pi(\theta))}$ and $\beta(\theta) = \frac{\theta}{l(1+\pi(\theta))}$
$\pi(\theta)$ is non-decreasing. Hence $\alpha(\theta)$ is non-increasing. Moreover,$\beta(\theta)$ must be non-decreasing. If not, then when θ increased, credit demand would go down for all firms, which is inconsistent with an upward-sloping supply of credit.

Borrowing and Capital Stock...

Equation cannot be estimated directly, since W is unobserved.
W is proxied with the firm's assets measured in 1990, based on the follwing underlying assumptions:

- Entrepreneurs' wealth has not changed between 1990 and year $t > 1990$ or can be proxied by wealth in 1990.
- All states had the same pre-DRT θ, denoted by $\overline{\theta}$.
- Once a state gets a DRT, its θ changes to $\overline{\theta} + \mu$ where $\mu > 0$.

Borrowing and Capital Stock...

$$\overline{\gamma}_j = \alpha(\overline{\theta}) + \beta(\overline{\theta})W_j \tag{17}$$

Where $\overline{\gamma}_j$ is firm j's fixed assets in 1990.
If firm j is in a state that has not received DRT in year t, $\gamma_{jt} = \overline{\gamma}_j$
. If it is in a state that received a DRT in year t, then

$$\gamma_{jt} = \alpha(\overline{\theta} + \mu) + \beta(\overline{\theta} + \mu)W_j \tag{18}$$

Substituting for W_j, we have

$$\gamma_{jt} = \overline{\gamma}_j + \phi DRT_{jt} + \psi(DRT_{jt} * \overline{\gamma}_j) \tag{19}$$

where $\phi \equiv \alpha(\overline{\theta} + \mu) - \alpha(\overline{\theta})\frac{\beta(\overline{\theta}+\mu))}{\beta(\overline{\theta})} < 0$ and $\psi \equiv \frac{\beta(\overline{\theta}+\mu)-\beta(\overline{\theta})}{\beta(\overline{\theta})} > 0$

Assume a locally linear function for the average rate of return to the firm's assets. Let $g(\gamma) \equiv f(\gamma)/\gamma$ and $g(\gamma) = \zeta_0 + \zeta_1\gamma$.
Then interest rates can be expressed as:

$$r_{jt} = r_0 + \rho DRT_{jt} + [\overline{\theta} + \chi DRT_{jt}][g(\gamma_{jt})] \tag{20}$$

where $\rho, \chi > 0$.
Substituting for γ_{jt} from the previously derived expression for borrowing,

$$r_{jt} = \rho_0 + \rho_1\overline{\gamma_j} + \rho_2 DRT_{jt} + \rho_3(DRT_{jt})\overline{\gamma_j} \tag{21}$$

where $\rho_0 \equiv r_0 + \theta\zeta_0$ $\rho_1 \equiv \overline{\theta}\zeta_1$, $\rho_2 \equiv \rho + \chi\zeta_0 + \overline{\theta}\zeta_1\phi + \chi\zeta_1\phi$ and $\rho_3 \equiv \chi\zeta_1 + \overline{\theta}\zeta_1\psi + \chi\zeta_1\psi$

Interest Rates...

- If the firm is operating on the concave portion of the production function, $\zeta_0 > 0, \zeta_1 < 0 \Rightarrow \rho_1 < 0, \rho_2 > 0, \rho_3 < 0$
- The intercept effect of DRT is positive and the slope effect with respect to 1991 asset size is negative.
- Throughout our model we have assumed that ν is atmost a small positive number, hence interest rates should not vary much with firm size. Hence we would expect ρ_3 to be small.

Profits

The average profit of a firm with asset W is
$\Pi(W;\theta) = \bar{y}f(\gamma(\theta;W)) - I(1+\pi(\theta))\gamma(\theta;W)$, where
$\gamma(W;\theta) \equiv \gamma^H(W,\pi(\theta);\theta)$
Hence

$$\frac{\partial \Pi}{\partial \theta} = [\bar{y}f'(\gamma(\theta;W)) - I(1+\pi(\theta))]\frac{\partial \gamma(\theta;W)}{\partial \theta} - \gamma(\theta;W)\frac{\partial \pi(\theta)}{\partial \theta} \qquad (22)$$

For credit- constrained firms, $\bar{y}f'(\gamma(\theta;W)) > I(1+\pi(\theta))$.

Profits...

- For small firms whose borrowing decreases as θ rises, the effect of DRT on profits is unambiguously negative.
- The effect is ambiguous for firms whose credit ceiling expands as a result of DRT.
- The empirical specification for profits is similar to that of interest rates and borrowing, with separate slope and intercept effects. We would expect intercept effects to be negative while the direction of the slope effect is theoretically ambiguous.

Empirical Results: Preliminary controls

- State-specific trends: To ensure that the estimated DRT effect is not confounded by secular changes in borrowing at the state level that may have coincided with DRT establishment.
- Size-specific year dummies: To control for any year-to-year changes in the national economic environment that may have affected firms of different sizes differently.
- state-specific size trends: addresses the concern that states that were more favorable to big businesses adopted DRT sooner.

TABLE V

THE EFFECT OF DRT ON BORROWING, ASSETS, AND PROFITS: MAIN SPECIFICATION[a]

	Borr.				PlaMa				Profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DRT	11.07***	5.023**	−18.81***	−5.793***	8.269	11.08***	−26.93***	−26.75***	3.773***	4.451***	−7.389***	−6.818***
	(3.75)	(2.66)	(−5.38)	(−6.59)	(1.69)	(2.96)	(−8.71)	(−9.68)	(2.83)	(4.12)	(−4.17)	(−4.81)
DRT*Tang.Ass.			0.711***	0.223***			1.273***	1.125***			0.386***	0.350***
			(6.39)	(7.43)			(9.69)	(9.99)			(5.80)	(6.17)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YDumm*Size	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Statetrend	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Statetrendsize	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Number of firms	1406	1406	1406	1406	1683	1683	1683	1683	1683	1683	1683	1683
$\bar{W}$			26.45	25.95			21.15	23.77			19.14	19.50
R^2	0.00564	0.00840	0.236	0.331	0.0224	0.0252	0.442	0.489	0.0118	0.0174	0.274	0.353
N	9762	9762	9762	9762	16,605	16,605	16,605	16,605	16,605	16,605	16,605	16,605

[a] t statistics are given in parentheses. Standard errors are clustered at the state level. All regressions run on data from 1992–2003. All regressions include borrower fixed effects. The dependent variables are new long-term borrowing (Borr.), plants and machinery (PlaMa), and profits, respectively. DRT is an indicator variable that takes value 1 if a DRT was operating in the state of the firms' headquarters at the end of the fiscal year and 0 otherwise. DRT*Tang.Ass. is a multiplicative interaction of DRT with tangible assets defined in 1990. The first row for each variable reports the results of a regression which estimates the average impact of DRT and includes year dummies to control for year-specific nationwide shocks. The second row allows for a linear state-specific time trend by introducing a multiplicative interaction of state dummies with time. In the specification which uses DRT*Tang.Ass. as a variable of interest we add year dummies interacted with the size of 1990 tangible assets (YDumm*Size) to allow for year-specific distributional effects. In the fourth column, the plain Statetrend is added in conjunction with Statetrend interacted with 1990 tangible assets to control for state-specific time-varying distributional effects. The statistic $\bar{W}$ reports the implied value of 1990 tangible assets for which the level of the dependent variable would be the same with and without DRT. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Empirical Results: Linear specification

- The intercept effect of DRT on borrowing is negative and the slope coefficient is positive, as was expected from theory.
- Analogous results for plants and machinery and profit.
- Estimation of a threshold level of assets below which the effect of DRT is negative, for each specification, indicates that the positive effect of DRT was limited to the top 25% firms.

Further Robustness checks

TABLE VI

ROBUSTNESS WITH RESPECT TO SIZE-SPECIFIC TIME TRENDS, STATE-LEVEL LENDING, AND INDUSTRY SHOCKS[a]

	Borr.				PlaMa				Profits			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DRT	−17.61***	−17.79***	−15.14***	−17.63***	−26.62***	−27.15***	−8.688***	−25.24***	−7.418***	−7.394***	−1.866	−7.715***
	(−5.01)	(−4.98)	(−3.76)	(−3.90)	(−9.22)	(−9.30)	(−3.23)	(−6.54)	(−4.02)	(−3.98)	(−1.26)	(−4.37)
DRT*Tang.Ass.	0.647***	0.647***	0.582***	0.626***	1.129***	1.129***	0.582***	1.090***	0.367***	0.367***	0.237***	0.362***
	(4.64)	(4.59)	(5.55)	(4.11)	(7.60)	(7.51)	(10.89)	(8.87)	(4.81)	(4.79)	(4.49)	(6.57)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YDum*Size	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
YDum*SizeClass	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
YDum*SizeCl.*Size	No	Yes	No	No	No	Yes	No	No	No	Yes	No	No
State-loglend	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No
Y*NIC2	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Number of firms	1406	1406	1382	1406	1683	1683	1679	1683	1683	1683	1679	1683
$\tilde{W}$	27.19	27.47	26.04	28.18	23.58	24.05	14.93	23.16	20.22	20.13	7.886	21.30
R^2	0.267	0.267	0.229	0.391	0.469	0.470	0.468	0.518	0.288	0.288	0.234	0.399
N	9762	9762	8900	9762	16,605	16,605	15,344	16,605	16,605	16,605	15,344	16,605

[a] t statistics are given in parentheses. Standard errors are clustered at the state level. All regressions use borrower fixed effects. All regressions run on data from 1992–2003. The dependent variables are new long-term borrowing (Borr.), plants and machinery (PlaMa), and profits, respectively. DRT is an indicator function which is 1 if a DRT was operating in the state of the firms' headquarters at the end of the fiscal year and 0 otherwise. Column 2 uses a linear specification with the interaction of DRT with tangible assets (as of 1990). This table retuns our main specification in Table V with the following additional controls: YDum*SizeClass interacts year dummies with size class dummies and we use deciles of 1990 tangible assets as our classes and have 10 size classes; YDum*SizeClass creates a dummy variable which is 1 for a specific year and a specific size class, and 0 otherwise. With YDum*SizeCl.*Size, each size class is allowed to have a linear slope effect and the respective dummy variable is multiplied with 1990 tangible assets. This means that the set of dummy variables YDum*SizeCl. is multiplied with 1990 tangible assets. Regressions that have State-loglend includes 12 variables that vary by state year, and measure the level of credit (in logs) given to agriculture, artisan and village industry, small scale industry, and total credit given by the State Bank of India, nationalized banks, and all scheduled commercial banks. Y*NIC2 stands for an interaction of year dummies with industry dummies and we use two-digit NIC code industries. The statistic $\tilde{W}$ reports the implied value of 1990 tangible assets such that the value of the dependent variable would be the same with and without DRT. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Was Small Firms' credit Shrinking Even Before DRTs?

- The main results are robust to controls like size-specific time-varying patterns and state-level controls for credit policy preferences toward small firms.
- Though this is strong evidence of negative distributive impacts of DRTs, to establish causation, we have to negate the claim that these negative distributive effects occurred before DRTs were introduced.
- To check this, the states are divided into two categories: Early (received DRT before 1995) and late (after 1995).
- Using data from 1988-1993, we check for difference in time trends in the key variables across these two categories of states.
- We have a problem if early states were more likely to have a negative distributive impact before DRT establishment.

Two specifications are estimated:

$$\gamma_{jt} = \overline{\gamma}_j + T_t + \beta_1(early_j.t) + \beta_2(W.T_t) + \beta_3(early_j.W.t) + \epsilon_{jt} \tag{23}$$

where $early_j$ is a dummy variable that takes value 1 for states that received a DRT before 1995, T_t denotes a set of time dummies, and t is time.

$$\gamma_{jt} = \overline{\gamma}_j + T_t + \beta_1(DRTyears_j.t) + \beta_2(W.T_t) + \beta_3(DRTyears_j.W.t) \tag{24}$$

In this specification we have replaced the early adoption dummy with the number of years the state had a DRT in the years 1993-2003. We find that early states were infact less likely to have a negative trend in borrowing for small firms. This strengthens our results.

TABLE VII

PRETRENDS[a]

	Borr.				PlaMa			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Early*t	−1.534***	1.847***			0.307	0.332		
	(−3.07)	(5.19)			(0.39)	(0.64)		
Early*t*Tang.Ass.		−0.0491***				−0.00835		
		(−5.02)				(−0.24)		
Drtyears*t			−0.244**	0.371***			−0.0811	0.122
			(−2.59)	(5.10)			(−0.57)	(1.26)
Drtyears*t*Tang.Ass.				−0.00937***				−0.00168
				(−4.13)				(−0.25)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YDum*Size	No	Yes	No	Yes	No	Yes	No	Yes
Number of firms	552	552	552	552	1741	1741	1741	1741
R^2	0.0343	0.726	0.0329	0.726	0.0657	0.728	0.0658	0.728
N	1276	1276	1276	1276	8221	8221	8221	8221

[a] t statistics are given in parentheses. Standard errors are at the state level. All regressions use borrower fixed effects. The unit of observation is a firm year. Dependent variables are new long-term borrowing (Borr.) and plants and machinery (PlaMa). These regressions run on data from 1988–1993. The first row reports the time trend in new long-term borrowing (Borr.) for our sample of firms and the interaction of the time trend with the variable early. Early = 1 if the DRT was introduced in the first wave of DRT (before 1995) and Early = 0 otherwise. The second row estimates the changing distribution of credit over time by estimating a time trend for a linear estimation of a time trend interacted with firm size measured in 1990 tangible assets. Then an interaction of the time trend with the early variable is added. DRT years counts the number of years the firm had a DRT in the sample period 1992–2003. For example, row 3 reports the estimates of a time trend and then interacts the time trend with DRT years. The fourth row reports the differential distributional trend for firms with different numbers of DRT years. ** $p < 0.05$; *** $p < 0.01$.

TABLE VIII

PRETRENDS[a]

	Profits				Intrate			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Early*t	−0.125	−0.0799			−0.0243	−0.00860		
	(−0.75)	(−1.39)			(−0.21)	(−0.08)		
Early*t*Tang.Ass.		−0.00249				−0.000483		
		(−1.42)				(−0.46)		
Drtyears*t			−0.0656**	−0.0173			0.00893	0.0122
			(−2.82)	(−1.60)			(0.42)	(0.60)
Drtyears*t*Tang.Ass.				−0.000647*				−0.000144
				(−2.07)				(−0.69)
YearDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YDum*Size	No	Yes	No	Yes	No	Yes	No	Yes
Number of firms	1741	1741	1741	1741	1724	1724	1724	1724
R^2	0.0572	0.484	0.0581	0.484	0.0202	0.0208	0.0202	0.0208
N	8221	8221	8221	8221	8083	8083	8083	8083

[a] t statistics are given in parentheses. Standard errors are at the state level. All regressions use borrower fixed effects. The unit of observation is a firm year. Dependent variables are profits and the interest rate (Intrate). These regressions run on data from 1988–1993. The first row reports the time trend in profits for our sample of firms and the interaction of the time trend with the variable early. Early = 1 if the DRT was introduced in the first wave of DRTs (before 1994) and Early = 0 otherwise. The second row estimates the changing distribution of profits over time by estimating a time trend for a linear estimation of a time trend interacted with firm size measured in 1990 tangible assets. Then an interaction of the time trend with the early variable is added. DRT years counts the number of years the firm had a DRT in the sample period 1992–2003. For example, row 3 reports the estimates of a time trend and then interacts the time trend with DRT years. The fourth row reports the differential distributional trend for firms with different numbers of DRT years. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Average Effects for Different Quartiles

We estimate the following specification:

$$\gamma_{jt} = \sum_{k=1}^{4} Q_{jk}\{\overline{\gamma}_j + DRT_{jt} + T_t + t.S\} \tag{25}$$

Where Q_{jk} is a dummy variable that takes value 1 for all firms that fall in quartile k of the size distribution, T, is a set of time dummies, and $t.S$ are state dummies interacted with a linear time trend.

TABLE IX

AVERAGE EFFECTS BY QUARTILE[a]

	Borr. (1)	PlaMa (2)	Profits (3)
DRT	−1.533*	−2.247*	−0.224
	(−1.95)	(−1.96)	(−0.77)
DRT*quart = 2	2.932***	1.020	0.354
	(3.72)	(0.76)	(0.90)
DRT*quart = 3	−0.167	1.052	1.287
	(−0.15)	(0.63)	(1.55)
DRT*quart = 4	20.06***	43.78***	14.73***
	(3.98)	(3.62)	(4.33)
YearDummy	Yes	Yes	Yes
YearDum*SizeClass	Yes	Yes	Yes
Statetrend*SizeClass	Yes	Yes	Yes
DRT effect on quart. 1	−1.533*	−2.247*	−0.224
p-value quart. 1 effect	(0.0647)	(0.0624)	(0.448)
DRT effect on quart. 2	1.399***	−1.227**	0.129
p-value quart. 2 effect	(0.00958)	(0.0389)	(0.645)
DRT effect on quart. 3	−1.700**	−1.195	1.062
p-value quart. 3 effect	(0.0437)	(0.218)	(0.161)
DRT effect on quart. 4	18.53***	41.54***	14.50***
p-value quart. 4 effect	(0.00175)	(0.00207)	(0.000315)
Number of firms	1406	1683	1683
R^2	0.0189	0.0633	0.0491
N	9762	16,605	16,605

[a] t statistics are given in parentheses. Standard errors are clustered at the state level. All regressions use borrower fixed effects. All regressions run on data from 1992–2003. The dependent variables are new long-term borrowing (Borr.), plants and machinery (PlaMa), and profits, respectively. DRT is an indicator value that takes value 1 if a DRT was operating in the state of the firms' headquarter at the end of the fiscal year and zero otherwise. DRT*quart = j is the additional effect of DRT over and above the baseline effect for first quartile firms captured by the variable DRT. "DRT effect on quart j" is the overall effect of DRTs for a firm of quartile j. "p-value quart. j effect" is the p-value from an F test with the null hypothesis that this effect is zero. All regressions are run with quartile specific time-varying time trends (an interaction of the quartile dummies and the linear time-varying state trend). * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Effects on Interest Rates

- As in the case of borrowing before, the effect of DRT on interest rates is estimated using the Prowess data set.
- The intercept effect is positive and significant while slope effect is insignificant, as expected.
- Imprecisely estimated coefficients, since the dataset includes old loans.
- Data on new loans from a particular private bank is used to carry out the same exercise. Results are similar.

TABLE X

EFFECTS ON THE INTEREST RATE USING PROWESS DATA[a]

	(1)	(2)	(3)
DRT	0.989**	0.990**	2.326
	(2.53)	(2.72)	(1.70)
DRT*Tang.Ass.		−0.00112	
		(−0.39)	
DRT*quart = 2			−2.704
			(−1.43)
DRT*quart = 3			−1.530
			(−1.09)
DRT*quart = 4			−0.544
			(−0.33)
YearDummy	Yes	Yes	Yes
YearDum*SizeClass	No	No	Yes
Statetrend*SizeClass	No	No	Yes
YDumm*Size	No	Yes	No
Statetrend	Yes	Yes	No
Statetrendsize	No	Yes	No
DRT effect on quart. 1			2.326
p-value quart. 1 effect			(0.103)
DRT effect on quart. 2			−0.378
p-value quart. 2 effect			(0.656)
DRT effect on quart. 3			0.796
p-value quart. 3 effect			(0.264)
DRT effect on quart. 4			1.782**
p-value quart. 4 effect			(0.0565)
Number of firms	1671	1671	1671
$\bar{W}$		882.8	
R^2	0.00982	0.0129	0.0210
N	16,049	16,049	16,049

[a] *t* statistics are given in parentheses. Standard errors are clustered at the state level. All regressions use borrower fixed effects. All regressions run on data from 1992–2003. The dependent variable intpay is the interest rate in percent terms. Tables V and IX describe the setup in detail. DRT takes value 1 if the firm is subject to DRTs and 0 otherwise. The first two regressions estimate the average impact of DRT on the interest rate and year dummies control for year-specific shocks. Column 2 uses a linear specification and includes controls for nationwide year-specific distributive effects (year dummies and YDumm*Size). The last two columns report the results of a quartile regression. DRT*quart − *j* is the additional effect of DRT over and above the baseline effect for first quartile firms captured by the variable DRT. "DRT effect on quart. *j*" is the overall effect of DRTs for a firm of class *j*." *p*-value quart. *j* effect" is the *p*-value from an *F* test with the null hypothesis that this effect is zero. All regressions are run with the appropriate [illegible]

TABLE XI

EFFECTS ON THE INTEREST RATE OF NEWLY ISSUED LOANS USING BANK DATA: STARTING IN 1992 USING 8 YEAR LOANS OR LONGER[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DRT	1.845**	1.930**	2.330***	2.331***	2.487**	2.387*	3.000*	3.359**
	(2.33)	(2.47)	(3.07)	(2.97)	(2.31)	(2.02)	(1.88)	(2.17)
Loan size		0.00460		0.00348		−0.00103		−0.00214
		(0.71)		(0.50)		(−0.19)		(−0.34)
Loan duration		−0.000829*		−0.000819		−0.000898*		−0.000972
		(−1.75)		(−1.46)		(−1.93)		(−1.73)
DRT*Assets			−0.0000453	0.000831			0.00107	−0.00480
			(−0.01)	(0.18)			(0.10)	(−0.41)
QuartDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
QDum*Size	No	No	Yes	Yes	No	No	Yes	Yes
State Trend	No	No	No	No	Yes	No	Yes	Yes
State Trend*Size	No	No	No	No	No	No	Yes	Yes
Number of firms	832	832	670	670	832	832	670	670
R^2	0.126	0.137	0.190	0.198	0.172	0.183	0.291	0.301
N	1557	1557	1344	1344	1557	1557	1344	1344

[a] t statistics are given in parentheses. Standard errors are clustered at the state level. All regressions use borrower fixed effects. The dependent variable intpay is the interest rate on newly issued project loans given out by the private bank. The variable DRT takes value 1 if the state is subject to DRT in the year and 0 otherwise. We observe loans given out in each quarter and control for time effects using quarter dummies. Further, we interact quarter dummies with fixed assets measured in the last available quarter before 1991 and measured in the earliest available quarter if there is no information prior to 1991. In addition, we allow for time-varying state trends, and time-varying size-specific state trends. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Evidence for Low Elasticity of Credit Supply

- Because of adjustment costs related to expanding lending, bank lending responses to DRT would be expected to occur gradually.
- This is borne out in the Prowess data as well as data from RBI on bank lending. But the results from the bank data are imprecisely estimated, since data corresponds to total outstanding credit and not new credit.
- Data from the central bank on bank branch location showed that the number of bank branches declined in both rural and urban areas, with the total amount of credit in cities rose.

TABLE XII

EFFECT OF DRT ON CREDIT: BANK VERSUS FIRMS[a]

	Prowess Data: New Long Term Borrowing				RBI Bank Data: Bank Lending			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DRT	5.023**	−2.065			3179.5	382.2		
	(2.66)	(−0.81)			(0.85)	(1.09)		
DRT year = 1			2.187	−0.652			1832.3	453.7
			(0.95)	(−0.27)			(0.92)	(1.67)
DRT year = 2			6.687***	0.687			2106.0	230.2
			(4.27)	(0.30)			(0.73)	(0.64)
DRT year ≥ 3			16.38***	8.235***			4124.1	1902.0*
			(4.89)	(3.12)			(0.68)	(1.85)
TimeDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statetrend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Priority sector lending	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.00840	0.00837	0.00875	0.00845	0.911	0.974	0.911	0.974
N	9762	8900	9762	8900	1536	1344	1536	1344

[a]Standard errors are clustered at the state level. t statistics are given in parentheses. All regressions run on data from 1992–2003. Columns 1–4 report regressions on Prowess firm-level data and columns 5–8 report regressions on RBI data. Columns 1–4 include firm fixed effects and year fixed effects; columns 5–8 include state fixed effects and quarter fixed effects. The dependent variables are new long-term borrowing (Borr.) for the Prowess data base and statewise total outstanding bank credit for the RBI data. For the Prowess data, DRT is an indicator variable that takes value 1 if a DRT was operating in the state of the firms' headquarters at the end of the fiscal year and 0 otherwise. For the RBI data, DRT take value 1 if the state had a DRT in the previous quarter and 0 otherwise. "DRT year = t" is a dummy that equals 1 if DRTs were introduced t years ago. The dummy DRT year ≥ 3 equals 1 if DRTs were introduced 3 or more years ago. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

TABLE XIII

EFFECT OF DRT ON BRANCHES AND LENDING[a]

	Citybranch		Countrybranch		Citycredit		Countrycredit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DRT	−7.586		−9.536		490.7		13.30	
	(−1.02)		(−1.70)		(1.11)		(0.19)	
DRT year = 1		−9.222***		−0.884		608.5*		20.26
		(−2.84)		(−0.27)		(1.84)		(0.60)
DRT year = 2		−7.230		−12.63*		331.0		−41.50
		(−0.81)		(−1.90)		(0.65)		(−0.59)
DRT year ≥ 3		−8.476		−32.21**		2709.6*		−43.32
		(−0.56)		(−2.22)		(1.96)		(−0.37)
TimeDummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Statetrend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Priority sector lending	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.973	0.973	0.762	0.778	0.971	0.972	0.980	0.980
N	992	992	1344	1344	992	992	1344	1344

[a]Standard errors are clustered at the state level. t statistics are given in parentheses. All regressions run on data from 1992–2003. The dependent variable are the number of city branches (branches located in metropolitan and urban areas) and country branches (branches located in semi-urban and rural areas) as well as total bank credit reported by city and country branches. All regressions include quarter fixed effects and state fixed effects. DRT is an indicator variable that takes value 1 if a state had a DRT in the previous time-period and is 0 otherwise. "DRT year = t" is a dummy that equals 1 if DRTs were introduced t years ago. The dummy "DRT year ≥ 3" equals 1 if DRTs were introduced 3 or more years ago. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Effect of DRT on profits of banks

We run the following regression:

$$\Pi_{it} = \beta_0 + \beta_1 \sum_{j=1}^{J} (DRT_{jt}.\text{presence of bank i in state j}) + \beta_2 X_{it} + \epsilon_{it} \quad (26)$$

where bank i's presence in state j is calculated using data on the number of city branches of each bank in each state in 1992, obtained from the Reserve Bank of India.

TABLE XIV

EFFECT OF DRT ON BANK PROFITS[a]

	Net Profit (RBI Data)			Profits PBDPTA (Prowess Data)		
DRT exposure	9371.9***	14,837.5***	27,987.3***	1.832**	2.015***	3.702***
	(3.55)	(6.31)	(5.29)	(2.55)	(4.06)	(4.48)
Banks	All	Small	Large	All	Small	Large
Observations	924	492	492	859	443	443

[a]Standard errors are clustered at the bank level. All regressions include year fixed effects. All regressions run on data from 1992–2003. The dependent variable is bank profits. Columns 1, 2, and 3 report regressions on bank net profit as reported by the Reserve Bank of India. The last three columns report regressions on the profit data from the Prowess data base. Prowess reports profits gross of depreciation, provisions for bad loans, taxes, and amortization. DRT exposure is the sum of all active branches that were opened in or before 1992 and are located in cities (metropolitan or urban areas) that are subject to DRT in that year. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Dynamics of Interest Rates and Distributive Effects

- Since increased interest rates is the main channel for general equilibrium effects in our model, it is necessary to look at the persistence of interest rate effects in order to make any claims about the permanence of redistributive effects.
- The Prowess dataset as well as the private bank dataset are used to look at interest rates one, two and three years after DRTs were established.
- Regressions are run to check for the persistence of the distributive effects on borrowing of firms of varying size. Results show that distributive effects are more pronounced three years following DRT.

TABLE XV

DYNAMIC INTEREST RATE EFFECTS[a]

	Prowess Data		Private Bank	
	(1)	(2)	(3)	(4)
DRT year = 1	0.760*	1.181	2.574**	3.871***
	(1.88)	(1.39)	(2.45)	(2.95)
DRT year = 2	0.00474	0.0246	1.252	3.503***
	(0.01)	(0.03)	(0.89)	(3.10)
DRT year ≥ 3	1.028	1.273	4.643**	6.063**
	(1.18)	(1.09)	(2.30)	(2.82)
Loan size			−0.000633	0.00291
			(−0.10)	(0.52)
Loan duration			−0.000998**	−0.000851**
			(−2.23)	(−2.14)
TimeDummy	Yes	Yes	Yes	Yes
Statetrend	Yes	Yes	Yes	Yes
Priority sector lending	No	Yes	No	Yes
R^2	0.00982	0.00721	0.188	0.238
N	16,049	14,875	1557	1490

[a]Standard errors are clustered at the state level. t statistics are given in parentheses. All regressions are run on data from 1992–2003. In columns 1 and 2, the dependent variable is the interest rates reported by firms in the Prowess data set and the data are at the firm-year level, and in columns 3 and 4, it is the interest rates on loans given by the private bank and the data are at the firm-quarter level. All regressions include firm fixed effects; also included are year fixed effects in columns 1 and 2, and quarter fixed effects in columns 3 and 4. DRT is an indicator variable that takes value 1 if a state had a DRT in the previous time period, and is 0 otherwise. "DRT year = t" is a dummy that equals 1 if DRTs were introduced t years ago. The dummy "DRT year ≥ 3" equals 1 if DRTs were introduced 3 or more years ago. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

TABLE XVI

DIFFERENTIAL EFFECT OF DRT ON FIRMS OF DIFFERENT ASSET QUARTILE[a]

	Quartile 1		Quartile 4	
	(1)	(2)	(3)	(4)
DRT	−1.533*		18.53***	
	(−1.94)		(3.58)	
DRT year = 1		0.0189		9.317
		(0.03)		(1.50)
DRT year = 2		−0.876		22.71***
		(−1.03)		(4.51)
DRT year ≥ 3		−1.125**		47.06***
		(−2.55)		(4.92)
YearDummy	Yes	Yes	Yes	Yes
Statetrend	Yes	Yes	Yes	Yes
Quartile	1	1	4	4
Number of firms	265	265	421	421
R^2	0.336	0.336	0.0186	0.0195
N	1445	1445	3451	3451

[a]Standard errors are clustered at the state level. t statistics are given in parentheses. All regressions are run on data from 1992–2003. The dependent variable is new long-term borrowing (Borr.). Columns 1 and 2 report regressions where the sample is restricted to firms in the first quartile of 1990 tangible assets, and columns 3 and 4 report regressions where the sample is restricted to firms in the fourth quartile. All regressions include firm fixed effects, year fixed effects, and state trends. DRT is an indicator variable that takes value 1 if a DRT was operating in the state of the firms' headquarters at the end of the fiscal year and 0 otherwise. DRT is an indicator variable that takes value 1 if a state had a DRT in the previous time period, and is 0 otherwise. "DRT year = 1" is a dummy which equals 1 if DRT was introduced last year, "DRT year = 2" takes value 1 if DRT was introduced 2 years ago, and "DRT year ≥ 3" takes value 1 if DRT was introduced three or more years ago. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Conclusion

- Strengthening enforcement of credit contracts may lead to adverse distributive impacts through general equilibrium effects on the price of credit.
- In India introduction of debt recovery tribunals led to diversion of credit away from small firms.
- Profit of banks increased.
- The general equilibrium effects on interest rates and thus the resultant inequality in access to credit appears to persist over time.