Does the Quality of the Judiciary Shape Economic Activity? Evidence from a judicial reform in India.*

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Abstract

This paper examines the consequences of slow judiciaries on firms' behavior in India. After deriving testable implications from a game theoretical model, I use the Code of Civil Procedure Amendment Act, 2002, a judicial reform with the explicit objective of facilitating speedy disposal of civil suits, as a source of variation of the speed of the judiciary. The spatial variation in the implementation of this reform allows me to isolate the causal impact of the judiciary on economic activity with a difference-in-differences analysis. I find that this reform decreases the number of pending cases per judge. I then examine how this reform affects the performance of 520,000 small non-agricultural informal firms from National Sample Survey's 2000 and 2002 rounds. I find that this reform implies less breaches of contract, encourages firms to undertake investments, facilitates firms' access to formal financial institutions, and modifies the ownership patterns of production goods. The positive implications of this reform are large - one extra amendment improving the procedures, out of 38 such amendments in the 2002 Amendment Act, increases the speed of the judiciary and results in a 1.7% improvement in firm performance.

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This paper investigates whether and how the judicial system affects economic activity. I use a major judicial reform implemented in 2002 in India as a source of variation in the quality of the judiciary. I will argue that the spatial variation in the implementation of this reform is largely exogenous. This allows me to isolate the causal impact of the judiciary on economic activity.

Economists used to think wealth came from a combination of physical capital, human capital, and technological resources. Obviously, poor countries grew into rich countries by investing money in physical resources and by improving human and technological resources with education and technology transfer programs. A clear implication of this simple model is that poor countries should have been catching up with rich ones for the last century or so—and that the farther behind they are, the faster the catch-up should be. This expectation is however not confirmed by the experience of many countries. Institutions are elements in that missing piece of the puzzle. It is clearly understood today from the contributions by North (1990) that institutions defined as the organization of society are a major determinant of economic performance. "Property rights" institutions protect citizens from various forms of expropriation by elites and "contracting institutions" determine the terms and ease of contracting between citizens.

A number of recent papers suggest that institutions may exert a fundamental impact on firms' contracting behavior and hence on aggregate economic performance. Knack and Keefer (1995) relate professional country risk measures provided by business experts to their measure of judicial quality which is the amount of contract-intensive money (the difference between M2 and cash). The intuition is that in a country with a better judiciary, we should see more complicated contracts involving this type of money. However, there is a problem of endogeneity: richer countries can afford better institutions. Three papers deal with the endogeneity of institutions using an instrumental variables approach. Mauro (1995) instruments corruption with ethno-linguistic fragmentation. Hall and Jones (1999) use distance from the equator as an instrument for social infrastructure because, they argue, latitude is correlated with "western influence", which leads to good institutions. Finally, Acemoglu et al (2001) use differences in the mortality rates

of European colonialists to estimate the effect of institutions on economic performance. The intuition is that in places where Europeans faced high mortality rates, they could not settle and were more likely to set up extractive institutions. These institutions have persisted to the present. They find that the risk of expropriation, instrumented by settlers' mortality, negatively affects economic growth today in a cross section of countries. More recently, Djankov et al (2003) gathered a remarkably detailed dataset on court performance and procedural formalism in a cross section of 109 countries to show that higher procedural formalism determined by legal origin is associated with a less efficient judiciary.

To date, literature on the links between institutions, contract enforcement and economic performance has been largely macroeconomic. In contrast, I will try to move this literature in a more microeconomic direction. To open the black box of "institutions", I focus in this paper on the judiciary, in particular its speed, which has been identified in India as one of its key problem. The literature has often lacked a source of variation of a particular institution. The identification strategy of the effect of the judiciary on economic activity resides in the use of a major judicial reform implemented in 2002 in India. The slowness of the judiciary has been attributed by experts to the inadequacy of the Code of Civil Procedure (1908). The Code of Civil Procedure regulates the functioning of Civil courts. It is qualified by experts as ambiguous and antiquated. Several commissions were set up to suggest a major overhaul of this code. The Code of Civil Procedure Amendment Act, 2002, have brought in 88 changes with the explicit objective of facilitating speedy disposal of civil suits and proceedings. This Code of Civil Procedure Amendment Act, 2002, concerns the whole territory of India and does not allow me to measure the causal impact of the reform. However, some amendments included in the Code of Civil Procedure Amendment Act, 2002, were already in place in some states in India thanks to the possibility of each state to locally amend the Code of Civil Procedure. I argue that these amendments were enacted on average a long time ago and that they were responsive to past economic and political conditions. But the impact of the Code of Civil Procedure Amendment Act, 2002, will be attenuated in a

state that has already enacted some of its 88 amendments. In other words, the state amendments should have no impact on the evolution of the quality of the judiciary in the state in 2002 other than through their attenuation of the Code of Civil Procedure Amendment Act, 2002. This allows me to use a difference-in-differences strategy that compares judiciary's and firms' outcomes before and after the 2002 reform, in states that already passed many amendments included in the Code of Civil Procedure Amendment Act, 2002, as opposed to states that did not pass any. In particular, I examine how this reform affects contracting behavior and economic performance in a large representative repeated cross-section of small non-agricultural firms in India in 1999 and in 2002. This dataset is unique in the sense that an array of questions were asked to firm owners concerning breaches of contract, investment decisions, access to credit and ownership of production goods. This type of information is typically not available in firm-level datasets. Also, by working within a single country, I am able to control for a range of factors and influences that cannot be as convincingly controlled for in cross country data. In this sense, my paper is in the spirit of recent works exploiting policy differences across Indian states. Besley and Burgess (2004), for example, examine how differences in the industrial relations climate across Indian states affects manufacturing performance. However, in my case, I have disaggregated information on both contracting behavior and performance of small firms in India.

The structure of this paper is as follows. Section 1 explores the channels through which the quality of the judiciary impacts on firms' economic performance. I introduce explicitly the role of the judiciary in simple models of four prominent aspects in the life of a firm: breaches of contract, investment decisions, access to credit markets and ownership of production goods. Section 2 describes the 2002 Amendment Act and details the identification strategy of the paper. Section 3 provides background on the 55th and 57th rounds of the National Sample Survey of India on non-agricultural informal enterprises. Section 4 presents the empirical method. Section 5 shows the results pertaining to firms' behavior. Section 6 discusses the effects on firm performance. Section 7 concludes.

1 Theory

1.1 Breaches of Contract

The first intuitive consequence of an imperfect judiciary would be the modification of economic agents' willingness to cooperate in previously signed contracts. We know that the judiciary acts as an important deterrent to any fraud that might be more economically attractive in the short run. The probability of harsh punishment in monetary or non-monetary terms would heavily dissuade opportunistic agents to default ex-post on previous agreements.

Consider a trade relationship between two agents, a buyer and a seller. These two individuals play a typical Prisoner's Dilemma game with perfect information. A good is traded, of valuation v_s to the seller and v_b to the buyer. The two players have two possible strategies: C will denote cooperation (payment for the buyer, delivery for the seller) and D indicates a deviant behavior (non-payment after delivery for the buyer, non-delivery after payment for the seller). We also consider that agents are risk-neutral. In the event of a default, the agent can sue his partner and regain a fraction ϕ of the price p of the good[1]. This fraction ϕ is a measure of the speed of the judicial system and a value close to 1 indicates an efficient judiciary (see appendix A1 for proof). The payoffs for this game are therefore:

		Buyer	
		C (pays)	D (does not pay)
Seller	C (delivers)	$p - v_s, v_b - p$	$\phi p - v_s, v_b - \phi p$
	D (does not deliver)	$p - \phi p, \phi p - p$	$0, 0$

The only dominant strategy for the buyer in the short run is to deviate. Therefore, no trade is possible in the short run. However, trade is possible in an infinitely repeated game framework where players discount the future at rate δ where $0 < \delta < 1$. The homogeneous intertemporal discount factor δ determines agents' tastes concerning the future, their sensitivity to punishment by a court in the future and thus their propensity to cooperate in a repeated game framework. Suppose that players play according to a

Grim Trigger strategy which consists in playing C until the other player defaults and then in playing D as a punishment for the rest of the game. Let s be the seller, b the buyer; all indices s or b indicate that we refer to the seller or the buyer. The aim is to determine the set of prices providing incentives to cooperation.

The buyer gets $\sum_{i=0}^{t} \delta^i (v_b - p)$ if he cooperates until time t, $\frac{v_b - p}{1-\delta}$ if he cooperates for ever; and $\sum_{i=0}^{t} \delta^i (v_b - p) + (v_b - \phi p)\delta^{t+1} + 0 + ...$ if he cooperates until time t and then defaults at time $t+1$. I assume here that the buyer gets 0 after having defaulted. This is true if the calculated payoff concerns the payoff obtained from that particular match. However, after having breached a contract, a buyer could search for a new partner and start a new interaction. The results are very similar to the framework developed here.[2]

Comparing these two payoffs, we conclude that the buyer will cooperate, as opposed to deviate, at any time if and only if:

$$p < \frac{v_b \delta}{1 + \delta(1 - \phi)} \qquad \text{(IC buyer)}$$

This is the incentive constraint for the buyer to cooperate and is therefore named IC buyer. The intuition is that for the buyer to cooperate the price has to be inferior to a certain level. It is interesting to note that the price threshold depends positively on ϕ. This implies that if the judiciary worsens, then the the buyer will require a lower price in order to cooperate. The low quality of the judiciary forces the buyer to offer a lower price because of the higher risk of not recovering the payment if the contract is broken. This can be seen in Figure 1.

Similar reasoning for the seller gives us an incentive constraint IC seller:

$$p > \frac{v_s}{\phi + \delta(1 - \phi)} \qquad \text{(IC seller)}$$

The intuition is that for the seller to cooperate the price must be superior to a certain level. The price threshold depends positively on ϕ. This implies that if the judiciary worsens, then the seller will require a higher price in order to cooperate. Again, the seller claims a certain insurance amount because of the higher risk of not recovering the

goods if the contract is broken. This can be seen in Figure 2.

These two incentive constraints meet at a certain ϕ^* in Figure 3, this ϕ^* being a function of v_s and v_b and therefore called $\phi^*(v_s, v_b)$[3]. Under some conditions, this ϕ^* is between 0 and 1, as in Figure 3[4]. When two agents meet randomly, in the case depicted in Figure 3, there will be an area of cooperation, but only for some high values of ϕ. In Figure 3, we can see that for $\phi < \phi^*$, there is no possible cooperation. But for $\phi > \phi^*$, there exists a set of prices allowing trade to take place. The exact price will then be determined by the bargaining power of the two agents, its determination being outside the scope of this paper. The important result is that agents have an incentive to deviate for low values of the quality ϕ of the judiciary. It is easy to see that $\phi^*(v_s, v_b)$ is a positive function of v_s and a negative function of v_b. This means that if v_s increases or if v_b decreases (trade becoming less beneficial for the agents), then a higher threshold $\phi^*(v_s, v_b)$ is required to do business. In other words, the range of (v_s, v_b) for which trade takes place is greater if ϕ is higher. This leads us to Proposition 1:

Proposition 1 *Trade takes place only if $\phi > \phi^*(v_s, v_b)$. The range of (v_s, v_b) for which trade takes place is greater if ϕ is higher; conversely, more breaches of contract should be observed if ϕ decreases.*

However, one can argue that agents could use business networks if $\phi < \phi^*$ to shield them from breached contracts. A business network consists in agents sharing private information about their likelihood of cooperation and using social pressure to ensure that contracts are respected. Indeed even if the judiciary is defective, a number of recent papers suggest that informal mechanisms of contract enforcement might fill the gap. Greif (1993) in particular presents an example of an informal institution, a coalition of Maghribi traders from the 11th century, in which the commitment problem is surmounted by multilateral punishment mechanisms. A series of theoretical papers tries to explain the stylized fact of relational contracting in business networks as an endogenous response to an inadequate legal framework. Kranton (1996) develops an explanation of reciprocal exchange as a self-sustaining system. Dixit (2003) builds a model based on

self-governance as an alternative to official law. Even if people do not create business networks to avoid clogged judiciaries, they could resort to settlements before even turning to the judiciary. This group of papers suggests that informal contract enforcement might mitigate the impact courts may have in shaping economic activity. Unfortunately, I do not have any information in my dataset on business networks or on the nature of the relationship between business partners. Theoretically, it is possible to build a model where agents could choose between entering into the anonymous market with the possibility of contract breaches or creating business networks without contract breaches but with less economic opportunities. Figure 4 shows a situation in which two agents function in a business network without a judiciary: even at $\phi = 0$, they gain from trade. The condition for this result to hold is $v_s < v_b\delta^2$. If we assume heterogeneity in δ in the population, it would hold for high values of δ which might concern few people. This result is in line with the findings of Dixit (2003). Dixit finds that honesty is self-enforcing only between pairs of sufficiently close neighbors. The extent of self-enforcing honesty is likely to decrease when the world expands beyond this size. Business networks remain efficient only in small and close-knit communities where information can be exchanged.

It is illuminating to apply this framework to two other situations: investment and access to credit markets.

1.2 Investment

The previous section demonstrated that more contracts are breached when judiciaries are of low quality. But one could also expect the quality of judiciaries to impact on investments undertaken by the firm. I consider the case where a firm would undertake an investment in order to supply another with a particular asset. However, as Klein et al (1978) emphasized, the possibility of post-contractual opportunistic behavior arises. Indeed, to induce the supplier to undertake an investment, a firm can either write a long-term contract with favorable terms for the supplier or guarantee exclusivity rights. But once the costs of the investment are sunk, there is an immediate incentive for the firm to renege on the contract and capture the suppliers' rents. Alternatively, if search

costs to find a new supplier are high, there is an immediate incentive for the supplier to use its monopoly power to impose higher prices. These frictions could reduce the incentive to invest; Klein et al (1978) conclude that vertical integration will supersede market systems in such cases. But another way to limit post-contractual opportunistic behavior is a strong judicial system that enforces contracts properly. I will now develop a simple model based on the previous game in which the judiciary is explicitly modelled to evaluate the impact of the quality of the judiciary on the incentive to invest.

Consider the game described earlier. There are two possibilities for a seller of a good: either he undertakes an investment of value i with a particular firm, or produces a good of more widespread use with little or no appropriable rents. The drawback of an investment is that there is a risk of post-contractual opportunistic behavior. Its advantage is the possibility of higher rents. As my analysis focuses arbitrarily on the seller, I model this as a decrease in production costs for the seller where a relationship-specific investment is undertaken. The valuation of the good for the buyer is v_s when an investment is undertaken and V_s otherwise, where $V_s > v_s$. We can calculate the payoffs associated with each strategy and compare them.

The seller gets $-i + \sum_{i=0}^{t} \delta^i (p_i - v_s)$ if he cooperates until time t and $-i + \frac{p_i - v_s}{1-\delta}$ if he cooperates for ever. p_i corresponds to the price determined between seller and buyer if an investment has been undertaken. The seller gets $\sum_{i=0}^{t} \delta^i (p_{\bar{i}} - v_s)$ if he cooperates until time t and $\frac{p_{\bar{i}} - v_s}{1-\delta}$ if he cooperates for ever in the case where no relationship-specific investment is undertaken. $p_{\bar{i}}$ corresponds to the price determined between seller and buyer when no investment is made. I assume here that the seller is always willing to cooperate in order to take advantage of his investment. The set of prices that give an incentive to the buyer to cooperate will be determined by looking at the buyer's situation.

The buyer is faced with an alternative: either he cooperates and obtains $\frac{v_b - p}{1-\delta}$; or he deviates at time t by expropriating the seller and appropriating the total rents and obtains $\sum_{i=0}^{t} \delta^i (v_b - p) + \sum_{i=t+1}^{\infty} \delta^i (v_b - v_s) - \delta^{t+1} \phi F(v_b - v_s)$. However, the seller may sue him in court, in which case the buyer will have to pay a fine depending positively

on the total rents.[5] Comparing these two payoffs, we obtain the incentive constraint for the buyer:

$$p < v_s + \phi F(v_b - v_s)(1 - \delta) \qquad \text{(IC buyer)}$$

The buyer cooperates if the price offered by the seller is inferior to this value. This means that to give incentive to the buyer to cooperate, as opposed to simply expropriating the seller, the seller must offer a sufficiently low price. This price function decreases with respect to ϕ. Indeed, if the quality ϕ of the judiciary decreases, then the buyer has more incentive to expropriate. The seller must therefore offer a lower price.

I now assume that the seller will offer the price corresponding to that incentive constraint. It is the lowest price with which the buyer will cooperate under a certain judiciary ϕ and the highest price with which to make profits. Calculating the payoffs for the seller is straightforward in both situations: if an investment is undertaken, the seller will get $-i + \phi F(v_b - v_s)$, if not, he will get $\phi F(v_b - V_s)$. The difference between these two payoffs, $-i + \phi[F(v_b - v_s) - F(v_b - V_s)]$ is a positive function of ϕ.

Proposition 2 *investments become less attractive as the quality of the judiciary decreases.*

The intuition is simply that with a weaker judiciary, contracts are less well-enforced, the risk of post-contractual opportunistic behavior increases and, as a consequence, the incentive to undertake a particular investment is reduced.

1.3 Access to credit markets

We may also believe that judicial systems impact on firms' debt contracts. As Pagano et al (2002) explain:

> "The key function of courts in credit relationships is to force solvent borrowers to repay when they fail to do so spontaneously. By the same token, poor judicial enforcement increases the opportunistic behavior of borrowers: anticipating that creditors will not be able to recover their loans easily and

cheaply via courts, borrowers will be more tempted to default. Creditors respond to this strategic behavior of borrowers by reducing the availability of credit."

These authors develop a model in which collateral is used as a device to solve credit rationing. They find that improving judicial efficiency reduces credit rationing and expands lending. This paper, however, is concerned with very small firms in India. Only 4% of the latter have access to formal financial institutions. Another way for these firms to find finance is by using personal relationships. Indeed, some firms get loans from relatives or business partners. I call this kind of creditor a "friend". I now develop a model based on the trade-off between a friend and a bank, and the impact of the judiciary on this choice. This will help explain when a firm chooses one over the other and when its credit is rationed.

Consider an entrepreneur who requires funds to start a project. There are two funding possibilities: a friend or a bank. All variables are per unit lent. The profit associated with the project is π. The entrepreneur is aware of this safe return. The interest rate is r (it can be different according to the source of the loan). The buyer has again two strategies after having obtained the loan: C for cooperation (repayment) and D for deviation (non-repayment). An important assumption about the information structure must be made here:

Assumption: The bank does not know the probability p of the project's success. On the other hand, the friend and the entrepreneur know that the project will succeed and earns the entrepreneur π.

I chose this particular assumption in order to underline the difference between bank and friend. The bank does not know for certain the probability of success but can resort to the judiciary if needed, whereas the friend cannot resort to the judiciary but has more information about the entrepreneur. There is an information asymmetry between bank and entrepreneur. This creates a trade-off for the entrepreneur between the bank and the friend, which depends on the judiciary. The payoffs for the entrepreneur are the following:

	Entrepreneur	
	C (pay)	D (do not pay)
Friend	$1+r-1,(1+\pi)-(1+r)$	$-1,1+\pi$
Bank	$p(1+r)+(1-p)\phi c-1,(1+\pi)-(1+r)$	$\phi c-1,1+\pi-\phi c$

The bank estimates that the entrepreneur will succeed with a probability p and therefore repay the loan. But with a probability $1-p$, the project will fail, the entrepreneur unlikely to repay the loan and the bank recovering only ϕc. It is then straightforward to estimate the entrepreneur's different payoffs from the two sources of a loan.

It is then straightforward to calculate the payoffs associated with both strategies for each loan source and obtain two incentive constraints for the entrepreneur. It is also easy to see that there exists a threshold ϕ^* such that if $\phi < \phi^*$, the bank will not lend because there does not exist an interest rate giving an incentive to the entrepreneur to take out a loan and be profitable for the bank. The entrepreneur has simply too many incentives to default when he is fined less (ϕc) and the bank considers the return in case of failure too low. This threshold ϕ^* is a negative function of collateral c, meaning that only customers with sufficiently high collateral will not be credit rationed. Interestingly, a loan from a friend becomes relatively more attractive when the judiciary worsens. Indeed, the bank must charge an interest rate negatively related to the quality of the judiciary. This is because the bank recovers less in cases of failure and must therefore increase its interest rate so that the transactions remain profitable. It is easy to demonstrate that there exists a threshold ϕ^{**} such that if $\phi < \phi^{**}$, a loan from a friend is actually cheaper than one from the bank. More loans from friends should be observed when judiciaries worsens.

Proposition 3 *Less agents get loans from banks when the quality of judiciaries decreases as banks recover less collateral in cases of non-repayment and are thus forced to charge higher interest rates. More entrepreneurs get loans from friends rather than banks when judiciaries are slower.*

Proof. See appendix A2 for proof. ■

1.4 Rental Markets

Another consequence of an inefficient judiciary is its impact on the allocation of ownership rights. The coasian view stresses that agents will allocate these rights in an efficient manner to maximize welfare. This may involve some individuals acquiring ownership over the assets they use, while others will purchase access from a separate owner on an occasional basis. But when the transfer of control is costly to enforce, in other words when the judiciary is inefficient, we may see departures from that optimal allocation. In particular the market participants may decide to avoid contractual disputes by relying less on transfers of control, and instead, having a market structure that relies on more direct ownership by the final user.

To examine this, I look at the prevalence of rental of means of production[6] by an entrepreneur. The user faces the following trade-off: when renting, he faces the risk in the fluctuation of the rental price; when owning, he avoids any risk if he keeps the production good, but faces the price risk for the sale of the good he owns if he decides to sell it. This gives a theory of the size of the rental market. The user who is likely to keep producing the same good in the future will own the production good while the user who is likely to change activity will want to rent and avoid the good price risk. I then extend the model to study the effects of the efficiency of the judicial system. I therefore assume that enforcing a rental agreement (repossessing one's production good in case the renter threatens not to pay) takes time. This gives renters bargaining power, which they will use to reduce future rents. Anticipating that, the investors (owners of the production good renting this good), will ration their supply of rental goods if they can discriminate between users.

Consider a two period model ($t = 1, 2$) where all goods of production are identical and worthless after period 2. I assume, for notational convenience, the interest rate to be zero. There are two types of individuals: users who value production goods and investors who do not. Investors are wealthy and risk neutral, they are willing to buy production goods as long as they get a non-negative return by renting them. A rental agreement is a contract by which the investor sells the access to that asset to the user for

a single time period in return for a payment at the beginning of the period. Competition among investors guarantee zero profits: $p = r_1 + r_2$, where p is the price of the good, r_1 and r_2 rental rates in period 1 and 2. I assume risk-neutral agents for simplicity of utility forms.

The user has two options: renting or buying the production good. If he rents, he will pay r_1 in period 1 and $r_2 + \pi$ in period 2, where π is the rental price risk. His utility in period 1 will be $\overline{v} - r_1$, where $\overline{v}$ is the utility gain from his production. In period 2, the user may keep on using the production good in which case he will get $\overline{v} - \delta - (r_2 + \pi)$, where δ is an idiosyncratic shock experienced by this user in this activity. δ is for simplicity uniformly distributed in $[0, \Delta]$. The user may also terminate his production and change activity, in which case he will get $v_0 - r_2$, with v_0 a reservation utility in another activity. This user will decide to keep on producing if $\overline{v} - \delta - (r_2 + \pi) \geq v_0 - r_2$, in other words if $\delta \leq \overline{v} - \pi - \delta = \delta^r$. The total utility U^r of a renter is therefore:

$$U^r = \overline{v} - r_1 + \Pr(\delta \leq \delta^r) \left[\overline{v} - \delta - (r_2 + \pi)\right] + (1 - \Pr(\delta \leq \delta^r)) \left[v_0 - r_2\right]$$

The first term is the utility in period 1, the second is his utility if he decides to keep on using the same good of production in period 2 and the last one is the utility if he decides to change activity in period 2.

If the user owns the production good, he will pay p in period 1 and obtain $p - \pi$ if he decides to sell in period 2, with π the same price risk for notational simplicity. His utility in period 1 will be $\overline{v} - p$. In period 2, the user may keep on using the production good in which case he will get $\overline{v} - \delta$. The user may also sell his production good and change activity, in which case he will get $v_0 + (p - \pi) - p$, with v_0 a reservation utility in another activity, $p - \pi$ the price he obtains from selling the good and p the price of a new good of production[7]. This user will decide to keep on producing if $\overline{v} - \delta \geq v_0 + (p - \pi) - p$ in other words if $\delta \leq \overline{v} + \pi - \delta = \delta^o$. Notice that $\delta^o \geq \delta^r$, the owner keeps the same production good more often than the renter, giving up the higher value of the other activity in order to avoid the risk of selling the production good. The total utility U^o of

an owner is therefore:

$$U^o = \overline{v} - p + \Pr(\delta \leq \delta^o) \left[\overline{v} - \delta\right] + (1 - \Pr(\delta \leq \delta^o)) \left[v_0 - \pi\right]$$

The first term is the utility in period 1, the second is his utility if he decides to keep on using the same good of production in period 2 and the last one is the utility if he decides to change activity in period 2. Under reasonable conditions, it is easy to demonstrate that there exists a δ^* such that $U^r \geq U^o \Leftrightarrow \delta \geq \delta^*$. The user prefers to rent if he believes his shock will be bigger than a certain value, in other words the user prefers to rent if he is likely to change activity.

Until now, I made the implicit assumption that the rental contract enforcement was perfect. At the first period, the investor signs a contract with the user by which the user is allowed to use the production good in return for payment of the rental price. This is easily enforced by requiring advance payment. Once the user has been granted access to the production good, it may be difficult for the investor to evict him in case the user threatens not pay the rental price. Using the notation of section 1.1, the investor will only recover ϕr_2 of the rental price, taking into account the slowness of the judiciary. Paying the enforcement cost is inefficient and the rental price in period 2 will be ϕr_2 if the user has all the bargaining power. Anticipating that, the investor will increase the rental price in the first period to compensate for this decrease in the second period, in order to maintain the zero-profit condition: $p = r_1 + r_2$. The rental price in the first period will now be $r_1' = p - \phi r_2$. In period 2, the user may keep on using the production good in which case he will get $\overline{v} - \delta - (\phi r_2 + \pi)$. The user may also terminate his production and change activity, in which case he will get $v_0 - r_2$. This user will decide to keep on producing if $\overline{v} - \delta - (\phi r_2 + \pi) \geq v_0 - r_2$, in other words if $\delta \leq \overline{v} - \pi - \delta + (1 - \phi) r_2 = \delta^{r\prime}$. The total utility $U^{r\prime}$ of a renter is therefore:

$$U^{r\prime} = \overline{v} - r_1' + \Pr(\delta \leq \delta^{r\prime}) \left[\overline{v} - \delta - (\phi r_2 + \pi)\right] + (1 - \Pr(\delta \leq \delta^{r\prime})) \left[v_0 - r_2\right]$$

Under reasonable conditions, it is easy to demonstrate that there exists a $\delta^{**}(\phi)$ such

that $U^r \geq U^o \Leftrightarrow \delta \geq \delta^{**}(\phi)$ and that $\delta^{**}(\phi)$ is a decreasing function of ϕ.

Proposition 4 *The size of the rental market decreases with inefficient judiciaries.*

Proof. See appendix A3 for proof. ■

This proposition may have important welfare consequences for firms in India. In the presence of liquidity constraints, a functional rental market may help poor entrepreneurs to start their businesses. A thick rental market may also facilitate mobility across sectors and across regional labor markets, thus "greasing the wheels" of the economy.

To conclude the theoretical component of this paper, I expect an inefficient judiciary to be associated with more breaches of contract, less investments, more difficulty accessing credit markets, and smaller rental markets. These predictions are testable using the dataset I analyze in the following sections and the judicial reform providing a source of variation in the quality of the judiciary.

2 The Judicial Reform

This paper's purpose is to relate the quality of the judiciary to firms' behavior. One cannot simply relate the efficiency of courts to firms' performance without considering the risk that state heterogeneity might drive the results more than the judiciary's efficiency per se. In this paper, I use the 2002 Amendment Act as a source of variation in the quality of the judiciary. I now describe this reform and then explain that the spatial variation in its implementation across states is largely exogenous.

2.1 The 2002 Amendment Act

The Judicial institutions in India are the same across courts and states. The Indian judiciary operates at three levels: a single Supreme Court at the federal level; High Courts in each state; and, at lower levels, district judges for civil cases and sessions judges for criminal cases. The Code of Civil Procedure Code regulates the functioning of Civil courts by laying down the rules in which a civil court is to function These rules

may be summed up as follows: procedure of filing the civil case, powers of court to pass various orders, court fees and stamp involved in filing of case, rights of the parties to a case, namely plaintiff and defendant, jurisdiction and parameters within which the civil courts should function, specific rules for proceedings of a case, right of appeals, review or reference. Data on cases pending in courts indicate that there were 3.1 million cases pending in 21 High Courts and 20 million in subordinate courts in 2000[8]. Examples of judicial slowness are striking:

> the highest court in the country, the Supreme Court, took 11 years to acquit the headmaster of a school on the charge of taking a bribe for signing the salary arrears bill of his school. In another case of judicial delay, the victim was former Union Law Minister, Dr. B.R.Ambedkar. The judgement came in his lifetime but it took 47 years for the Maharashtra government to execute the decree passed in his favour against illegal encroachment of his land by Pakistani refugees. By then he was dead.[9]

To remedy this situation, the parliament enacted the 2002 amendment to the Civil procedure Code, 1908 to make litigation in the country more effective and speedy. This reform can be summarized in five main points:

- encouragement of settlement of disputes outside of court. According to section 89, the court may by itself, proactively refer a dispute for alternative dispute resolution methods (arbitration, conciliation, lok adalats, mediation) if it appears that elements of a settlement exist, which may be acceptable to the parties to the dispute.

- restriction of judicial discretion which allowed for unnecessary delays. Several mandatory time limits are imposed on the plaintiff and defendant, at each stage of the litigation, by this amendment. An example is found in section 27, summons to defendants:

  "**Summons to defendants**.-Where a suit has been duly instituted, a summons may be issued to the defendant to appear and answer the claim and may be served

in manner prescribed *on such day not beyond thirty days from the date of the institution of the suit*"

The part in italics was added by the 2002 amendment act.

- reduction of frivolous litigation. Order 16, Rule 16, Sub-rule 4 is inserted:

  "**Verification of pleadings**.-(4) The person verifying the pleadings shall also furnish an affidavit in support of his pleadings".

  This is supposed to curtail frivolous litigation, thereby increasing the speed of the judiciary.

- use of commission. Order 26, rule 4A states that a commission can be sent by any court to interrogate any person within the local limits of a court's jurisdiction. Before the amendment, a commission which is to supposed to collect evidence and declarations, was reserved for persons outside the state and for persons not physically able to attend the court.

- reduction of adjournments. Order 17, rules 1 and 2 states that the court shall not grant more than three adjournments to either party to the suit. Any adjournment shall only be granted after the party requesting time shows sufficient cause. In each adjournment, the court shall make an order as to costs faced by the other party as a result of the adjournment. The court may also award higher costs if its thinks fit.

It is interesting to note that this reform was resisted at first by the lawyers. The 2002 Amendment Act was written originally in 1999 and had even secured presidential assent. However, lawyers who opposed certain provisions of the Bill resisted its notification in February 2000 by resorting to a country-wide strike. In Tamil Nadu, the functioning of courts was paralyzed for more than 10 days. The lawyers argued that the amendments would not only increase the cost of litigation, but also result in delays. In New Delhi, lawyers were lathi-charged during a protest demonstration. As a result of the protests, Ram Jethmalani, Union Law Minister at that time, decided to keep the Act in abeyance.

The 1999 Act invited protests mainly because Jethmalani showed little sensitivity to objections raised by lawyers to the various provisions. Another major criticism of the 1999 Bill was that it facilitated recording of evidence by commissioners as opposed to the examination of witnesses in open court. As the Commissioner could be anyone, a retired judicial officer or a practising lawyer (the 1999 Act did not identify who could qualify for it), this was an obvious infringement on the power of lawyers. Jethmalani's successor, Arun Jaitley, introduced a fresh amendment Bill later in 2000, taking into account the suggestions made by bar representatives, political parties and the Law Commission[10]. The act coming into effect in 2002 and dubbed the 2002 Amendment Act in this paper was met with little resistance[11].

The 2002 Amendment Act contains 89 amendments. I read through the text of each amendment and found that 57 of them were likely to have an impact on speed. Codifying an amendment as +1 if it is supposed to increase speed and -1 if it will likely reduce speed, I calculated that the 2002 Amendment Act fared +38. I therefore conclude that the 2002 Amendment Act is likely to increase the speed of the judiciary.

Figure 5 shows the number of cases pending per judge in Lower Courts in India between 2000 and 2004. This figure shows a sharp reduction in the number of cases pending after 2002. This is not obvious: when the judiciary improves its efficiency, people will seek judicial help in the belief that help will be forthcoming. An increase in cases solved due to the reform could be accompanied with an increase in cases filed suggesting greater public confidence in the judiciary. The impact on the overall duration to treat a case would be ambiguous. The decrease in cases pending per judge in 2002 followed by an increase in 2003 would be consistent with the explanation that it took one year for people to file more cases due to their renewed confidence in the judiciary.

However this analysis cannot disentangle the effect of the reform from any other changes that might have occurred in 2002 in India. I will now describe a particular feature of this reform implying that there was some spatial variation in the implementation of the reform.

2.2 Identification strategy

The identification strategy in this paper relies on the fact that some of the 89 amendments of the 2002 Amendment Act were already enacted by some states in the past. Under Section 122 of the Code of Civil Procedure, the High Courts have power to amend, by rules, the procedure laid down in the orders of the code. If a state had already enacted a particular amendment of the 2002 Amendment Act, then this particular amendment of the 2002 Amendment Act will have no effect in this state in 2002 compared to the rest of the country. I therefore read every order of the Code of Civil Procedure, checked if it was amended by the 2002 Amendment Act, codified its likely impact on speed (+1 if it is supposed to increase speed and -1 if it will likely reduce speed), checked if any state had already passed the same amendment earlier. The total impact of the 2002 Amendment Act for a particular state will be decreased by one if that state had already passed a positive amendment of the 2002 Amendment Act.[12]

A concrete example can be found in the order 26 rule 4A. Rule 4A is added by the 2002 Amendment Act:

> "**Commission for examination of any person resident within the local limits of the jurisdiction of the court**.-Notwithstanding anything contained in these rules, any court, may in the interest of justice or for the expeditious disposal of the case or for any other reason, issue commission in any suit for the examination, on interrogatories or otherwise, of any person resident within the local limits of its jurisdiction, and the evidence so recorded shall be read in evidence."

The exact same amendment was enacted in Rajasthan in 1973. Therefore commissions have been used for any person resident within the local limits of the jurisdiction of the court in Rajasthan from 1973 onwards. This amendment of the 2002 Amendment Act will have no impact in Rajasthan in 2002 compared to other states in India. The question might arise as to why such an amendment was already passed in Rajasthan. It might mean that Rajasthan is simply a more "advanced" state. This unobserved

heterogeneity will drive the results in the empirical analysis. I have two answers to this claim. First, I will later use a difference-in-differences analysis, comparing states which will feel less impact from the 2002 Amendment Act to the other states, before and after the reform. This empirical strategy deals with any time-constant heterogeneity. The only remaining concern of such an analysis is the assumption of common time effects: "treated" and "untreated" states should evolve the same way. The question is therefore whether amendments already enacted in the past would have any bearing on the evolution of the quality of the judiciary in 2002, coinciding with the 2002 Amendment Act. This brings me to the second point: I will assume that these amendments already enacted in the past were maybe responsive to economic and political conditions of the time but have no bearing on the evolution of the quality of the judiciary in 2002, except through their attenuation of the 2002 Amendment Act. In other words, these amendments were enacted such a long time ago that they can be considered predetermined. This is confirmed by the distribution in time of these amendments. I found 106 state amendments in the Code of Civil Procedure that are the same as the 89 amendments of the 2002 Amendment Act[13]. They were enacted on average in 1969 (standard error of 17). The last state amendment was enacted in 1994. Figure 6 shows the distribution of the amendments over time. It is clear on this figure that most of the amendments were enacted a long time ago. In other words, they can be considered predetermined.

Some other amendments are less straightforward. A peculiar example lies in order 20, rule 1. This rule describes when a judgement has to be pronounced. The court shall pronounce the judgement 15 days from the date on which the hearing of the case was concluded, and in exceptional circumstances 30. The 2002 Amendment Act changed these two numbers to 30 and 60 respectively. This is going against the objective of facilitating speedy disposal of cases and is therefore codified as a -1. However, the states of Tamil Nadu, Pondicherry and Andhra Pradesh passed an amendment in 1930 specifying that no time limits should be imposed on court. As the 2002 Amendment Act overrules all previous legislation, the impact in these three states will be positive as time limits are now imposed, whereas the impact of the reform in any other state will

be negative as longer time limits are imposed. I therefore place a +2 for these three states in order to specify that the overall impact for these three states should be positive (-1+2) as opposed to every other state which just receive a -1.

Another different example lies in order 58, rule 1. This rule specifies the duration of detention in civil prison of a judgement-debtor who has not satisfied the decree against him. The changes due to the 2002 Amendment Act are noted in parentheses. He shall be detained no more than three months if the decree is for the payment of a sum of money exceeding 1,000 Rs. (5,000). He shall be detained no more than six weeks if the decree is for the payment of a sum of money between 500 (2,000) and 1,000 Rs. (5,000). This change is obviously made to adjust for the depreciation of the Rupee. However, in 2002, some judgement debtors who would have gone to civil prison under the previous code will not go under the 2002 Amendment Act. This will give more incentive to the judgement debtor to delay the payment of the decree as he will not be sent to prison over it. I therefore codify this amendment in the 2002 Amendment Act as a -1. However, West Bengal enacted an amendment in 1967 that was harsher: the judgement debtor shall be detained six months if the decree is for the payment of a sum of money exceeding 50 Rs. and six weeks in any other case. As the 2002 Amendment Act overrules any previous litigation, the impact of the 2002 Amendment Act in West Bengal will be even more negative than in the rest of the country which had already softer laws. I therefore added a -1 to West Bengal compared to the other states.

These three examples give an idea of the spatial variation in the likely effect of the 2002 Amendment Act. Figure 7 shows the cumulative impact of the amendments already present in the 2002 Amendment Act for each state. An amendment is codified as +1 if it increases the speed of the judiciary, -1 if it decreases the speed of the judiciary. Figure 8 shows gives the same graph for two hypothetical states 1 and 2. This figure represents state 1 which has enacted some amendments already present in the 2002 Amendment Act as opposed to state 2. Therefore the impact of the 2002 Amendment Act in 2002 will be lower for state 1 than for state 2. Figure 9 depicts then the evolution of a particular outcome of interest (for example the number of cases pending per judge) for state 1 and

2. I do not expect the outcome to be similar before the reform. Indeed, state 1 enacted some amendments that are likely to increase the speed of the judiciary. State 1 is maybe systematically different from state 2. But the reform should equalize the outcomes for states 1 and 2 as the 2002 Amendment Act overrules any past litigation. It is therefore possible to isolate the causal impact of the reform by comparing the outcome for state 1 and state 2 before and after the reform. The systematic difference between state 1 and state 2 is taken into account if the outcome of state 1 is differenced before and after the reform. It is also possible to disentangle the effect of the reform from any coincidental change by differencing between state1 and state 2 after the reform (and before) as state 1 and state 2 evolve in the same macroeconomic context. This is the intuition of a difference-in-differences analysis.

It is reassuring to see an example of the hypothetical situation I described in Figures 8 and 9. Figure 10 represents the number of cases pending per judge in Lower Courts in India between 200 and 2004. The examples of Delhi and Uttar Pradesh are striking. Uttar Pradesh experienced many positive changes that were redundant with the 2002 Amendment Act, whereas Delhi experienced only one amendment. I would expect the effect of the reform to be stronger in Delhi than in Uttar Pradesh. In Figure 10, we see that Uttar Pradesh experienced a slight flattening of its number of cases pending per judge, whereas Delhi experienced a decrease in the number of cases pending per judge after 2002. This is some graphical evidence of the different implementation across states of the 2002 Amendment Act due to amendments being already enacted in some states. I now turn to the description of the data I am using.

3 Data

The goal of the paper is to relate the improvement due to the reform to firms' behavior. To do this, I use two representative samples of small informal firms in India. The 55th round of the National Sample Survey in India collected in 1999/2000 contains information about 170,000 small non-agricultural firms.[14] The 57th round of the

National Sample Survey in India collected in 2002 contains information about 350,000 small non-agricultural firms specialized in services (hotels and restaurants, transport, storage, communications, real estate, renting and business activities, education, health and social work). I include sector dummies in the empirical analysis to compare firms in the same sectors (the dataset includes the sector in which the firm is operating according to the 5-digit level in the National Industry Classification). A potential problem arises from the date of the data collection. The 2002 Amendment Act was implemented in May 2002 whereas this dataset was collected over 2002. One might argue that firms in the 57th round did not have time to file a case and experience the increased speed of the judiciary due to the reform. However, my theoretical model emphasized the fact that the judiciary has influence on firms' behavior even if the firm does not explicitly use the judiciary. The theoretical model is based upon perceptions of the judiciary by firms. Moreover, one can argue that firms knew about the imminent implementation of the reform and adopted a different behavior in 2002 as opposed to 2000 due to the reform. Several characteristics of this dataset make it appropriate for use in identifying the impact of judicial delays on firms' behavior. First, a detailed list of problems experienced by the firm was collected. Each firm reported whether it found the non-recovery of service charges, fees or credit to be a major obstacle to its operation. I interpret this problem as a breach of contract. Second, a detailed questionnaire about the type of investment made is also available. I know whether or not the firm added plant and machinery, tools, transport equipment or land to its assets. Third, I have information about access to credit markets. Each firm was asked whether it found the shortage of capital to be a major problem to its operation. Related to this, a wealth of information on the source of loans is reported. I know whether the loan was granted from a formal financial institution (central and state-level term lending institution, a government (central, state or local), public sector banks, other institutional agencies), money lenders, business partners, suppliers/contractors, or friends and relatives. Fourth, I have information on production goods ownership. I know if a firm hires or owns its plant and machinery, tools, transport equipment or land. This wealth of information allows me

to test each proposition made in the theoretical analysis. I now describe the empirical method I am using.

4 Empirical Method and Assumptions

To relate the judicial reform to firms' behavior, I perform regressions of the form:

$$y_{ist} = \alpha_s + \beta_1 2002_t + \beta_2 2002_t * 2002AmendmentAct_s + \gamma x_{st} + \delta d_{ist} + \varepsilon_{ijs}$$

where i corresponds to the firm, s to the state and t to time (2000 or 2002). The variable y_{ist} represents the outcome variable of interest; this will first be the firm's experience of breach of contract, access to financial market, investment, renting decisions and later its performance. In this specification, determinants of the outcome include state fixed effects (α_s), year fixed effects ($2002_t = 1$ if $t = 2002$, 0 if $t = 2000$), an interaction term between this year dummy and the variable $2002AmendmentAct_s$ ($2002AmendmentAct_s$ is equal to the impact in the particular state s of the 2002 Amendment Act calculated according to the methodology developed in section 2.2), state-level controls (x_{st}), and sector-fixed effects (d_{ist}). The coefficient of interest is therefore β_2.

The main advantage of this difference-in-differences analysis is that I can control for state and year fixed effects; in other words, constant state unobserved heterogeneity and time effects are controlled for. Three main problems remain: common time effects and endogeneity of the reform as far as the consistency of β_2 is concerned, serial correlation in the disturbance term as for the efficiency of β_2. I now review my corrections for these three problems.

To isolate the causal impact of the reform, difference-in-differences relies on the assumption of common time effects: firms in states with a low impact of the 2002 Amendment Act (because of amendments already present in the past cancelling the changes from the 2002 Amendment Act) would evolve between 2000 and 2002 the same way firms in states with a high impact would have, if they had been in a state with a high impact of the reform. In other words, states with a low impact not only differ

systematically from states with a high impact (which is controlled for by the state fixed effects in the regression), but they might also evolve differently. To control for state-level changes that could have occurred at the same time and that could blur the impact of the reform, I include state-level controls (x_{st})[15]. I control for the state-wise amount released for development of infrastructural facilities for judiciary in India per capita to control for any coincidental increase in the budget allocated to the judiciary to make sure the effect captured is only coming from the procedural reform. I also control for the quality of alternative dispute resolution mechanisms that could have increased at the same time. In consider in particular two institutions: the fast-track courts and the Lok Adalats. Fast track courts are meant to expeditiously clear the colossal scale of pendency in the district and subordinate courts under a time-bound programme. An objective of the five-year experimental scheme starting in 2001 is to take up on top priority basis sessions and other cases involving undertrials. The scheme envisages the appointment of ad hoc judges from among retired sessions or additional sessions judges with explicit productivity incentives: the fast track courts will be required to dispose of 14 sessions trial cases or 20 to 25 criminal or civil cases every month. I therefore include in the regressions the number of fast-track courts functioning per capita and the state-wise financial assistance released for fast-track courts per capita. The other alternative dispute resolution mechanism is the Lok Adalat (people's courts). It was established by the government in 1986 to settle dispute through conciliation and compromise. Main condition of the Lok Adalat is that both parties in dispute should agree for settlement. The decision of the Lok Adalat is binding on the parties to the dispute and its order is capable of execution through legal process. No appeal lies against the order of the Lok Adalat. There is no court fee. I therefore include in the regression the state-wise number of cases disposed off in Lok Adalats per capita to control for any coincidental improvement of the Lok Adalats. I also control for the quality of the police forces which could have an influence on breaches of contract by firms. I include the number of policemen per one thousand of population and the total police expenditure per policemen. When outcomes are the access to financial institutions by firms, I include variables to control for the overall

financial development of the state: state-wise ratio of aggregate deposits to total credit of public sector banks and state-wise number of bank offices of public sector banks per capita. When the outcome is the economic performance of the firm, I include the growth rate of the state net domestic product per capita. This allows me to control for any macroeconomic change that might have occurred at the same time. These variables control for state trends that might have occurred between 2000 and 2002 and that could potentially impact the outcomes I am considering.

The second problem of a difference-in-differences analysis is the endogeneity of the reform (Besley, 2000). In this framework, the fact that a state will experience a low impact of the reform means that this state has already enacted some of the amendments contained in the 2002 Amendment Act. These amendments are maybe responsive to economic, political or judiciary's conditions within the state. It is necessary to identify and control for the forces that lead the Code of Civil Procedure to be amended if the unbiased estimates of the effect of the 2002 Amendment Act is to be obtained. However, as I have already argued, the amendments were enacted a long time ago (on average in 1969) and were responsive to economic, political or judiciary's conditions at the time they were enacted, not of 2002. I therefore argue that these amendments are predetermined. They surely have an impact on the number of cases pending before 2002 but this systematic difference between states will be dealt with by the difference-in-differences analysis. The only assumption needed to establish the causal impact of the reform is that these amendments have no influence on the evolution of the number of cases pending in 2002, except through their attenuation of the 2002 Amendment Act. This is directly testable before 2002. Table 1 examines the relationship between the 2002 Amendment Act and the speed of the judiciary. In column (1), the dependent variable is the number of cases pending per judge in Lower Courts. The specification include state fixed effects, year fixed effects and the 2002 Amendment Act interacted with a post 2002 dummy (equal to 1 if the observation is after 2002). I have collected data on the number of cases pending in Lower Courts between 1999 and 2004 from various annual reports of the Ministry of Law. Column (1) illustrates the positive impact of

the 2002 Amendment Act. One amendment of the 2002 Amendment Act decreased by 466 the number of cases pending per judge in Lower Courts. The effect is statistically significant at 10% and indicates that the reform was successful at reducing the backlog of cases to treat. In column (2), the dependent variable is the change in the number of cases pending per judge between 1999 and 2000. The explanatory variable is now the cumulative amount of amendments increasing speed already enacted in the past. This variable has no impact on the evolution of cases to treat in 2000. Column (3), (5), (6) and (7) show that the cumulative amount of amendments increasing speed already enacted in the past has also no influence on the evolution of the number of cases pending in 2001, 2003, 2004 and 2000, 2001 pooled together. This is a clear confirmation that the amendments enacted in the past have no influence on the evolution of the speed of the judiciary before and after the reform. Column (4) shows that the number of amendments enacted in the past have an influence on the change in number of cases pending only in 2002. This demonstrates that it is the combination of these amendments enacted in the past and the 2002 Amendment Act which has a differential effect across states on the speed of the judiciary.

The third problem is about serial correlation in the disturbance term (Bertrand, 2004). This is not a major concern as I have only two periods of observation. A potentially more important problem is the serial correlation for firms in the same state (Moulton, 1990). To deal with this problem, I cluster the standard errors at the state level.

I also include sector dummies (d_{ist}) to control for sector-specific effects. I use simple probit regressions when the outcome is a dummy variable. Rather than reporting coefficients, I report the change in the probability for an infinitesimal change in each independent variable at the mean. Multipliers defined as the inverse of the probability that the observation is included due to the sampling design are used as weights in the regressions in order to have a representative sample. I now discuss the results testing the four theoretical predictions found in section 1.

5 Results

This paper aims at relating the spatial variation in the implementation of the 2002 Amendment Act to firms' outcomes that are likely to be influenced by the judiciary. I found in the theoretical section that the judiciary should affect the probability to experience a breach of contract, the incentive to invest, the access to financial markets and the decision to rent or own production goods. I will now test these four predictions using the empirical methodology I outlined in section 3.

Table 2 examines the relationship between contracting behavior and the 2002 Amendment Act. The dependent variable is the occurrence of contract breaches. It was obtained from a list of problems commonly experienced by firms. One such problem is the 'non-recovery of service charges/ fees/ credit'. This relates to cases in which a breach of contract has occurred. I therefore construct a dummy variable equal to 1 in cases where the firm experienced this type of problem as one of its main problems, and 0 if it did not. In Column (1), I include state fixed effects, year fixed effects and a term called "2002 Amendment Act" which is the interaction between the year 2002 dummy and the number of amendments likely to increase speed for each state. As outlined in section 2.2, there is spatial variation in this index as some states had already enacted some of the amendments present in the 2002 Amendment Act. The coefficient means that one amendment likely to increase speed in the 2002 Amendment act decreases the probability to experience a breach of contract by 0.73 percentage point. This coefficient is statistically significant. It is also economically significant. Indeed, there are 38 amendments in the 2002 Amendment Act likely to increase speed. However, multiplying this result by 38 would be extrapolating the results coming from the regressions as there is not much variation in our index measuring the spatial variation in the implementation of the 2002 Amendment Act. Instead, it is worthwhile comparing this result to the probability of experiencing a breach of contract which is 6 percent in the population. Therefore one amendment likely to increase speed in the 2002 Amendment act decreases the probability to experience a breach of contract by 12 percent. In Column (2), I add NIC2 dummies. This corresponds to the National Industrial Classification, disaggregated to

the second level. 42 NIC2 dummies were included. This is to control for the fact that the 57th round of the National Sample Survey focuses on services firms. The coefficient does not vary. In column (3), NIC3 dummies are included. This corresponds to the National Industrial Classification, disaggregated to the third level. 119 NIC3 dummies were included. The effect remains similar. In column (4), state-level controls are included. I control for the budget allocated to the judiciary by including the state-wise amount released for development of infrastructural facilities for judiciary in India per capita, the quality of alternative dispute resolution mechanisms by including the number of fast-track courts functioning per capita, the state-wise financial assistance released for fast-track courts per capita and the state-wise number of cases disposed off in Lok Adalats per capita. I control for the quality of the police forces by including the number of policemen per one thousand of population and the total police expenditure per policemen. The coefficient remains remarkably similar. This result confirms the fact that the effect on the probability to experience a breach a contract is coming from the procedural reform and not from any coincidental change in the infrastructure of the judiciary, the quality of alternative dispute resolution mechanisms such as the fast-track courts or the Lok Adalats and the quality of the police forces. Table 2 confirms proposition 1 which states that a speedier judiciary is associated with less breaches of contract. Table 2 also provides a policy implication in the sense that this procedural reform is having an effect on the probability for firms to experience a breach of contract.

Table 3 examines the relationship between the reform and the incentive to invest. The explanatory variable of interest is the index interacting the year 2002 dummy with the number of amendments likely to increase speed from the 2002 Amendment Act in a particular state. In column (1), the dependent variable is the net addition to plant and machinery assets owned during last 365 days. This variable is equal to 1 if the enterprise experienced a net addition to plant and machinery assets, 0 otherwise. One extra amendment likely to increase speed in the 2002 Amendment act increases the probability to invest in plant and machinery assets 0.4 percentage point. This is a sizeable impact knowing that only 3 percent of the firms investment in plant and

machinery assets. The dependent variable in column (2) is the net addition to tools and other fixed assets owned during last 365 days (1 if the enterprise did such an investment, 0 otherwise). One extra amendment likely to increase speed increases the probability to invest in tools and other fixed assets by 4 percentage points, given that 17 percent of the firms investment in tools. The dependent variable in column (3) is the net addition to transport and equipment assets owned during last 365 days (1 if the enterprise did such an investment, 0 otherwise). The effect is also quite important. The dependent variable in column (4) is the net addition to land assets owned during last 365 days (1 if the enterprise did such an investment, 0 otherwise). The coefficient is not significative for land assets. The proposition therefore seems to hold for production goods but not for land assets.

Table 4 examines the influence of the judiciary on firms' access to credit markets. The dependent variable is information on loans and the explanatory variable of interest is the interaction between the year 2002 dummy and the number of amendments likely to increase speed for each state. The dependent variable used in the regression of column (1) is a dummy variable equal to 1 in cases where the firm experienced a shortage of capital as one of its problems, and 0 otherwise. One amendment likely to increase speed in the 2002 Amendment act decreases the probability to experience a breach of contract by 6 percentage points. This result is statistically significant and rather large when compared to the fact that 25% of the firms experience a problem of shortage of capital. This regression include state fixed effects, year fixed effects, NIC3 dummies and state level controls. I include the same state level controls as in Table 2, and add some variables controlling for the development of the financial sector such as the state-wise ratio of aggregate deposits to total credit of public sector banks and the state-wise number of bank offices of public sector banks per capita. This is to control for any coincidental change in the quality of the state financial sector[16]. The rest of the table restricts the sample to firms that obtained a loan in order to test proposition 2 stating that more firms will get a loan from a formal financial institution and less from friends if the quality of the judiciary increases. In column (2), the dependent

variable is the probability to obtain a loan from a formal financial institution (financial institutions, government, bank). I find that with one more amendment of the 2002 Amendment Act increasing the speed of the judiciary, the probability to obtain a loan from a formal financial institution conditional on obtaining a loan increases by almost 5 percentage point. In Column (3), the dependent variable is the probability to obtain a loan from a business friend (contractor, moneylender) if the enterprise obtained a loan. The coefficient is positive showing that a better judiciary is associated with more loans coming from a contractor where an efficient judiciary is key to recover the defaulted loans. However, the effect is not statistically significant. The dependent variable in column (4) is the probability to obtain a loan from a relative (relative, business partner) if the enterprise obtained a loan. The result is not statistically significant.

Table 5 looks at the relationship between the reform and the propensity of small informal firms to rent. The dependent variable is equal to 1 if the enterprise is renting some of its production goods[17]. The four categories of production goods (plant and machinery assets, tool assets, transport and equipment assets and land assets) are considered in the four columns. I find that the 2002 Amendment Act does not have any impact on the propensity to rent plant and machinery assets. However, one extra amendment increased the propensity to rent tools and other fixed assets by 0.3 percentage point. This an economically significant result compared to the fact that 1.7 percent of the population rented tools. The effect is not so strong for transport and equipment assets and negative for land assets. But the magnitude of this coefficient is small compared to the fact that 35 percent of the population are renting land assets.

Results indicate that the four theoretical predictions obtained from the model seem to hold in the data. Considering that experiencing less breaches of contract, investing more, having a better access to financial markets and to thicker rental markets are positive determinants of firms' economic performance, I now turn to the effects of this reform on the expansion of small informal firms.

6 Effects on Firm Performance

This paper seeks to determine whether a judicial reform that seems to be correlated with an increased speed of the judiciary affect not only firm-level behavior but also firm-level performance. Table 6 examines the relationship between this reform and the performance of the firm. The dependent variable is now the growth status of the firm. It is a subjective measure since it was asked directly of firm owners. It is a dummy variable equal to one if the firm is expanding or constant, to zero if the firm is shrinking. In column (1), the explanatory variables include state fixed effects, year fixed effects and the index measuring the number of amendments effectively implemented in the state. The coefficient is statistically positively significant and indicates that one extra amendment improving the procedures of the Code of Civil Procedure increases the probability for the firm to be expanding by 1.2 percentage point. The proportion of firms saying that their firms was expanding or constant is 74 percent. This means that an extra amendment increases the proportion of firms expanding or constant by 1.7 percent. This is the effect of just one amendment of the 2002 Amendment Act. But the number of amendments passed varied between 34 and 40. Another interpretation would be to say that moving a firm from an average state with the lowest number of amendments passed to the highest number of amendments passed will increase its probability to be expanding or constant by 7.2 percentage point, in other words the proportion of firms expanding increases by 9.7 percent in a state with the highest as opposed to the lowest number of amendments passed . It is also worthwhile remembering that the 2002 Amendment Act contains 38 amendments likely to increase speed. In column (2), I control for the same state level controls I have used in section 5. The coefficient stays constant. In Column (3), I add the growth rate of the state net domestic product per capita to control for states' economic development. The coefficient remains statistically positive. This means that the effect is not just due to a coincidental state-specific macroeconomic improvement. It is also interesting to investigate the effect of the reform on the decision to start a company. An entrepreneur in a state with a speedy judiciary knows that he will suffer less from breaches of contract, be protected in case of appropriation of his investment

rents, have better access to formal financial institutions and to thicker rental markets. An entrepreneur will therefore be more willing to start his own company. The dependent variable in column (4) is now equal to 1 if the firm operated for less than 3 years, in other words a new firm, 0 otherwise. This is a measure of the new firms created in each state. One extra amendment increases the likelihood to be a new firm having operated for less than three years by 0.9 percentage point. Given that 14.9% firms in the sample were new, it means that an extra amendment increased the proportion of new firms by 6 percent. A state with the biggest impact from the 2002 Amendment Act, in other words with the most number of amendments enacted in 2002, has 36 percent more new firms than a state with the smallest impact of the 2002 Amendment Act.

7 Conclusion

This paper has shown that the quality of judicial institutions in Indian states matters for both small firms' behavior and their economic performance. My findings are in line with an emerging, largely macroeconomic literature (Djankov et al (2002), Acemoglu et al (2001), Rodrik et al (2002), for example), underlining the importance of institutions in economic performance. The identification strategy in this paper allows me to isolate the causal impact of one type of institution, the judiciary, on firms' outcomes. I use the spatial variation in the implementation of a judicial reform, the 2002 Amendment Act, with the objective of facilitating speedy disposal of cases. This spatial variation is due to the fact that some states already enacted some of the amendments contained in the 2002 Amendment Act. These states will therefore feel a weaker effect of the 2002 Amendment Act in 2002. I argue that the amendments already enacted were passed a long time ago and can be considered predetermined. Additionally, a difference-in-differences strategy accounts for unobserved state heterogeneity.

I found that this reform was effective in the sense that it decreased the number of cases pending per judge in Lower Courts. I then used repeated cross-sections of firm-level data that contains much information on non-recovery of service charges/fees/credit, in-

vestment decisions, whether a firm is capital constrained, sources of borrowing and forms of ownership of production goods for small informal non-agricultural firms specialized in services. I found that this reform and therefore a speedier judiciary decreases the probability to experience a breach of contract, increases the incentives to invest, decreases the probability to experience shortage of capital, favors access to formal financial institutions and thickens rental markets. These results indicate that the quality of judiciaries across Indian states plays an important role in shaping economic activity in this important sector of the economy. Moreover, I found that having faster courts is positively associated with firm performance. My results are consistent with a simple game theoretic model illustrating how slower judiciaries affect agents' behavior in contracting relationships. This theory's key insights are that firm owners in slow judiciary environments are more likely to break contracts, less likely to engage in investments, more likely to be credit constrained, less likely to have access to formal credit and less likely to have access to rental markets.

This paper not only suggests that the judiciary shape economic activity but also suggests a way to improve it by modifying the procedures to treat of a case. This research leaves important questions open concerning the political economy of such a reform. It raises the question as to why this reform was not implemented earlier if it is so beneficial for small firms. An unanswered question concerns whether the effects of a slow judiciary vary across sectors of an economy. One can imagine for example that firms in India's registered or formal manufacturing sector may have fewer contracting problems than informal firms I examined in this paper. One can also imagine that some economic agents or firms could benefit from a slow judiciary by using it as a way to delay bad outcomes. These vested interests could perturb the enactment of such a reform. In future work, I plan to extend my analysis to firms in other sectors of the Indian economy as a means of testing this hypothesis.

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Notes

[1]Although it could be argued that the buyer could get v_b, the court does not observe that value and can therefore only compensate the buyer with the amount observed on the market. This claim follows in fact exactly the Sale of Goods Act (1930), chapter 6, article 55: "Where under a contract of sale the property in the goods has passed to the buyer and the buyer wrongfully neglects or refuses to pay for the goods according to the terms of the contract, the seller may sue him for *the price of the goods"* (italics added). Moreover, if the claimant could obtain compensation amounting to more than v_b, he would be better off by becoming a professional claimant, earning more than what he would have earned without the breach of contract. We will not consider this perverse effect here.

[2]Explicitely, we could model the payoff from deviating at time t with a recurring expression such as $U = \sum_{i=0}^{t} \delta^t(v_b - p) + (v_b - \phi p)\delta^{t+1} + \delta^{t+1}U$ where at time $t+1$, the buyer could start over with another partner. However, it is clear from this expression that the buyer always has an incentive to deviate as he is fined $\phi p < p$. An improved version would be: $U = \sum_{i=0}^{t} \delta^t(v_b - p) + \delta^{t+1}v_b - \phi(\sum_{i=t+1}^{\infty} \delta^t(p - v_s)) + \delta^{t+1}U$. This expression imposes a heavier fine on the buyer in the sense that he has to compensate for the future gains of trade the seller would have made from this relationship.In this case, the results are exaclty similar to the results obtained from the simple case explained in the paper.

[3]The exact formula of $\phi^*(v_s, v_b)$ is: $\phi^*(v_s, v_b) = \frac{v_s(1+\delta) - v_b\delta^2}{v_s\delta + v_b\delta(1-\delta)}$.

[4]These conditions are $v_s(1+\delta) > v_b\delta^2$ and $v_s < v_b\delta$. These conditions are simultaneously possible for some values of v_s, v_b and δ.

[5]The function F could well be identity. The amount of the fine would be $\sum_{i=t+1}^{\infty} \delta^i(v_b - v_s)$. It would correspond to the full discounted amount of the total profits. If the judiciary is perfect and $\phi = 1$, then the profits made by the buyer after expropriation

are 0. This would seem a fair fine to impose on the buyer.

Damages in contract law seek to put the injured party in the position he would have been in had the contract been performed satisfactorily. The award is made on the estimated loss directly resulting from the ordinary course of events since the breach. In contract law, future economic loss is a source of compensation.

This modern English law stems from the judgment of Alderson B in Hadley v Baxendale (1854) in which the rule was said to consist of two limbs. To be recoverable, damages should be such as may fairly and reasonably be considered either arising naturally, ie according to the usual course of things, from such a breach of contract itself, or such as may reasonably be supposed to have been in the contemplation of both parties at the time they made the contract, as the probable result of its breach.

[6]To be more precise, in the empirical part, I will look at plant and machinery assets, tools and other fixed assets, land assets, transport and equipment assets.

[7]A more rigorous expression would include a recursive expression for period 2 because this user has again the choice between renting and owning in period 2. For mathematical ease, I assume that the owner in period 1 will be an owner in period 2, although relaxing this assumption does not change the results.

[8]Law's Delays: Arrears in Courts, 85th Report, Department-related parliamentary standing committee on Home affairs, Parliament of India, Rajya Sabha. http://rajyasabha.nic.in/

book2/reports/home_aff/85threport%20.htm

[9]Krishnamoorty, Dasu, *Judicial Delays*, Indolink, editorial analysis, 2003

[10]http://www.hinduonnet.com/fline/fl1914/19141020.htm

[11]the resistance was even weaker due to a decision of the Supreme Court on December, 18, 2002 alledging that lawyers have no right to go on strike or give a call for boycott, not even on a token strike, as it denies the fundamental right of access to justice to the

litigant public. http://www.dailyexcelsior.com/web1/03jan17/edit.htm#4

[12]The complete example for Uttar Pradesh is shown in Data Appendix 1.

[13]I found only 82 state amendments that are the same as the 57 amendments related to speed in the 2002 Amendment Act.

[14]See the Data Appendix 2 for details on variables.

[15]See the Data Appendix 2 for some descriptive statistics and sources of the variables.

[16]The result is robust to a variety of specifications with and without controls but the most complete specification is shown.

[17]an alternative dependent variable equal to 1 if the firm was a global renter in the particular production good of interest (market value of production good hired superior to market value of production good owned) was also used and produced the same results.

Appendix

A1. Why is ϕ a measure of the speed of the judiciary?

Let us call U_{court} the utility a buyer can retrieve from taking the seller to court. E corresponds to the expected value.

$$U_{court} = E(\text{net gain}) = E(\text{gain}) - E(\text{cost of litigation})$$

$$E(\text{gain}) = E(\delta^{T-1}G)$$

G corresponds to the gross gain:

$$G : \text{gross gain} = \left\{ \begin{array}{c} p \text{ with probability } w \\ 0 \text{ with probability } 1-w \end{array} \right\}$$

T being the time at which a decision is reached (a random variable), and p_t the probability that the decision is reached at t.

Therefore, $E\left(\delta^{T-1}\right) = \sum_{t=1}^{\infty} p_t \delta^{t-1}$, and the expected gain is:

$$E(gain) = wp \sum_{t=1}^{\infty} p_t \delta^{t-1}$$

Here I make two assumptions. The first is that w, the probability of winning, is independent of time; the predictability of the decision is thus not affected by time. I will not focus on predictability in this model and will later equate w to 1 for the buyer. The second assumption is that the value of punishment p_n is independent of time. I could also consider that the verdict takes into account the time spent in court, but for simplicity's sake I will ignore this aspect. Now to the cost of litigation:

$$E(\text{cost of litigation}) = E(c_a + \sum_{t=1}^{t=T} c_t \delta^{t-1} + C\delta^{T-1})$$

c_a represents the cost of access to justice and c_t regular expenses during a trial (lawyer fees). In the rest of this paper, I will consider this cost c_t as a constant c, with a gross cost C incurred at the end of the trial. I introduce these three types of cost to emphasize common features of the judicial system. First, a fixed cost represents the initial barrier caused by information from the claimant. Second, a fixed cost per period represents regular expenses. This cost decreases with the speed of the judiciary: a rapid judiciary would lower these costs. Third, a cost occurring at the end of the trial represents a consequence of local legislations stating that losers and/or winners must pay the cost of the trial. This cost increases with judicial efficiency. Slow judiciaries make the occurrence of such costs appear so distant as to be almost irrelevant. The second and third costs illustrate the trade-off in any trial: defendants want trials over quickly so as to avoid paying high lawyer fees, but they also want to slow down the process so as to avoid paying fines. Using these refinements:

$$E(\text{cost of litigation}) = E(c_a + c \sum_{t=1}^{t=T} \delta^{t-1} + (wc_w + (1-w)c_l)\,\delta^{T-1})$$

with cost c_w if the individual in question wins and cost c_l if he loses. Thus:

$$E(\text{cost of litigation}) = c_a + \frac{c}{1-\delta}(1 - \delta\sum_{t=1}^{\infty} p_t\delta^{t-1}) + (wc_w + (1-w)c_l)\sum_{t=1}^{\infty} p_t\delta^{t-1}$$

and therefore:

$$U_{court} = wp_n\sum_{t=1}^{\infty} p_t\delta^{t-1} - c_a - \frac{c}{1-\delta}(1 - \delta\sum_{t=1}^{\infty} p_t\delta^{t-1}) - (wc_w + (1-w)c_l)\sum_{t=1}^{\infty} p_t\delta^{t-1}$$

I will now make some simplifying assumptions. First, I assume a distribution for the time in which the decision is reached. Specifically, I assume a geometric law with factor θ. Thus θ is the probability that the decision would be reached at t had it been not reached at $t-1$. Following this assumption, $p_t = \theta(1-\theta)^{t-1}$. The intuition behind this distribution is that a high θ would correspond to a rapid judiciary. In extreme cases, where $\theta = 1$, the decision would be reached immediately. A low θ would indicate a slow judiciary. Thus:

$$\sum_{t=1}^{\infty} p_t\delta^{t-1} = \frac{\theta}{\delta\theta + 1 - \delta}$$

With $(1-\theta)\delta < 1$, the sum converges. Note that a patient player ($\delta = 1$) will have $\frac{\theta}{\delta\theta+1-\delta} = 1$, meaning that regardless of judicial performance, he will receive compensation. An impatient player ($\delta = 0$) will have $\frac{\theta}{\delta\theta+1-\delta} = \theta$, meaning that his compensation will be discounted due to the speed of the judicial system.

I also assume, to simplify matters even more, that $c_a = 0$, $c_w = 0$ (in which the winner does not pay anything), $w = 1$ (in which the claimant, or buyer, wins for sure, the justice being fair), and $c = 0$ (no cost of trial). Therefore:

$$U_{court}(\theta) = E(netgain) = \frac{p\theta}{\delta\theta + 1 - \delta}$$

If ϕ is defined as $\frac{\theta}{\delta\theta+1-\delta}$, $U_{court}(\theta)$ can then be rewritten as:

$$U_{court}(\theta) = p\phi$$

The intuition behind this expression is that if $\theta = 1$ (the ideal instantaneous judicial system) then $U_{court}(1) = p$ which is the exact amount the buyer has had taken from him. If $\theta = 0$ (an interminably slow justice system) then $U_{court}(0) = 0$. Note that $U_{court}(\theta)$ is an increasing function of θ. To be completely rigorous in Section 1, I should consider the fact that ϕ depends also on δ. The intuition behind this being that patient players will be rewarded even when the judiciary is slow. However, to simplify the algebra in this paper, I will only consider ϕ.

A2. Proof of proposition 3

Proposition 3: *Less agents obtain loans from banks when judicial quality decreases, as banks recover less collateral in cases of non-repayment, forcing them to charge higher interest rates. More entrepreneurs obtain loans from friends as opposed to banks when judiciaries are slower.*

The game is as described in Section 1.3:

	Entrepreneur	
	C (pay)	D (do not pay)
Friend	$1+r-1, (1+\pi)-(1+r)$	$-1, 1+\pi$
Bank	$p(1+r)+(1-p)\phi c-1, (1+\pi)-(1+r)$	$\phi c-1, 1+\pi-\phi c$

If an entrepreneur obtains a loan from a friend, he understandably wants to default in the short run. However, the possibility of a long term relationship and repeated loans persuade him to cooperate. An entrepreneur will get $\sum_{i=0}^{t} \delta^i(\pi - r) + \delta^{t+1}(1+\pi)$ if he cooperates until time t and then deviates at time $t+1$. He would have received $\frac{\pi - r}{1-\delta}$ had he collaborated forever. Comparing these two payoffs, we know that an entrepreneur will always repay if and only if $r < \delta(\pi+1) - 1 = r_{friend}$. This is similar to an incentive constraint for the entrepreneur: the friend must charge such an interest rate in order to induce the entrepreneur to cooperate. The friend as a profit maximizer will charge r_{friend}.

Given this interest rate, the friend's expected profitability is $\sum_{i=0}^{\infty} \delta^i r_{friend} = \frac{r_{friend}}{1-\delta} = \frac{\delta(\pi+1)-1}{1-\delta}$. However, this expected profitability must exceed the friend's cost of raising funds $\overline{r}$. So the friend must ensure that $\delta(\pi+1) - 1 = r_{friend} > \overline{r}$.

But one must also consider banks. An entrepreneur will obtain $\sum_{i=0}^{t} \delta^i(\pi - r) + \delta^{t+1}(1+\pi-\phi c)$ if he cooperates until time t and then deviates at time $t+1$. He would have received $\frac{\pi - r}{1-\delta}$ had he collaborated forever. Comparing these two payoffs, we know that the entrepreneur will always repay if and only if $r < \delta\pi - (1-\delta)(1-\phi c)$. This is similar to an incentive constraint for the entrepreneur: the bank must charge such an interest rate to induce the entrepreneur to cooperate.

If the bank respects this condition, the entrepreneur will cooperate. The bank's payoff associated with this loan will thus be $\frac{p(1+r)+(1-p)\phi c-1}{1-\delta}$, which corresponds to the payoff associated with a repaying entrepreneur discounted over time. Again, this must be superior to the cost $\overline{r}$ of raising funds. The incentive constraint for the bank is thus: $p(1+r)+(1-p)\phi c - 1 > \overline{r}$ or $r > \frac{-p-(1-p)\phi c+1+\overline{r}}{p}$.

This is exactly the same situation as in Section 1.1. The incentive constraint for the entrepreneur is a positive relationship between r and ϕ. The incentive constraint for the bank is a negative relationship between r and ϕ. The intersection (r^*, ϕ^*) can under some conditions occur for $0 < \phi^* < 1$, with $\phi^* = \frac{1+\overline{r}-p(\delta\pi+1)}{c(1-p\delta)}$.

The conclusion for this model is that for $\phi < \phi^*$, the bank will not lend to this particular entrepreneur. This is credit rationing. It is interesting to note that the amount of collateral c has an impact on this limit ϕ^* with $\frac{\partial c}{\partial \phi^*} < 0$. This simply implies that increasing the amount of collateral can lower the threshold below which no credit is granted, or alternatively that banks will require more collateral to compensate for slower judiciaries.

An additional result comes from the comparison between an entrepreneur's two loan sources. Let us now assume that banks act in a competitive manner and set their interest rates so that their profits equal to zero. Thus, no credit is granted for $\phi < \phi^*$, but the interest rate is $r = \frac{-p-(1-p)\phi c+1+\overline{r}}{p}$ for $\phi > \phi^*$ (equality in the incentive constraint of the bank). It can be shown that $r_{bank} > r_{friend} \Leftrightarrow \phi < \phi^* \frac{1-p\delta}{1-p} = \phi^{**}$.

The conclusion is that banks will lend to entrepreneurs only if $\phi > \phi^*$, entrepreneurs, however, will find this more attractive than borrowing from friends only if $\phi > \phi^{**}$. In other words, more entrepreneurs switch to friends when judiciaries are slow.

A3. Proof of proposition 4

Proposition 4: *The size of the rental market decreases with inefficient judiciaries.*

With an efficient judiciary, the utility of the renter is:

$$U^r = \overline{v} - r_1 + \Pr(\delta \leq \delta^r)\left[\overline{v} - \delta - (r_2 + \pi)\right] + (1 - \Pr(\delta \leq \delta^r))\left[v_0 - r_2\right]$$

The utility of the owner is:

$$U^o = \overline{v} - p + \Pr(\delta \leq \delta^o)\left[\overline{v} - \delta\right] + (1 - \Pr(\delta \leq \delta^o))\left[v_0 - \pi\right]$$

Therefore $U^r - U^o = \frac{\pi}{\Delta}\left(\Delta - 4(\overline{v} - v_0) + 2\delta\right)$ so $U^r > U^o \Leftrightarrow \delta > \frac{4(\overline{v}-v_0)-\Delta}{2}$. There exists a δ^* such that $U^r \geq U^o \Leftrightarrow \delta \geq \delta^*$. The user prefers to rent if he believes his shock will be bigger than a certain value, in other words the user prefers to rent if he is likely to change activity.

With an inefficient judiciary, the utility of the renter is:

$$U^{r\prime} = \overline{v} - r_1' + \Pr(\delta \leq \delta^{r\prime})\left[\overline{v} - \delta - (\phi r_2 + \pi)\right] + (1 - \Pr(\delta \leq \delta^{r\prime}))\left[v_0 - r_2\right]$$

The utility of the owner has not changed because the judiciary does not impact the owner. The difference between these two utilities can be calculated:

$$U^{r\prime} - U^o = \frac{\pi}{\Delta}\left(\Delta - 4(\overline{v} - v_0) + 2\delta\right) + B(\phi)$$

where $B(\phi) = (1-\phi)r_2\left[-1 + 2\frac{\overline{v}-\pi-v_0}{\Delta}\right] + \frac{(1-\phi)^2 r_2^2}{\Delta}$. It is easy to show that $\frac{\partial B(\phi)}{\partial \phi} > 0 \Leftrightarrow \phi < 1 - \frac{-\Delta + 2(\overline{v}-\pi-v_0)}{2r_2}$. A sufficient condition for our results is that if $-\Delta + 2(\overline{v} - \pi - v_0) < 0$, then $B(\phi)$ is a positive function of ϕ and there exists a $\delta^{**}(\phi)$ such that $U^r \geq U^o \Leftrightarrow \delta \geq \delta^{**}(\phi)$ with $\delta^{**}(\phi)$ is a decreasing function of ϕ.

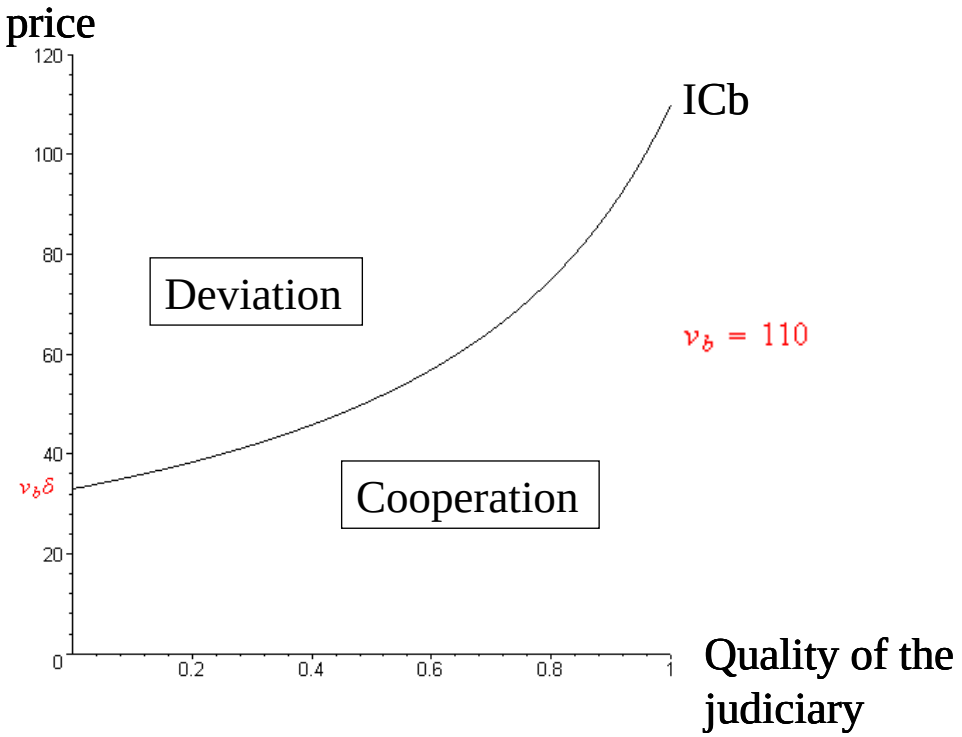

Figure 1: price offered by the buyer as a function of the quality of the judiciary in order to cooperate (ICb: Incentive Constraint of the buyer)

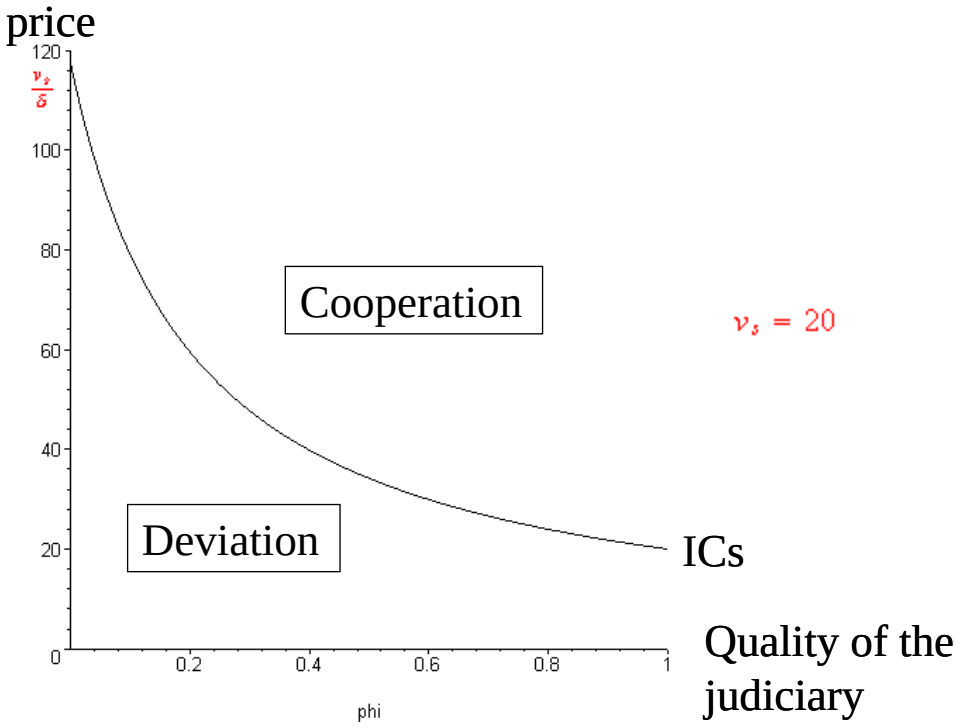

Figure 2: price asked by the seller as a function of the quality of the judiciary in order to cooperate (ICs: Incentive Constraint of the seller)

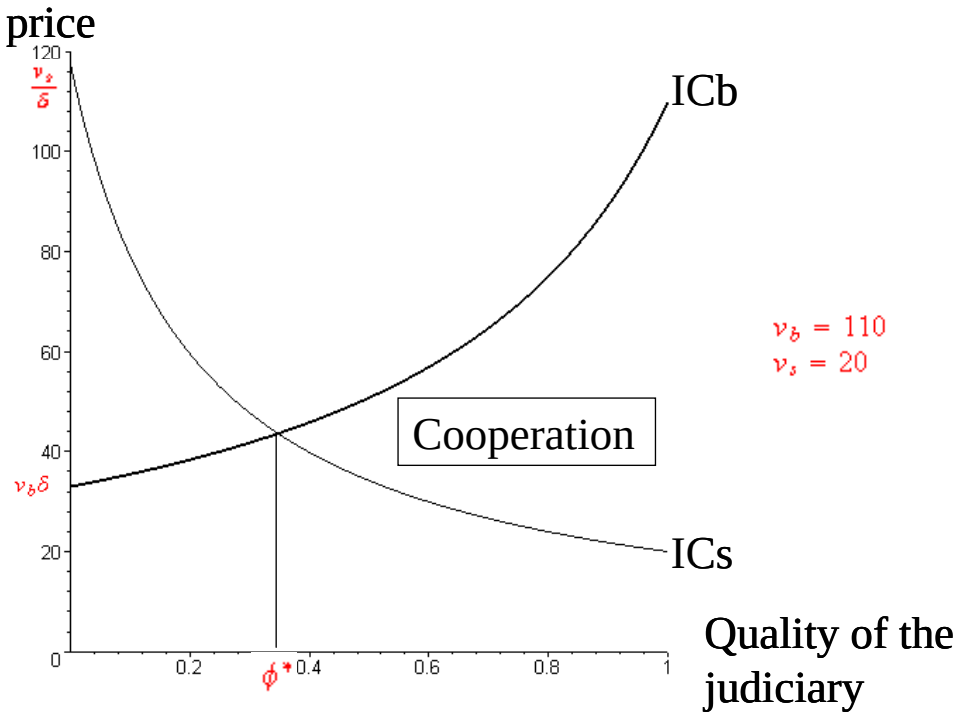

Figure 3: a potential matching between two individuals and the zone of cooperation

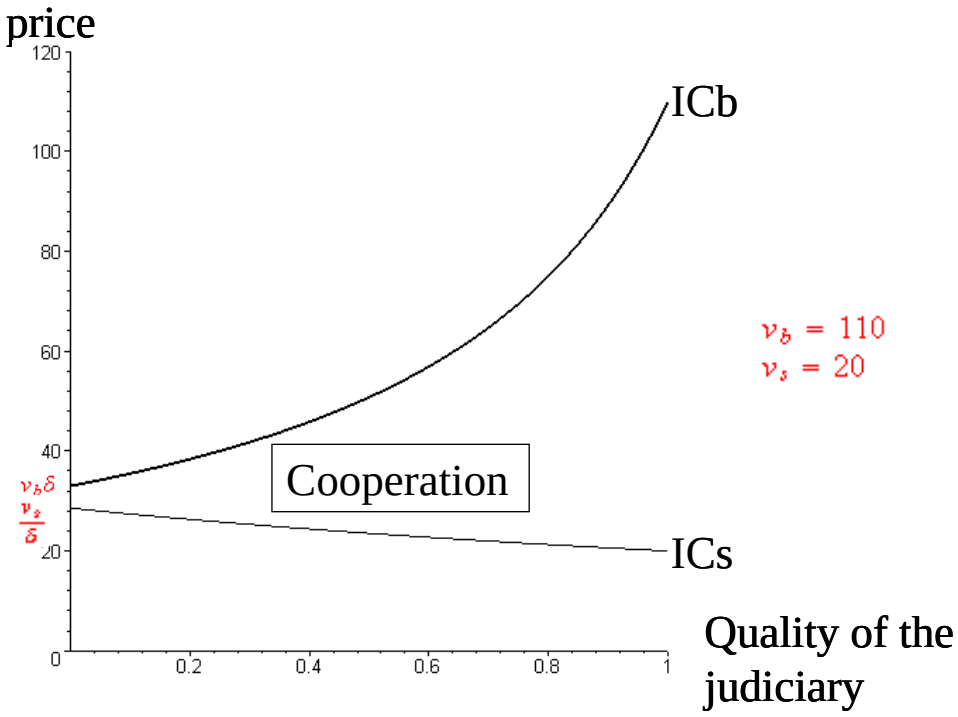

Figure 4: a matching between two individuals who could work in a business network

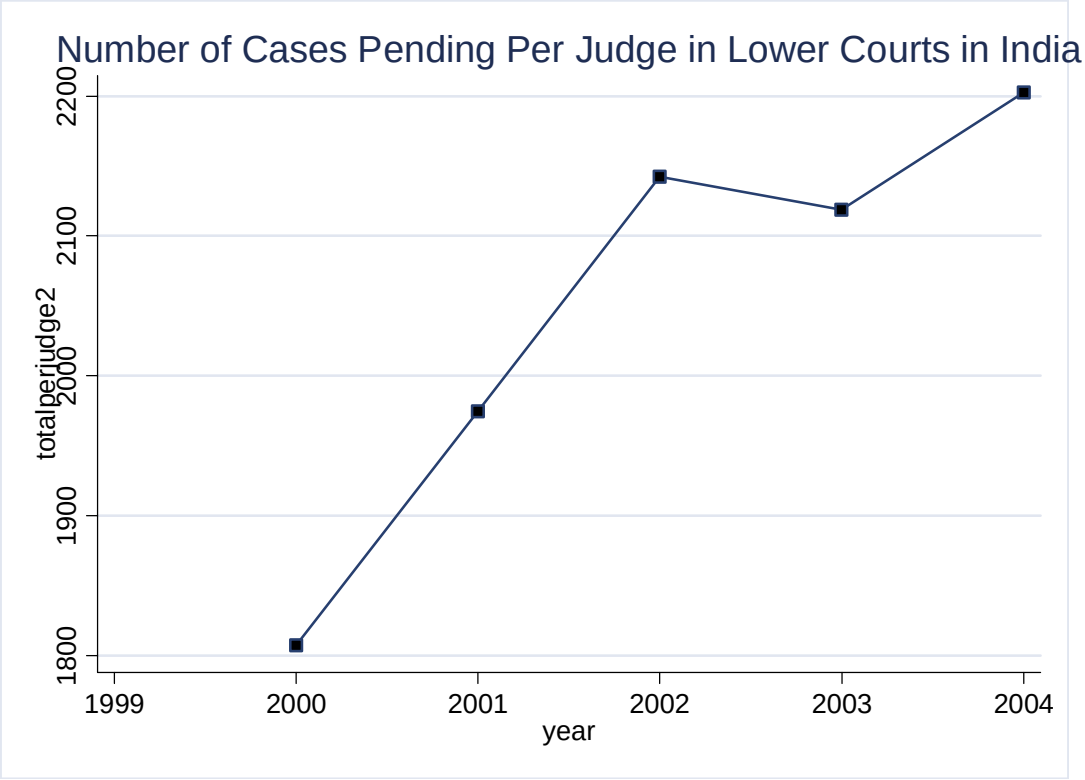

Figure 5: Number of cases pending per judge in Lower Courts in India

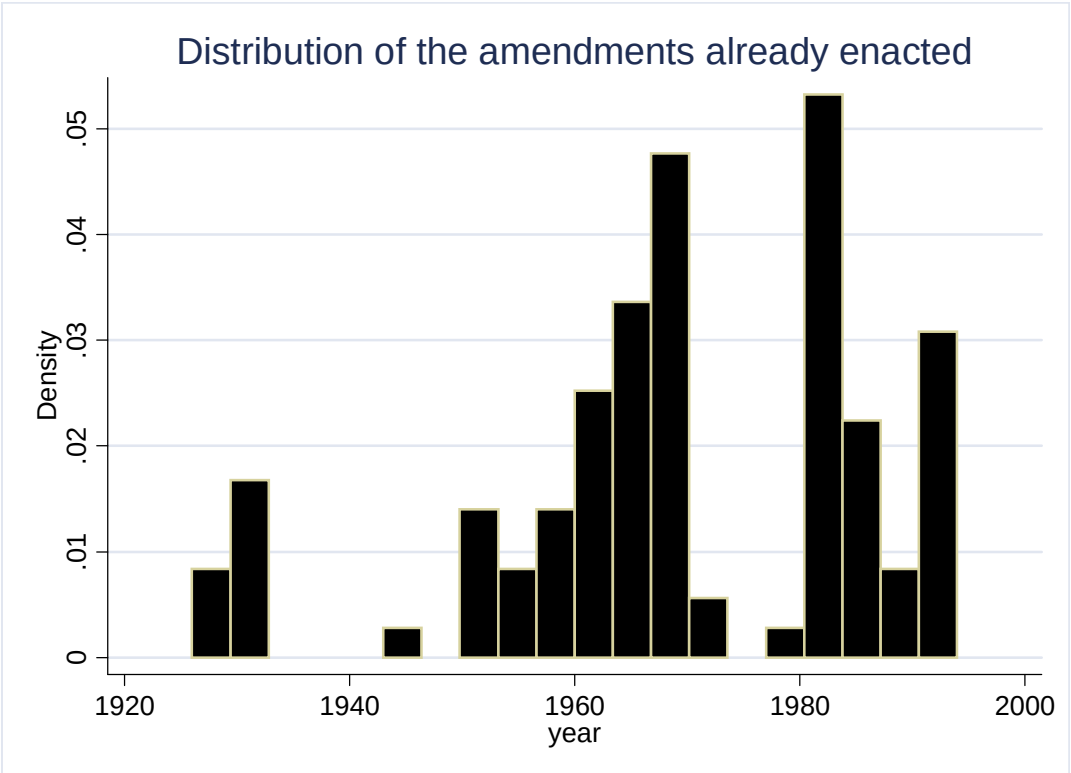

Figure 6: Distibution over time of the amendments already enacted

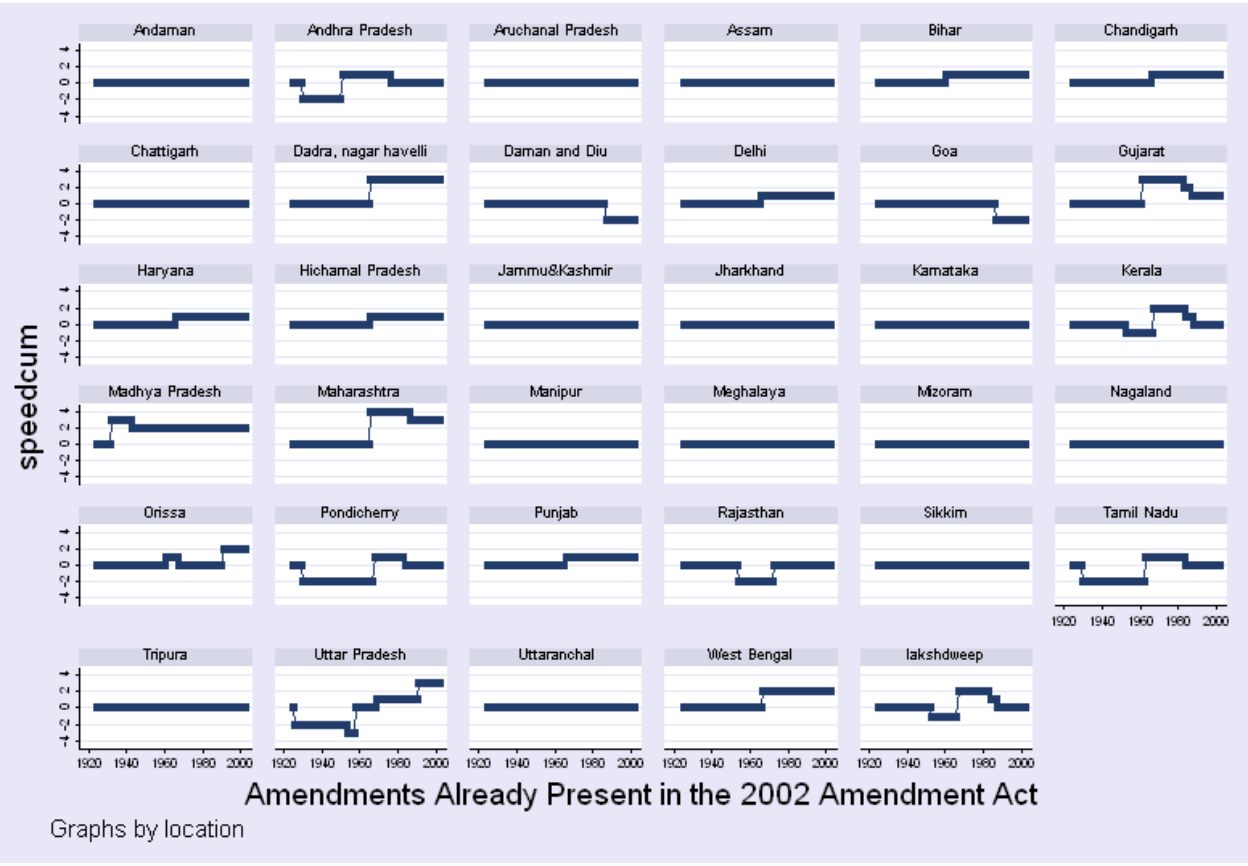

Figure 7: Amendments already present in the 2002 Amendment Act

Figure 8: Illustration of the identification strategy

Figure 9: Outcome for state 1 and 2

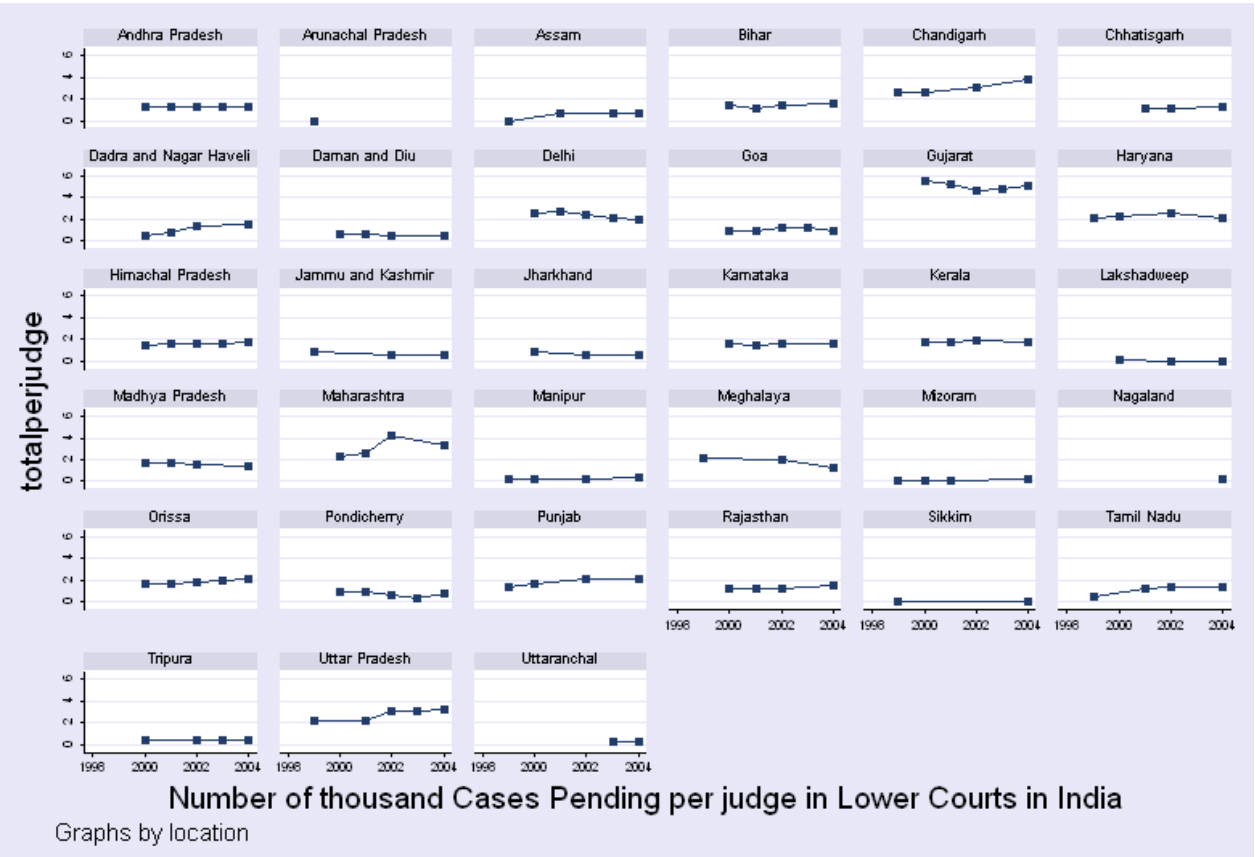

Figure 10: Number of thousand cases pending per judge in Lower Courts in India

Table 1: Impact of the 2002 Amendment Act on Number of Cases Pending Per Judge in Lower Courts and Exogeneity of the Amendments Already Enacted

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	thousand cases	Change in number of thousand cases pending per judge in					
	pending per judge	2000	2001	2002	2003	2004	2000, 2001
2002 Amendment Act	-0.4667						
	(-1.96)*						
Cumulative amount of		-0.0768	-0.0101	-0.1642	-0.0345	-0.0484	-0.0413
amendments increasing speed		(-0.29)	(-0.22)	(-2.59)**	(-0.78)	(-0.80)	(-0.31)
already enacted in the past							
State Dummies	Yes	No	No	No	No	No	No
Year Dummies	Yes	No	No	No	No	No	Yes
Observations	128	22	19	25	10	30	41
R-squared	0.80	0.00	0.00	0.23	0.07	0.02	0.00

Robust t statistics in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. Number of cases pending in Lower Courts in India obtained from Annual Reports, Ministry of Law & Justice & Past Issue, Govt. of India. Number of Judges obtained from various Rajya Sabha and Lok Sabha questions, centralised by www.indiastat.com. The variable 2002 Amendment Act is the net impact of the 2002 Amendment Act once taken into account the fact that some states already enacted some amendments in the past. Therefore, this variable varies by state. State dummies and Year Dummies are included. 35 states and 6 years are included. The dependent variable in Column (2) is the change in the number of thopusand cases pending per judge in 2000, measured by the difference in cases pending per judge between 2000 and 1999. Dependent variables in column (3), (4), (5) and (6) are the equivalent changes for 2001, 2002, 2003 and 2004 respectively. The last columns pools together changes in 2000 and 2001.

Table 2: Impact of the 2002 Amendment Act on the probability to experience a breach of contract

	(1)	(2)	(3)	(4)
	non-recovery of service charges, fees, credit			
2002 Amendment Act	-0.0073	-0.0067	-0.0069	-0.0072
	(-2.67)***	(-2.69)***	(-2.65)***	(-2.91)***
State Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
NIC2 dummies	No	Yes	No	No
NIC3 dummies	No	No	Yes	Yes
State-Level Controls	No	No	No	Yes
Observations	537454	537396	537141	527547

Robust z statistics in parentheses, clustered at the level of the state. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the probability to experience a problem of non- recovery of service charges / fees/ credit. This variable is equal to 1 if the entreprise experienced such a problem, 0 otherwise. The variable 2002 Amendment Act is the net impact of the 2002 Amendment Act once taken into account the fact that some states already enacted some amendments in the past. Therefore, this variable varies by state. State dummies and Year Dummies are included. In column (2), NIC2 dummies are included. This corresponds to the National Industrial Classification, disaggregated to the second level. 42 NIC2 dummies were included. In column (3), NIC3 dummies are included. This corresponds to the National Industrial Classification, disaggregated to the third level. 119 NIC3 dummies were included. In column (4), state-level controls are included: number of fast-track courts functioning per capita, state-wise financial assistance released for fast-track courts per capita, state-wise number of cases disposed off in Lok Adalats per capita, state-wise amount released for development of infrastructural facilities for judiciary in India per capita, number of policemen per one thousand of population, total police expenditure per policemen.

Table 3: Impact of the 2002 Amendment Act on investment

	(1)	(2)	(3)	(4)
	net addition to plant and machinery assets	net addition to tools and other fixed assets	net addition to transport and equipment assets	net addition to land assets
2002 Amendment Act	0.0044	0.0408	0.0039	-0.0026
	(3.65)***	(2.73)***	(2.77)***	-1.11
State Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
NIC3 dummies	Yes	Yes	Yes	Yes
State-Level Controls	Yes	Yes	Yes	Yes
Observations	502633	504901	502762	498969

Robust z statistics in parentheses, clustered at the level of the state. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in column (1) is the net addition to plant and machinery assets owned during last 365 days. This variable is equal to 1 if the entreprise experienced a net addition to plant and machinery assets, 0 otherwise. The dependent variable in column (2) is the net addition to tools and other fixed assets owned during last 365 days (1 if the entreprise did such an investment, 0 otherwise). The dependent variable in column (3) is the net addition to transport and equipment assets owned during last 365 days (1 if the entreprise did such an investment, 0 otherwise). The dependent variable in column (4) is the net addition to land assets owned during last 365 days (1 if the entreprise did such an investment, 0 otherwise). The variable 2002 Amendment Act is the net impact of the 2002 Amendment Act once taken into account the fact that some states already enacted some amendments in the past. Therefore, this variable varies by state. State dummies and Year Dummies are included. NIC3 dummies are always included. This corresponds to the National Industrial Classification, disaggregated to the third level. 119 NIC3 dummies were included. State-level controls are always included. They are: number of fast-track courts functioning per capita, state-wise financial assistance released for fast-track courts per capita, state-wise number of cases disposed off in Lok Adalats per capita, state-wise amount released for development of infrastructural facilities for judiciary in India per capita, number of policemen per one thousand of population, total police expenditure per policemen. I also added some controls specific to states' financial development: state-wise ratio of aggregate deposits to total credit of public sector banks and state-wise number of bank offices of public sector banks per capita.

Table 4: Impact of the 2002 Amendment Act on access to finance

	(1)	(2)	(3)	(4)
	shortage of capital	loan from a formal institution	loan from a business friend	loan from a relative
2002 Amendment Act	-0.064	0.0487	0.0285	0.0297
	(-4.28)***	(2.73)***	0.43	0.99
State Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
NIC3 dummies	Yes	Yes	Yes	Yes
State-Level Controls	Yes	Yes	Yes	Yes
Observations	504966	49588	50233	50179

Robust z statistics in parentheses, clustered at the level of the state. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in column (1) is the probability to experience a problem of shortage of capital (1 if the entreprise experienced such a problem, 0 otherwise). The dependent variable in column (2) is the probability to obtain a loan from a formal financial institution (financial institutions, government, bank) among the entreprises which obtained a loan (1 if the entreprise obtained a loan from a formal financial institution if it obtained a loan, 0 otherwise). The dependent variable in column (3) is the probability to obtain a loan from a business friend (contractor, moneylender) if the entreprise obtained a loan.The dependent variable in column (4) is the probability to obtain a loan from a relative (relative, business partner) if the entreprise obtained a loan. There are only 50,000 observations for columns (2), (3) and (4) as only 50,000 of the entreprises reported having obtained a loan. The variable 2002 Amendment Act is the net impact of the 2002 Amendment Act once taken into account the fact that some states already enacted some amendments in the past. Therefore, this variable varies by state. State dummies and Year Dummies are included. NIC3 dummies are always included. This corresponds to the National Industrial Classification, disaggregated to the third level. 119 NIC3 dummies were included. State-level controls are always included. They are: number of fast-track courts functioning per capita, state-wise financial assistance released for fast-track courts per capita, state-wise number of cases disposed off in Lok Adalats per capita, state-wise amount released for development of infrastructural facilities for judiciary in India per capita, number of policemen per one thousand of population, total police expenditure per policemen. I also added some controls specific to states' financial development: state-wise ratio of aggregate deposits to total credit of public sector banks and state-wise number of bank offices of public sector banks per capita.

Table 5: Impact of the 2002 Amendment Act on rental markets

	(1)	(2)	(3)	(4)
	rent plant and machinery assets	rent tools and other fixed assets	rent transport and equipment assets	rent land assets
2002 Amendment Act	0.0004	0.0033	0.0012	-0.0205
	0.97	(2.95)***	(1.95)*	(-2.39)**
State Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
NIC3 dummies	Yes	Yes	Yes	Yes
State-Level Controls	Yes	Yes	Yes	Yes
Observations	495464	503007	496390	504857

Robust z statistics in parentheses, clustered at the level of the state. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in column (1) is equal to 1 if the entreprise is renting plant and machinery assets, 0 otherwise. The dependent variable in column (2) is equal to 1 if the entreprise is renting tool assets, 0 otherwise. The dependent variable in column (3) is equal to 1 if the entreprise is renting transport and equipment assets, 0 otherwise. The dependent variable in column (4) is equal to 1 if the entreprise is renting land assets, 0 otherwise. The variable 2002 Amendment Act is the net impact of the 2002 Amendment Act once taken into account the fact that some states already enacted some amendments in the past. Therefore, this variable varies by state. State dummies and Year Dummies are included. NIC3 dummies are always included. This corresponds to the National Industrial Classification, disaggregated to the third level. 119 NIC3 dummies were included. State-level controls are always included. They are: number of fast-track courts functioning per capita, state-wise financial assistance released for fast-track courts per capita, state-wise number of cases disposed off in Lok Adalats per capita, state-wise amount released for development of infrastructural facilities for judiciary in India per capita, number of policemen per one thousand of population, total police expenditure per policemen. I also added some controls specific to states' financial development: state-wise ratio of aggregate deposits to total credit of public sector banks and state-wise number of bank offices of public sector banks per capita.

Table 6: Impact of the 2002 Amendment Act on the status of the entreprise and on firms creation

	(1)	(2)	(3)	(4)
	status of the enterprise			probability to be a new enterprise
2002 Amendment Act	0.0122	0.0159	0.0313	0.0089
	(1.66)*	(2.73)***	(3.20)***	(1.71)*
State Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
NIC3 dummies	Yes	Yes	Yes	Yes
State-Level Controls	No	Yes	Yes	Yes
Growth controls	No	No	Yes	Yes
Observations	537424	527830	489510	489432

Robust z statistics in parentheses, clustered at the level of the state. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable in columns (1), (2) and (3) is the status of the entreprise over the last three years. It is equal to 1 if the entreprise is expanding or constant , to 0 if the entreprise is contracting. The dependent variable in column (4) is equal to 1 if the firm operated for less than 3 years, in other words a new firm, 0 otherwise. The variable 2002 Amendment Act is the net impact of the 2002 Amendment Act once taken into account the fact that some states already enacted some amendments in the past. Therefore, this variable varies by state. State dummies and Year Dummies are included. NIC3 dummies are always included. This corresponds to the National Industrial Classification, disaggregated to the third level. 119 NIC3 dummies were included. In column (1), no controls are included. In column (2) , the following state-level controls are included: number of fast-track courts functioning per capita, state-wise financial assistance released for fast-track courts per capita, state-wise number of cases disposed off in Lok Adalats per capita, state-wise amount released for development of infrastructural facilities for judiciary in India per capita, number of policemen per one thousand of population, total police expenditure per policemen. In column (3), additional state-level controls are included: state-wise ratio of aggregate deposits to total credit of public sector banks and state-wise number of bank offices of public sector banks per capita. I also included in column (3) the growth rate of the state net domestic product per capita to control for states' economic development.

Data Appendix 1: coding for Uttar Pradesh

Amendment	year	page	section	rule	speed	synopsis
Amendment Act	2002	52	102		1	no second appeal for cases less than 25,000RS (before:1,000, 1976: 3,000)
Uttar Pradesh	1954	52	102		0	no second appeal for cases less than 200RS (but superseded in 1976)
Amendment Act	1999	56	115	1	1	a revision can be made if the order would cause irreparable injury to the party against whom it was made. This disappears in 1999: less quality but more speed
Amendment Act	1999	56	115	3	1	a revision is not a stay of suit (more speed because the court cannot use revisions to slow down the process)
Uttar Pradesh	1991	57	115		-1	revision only for cases more than 1 lakh rupees (=less revisions!). So negative impact in 2002 with respect to the rest of the country because the 20002 Amendment Act will supersede this amendment.
Uttar Pradesh	1991	57	115		-1	no revision by district court. So negative impact in 2002 with respect to the country
Uttar Pradesh	1991	57	115	1	0	the 1991 amendment is the 1976 amendment. No differential impact in 2002
Uttar Pradesh	1991	57	115	3	0	the 1991 amendment is the 1976 amendment. No differential impact in 2003
Amendment Act	1999	86	4	1	-1	a plaint shall be presented in duplicate to the court.
Uttar Pradesh	1926	86	4	1	1	for the rest of the country, it is harder to file a case (it has to be a duplicate). Not so for Allahabad because since 1926 they had to file a case and the copy for service with summons upon each defendant. By comparison, it becomes easier in allahabad.
Amendment Act	1999	88	5	2	-1	the plaint has to accompany the summons (concise statement not allowed=less speed).
Uttar Pradesh	1926	88	5	2	1	the concise statement omission was already present in 1926. no change felt in 2002.
Amendment Act	2002	92	5	9	1	to summon a defendant, the court can now use post, fax, email.
Amendment Act	2002	92	5	9	1	if the defendant refuses to receive the mail, the summons is considered served
Uttar Pradesh	1958	92	5	9	-1	the post rule is already present here
Uttar Pradesh	1958	92	5	9	-1	if the defendant refuses to receive the mail, the summons is considered served
Amendment Act	1999	97	5	21	1	to summon a defendant outside the jurisdiction of a court, the court can send a courier service.
Uttar Pradesh	1958	98	5	21	-1	this post rule already present for Allahabad
Amendment Act	1999	179	17	2	1	the court can impose higher costs for adjournment
Uttar Pradesh	1926	180	17	2	0	no adjournment to call a witness. But that stays.
Amendment Act	1999	373	41	1	1	only a copy of the judgement required to file an appeals (not the decree as before)=more speed because it can take time to get a decree
Uttar Pradesh	1969	374	41	1	-1	but if the appelate court realises that the original court did not have time to issue the decree, then it will be ok. No impact of 2002 amendment.

Overall, Uttar pradesh has already enacted 4 amendments present in the 2002 Amendment Act. The overall impact of the 2002 Amendment Act is +38. The effect in 2002 will be 38-4=34 for Uttar Pradesh with respect to the rest of the country. (page given according to "Code of Civil Procedure", 19th edition, 2004, Eastern Book Company)

Data Appendix 2: Table of means

Variable	source	Number of observations	Mean	Std. Dev.
2002 Amendment Act	Code of Civil Procedure	70	37.457	1.146
Number of judges	Annual Reports, Ministry	201	326.105	352.178
Number of thousand cases pending per judge in Lower Courts in India	of Law Justice, India	128	1.752	2.365
Non recovery of service charges, fees, credit		537622	0.061	0.239
shortage of capital		537622	0.244	0.430
having obtained a loan		537622	0.099	0.299
loan from a formal institution (fin. institutions, government, bank)		53183	0.579	0.494
loan from a business friend (contractor, moneylender)		53183	0.300	0.458
loan from a relative(relative, partner)		53183	0.147	0.354
net addition to plant and machinery assets owned during last 365 days	National Sample Survey	537622	0.030	0.172
net addition to tools and other fixed assets owned during last 365 days	55th (2000) and 57th	537622	0.169	0.375
net addition to transport, equip. assets owned during last 365 days	(2002) rounds	537622	0.029	0.168
net addition to land assets owned during last 365 days		537622	0.010	0.098
rent plant and machinery assets		537622	0.007	0.082
rent tools and other fixed assets		537622	0.017	0.128
rent transport and equipment assets		537622	0.043	0.202
rent land assets		537622	0.356	0.479
status of the entreprise		537622	0.739	0.439
probility to be have been created within the last 3 years		537622	0.149	0.356
number of fast-track courts functioning per capita	Rajya Sabha and Lok	49	8.910E-07	6.860E-07
state-wise financial assistance released for fast-track courts per capita	Sabha questions,	60	1.460E-05	3.150E-05
state-wise number of cases disposed off in Lok Adalats per capita	collected by	70	0.001	0.003
state-wise amount released for development of infrastructural facilities for judiciary in India per capita	www.indiastat.com	57	8.780E-06	1.260E-05
number of policemen per one thousand of population	Crime in India, National	70	1.464	1.041
total police expenditure per policemen	Crime Records Bureau	70	130535.900	38121.100
growth rate of the state net domestic product per capita	Economic Surveys,	69	1.860	5.093
state-wise ratio of aggregate deposits to total credit of public sector banks	http://indiabudget.nic.in/	70	0.470	0.212
state-wise number of bank offices of public sector banks per capita		70	4.900E-05	1.930E-05