Does the Quality of the Judiciary Shape Economic Activity? Evidence from India.*

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Abstract

There were 3.1 million cases pending in India's 21 High Courts and 20 million in its subordinate courts in 2000. This paper examines the consequences of a slow judiciary on the contracting behaviour of firms in India. I develop a game theoretical model which allows me to study how the judiciary's efficiency affects the contracting behaviour of firms. I then examine how the case pendency rate in state courts in India affects the contracting behaviour of 170,000 small non-agricultural informal firms from the 55th round of the National Sample Survey of 2000. My estimates suggest that a slow judiciary implies more breaches of contract, discourages firms from undertaking relationship-specific investments, impedes the access of firms to formal financial institutions, and favours inefficient dynasties. The negative implications of having an inefficient judiciary are large - moving a firm from the highest to the lowest pendency state would result in a 10% improvement in firm performance.

Keywords: Law and economics, Institutions, Courts, Contracts, Industrial Organisation, Economic Growth, Industrial Performance

JEL Classification: K0, K12, K40, K42,O12, O17, L14, D23, C72.

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1 Introduction

In this paper, I examine both theoretically and empirically whether the quality of the judicial system has implications for the contracting behaviour and economic performance of firms. Standard neoclassical economics assumes that the judiciary is perfect, fair, immediate. There always exists a set of prices such that contracting can achieve Pareto efficiency, as in the First Welfare Theorem. However, it is clearly understood today from the contributions by North (1990) that institutions defined as the organisation of society, "rules of the game" 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 the contracting behaviour of firms and hence on aggregate economic performance. Knack and Keefer (1995) relate some professional country risk measures provided by business experts to their measure of the quality of the judiciary 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 that type of money. However, there is a problem of endogeneity: richer countries can afford better institutions. Three papers deal with the endogeneity of the 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 faced by 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 persisted to the present. They find that the risk of expropriation, instrumented by settler's mortality, negatively affects economic growth today in a cross section countries. More recently, Djankov et al (2003) gathered a remarkably detailed dataset on courts performance and procedural formalism in a cross section of 109 countries to show that a higher procedural formalism coming from the legal origin is associated with a less efficient judiciary.

To date, the literature on the links between institutions, contract enforcement and economic performance has been largely macroeconomic. In contrast, I try to move this literature in a more microeconomic direction. I focus on one specific measure of institutional quality, the speed of the judiciary, which I can evaluate in an objective fashion. I then examine how this measure affects the contracting behaviour and the economic performance in a large representative sample of small non-agricultural firms in India. This dataset is unique in the sense that an array of questions are asked of firm owners concerning breaches of contract, nature of the contracts signed, access to credit, corporate ownership. 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 which cannot be as convincingly controlled for in cross country data. In this sense, my paper is in the spirit of recent papers which exploit 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 the contracting behaviour and performance of small firms in India.

The structure of this paper is as follows. Section 2 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, use of relationship-specific investments, access to credit markets and corporate ownership. Section 3 provides a background on the functioning of the judiciary in India and on the 55th round of the National Sample Survey of India on non-agricultural informal enterprises. Section 4 presents my method, and results pertaining to the contracting behaviour of firms. Section 5 discusses the effects on the performance of firms. Section 6 concludes.

2 Theory

2.1 Breaches of Contract

The first intuitive consequence of an imperfect judiciary would be the modification of the willingness of economic agents to cooperate in a previously signed contract. 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 a harsh punishment in monetary or non-monetary terms would heavily dissuade opportunistic agents to default ex-post on a previous agreement.

Consider a trade relationship between two agents, a buyer and a seller. These two individuals are playing 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 behaviour (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

[1]We could argue that the buyer could get v_b but the court does not observe that value and can therefore only compensate the buyer by 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 get a compensation more than v_b, the claimant would

and a value close to 1 indicates a very speedy judiciary (see appendix for proof). The payoffs for this game are therefore:

		Buyer	
		C (pay)	D (do not pay)
Seller	C (deliver)	$p - v_s, v_b - p$	$\phi p - v_s, v_b - \phi p$
	D (do 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 the tastes of agents concerning the future, their sensitivity to a punishment by a court in the future and therefore their propensity to cooperate in a repeated game framework. Suppose that the 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 giving an incentive to cooperate.

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 payoff calculated concerns the one obtained from that particular match. However, after having breached a contract, a buyer could search for a new partner and start over 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

be better off by becoming a professional claimant, earning more than he would have got without the breach of contract. We will not consider that 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.

ϕ. This is just saying that if the judiciary gets worse, 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 non 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 has to be superior to a certain level. The price threshold depends positively on ϕ. This is just saying that if the judiciary gets worse, then the seller will require for a higher price in order to cooperate. Again, the seller claims a certain insurance amount because of the higher risk of non 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 price allowing trade to take place. The exact price will then be determined by the bargaining power of the two agents and its determination is outside the scope of the 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 becomes 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 their private information about their probability to cooperate and using social pressure to ensure that contracts are respected. Indeed even if the judiciary is defective, a number of recent papers have suggested 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, where the commitment problem

[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.

is surmounted by a multilateral punishment mechanism. A series of theoretical papers try to explain the stylised fact of relational contracting in a business network 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 about self-governance as an alternative to official law. Even if people do not create business networks to avoid a clogged judiciary, they could resort to settlements before even using the judiciary. This group of papers suggest that informal contract enforcement might mitigate the impact that courts may have in shaping economic activity. Unfortunately, I do not have any information in my dataset on business networks or at least on the nature of the relationship between business partners. Theoretically, it is possible to build a model where agents would get the choice between going in the anonymous market with the possibility of breaches of contract or creating business networks without breaches of contract but with less economic opportunities. Figure 4 shows the situation where two agents could function in a business network without a judiciary: even at $\phi = 0$, they would gain from trade. The condition for that 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 neighbours. 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 interesting to apply this framework to two other situations: relationship-specific investment and access to credit markets.

2.2 Relationship-Specific Investment

The previous section demonstrated that more contracts are breached if the judiciary is of low quality. But one could also expect the quality of the judiciary to impact on the degree of specificity in the relationships between firms. A relationship-specific investment is defined as an investment made by an agent in order to supply another with a specialised asset. A specialised asset is itself defined as an asset whose value in the current use exceeds its value in alternative use. A relationship-specific investment is preferred by firms for obvious reasons of economic specialisation. However, as Klein et al (1978) emphasized, the possibility of post-contractual opportunistic behaviour arises. Indeed, to induce the supplier to realise a relationship-specific investment, a firm can either write a long-term contract with favourable 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 rents of the supplier. Alternatively, if the 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 in specialised assets; Klein et al (1978)

conclude that vertical integration will supersede market systems in those cases. But another way to limit post-contractual opportunistic behaviour is a strong judicial system to enforce contracts properly. I develop now a simple model based on the previous game where the judiciary is explicitly modelled to evaluate the impact of the quality of the judiciary on the incentive to invest in specialised assets.

Consider the game described earlier. There are two possibilities for a seller of a good: either realise a relationship-specific investment (RSI) of value i with a particular firm, or produce a good of more widespread use (the opposite of a relationship-specific investment, $\overline{RSI}$) with no or little appropriable rents. The drawback of a relationship-specific investment is that there is a risk of post-contractual opportunistic behaviour but its advantage is the possibility of higher rents. As my analysis is focused arbitrarily on the seller, I model this as a decrease in the costs of production for the seller if a relationship-specific investment is undertaken. The valuation of the good for the buyer is v_s with a relationship-specific investment and V_s without, where $V_s > v_s$. We can calculate the payoffs associated with each strategy and compare them.

The seller gets $-i + \sum_{i=0}^{t} \delta^i (p_{RSI} - v_s)$ if he cooperates until time t and $-i + \frac{p_{RSI} - v_s}{1-\delta}$ if he cooperates for ever. p_{RSI} corresponds to the price determined between the seller and the buyer if a relationship-specific investment has been undertaken. The seller gets $\sum_{i=0}^{t} \delta^i (p_{\overline{RSI}} - v_s)$ if he cooperates until time t and $\frac{p_{\overline{RSI}} - v_s}{1-\delta}$ if he cooperates for ever in the case where no relationship-specific investment is undertaken. I assume here that the seller is always willing to cooperate in order to take advantage of his relationship-specific investment. The set of prices that give an incentive to the buyer to cooperate will be determined by looking at the situation of the buyer.

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

rents.[5] Comparing these two payoffs, we get 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 expropriate the seller, the seller has to offer a low enough price. This price function is decreasing with respect to ϕ. Indeed, if the quality ϕ of the judiciary decreases, then the buyer has more incentive to expropriate. The seller has therefore to offer a lower price.

I now make the assumption that the seller is going to offer the price corresponding to that incentive constraint. It is the lowest price at which the buyer cooperates under a certain judiciary ϕ and the highest price to make profits. It is straightforward to calculate the payoffs for the seller in the two situation: if a relationship-specific 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 *relationship-specific 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 behaviour increases and as a consequence the incentive to supply a particular firm with a specialised asset of no value to other firms is reduced.

2.3 Access to credit markets

We may also think that the judicial system would have an impact on the debt contracts of firms. As Pagano et al (2002) put it:

[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 will be made on the estimated loss directly resulting in the ordinary course of events from the breach. In contract law, future economic loss is capable of compensation.

The modern law in England stems from the judgment of Alderson B in *Hadley* v *Baxendale* (1854) where the rule was said to consist of two limbs. To be recoverable the damages should be such as may fairly and reasonably be considered either arising naturally, ie according to the usual course of things, from such 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 the breach of it.

"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 behaviour 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 behaviour of borrowers by reducing the availability of credit."

They develop a model where collateral is used as a device to solve credit rationing. They find that improving judicial efficiency reduces credit rationing and expands lending. However, I am concerned in this paper with very small firms in India. Only 4% of them have access to formal financial institutions. Another way for these firms to find finance is to use their relationships. Indeed, some firms get loans from relatives or business partners. I call that kind of creditor a "friend". I now develop a model about the trade-off between a friend and a bank, and the impact of the judiciary on this choice. This helps me to explain when a firm will choose one of them and when it is credit rationed.

Consider an entrepreneur who wants to start a project and following needs funds. There are two possibilities of funding: a friend or a bank. All the variables are in per unit lent. The profit associated with the project is π. The entrepreneur knows this unrisky 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 has to be made here:

Assumption: The bank does not know the probability p of success of the project. On the other hand, the friend and the entrepreneur knows that the project is going to be successful and is going to earn π to the entrepreneur.

I chose that particular assumption in order to underline the difference between the bank and the 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 the bank and the entrepreneur. This creates a trade-off for the entrepreneur between the bank and the friend which is going to depend 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 repays the loan. But with a probability $1-p$, the project should fail, the

entrepreneur would be unlikely to repay the loan and the bank will only recover ϕc. It is then straightforward to estimate the different payoffs to the entrepreneur from the tow sources of a loan.

It is then straightforward to calculate the payoffs associated with both strategies for each source of the loan to get 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 would not give a loan because there does not exist an interest rate that will give an incentive to the entrepreneur to take a loan and be profitable for the bank. The entrepreneur has simply too many incentives to default as 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 the collateral c meaning that only customers with a high enough collateral will not be credit rationed. Interestingly, a loan from a friend becomes relatively more attractive if the judiciary gets worse. Indeed, the bank has to charge an interest rate negatively related to the quality of the judiciary. This is because the bank would recover less in the case of failure and has therefore to increase the interest rate to make the transaction still 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 if the judiciary gets worse.

Proposition 3 *Less agents get a loan from a bank if the quality of the judiciary decreases as the bank recovers less collateral in the case of non-repayment forcing the bank to charge a higher interest rate. More entrepreneurs get a loan from a friend as opposed to a bank if the judiciary is slower.*

Proof. See appendix for proof. ■

2.4 Dynastic Management

Dynastic management is the inter-generational transmission of control over assets that is typical of family-owned firms. The most comprehensive data on corporate ownership around the world has been collected by La Porta, De-Silanes and Shleifer (1999), who look at the control structure of the 20 largest publicly traded companies in 27 (mostly wealthy) economies in 1995. On average across these countries, family ownership is the control structure of 30% of companies. The numbers for the middle-income countries in the sample are especially striking: 65% in Argentina, 50% in Greece, 100% in Mexico, 45% in Portugal. They argue that widely held corporations should be more common in countries with good legal protection of minority shareholders. In these countries, controlling shareholders have less fear of being expropriated themselves in the event that they ever lose control through a takeover or a market accumulation of shares by a raider, and so might be willing to cut their ownership of voting rights by selling shares to raise funds or to diversify.

However, the firms I study here are very small firms with less than ten employees and are certainly not floated on stock markets. Another explanation that might be more adapted to the type of firms I consider in this paper comes from Caselli, Gennaioli (2002). Their reasoning proceeds in two steps. First, the heir to the family firm has no obvious talent for managerial decision making: dynastic management is a potential source of inefficiency. Second, the owner of the firms; realising that his heir is untalented, would like to transfer control to new talented owners or hire talented managers. However, imperfect financial-contract enforcement discourages ownership changes for the same reason I developed in the access to credit markets section of this paper. The imperfect judicial systems in developing countries could be the cause of the prevalence of family-owned firms and therefore of the poor economic performance of those countries. Hence:

Proposition 4 *There must be more family-owned firms in states with a worse judiciary.*

To conclude the theoretical component of this paper, I expect in states with a higher pendency rate more breaches of contract, less relationship-specific investments, more difficulty accessing credit market, and more family firms. These predictions are testable using the dataset I analyse in the following sections.

3 Background

The purpose of the paper is to relate the quality of the judiciary to the contracting behaviour of firms. To do this, I make use of a state-level dataset of the courts. The judicial institutions are the same across courts and states. The Indian judiciary operates at three levels: a unique 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. India operates under a common law system which implies that the actions of High Court judges set precedents for the functioning of subordinate courts in that Indian state.

Data on cases pending in courts indicate that there are 3.1 million cases pending in 21 High Courts and 20 million in subordinate courts in 2000.[6] Some examples of the slowness of the judiciary 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

[6] 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

execute the decree passed in his favour against illegal encroachment of his land by Pakistani refugees. By then he was dead".[7]

One of the reasons for judicial delays is the shortage of judges. As Videh Upadhyay, a lawyer in the Supreme Court of India, states,

> "the imperative for clearing the burgeoning judicial backlog, and hence for more judges and Courts, needs to be fully understood. Any lawyer practising in the Delhi High Court - undoubtedly one of the most important High Courts of the country - can testify that, on an average 60-70 cases are listed before a Delhi High Court Judge per day. The sheer quantum of cases forces a judge to adjourn most of the matters leading to further backlogs. The inevitable outcome: normal adjournments are for 4-6 months, the trial dates are not available before 2 years and settlement of suit takes place over 15 years."[8]

Another reason is the inadequacy of laws in India. Some provisions in place in India can have a positive impact on the speed of a trial. One of the major positive legal principles is *res judicata*, which means that no claim or suit can be brought to court more than once. Another is the rule governing the transfer of suits forbidding multiple suits in different places on the same issue. This statute helps reduce the backlog of the judiciary. But other provisions in place in India can have a negative impact. For instance, the Code of Civil Procedure states that a litigant does not have to appear in court in person. Each litigant can send a pleader instead. But the pleader cannot accept a brief in lieu of a litigant; hence, pleaders are often sent as a strategy to delay judgments. Another rule is that the plaint has to include the complete claim. However, amendments of the original pleadings are impossible. Therefore, the statements are prolific in language, leaving a wide interpretation of the plaint in the proceedings. This reduces the clarity of the plaint.

Therefore, speed has been identified as the key problem with the judiciary in India dominating all other problems such as fairness, predictability and access to the judiciary. I measure the speed of the judiciary with the pendency percentage, defined as:

$$\text{pendency percentage} = \frac{\text{cases pending}(t)}{\text{cases pending}(t-1)+\text{cases filed}}$$

I constructed this index for 1999 from the annual report of India's Ministry of Law, Justice and Company Affairs. This is an incomplete measure since the quality of a judiciary can also be measured by the fairness of its decisions. But the measure I employ does have the advantage of being an objective measure of judicial efficiency. The overall pendency (civil and criminal cases) is an interesting statistic since it captures the

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

[8] Upadhyay Videh, "More cases, more judges, more courts", *India Together*, 2003.

perceived efficiency of the judicial system and it is the perceived efficiency of the judicial system that will affect the contracting behaviour of firms.

One attractive feature of this Indian data is the variation in pendency percentage across states. This is due to the common law system which compared with the civil law system, is much less codified. This liberty enables the judiciary to interpret the law more flexibly, and to adjust quickly to new developments. In particular, The Code of Civil Procedure, which defines the rules of a trial from the filing of a suit to the execution of a verdict, leaves great discretion to judges to either streamline the process or make it more complex. Due to the common law system, the decisions of High Courts concerning disputes about statutes of the Code of Civil Procedure set precedents for the respective subordinate courts. This is why a High Court's ruling can enhance or impair the efficiency of all courts within its jurisdiction. For example, an order in the Code of Civil Procedure states that the court may "grant an adjournment if sufficient cause is shown". The perception of sufficiency varies significantly among High Courts: the Calcutta High Court decided that the absence of a lawyer is not a cause to adjourn trial, whereas the Allahabad High Court granted a similar request. This example is particularly interesting as it shows that different interpretations of the same law in different states can have an impact on the speed of the judiciary.[9]

It is often claimed that the judicial system has only a limited impact on the economy because people resort to alternative dispute resolution institutions, in particular informal ones. Koehling (2002) describes two types of such informal institutions in India: Panchayats and rural planning commissions. Both institutions play a crucial role in settling and avoiding rural disputes. The Panchayats, with their limited judicial authority, are used to settle disputes about land usage, tenure and commons. As locally-bound institutions, they are highly efficient since they are familiar with the situation and the litigants at the village level. Correspondingly, the level of acceptance among the population is high. In the case of dispute resolutions, Panchayats can impose very limited sanctions, but the social pressure created by a judgement serves as a strong incentive to comply with the judgement. Rural planning commissions submit proposals for infrastructure projects such as water dwelling, road improvement to the respective state's authorities. Their involvement ensures broad participation of the affected population, and provides the basis for a distribution of public goods and services according to the needs of the poor. They are the first contact point for administrative complaints, and thus do prevent disputes before the projects are implemented. I therefore collect information on the number of these entities, and use this as a control in my regressions.

My aim in this paper is to relate these measures of judicial efficiency to firm's contract behaviour. In this regard, I turn to a representative sample of 170,000 small informal firms in India. This dataset is the 55th round of the National Sample Survey in India col-

[9]See Koehling (2002) for a more extensive analysis of the Indian judiciary.

lected in 1999/2000 for small non-agricultural firms.[10] There are several characteristics of this dataset that make it appropriate for use in identifying the impact of judicial delays on contracting behaviour. First, a detailed list of problems experienced by the firm was collected. Each firm reported if it found that the non-recovery of service charges, fees or credit was a major obstacle to its operation. I interpret this problem as a breach of contract. Second, a detailed questionnaire about the type of contracts used is also available. I know if the firm operated on a contract basis, and if so, the type of contract it used. For example, I know if the equipment and raw materials were self-procured, supplied by the master unit/contractor, or both. I also know if the design was specified by the contractor. Third, I have information about the access to credit markets. Each firm was asked if it found that the shortage of capital was a major problem to its operation. Related to this, a wealth of information on the source of loans is reported. I know if the loan was granted from a central and state-level term lending institution, a government (central, state, local bodies), public sector banks, commercial banks, other institutional agencies, money lenders, business partners, suppliers/contractors, or friends and relatives. Fourth, we have information on the type of ownership of the firm, whether it is a partnership with members of the same household or not. Finally, a wide range of more conventional information is also available for each firm: the full characteristics of all employees, the firm's capital stock, and factor incomes, the source and destination of the firm's final product, and the sector in which the firm is operating (to the 5-digit level in the National Industry Classification).

4 Methods and Results

To relate judicial efficiency to contracting behaviour, I perform regressions of the form:

$$y_{ijs} = \alpha_0 + \beta p_s + \delta_s Z_s + \gamma_{ijs} X_{ijs} + \alpha_j d_j + \varepsilon_{ijs}$$

where i corresponds to the firm, j to the sector studied, and s to the state. The variable y_{ijs} represents the outcome variable of interest; first this will be the firm's contracting behaviour, and later its performance. In this specification, determinants of the outcome include a constant (α_0), the pendency percentage (p_s), a vector of state-level controls (Z_s), a vector of firm-level controls (X_{ijs}) and sector-fixed effects (d_j). The coefficient of interest is therefore β.

My research design begins with a simple examination of the correlation between the contracting behaviour outcomes and the pendency percentage, and then incrementally adds control variables to that regression in order to check the robustness of the result.

[10] See Data Appendix for details of variables and an outline of the sampling design.

The state-level controls (Z_s)[11] consist of the following: state gross domestic product per capita and per capita income growth rate, to control for overall economic development; the state school enrolment and literacy rates, to control for educational attainment; state amount of credit per capita, to control for overall development of the financial sector; state expenditure on the organs of state and the unit cost per policemen, to control for the part of the state budget devoted to the enforcement of law and order; the state length of roads per capita and access to safe drinking water, to control for the quality of infrastructure; and finally, the state death rate and state male life expectancy to control for health sector development.

The firm-level variables (X_{ijs})[12] consist of the following: indebtedness, to control for the disciplinary effect that an increase in indebtedness has on the use of available funds; level of interest payments as a proportion of firms' profits, to control for the likelihood of bankruptcy; amount of capital accruing from financial institutions, to control for the firm's ability to gain access to sources of financing; proportion of temporary to total employment in the firm, to control for for labour productivity[13]; gender of the owner, to control for any gender-specific effects on firm performance[14]; number of unrelated other activities undertaken by the owner, to control for time spent on the firm's activities; and finally, whether or not the firm is registered, to control for the level of informality of the business.

I also include sector dummies (d_j) to control for sector-specific effects. I use simple probit regressions when the outcome is a dummy variable. I do not expect much endogeneity because there is no reverse causality between a small firm of less than ten employees[15] and the quality of the judiciary. I use robust standard errors and a clustered sampling strategy at the level of the state because I include state-level variables in a micro-econometric survey (Moulton, 1990).

4.1 Basic Results

Table 1 examines the relationship between contracting behaviour and the quality of the judiciary. The dependent variable is the occurrence of breach of contract and the sole

[11] See Data Appendix for exact definition and sources of the variables.

[12] See Data Appendix for exact definition and sources of the variables.

[13] The expected effect of this variable on productivity is ambiguous. It is possible that the incentives for the firm to earmark resources to investment in human capital are greater in the case of a full-time working relationship. Alternatively, temporary labour might provide a firm with increased flexibility to adapt to changes in its environment. Furthermore, it could be argued that temporary workers have an incentive to make a greater effort with the aim of becoming permanent.

[14] The impact of female ownership on firm performance is ambiguous. Many studies indicate that businesses owned by women underperform those of men. One of the difficulties faced by women in operating their own small business is family responsibilities which limit the hours they are able to spend working in their small businesses.

[15] 55% of the firms in the dataset used in this paper have one worker.

determinant is the pendency percentage. The dependent variable was obtained from a list of problems commonly experienced by the firms. One such problem is defined as: 'non-recovery of service charges/ fees/ credit'. This relates to cases where there has been a breach of contract. I therefore construct a dummy variable equal to 1 if the firm experienced this type of problem as one of its main problems, and 0 if not. I calculate in column (1) a simple correlation between these two variables. I incrementally add state-level control variables in column (2), firm-level control variables in column (3) and sector dummy variables in column (4). The results are all statistically significant which strengthens the claim that there is a significant relationship between the pendency rate and the contracting behaviour of firms. This result is consistent with proposition 1. Column (4) of Table 1 indicates that if the pendency percentage increases by one percentage point, then the probability that the firm will experience a breach of contract will increase by 0.1 percent. This result is quite weak and although statistically significant seems economically insignificant. However, the ranges of pendency percentages in India must be borne in mind. In 1999, the pendency percentage varied across states between 45% and 90%. The following interpretation of the coefficient β can therefore be devised. Based on the coefficients of the regression and using the standard cumulative normal function, which is the definition of the probit function, the probability that an average firm in the average state will experience a breach of contract, where the pendency percentage is 45%, can be estimated. I estimated the same quantity for the average firm in the average state with a pendency percentage of 90%. The difference between these two probabilities is 5 percentage points. The results can be interpreted in the following way: the probability that the average firm in the average state will experience a breach of contract is 5 percentage points higher if the pendency percentage varies from the lowest rate to the highest rate in India.

Table 2 looks at the nature of contracts as a function of the quality of the judiciary. The dependent variable represents whether or not a firm is operating on a contractual basis and the explanatory variable is the pendency percentage. As discussed earlier, the dataset contains detailed information about the contractual environment under which these firms are operating. I therefore constructed a dummy variable equal to 1 if the firm was working on a contract basis and 0 if not. Column (1) of Table 2 does not indicate any relationship between the quality of the judiciary and that variable. This may be due to the fact that only 7 percent of the firms in the dataset operate on a contractual basis. However, instead of evaluating the impact that the judiciary has on the number of contracts entered into, it is more instructive to assess the impact that the judiciary has on contract design. The dataset contains additional information on the nature of these contracts. In particular, three questions were asked to the firms: was the design of the product specified entirely by the contractor, was the equipment provided by the master unit, and were the raw materials provided by the master unit. I define the contract as a relationship-specific investment contract if these three questions were answered in the affirmative. Indeed, the definition of a relationship-specific investment is an investment

of capital that could not be used in another activity, or if so used would result in a great loss of value. In columns (2) to (5) of Table 2, I keep only the firms working on a contract basis, amongst which some signed a relationship-specific investment contract. By reducing the size of the sample, I hope to be able to pinpoint a significant relationship between the quality of the judiciary and the likelihood to sign a relationship-specific investment contract. I incrementally add control variables from column (2) to column (5). Column (5) illustrates that fewer relationship-specific investment contracts are signed in states with higher pendency rates. This provides support for proposition 2. An economic interpretation of this result is that the average firm in the average state is 4 percentage points less likely to undertake a relationship-specific investment if the judiciary is the slowest of India as opposed to the fastest.

Table 3 examines the influence of the judiciary on firm's access to credit markets. The dependent variable is information on loans and the explanatory variable of interest is the pendency percentage. The dependent variable used in the regression of column(1) is a dummy variable equal to 1 if the firm experienced a shortage of capital as one of its problems, and 0 otherwise. A higher pendency means more problems of that type. This result can be interpreted in the following way: the probability that the average firm in the average state will experience a shortage of capital increases by 7 percentage points if the judiciary is the slowest as opposed to the fastest. In column (2), the dependent variable represents whether or not the firm had an outstanding loan at the time of the survey. I find that fewer firms have outstanding loans where the rate of pendency is higher. The average firm in the average state will find it 3.5 percentage points harder to get a loan with the slowest judiciary in India, relative to the fastest. An interesting test is to refine the analysis to factor in the exact source of the loan. Column (3) demonstrates that it is 2 percentage point harder to obtain a loan from formal financial institutions in states with a slow judiciary. As predicted, column (4) shows that it is harder to secure a loan from strangers (suppliers, contractors, moneylenders) although the statistical significance of this result is not very high. Turning to loans from friends, relatives and business partners (column (5)), there are very few firms in this category so I restrict attention to the sample of firms that obtained a loan. Among this subset of firms, column (5) demonstrates that loans are more likely to come form friends, relatives, and business partners when the judiciary is slow. This agrees with the notion that people tend to operate in small business networks in areas where the pendency rate is higher. The average firm to have obtained a loan will be 16 percentage points more likely to have obtained it from a relative than from other sources if the judiciary is the slowest in India as opposed to the quickest. This result is consistent with Proposition 3, which holds that agents should obtain more loans from friends and less from banks in situations where there is a slow judiciary.

Table 4 looks at the nature of the ownership of the firm as a function of the quality of the judiciary. I restrict the sample to firms engaged in partnerships as opposed to single-ownership firms, as the partnerships firms have further data on the relationships between

partners. There are two possible types of partnership: partnership with members of the same household and partnership between members not all from the same household. Dynastic management corresponds to the first category of partnership. Control variables are added incrementally in the four columns. Column (4) illustrates that there are more partnerships with members of the same household in states with a slow judiciary. The average firm engaged in a partnership in the average state is 9 percentage points more likely to be a family firm if the judiciary is the slowest of India as compared to the fastest. This is consistent with Proposition 4 which says that family firms should be more prevalent in states with a slower judiciary.

These basic results can be refined using the methodology of Rajan and Zingales (1998). The intuition is that a good judicial system should disproportionately help firms typically dependent on the judicial system for their growth. I will construct the test as follows. A sector's need for the judicial system is identified from data on U.S. firms. The need for the judicial system will be measured by the vertical integration of the firms. Indeed, a highly vertically integrated firm does not rely on the judicial system since all activities are internalized. On the contrary, a non vertically integrated firm relies on many suppliers or customers and therefore is more dependent on the judicial system. The vertical integration of the firms will be measured by the ratio of the value added generated in the firm to the total sales. If that indicator is 1, then it means that all the creation of value comes from within the firm. If that indicator is 0, it means that a firm is not highly vertically concentrated. Following Rajan and Zingales (1998), I make two very important assumptions. First, it is considered that the judicial system is optimal in the United States. This method allows us to identify a sector's technological demand for a judicial system. Second, it is assumed that such a technological demand carries over to other countries. I then examine whether industries that are more dependent on the judicial system experience more problems of breach of contract, undertake fewer relationship-specific investments, suffer from shortages of capital or are more likely to be family firms.

Data for vertical integration in the US was gathered from the Industrial Statistics Database 2003 at the 3- and 4-digit level of ISIC Code (Revision 3) put together by the United Nations Statistical Division.[16] I then construct the interaction between the demand for justice (defined as 1 minus the vertical integration) at the NIC2 level and the pendency percentage.

Table 5 column (1) and (2) show no significant impact. In Table 5 column (3), the dependent variable is the occurrence of a shortage of capital. It can be seen that a firm operating in a sector which is dependent on the judicial system in the USA suffers more from a slow judiciary than a firm operating in a sector not dependent on the judiciary. In column (4), the dependent variable is the likelihood of being a family firm. We see that a firm in a sector that would be dependent on the judicial system in the USA is

[16] I restrict the sample to manufacturing firms following Rajan and Zingales (1998).

more likely to be a family firm than a firm in a sector not dependent on the judiciary. I tested if my results did not depend on the choice of the benchmark country by gathering the data for Canada. The last four columns of table 5 show that the result is comparable and according to what expected.

This extension provides an additional insight compared to the basic results in the sense that the effect of the judiciary depends on the demand for justice by a firm. Sectors that are typically more dependent on the judiciary would suffer more from a slow judiciary.

4.2 Robustness checks

To lend support to the previous set of estimates, I now perform a series of robustness checks.

The first robustness check concerns the efficiency measure of the judicial system. It must be determined whether or not the results obtained are sensitive to the particular measure of the quality of the judiciary used. Table 6 looks at the relationship between the occurrence of a breach of contract and the quality of the judiciary using various measures of the quality of the judiciary as an explanatory variable. I used successively in column (1) to (6) the pendency percentage of total cases in High Courts in 1999 (from Annual Report, Ministry of Law, Justice and Company Affairs); the pendency percentage of total cases in High Courts in 1998 (same source); the expected duration of a trial in High Court in 1996 (measured in number of pending cases at the beginning of the period plus number of filed cases within the year divided by the number of cases disposed of within the year from Law commission reports, Annual Reports of the Ministry of Law and Justice); the corresponding pendency rate in 1996 (defined as 1-1/duration); the expected duration of a trial in High Court in 1995; and the corresponding pendency rate in 1995. Columns (1) to (6) of Table 6 show that the positive result remains unchanged even while the pendency rate is measured at different times, from different sources or relating to other types of cases.

A potential problem with using the pendency rate as a measure of the quality of the judiciary is the possibility of out of court settlements. Indeed, if contracting parties are aware that they are unlikely to achieve an expeditious verdict, they might be more inclined to resolve disputes by way of settlement. This could artificially reduce the backlog of cases the judiciary is treating. The pendency rate could be influenced by the settlements and a low pendency rate would not be evidence of an efficient judiciary.

A similar problem might arise if the assumption made in section 2.1, about random matching between a seller and a buyer, is relaxed. It could be argued that, faced with a slow judicial system, a seller would seek to acquire information about his partner in order to solve the information asymmetry. This would enable him to deal only with patient agents who would be willing to cooperate, thereby creating a business network,

as opposed to the anonymous market where players are matched randomly. Kali (1999) develops a theory of business networks where they are endogenous to the reliability of the legal system. He finds that the existence of networks exerts a negative effect on the functioning of the anonymous market. This is because the networks absorb honest individuals, raising the density of dishonest individuals engaged in anonymous market exchange. If agents could self-select in small groups where information is shared and no default occurs, this would surely reduce the number of breaches of contract in the economy, unclog the judiciary and make it artificially efficient. In that case again, a low pendency rate would not be evidence of an efficient judiciary.

These two points of criticism arise from the fact that the measure of the efficiency of the judiciary used relates to the demand for justice as well as the supply of justice. Indeed, the pendency rate is defined as:

$$\text{pendency percentage} = \frac{\text{pending}(t)}{\text{pending}(t-1)+\text{filed}}$$

Considering the following identity:

$$\text{pending}(t-1)+\text{filed}=\text{pending}(t)+\text{solved}$$

the pendency percentage can be rewritten as:

$$\text{pendency percentage} = \frac{\text{pending}(t-1)+\text{filed-solved}}{\text{pending}(t-1)+\text{filed}}$$

This expression of the pendency percentage includes the quantity of cases filed. The pendency rate depends both on how many cases were resolved (the supply of justice) and the number of new cases brought (the demand for justice). I am interested in the effect of the supply of justice on contracting behaviour of firms, but that effect here is confounded by the demand for justice. In particular, if the number of new cases increases, the pendency rate goes up. An increasing pendency rate would not be evidence of an increasingly inefficient judiciary but would merely reflect the litigious nature of agents.

To solve this particular problem, a measure of the efficiency of the judiciary that focuses more on the supply side of justice can be employed. I considered the following indicator:

$$\frac{\text{solved}}{\text{pending}}$$

This indicator would only reflect the capacity of judges to solve cases. A high ratio would indicate that many pending cases are being treated. Column (7) of Table 6 shows that this indicator is positively correlated with breach of contract. Indeed, I find that all results presented in this paper are robust to the use of this alternative measure of

judicial efficiency. This confirms the conclusion that the efficiency of the judiciary in dealing with pending cases affects the contracting behaviour of firms.

In order to explain the similarity of the results, it is necessary to look at the determinants of cases filed and cases pending in India. Column (1) of Table 7 demonstrates that the number of cases pending per judge does not depend on the number of cases filed per judge. This result would be characteristic of a judicial system where a judge solves more cases as the number of cases filed increases in order to keep constant the amount of cases pending. This is confirmed in Column (2) of Table 7 where the number of cases disposed per judge is positively correlated, by a one-to-one ratio, with the number of cases filed per judge. The number of cases pending cannot be explained by the number of cases registered. Other operational factors such as scarceness of means are more important in determining the amount of cases pending. An indicator of the scarceness of means is the number of judges that would be required for a well-functioning judiciary in any state. This indicator is positively correlated with the number of cases pending as can be seen in column (3) of Table 7. The conclusion that can be drawn from Table 7 is that the number of cases pending does not depend on the number of cases filed. Therefore, if less cases are filed due to out of court settlements or due to the creation of business networks, this would not have an impact on the number of cases pending.[17]

Another concern is that the judicial system is inconsequential as firms endeavour to avoid it through using methods of alternative dispute resolution. The impact of alternative dispute resolutions mechanisms may be measured by the number of panchayats per capita and the number of rural planning commissions per capita. Although such numbers do not reflect the quality of the institutions themselves, they do indicate whether the system is working in the respective state or not, as the majority of institutions are not imposed by the government and thus only come into existence if they are supported by the population itself. Table 8 includes the number of panchayats and the number of rural planning commissions as additional state controls. In column (1), the dependent variable is the occurrence of breach of contract. We see that the pendency percentage variable retains its significance. Unexpectedly, the number of panchayats is positively associated with the probability of experiencing a breach of contract. The number of planning commissions is insignificant. In column (2), the dependent variable is the probability for a firm to undertake a relationship-specific investment. The quality of the judiciary loses its statistical significance but the coefficient remains negative. In column (3), the dependent variable is the shortage of capital. Here again, the quality of the judiciary retains its significance and the number of panchayats enters with a positive sign. In Column (4), the dependent variable is the probability that the firm is a family firm. Only the pendency percentage is significant. The conclusion from this table is that even if alternative dispute resolution mechanisms are controlled for, the pendency

[17]Note that the pendency percentage collapses to an indicator similar to the last indicator if the number of cases solved is equal to the number of cases filed.

percentage remains significant.

5 Effects on Firm Performance

This paper seeks to determine whether pendency rates affect not only firm-level contracting behaviour but also firm-level performance. The dependent variable is now the growth status of the firm. It is a subjective measure since it was asked directly to the firm owner. It is a dummy variable equal to one if the firm is expanding or constant, to zero if the firm is shrinking.

Columns (1) to (4) of Table 9 show the reduced form relationship between the pendency rate and firm performance. There is a significant negative relationship between the pendency rate and the performance of the firm even when control variables are incrementally added. Based on Table 9 column (4), the effect on economic performance is large. The average firm in the average state will be less likely by 10 percentage points to be expanding if the judiciary is the slowest as opposed to the quickest one of India. In Column (5), I included the variables corresponding to the alternative dispute resolution mechanisms. We see that the pendency percentage remains significant and that the other variables are insignificant. I have also carried out the robustness checks of section 4. I have used different measures of the pendency percentage, different measures for the efficiency of the judiciary (solved/pending) and found similar results.

I also applied the methodology of Rajan and Zingales (1998) to the performance of the firm. The intuition is that a good judicial system should disproportionately help firms typically dependent on the judicial system for their growth. Indeed, we can see in Table 10 column (1) that firms in India in sectors that would depend more on the judiciary in the USA grow less in states with a bad judiciary. Another possibility is that firms simply move states or that people decide not to undertake an activity which is not dependent on the judiciary. Column (2) of Table 10 investigates the relationship between the number of firms in a particular sector depending on their demand for justice calculated in the USA interacted with the quality of the judiciary. There are significantly less firms of a sector that requires a good judicial system in a state with a bad judicial system. Unfortunately this does not allow me to discriminate between the two hypothesis of occupational choice or mobility. Having no data on migration, I do not know if people decide not to undertake judiciary-dependent activities or if they move to another state, but a bad judicial system certainly has an impact on the firms through their industrial organization. As in section 4, these findings are robust to the use of Canadian data (columns (3) and (4)).

6 Conclusion

This paper shows that the quality of judicial institutions in Indian states matter both for the contracting behaviour and economic performance of small firms. My findings are in line with an emerging, largely macroeconomic literature which suggests that institutions matter for economic performance (for example, Djankov et al (2002), Acemoglu et al (2001), Rodrik et al (2002)). My firm-level data is somewhat unique in the sense that it contains a great deal of information on non-recovery of service charges/fees/credit, design of contracts, whether a firm is capital constrained, source of borrowing and the form of ownership. This type of information is typically not available in most firm-level databases.

When I relate these specific measures to the state pendency rate, I find that having a slower judiciary is associated with more breaches of contract, less relationship-specific investments, a greater shortage of capital, less access to formal financial institutions and a preference for family ownership of firms. These results indicate that the quality of the judiciary across Indian states plays an important role in shaping economic activity in this important sector of the economy. Moreover, I find that having slower courts in an Indian state is negatively associated with firm performance. My results are consistent with a simple game theoretic model which illustrates how having a slower judiciary will affect the behaviour of agents in a contracting relationship. The key insights from the theory are that firm owners in slow judiciary environments are more likely to break contracts, less likely to engage in relationship-specific investment, more likely to be credit constrained, less likely to have access to formal credit and more likely to keep the firm under family ownership.

This research leaves important questions open. The first is that we would like to know more about what determines the speed of the judiciary. In particular, we would like to identify specific policy measures which would enhance judicial efficiency. This is a problem both for India and for large number of other countries which would suffer from slow courts (Djankov et al, 2003). A key implication emerging from this paper is that the quality of the judiciary has large effects on economic performance. Finding specific means of speeding up courts is therefore an important area for future work. In India, the fact that there is a common law system in place would suggest that the actions of High Court judges may be an important determinant of the speed of the judiciary. Linking the rulings of these judges to court functioning is an area of research that I plan to take up in the future. The second key question that remains open concerns whether the effects of a slow judiciary vary across sectors of an economy. One can imagine for example that firms in the registered or formal manufacturing sector in India may have fewer contracting problems than the informal firms that I examine in this paper. 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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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 decision is reached (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; hence, the predictability of the decision is not affected by time. I will not focus in this model on predictability and will therefore 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 the judicial system correcting for the time spent in court, but for simplicity I will ignore this aspect. Now for the cost of litigation:

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

with c_a representing the cost of access to justice, c_t regular expenses during the process of a trial (fee of the lawyer). During the rest of the paper, I consider this cost c_t asa constant c, with a gross cost C incurred at the end of the trial. I introduce these three types of cost to emphasize some common features of the judicial system. First, a fixed cost which represents the initial barrier due to the information of the claimant. Second, a fixed cost per period for regular expenses. This cost is decreasing with the speed of the judiciary: a speedy justice would lower those costs. Third, a cost that occurs at the end of the trial. This last cost is a consequence of local legislations, which says that

the loser and/or the winner must pay the cost of the trial. That cost increases with the efficiency of the judiciary. A slow justice will make the occurrence of those costs appear so distant as to be almost irrelevant. The second and third costs illustrate the trade-off in any trial: the defendant wants to terminate the trial quickly to avoid paying high fees to his lawyer but also wants to slow down the process to avoid paying the fine. 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 c_w cost if the individual in question wins and c_l cost 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 now make some simplifying assumptions. First I will assume a distribution for the time at which the decision is reached. Specifically, I assume a geometric law with factor θ. Thus θ is the probability that the decision is reached at t had it been not reached at $t-1$. Under that assumption, $p_t = \theta(1-\theta)^{t-1}$. The intuition for that distribution would be that a high θ would correspond to a very speedy justice. In the extreme case, where $\theta = 1$, the decision is reached immediately. A low θ would indicate a slow justice. Then:

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

with $(1-\theta)\delta < 1$, the sum therefore converges. Note that a very patient player ($\delta = 1$) will have $\frac{\theta}{\delta\theta+1-\delta} = 1$, meaning that no matter how the justice performs, he will get his compensation. A very impatient player ($\delta = 0$) will have $\frac{\theta}{\delta\theta+1-\delta} = \theta$, meaning that his compensation is discounted by the speed of the judicial system.

I also assume, in order to simplify matters even more, that $c_a = 0$, $c_w = 0$ (the winner does not pay anything), $w = 1$ (the claimant, or buyer, wins for sure: the justice is 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 for 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 $\theta = 0$ (never ending justice system) then $U_{court}(0) = 0$. Note that $U_{court}(\theta)$ is an increasing function of θ. To be completely rigorous in section 2, I should consider the fact that ϕ depends also on δ. The intuition for this being that a very patient player will be rewarded even if 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 get a loan from a bank if the quality of the judiciary decreases as the bank recovers less collateral in the case of non-repayment forcing the bank to charge a higher interest rate. More entrepreneurs get a loan from a friend as opposed to a bank if the judiciary is slower.*

The game is as described in Section 2.3:

	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 the entrepreneur gets a loan from a friend, the entrepreneur obviously wants to default in the short run. However, the possibility of a long term relationship and repeated loans make him 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 those two payoffs, we know that the 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 has to charge such an interest rate in order to induce the entrepreneur to cooperate. The friend as a profit maximiser will charge r_{friend}.

Given that interest rate, the expected profitability of the friend 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 has to ensure that $\delta(\pi + 1) - 1 = r_{friend} > \overline{r}$.

But one must also consider the bank. An entrepreneur will get $\sum_{i=0}^{t} \delta^i(\pi - r) + \delta^{t+1}(1 + \pi - \phi c)$ 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 those 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 has to charge such an interest rate to induce the entrepreneur to cooperate.

If the bank respects that condition, then the entrepreneur is going to cooperate. The payoff associated with that loan for the bank will therefore 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 has to be superior to the cost $\overline{r}$ of raising funds so the incentive constraint for the bank is: $p(1+r)+(1-p)\phi c-1>\overline{r}$ or $r>\frac{-p-(1-p)\phi c+1+\overline{r}}{p}$.

This now exactly the same situation as in section 2.1. 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 that model is that for $\phi<\phi^*$, the bank will not lend to that particular entrepreneur. This is credit rationing. It is interesting to note that the amount of collateral c has an impact on that limit ϕ^* with $\frac{\partial c}{\partial \phi^*}<0$. This just says that increasing the amount of collateral can lower the threshold below which no credit is granted, or alternatively that the bank is going to ask for more collateral to compensate for a slower judiciary.

An additional result comes from the comparison between the two sources of the loan for the entrepreneur. Assume now that the bank is acting in a competitive manner and sets its interest rate to set its profits equal to zero. Therefore, 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 the bank is going to lend to the entrepreneur only if $\phi>\phi^*$, but the entrepreneur will find it more attractive than a friend only if $\phi>\phi^{**}$. In other words, more entrepreneurs switch to a friend if the judiciary is slower.

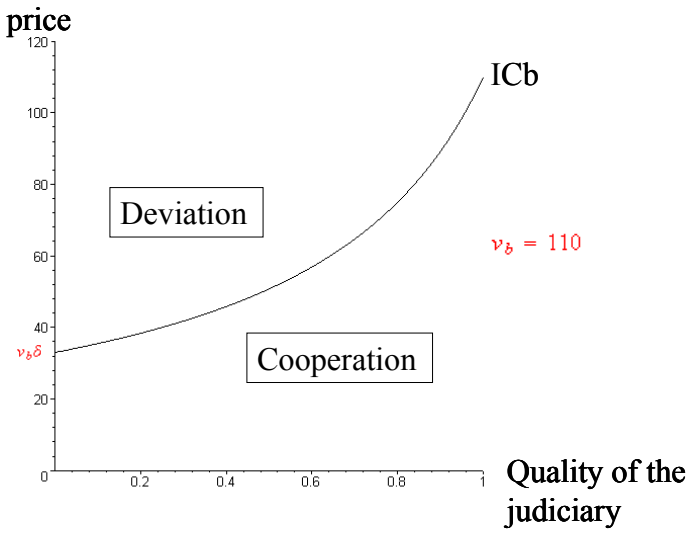

Figure 1: price offered by the buyer as a function of the quality of the judiciary in order to cooperate (ICb: Incentive Constraint of the buyer)

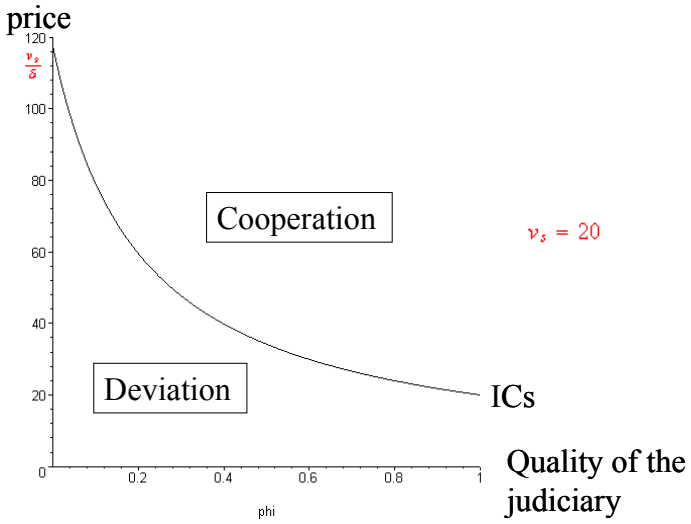

Figure 2: price asked by the seller as a function of the quality of the judiciary in order to cooperate (ICs: Incentive Constraint of the seller)

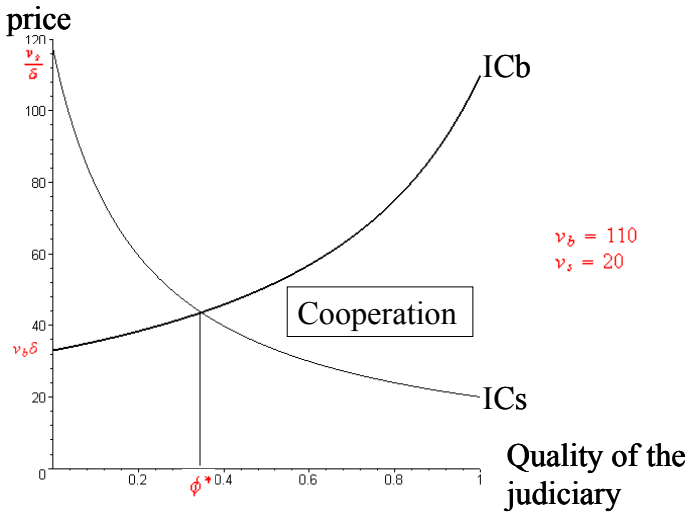

Figure 3: a potential matching between two individuals and the zone of cooperation

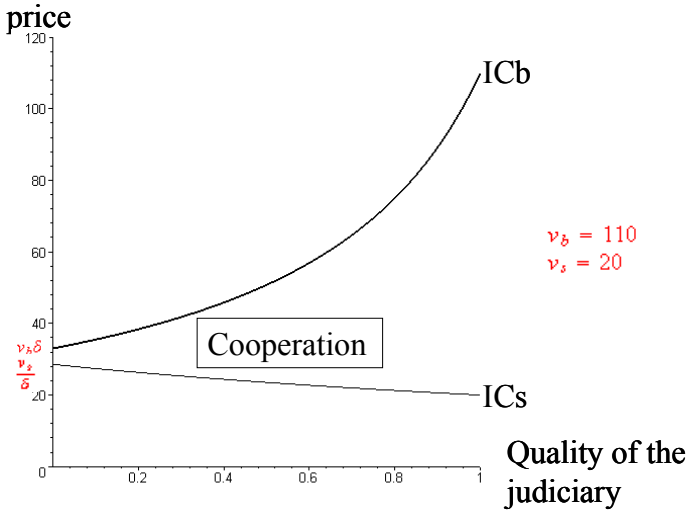

Figure 4: a matching between two individuals who could work in a business network

Data Appendix

Variable	Unit	Definition	Source
		Court Data	
Pendency percentage in High Courts in 1999 and 1998	%	(number of cases pending trial at the end of the year)/(number of cases filed+number of cases pending at the beginning of the year)	Annual Report, Ministry of Law, Justice and Company Affairs
expected duration of a case in High Court in 1996 and 1995	years	number of pending cases at the beginning of the period plus number of filed cases within the year divided by the number of cases disposed of within the year	Law commission reports, Annual Reports of the Ministry of Law and Justice.
pendency percentage in 2000 of criminal cases	%	(number of cases pending trial at the end of the year)/(number of cases filed+number of cases pending at the beginning of the year)	governmental publication "Crime in India", 2000.
		State level data	
State GDP per Capita*	Rupees	net state domestic product per capita at current prices, 1999-2000	Directorate of Economics and Statistics of respective State Governments and Union Territories
State Per Capita Income Growth Rate	%	For 1997-2001	Lok Sabha Unstarred Question No. 1528, dated, 27.11.2002.
State Enrolment*	%	Gross enrolment ratio in classes I-VIII (6-14 years) per state	Selected Educational Statistics, 2000-01, Ministry of Human Resource Development, Government of India.
State literacy*	%	for 2001	Office of the Registrar General of India
State Credit per Capita*	Rupees crore per thousand persons	Total credit of public banks divided by state population in 2002	Credit: Reserve Bank of India, population: Office of the Registrar General of India, Ministry of Home Affairs
State Expenditure for the Organs of State	Rs. Lakhs at 2002 prices	Organs of State: Administration of Justice, State Legislature, Governer, Council of Ministers, and Elections.	www.statesforum.org
State Unit Cost per Policemen (per annum)	Rs.	Total Police Expenditure divided by Actual Police Strength (civil and armed)	Crime in India, Table 92, 2001, Governmental Publication.

State length of roads per capita	Km per thousand persons	State length of roads divided by state population in 2001	Statistical Abstract 2001
State Access to Safe Drinking Water in Households in India*	%	Rural and Urban combined in 1991	Housing and Amenities, Pa1.r 2 of 1993; Census of India 1993.
State Death Rate*	Per 1000	Death Rate in 2000.	Ministry of Health and Family Welfare, Govt. of India
State Male Life Expectancy*	years	State Male Life Expectancy in 2000	Ministry of Health and Family Welfare, Govt. of India
Percentage of seats won by Bharatyia Janata Party in 2000 (or at the last previous election) per state	%	No of seats won by the Bharatyia Janata Party in 2000, (including Akhil Bharatiya Ram Rajya Prishad for Madhya Pradesh) divided by the No of seats in the state legislature Vidhan Sabha, the Lower House.	Election Commission of India.
		Firm level data	
Indebtedness		Total amount of loans outstanding divided by the amount of capital (=total assets owned+ total assets hired); assets=tools+transport+land+plant)	NSS, 55th round, 1999-2000, Schedule2: Informal Non-Agricultural Enterprises
Interest Payment		Total Interest Payments due divided by the total year receipts.	
Loan from Financial Institutions	Rupees	Amount of loan coming from a central and state level term lending institutions; the government (central, state, local Bodies); public sector banks and other commercial banks; cooperative banks and societies; other institutional agencies	
Temporary job in the Enterprise		Share of the temporary work (male or female) in the total number of hours worked in the enterprise	
Cost of labour per employee	Rupees per employee	Total salary (=salary+group benefits) divided by the number of hours worked	
Number of other activities		Number of other activities taken up during the last 365 days	
registered		Act of registration	
Female owner		1=the owner is a female, 0=male	
		Sector level data	
Output	Current US dollars		Industrial Statistics Database 2003 at the 3- and 4-digit level of ISIC Code (Revision 3)

Value added	Current US dollars	Industrial Statistics Database 2003 at the 3- and 4-digit level of ISIC Code (Revision 3)

*Collected on http://indiabudget.nic.in/es2002-03/tables.htm

An outline of the sampling design of the 55th round of the NSS of 2000.

The 55th round of NSS is an integrated survey on informal non-agricultural enterprises (other than those covered by the Annual Survey of Industries and other industrial categories of `mining & quarrying' & `electricity, gas and water supply'). The survey covers the whole of the Indian Union. The fieldwork of 55th round of NSS is from 1st July, 1999 to 30th June, 2000.

A stratified sampling design has been adopted for selection of the sample first-stage units (FSU's). The FSU's are villages (panchayat wards for Kerala) for rural areas and Urban Frame Survey (UFS) blocks for urban areas. List of villages (panchayat wards for Kerala) as per 1991 Census and latest lists of UFS blocks are respectively used for selection of rural and urban sample FSU's. A total number of 10,384 FSU's is selected randomly for survey in the central sample at all-India level (rural & urban combined) in the 55th round. The Ultimate stage units (USU's) are enterprises which are selected by the method of circular systematic sampling from the corresponding frame in the FSU. Large FSU's are subdivided into hamlet groups (rural)/ sub-blocks (urban), that are grouped into two segments, and USU's are selected independently from each of these segments: All the eligible enterprises in a segment (both rural & urban) are stratified into 12 strata by jointly considering their broad industry group (manufacturing; construction; trade & repair services; hotels & restaurants; transport, storage & communication; other service sector).and enterprise class (hired worker or not). Approximate number of enterprises of each strata in the hamlet/sub-block are gathered, as well as the proportion of enterprises in the FSU. Multipliers defined as the inverse of the probability that the observation is included due to the sampling design are therefore constructed. I took into account those multipliers in my empirical analysis and can therefore conclude that the sample is representative.

Table 1: The impact of pendency on the occurrence of breach of contract

	(1)	(2)	(3)	(4)
Dependent Variable	non-recovery of service charges, fees, credit			
pendency percentage of total cases in High Courts in 1999	0.1546	0.0948	0.1012	0.1113
	(3.03)***	(2.82)***	(3.00)***	(4.28)***
state-level controls	no	yes	yes	yes
firm-level controls	no	no	yes	yes
sector dummies (NIC2)	no	no	no	yes
Observations	176130	176130	172533	172484

• non-recovery of service charges, fees, credit: =1 if the entreprise experienced a major problem of non-recovery of service charges, fees, credit; =0 otherwise
• Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
• * significant at 10%; ** significant at 5%; *** significant at 1%
• Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
• 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.

Table 2: The impact of pendency on the probability of working on a contract basis

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	contract[1]	relationship-specific investment contract[2]			
pendency percentage of total cases in High Courts in 1999	0.1080	-0.0231	-0.1255	-0.1837	-0.1144
	(1.63)	(0.18)	(2.45)**	(3.61)***	(1.89)*
state-level controls	yes	no	yes	yes	yes
firm-level controls	yes	no	no	yes	yes
sector dummies (NIC2)	yes	no	no	no	yes
Observations	166085	12295	12295	12011	11989

- [1] =1 if the entrepise works on a contract basis; =0 otherwise
- [2] =1 if the entreprise undertakes a relationship-specific investment contract; =0 otherwise (restricted to the entreprises working on a contract basis)
- a relationship-specific investment contract is defined as a contract where the design is specified by the contractor and when the equipment/raw material is supplied by the master unit/contractor
- Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
- * significant at 10%; ** significant at 5%; *** significant at 1%
- Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
- 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.

Table 3: The impact of pendency on shortage of capital

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	shortage of capital[1]	loan[2]	formal loan[3]	business loan[4]	"relative" loan[5]
pendency percentage of total cases in High Courts in 1999	0.4105	-0.0519	-0.0406	-0.0189	0.3347
	(4.53)***	(3.26)***	(4.19)***	(1.03)	(9.12)***
state-level controls	yes	yes	yes	yes	yes
firm-level controls	yes	yes	yes	yes	yes
sector dummies (NIC2)	yes	yes	yes	yes	yes
Observations	172533	176127	175792	175709	15641

• [1]shortage of capital:=1 if the entreprise experienced a major problem of shortage of capital; =0 otherwise

the sources of the loan are :

central and state level term lending institutions
government (central, state, local bodies)
public sector banks and other commercial banks
co-operative banks and societies
other institutional agencies
money lenders
business partner(s)
suppliers/contractors
friends and relatives
others

• [2]loan:=1 if the entreprise got a loan; =0 otherwise
• [3]formal loan: =1 if the entreprise got a loan from lending institutions, government, banks; =0 otherwise
• [4]business loan: =1 if the entreprise got a loan from suppliers/contractors and moneylenders; =0 otherwise
• [5]"relative" loan: =0 if the entreprise got a loan from friends and relatives or the business partner; =0 otherwise
(among the entreprises which got a loan; this restriction is imposed because we observed too few loans of that type)
• Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
• * significant at 10%; ** significant at 5%; *** significant at 1%
• Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
• 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.

Table 4: The impact of pendency on the type of ownership

	(1)	(2)	(3)	(4)
Dependent Variable		dynasty[1]		
pendency percentage of total cases in High Courts in 1999	0.2937	0.4487	0.3118	0.2937
	(1.04)	(2.92)***	(1.97)**	(2.14)**
state-level controls	no	yes	yes	yes
firm-level controls	no	no	yes	yes
sector dummies (NIC2)	no	no	no	yes
Observations	3619	3619	3540	3535

- There are two possible types of partnership: partnership with members of the same household and partnership between members not all from the same household.
- [1]dynasty=1 if the type of partnership is the one with members of the same household; =0 otherwise
- Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
- * significant at 10%; ** significant at 5%; *** significant at 1%
- Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
- 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.

Table 5: The impact of the interaction between pendency and the demand for justice on the contracting behaviour of the firm

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	demand for justice calculated in the USA				demand for justice calculated in Canada			
Dependent variable	breach[1]	RSI contract[2]	shortage[3]	dynasty[4]	breach[1]	RSI contract[2]	shortage[3]	dynasty[4]
interaction between the pendency percentage	0.0132	0.2783	0.4549	0.6008	0.1721	-0.2006	0.2676	0.5649
in 1999 and the demand for justice[5]	(0.07)	(1.12)	(2.38)**	(1.82)*	(1.62)	(1.91)*	(1.74)*	(1.61)
state-level controls	yes	yes	yes	yes	yes	yes	yes	yes
firm-level controls	yes	yes	yes	yes	yes	yes	yes	yes
sector dummies (NIC2)	yes	yes	yes	yes	yes	yes	yes	yes
Observations	50063	8655	50112	936	44490	7944	44506	797

- [1]non-recovery of service charges, fees, credit: =1 if the entreprise experienced a major problem of non-recovery of service charges, fees, credit; =0 otherwise
- [2]=1 if the entreprise undertakes a relationship-specific investment contract; =0 otherwise (restricted to the entreprises working on a contract basis)
- [3]shortage of capital:=1 if the entreprise experienced a major problem of shortage of capital; =0 otherwise
- [4]dynasty=1 if the type of partnership is the one with members of the same household; =0 otherwise
- [5]the interaction term is calculated as the product of the pendency percentage in High Courts in 1999 (at the level of the state) and the demand for justice of the firm (at the level of the sector). The demand for justice is calculated for each sector of manufacturing in United States (or in Canada) as one minus the vertical integration of the sector; the vertical integration being measured as the ratio of value added to total sales.
- Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
- * significant at 10%; ** significant at 5%; *** significant at 1%
- Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
- Multipliers defined as the inverse of the probability that the observation is included due to the sampling design are used in the regressions.

Table 6: The impact of different measures of pendency on the occurrence of breach of contract

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
pendency percentage of total cases in High Courts in 1999	0.1113						
(from Annual Report, Ministry of Law, Justice and Company Affairs)	(4.28)***						
pendency percentage of total cases in High Courts in 1998		0.1350					
		(7.41)***					
expected duration of a trial in High Court in 1996[1]			0.0169				
			(8.98)***				
pendency rate in 96[2]				0.0568			
				(5.86)***			
expected duration of a trial in High Court in 1995[1]					0.0184		
					(8.70)***		
pendency rate in 95[2]						0.0553	
						(5.65)***	
number of cases solved divided by number of cases pending in1999							-0.0513
							(4.78)***
state-level controls	yes	yes	yes	yes	yes	yes	yes
firm-level controls	yes	yes	yes	yes	yes	yes	yes
sector dummies (NIC2)	yes	yes	yes	yes	yes	yes	yes
Observations	172484	172484	172484	172484	172484	172484	172484

• Dependent Variable: non-recovery of service charges, fees, credit: =1 if the entreprise experienced a major problem of non-recovery of service charges, fees, credit; =0 otherwise

• [1]expected duration of a case in High Court, measured in number of pending cases at the beginning of the period plus number of filed cases within the year divided by the number of cases disposed of within the year. Unit=years. Source: Law commission reports, Annual Reports of the Ministry of Law and Justice.

• [2]the pendency rate is therefore defined as 1-1/duration

Note: pending beginning+filed=pending end+solved

• [3]obtained from the governmental publication "Crime in India"

• Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state

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

• Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.

• 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.

Table 7: The judiciary's technology

	(1)	(2)	(3)	(4)
Dependent Variable	number of solved cases		number of pending cases at the end of the year	
number of filed cases	0.4880*	0.8157***	1.1652*	1.1117
	(2.88)**	(8.96)***	(2.89)**	(1.76)*
total population	0.8717	-0.4881	5.1621	6.0055
	(1.55)	(1.39)	(1.75)*	(1.75)
population growth rate		0.3384		-4.5837
		(0.79)		(1.98)*
Four-year lagged per capita education expenditure		-2.0597		17.7354
		(1.21)		(1.53)
Four-year lagged per capita health expenditure		0.0113		0.8461
		(0.01)		(0.14)
Four-year lagged per capita other expenditure		9.5364		-57.7160
		(2.03)*		(1.35)
Four-year lagged state taxes		5.3878		-49.3674
as a percentage of state domestic product		(1.76)*		(1.72)
state fixed effects	yes	yes	yes	yes
year fixed effects	yes	yes	yes	yes
Constant	-6,690.6195	7,729.2324	10,539.6074	-27,306.8007
	(3.20)***	(0.58)	(0.90)	(0.26)
Observations	400	311	400	311
R-squared	0.92	0.99	0.89	0.92

• Data from 1971 to 1995 for 16 states (=400 observations)
• Panel data regressions with state and year fixed effects. Robust t-statistics in parentheses, clustered at the level of the state
• * significant at 10%; ** significant at 5%; *** significant at 1%
• Block bootstrapped significance tests are reported next to the coefficients (with the same meaning in the *,**,***). Only these tests should be considered in the presence of serial correlation.

Table 8: The impact of alternative dispute resolution on the contracting behaviour of the enterprise

	(1)	(2)	(3)	(4)
dependent variable	breach of contract[1]	RSI contract[2]	shortage of capital[3]	dynasty[4]
pendency percentage of total cases in High Courts in 1999	0.3266	-0.3609	1.6541	2.0902
	(3.45)***	(1.52)	(3.29)***	(2.80)***
number of panchayats per million inhabitants[5]	0.0007	-0.0012	0.0042	0.0047
	(2.04)**	(1.40)	(2.29)**	(1.74)
number of planning commissions per million inhabitants[5]	0.0005	-0.0070	0.0144	0.0106
	(0.20)	(3.70)***	(1.56)	(0.96)
state-level controls	yes	yes	yes	yes
firm-level controls	yes	yes	yes	yes
sector dummies (NIC2)	yes	yes	yes	yes
Observations	160476	11619	160523	3280

- [1]non-recovery of service charges, fees, credit: =1 if the entreprise experienced a major problem of non-recovery of service charges, fees, credit; =0 otherwise
- [2]=1 if the entreprise undertakes a relationship-specific investment contract; =0 otherwise (restricted to the entreprises working on a contract basis)
- [3]shortage of capital:=1 if the entreprise experienced a major problem of shortage of capital; =0 otherwise
- [4]dynasty=1 if the type of partnership is the one with members of the same household; =0 otherwise
- [5]Obtained from the statistical abstracts of the CSO (Central Statistical Organisation) of the Department of Statistics within the Ministry of Planning
- Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
- * significant at 10%; ** significant at 5%; *** significant at 1%
- Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
- 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.

Table 9: The impact of the Contracting Behaviour and of the quality of the Judiciary on the Firm Performance
(Dependent Variable: growth status of the enterprise over the last 3 years: 1=expanding and constant, 0=contracting)

	(1)	(2)	(3)	(4)	(5)
pendency percentage of total cases in High Courts in 1999	-0.2151 (6.07)***	-0.3215 (3.72)***	-0.3065 (3.61)***	-0.3025 (3.73)***	-0.5203 (2.14)**
number of panchayats per million capita					-0.0010 (1.15)
number of planning commissions per million capita					-0.0010 (0.30)
state-level controls	no	yes	yes	yes	yes
firm-level controls	no	no	yes	yes	yes
sector dummies (NIC2)	no	no	yes	yes	yes
Observations	156144	156144	153010	153006	148226

- Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
- * significant at 10%; ** significant at 5%; *** significant at 1%
- Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
- 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.

Table 10: The impact of the interaction between pendency and the demand for justice on the status of the firm

	(1)	(2)	(3)	(4)
	demand for justice calculated in the USA		demand for justice calculated in Canada	
dependent variable	status of the firm[2]	number of firms[3]	status of the firm[2]	number of firms[3]
interaction between the pendency percentage	-0.1731	-214.2002	-0.1431	-87.6315
in 1999 and the demand for justice[1]	(2.77)***	(4.76)***	(3.02)***	(1.73)
state-level controls	yes	yes	yes	yes
firm-level controls	yes	no	yes	no
sector dummies (NIC2)	yes	yes	yes	yes
Observations	46925	597	41610	527

- [1]the interaction term is calculated as the product of the pendency percentage in High Courts in 1999 (at the level of the state) and the demand for justice of the firm (at the level of the sector). The demand for justice is calculated for each sector of manufacturing in United States (or in Canada) as one minus the vertical integration of the sector; the vertical integration being measured as the ratio of value added to total sales.
- [2]growth status of the enterprise over the last 3 years: 1=expanding and constant, 0=contracting
- [3]number of firms per sector per state
- Probit regressions. Robust z-statistics in parentheses, clustered at the level of the state
- * significant at 10%; ** significant at 5%; *** significant at 1%
- Rather than the coefficients, we report the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.
- 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.