C.I.R.P.É.E

Centre Interuniversitaire sur le Risque, les Politiques Économiques et l'Emploi

Cahier de recherche/Working Paper **07-24**

The Impact of the Judiciary on Economic Activity: Evidence from India

Matthieu Chemin

Septembre/September 2007

Chemin : Department of Economics, University of Quebec at Montreal, case postale 8888, succursale Centre-Ville, Montréal (Québec) Canada H3C 3P8 and CIRPÉE
chemin.matthieu@uqam.ca

Abstract:
This paper examines the consequences of slow judiciaries on firms' contracting behaviour in India. After deriving testable implications from a game theoretical model, I examine how case pendency rates in India's state courts affect the contracting behaviour of 170,000 small non-agricultural informal firms from the 2000 National Sample Survey's 55th round. I find that a slow judiciary implies more breaches of contract, discourages firms from undertaking relationship-specific investments, impedes firms' access to formal financial institutions, and favours inefficient dynasties. 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: K10, K12, K40, K42, O12, O17, L14, D23, C72

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 that enables contracting to achieve Pareto efficiency, as in the First Welfare Theorem. However, it is clearly understood today thanks to the contributions by North (1990) that institutions defined as the organisation of society, the "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 firms' contracting behaviour and hence on aggregate economic performance. Knack and Keefer (1995) relate professional country risk measures provided by business experts to their measure of judicial quality which is the amount of contract-intensive money (the difference between M2 and cash). The intuition is that in a country with a better judiciary, we should see more complicated contracts involving this type of money. However, there is a problem of endogeneity: richer countries can afford better institutions. Three papers deal with the endogeneity of institutions using an instrumental variables approach. Mauro (1995) instruments corruption with ethno-linguistic fragmentation. Hall and Jones (1999) use distance from the equator as an instrument for social infrastructure because, they argue, latitude is correlated with "western influence", which leads to good institutions. Finally, Acemoglu et al (2001) use differences in the mortality rates of European colonialists to estimate the effect of institutions on economic performance. The intuition is that in places where Europeans faced high mortality rates, they could not settle and were more likely to set up extractive institutions. These institutions have persisted to the present. They find that the risk of expropriation, instrumented by settlers' mortality, negatively affects economic growth today in a cross section of countries. More recently, Djankov et al (2003) gathered a remarkably detailed dataset on court performance and procedural formalism in a cross section of 109 countries to show that

higher procedural formalism determined by legal origin is associated with a less efficient judiciary.

To date, literature on the links between institutions, contract enforcement and economic performance has been largely macroeconomic. In contrast, I will try to move this literature in a more microeconomic direction. I focus on one specific measure of institutional quality, the speed of the judiciary, evaluated in an objective fashion. I then examine how this measure affects contracting behaviour and 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 were asked to firm owners concerning breaches of contract, the nature of contracts signed, access to credit and 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 that cannot be as convincingly controlled for in cross country data. In this sense, my paper is in the spirit of recent works exploiting policy differences across Indian states. Besley and Burgess (2004), for example, examine how differences in the industrial relations climate across Indian states affects manufacturing performance. However, in my case, I have disaggregated information on both contracting behaviour and performance of small firms in India.

The structure of this paper is as follows. Section 1 explores the channels through which the quality of the judiciary impacts on firms' economic performance. I introduce explicitly the role of the judiciary in simple models of four prominent aspects in the life of a firm: breaches of contract, use of relationship-specific investments, access to credit markets and corporate ownership. Section 2 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 3 presents my method, and results pertaining to firms' contracting behaviour. Section 4 discusses the effects on firm performance. Section 5 concludes.

1 Theory

1.1 Breaches of Contract

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

Consider a trade relationship between two agents, a buyer and a seller. These two individuals play a typical Prisoner's Dilemma game with perfect information. A good is traded, of valuation v_s to the seller and v_b to the buyer. The two players have two possible strategies: C will denote cooperation (payment for the buyer, delivery for the seller) and D indicates a deviant 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 and a value close to 1 indicates an efficient judiciary (see appendix for proof). The payoffs for this game are therefore:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.2 Relationship-Specific Investment

The previous section demonstrated that more contracts are breached when judiciaries are of low quality. But one could also expect the quality of judiciaries to impact on the degree of specificity in 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 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 carry out 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 suppliers' rents. Alternatively, if search costs to find a new supplier are high, there is an immediate incentive for the supplier to use its monopoly power to impose higher prices. These frictions could reduce the incentive to invest in specialised assets; Klein et al (1978) conclude that vertical integration will supersede market systems in such cases. But another way to limit post-contractual opportunistic behaviour is a strong judicial system that enforces contracts properly. I will now develop a simple model based on the previous game in which the judiciary is explicitly modelled to evaluate the impact of the quality of the judiciary on the incentive to invest in specialised assets.

Consider the game described earlier. There are two possibilities for a seller of a good: either he makes a relationship-specific investment (RSI) of value i with a particular firm, or produces a good of more widespread use (the opposite of a relationship-specific investment, $\overline{RSI}$) with little or no appropriable rents. The drawback of a relationship-specific investment is that there is a risk of post-contractual opportunistic behaviour. Its advantage is the possibility of higher rents. As my analysis focuses arbitrarily on the seller, I model this as a decrease in production costs for the seller where a relationship-specific investment is undertaken. The valuation of the good for the buyer is v_s 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 seller and 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 buyer's situation.

The buyer is faced with an alternative: either he cooperates and obtains $\frac{v_b - p}{1-\delta}$; or he deviates at time t by expropriating the seller and appropriating the total rents and obtains $\sum_{i=0}^{t} \delta^i (v_b - p) + \sum_{i=t+1}^{\infty} \delta^i (v_b - v_s) - \delta^{t+1} \phi F(v_b - v_s)$. However, the seller may sue him in court, in which case the buyer will have to pay a fine depending positively on the total rents.[5] Comparing these two payoffs, we obtain the incentive constraint for the buyer:

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

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

I now assume that the seller will offer the price corresponding to that incentive constraint. It is the lowest price with which the buyer will cooperate under a certain judiciary ϕ and the highest price with which to make profits. Calculating the payoffs for the seller is straightforward in both situations: if 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.

1.3 Access to credit markets

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

> "The key function of courts in credit relationships is to force solvent borrowers to repay when they fail to do so spontaneously. By the same token, poor judicial enforcement increases the opportunistic 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."

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

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

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

and earns the entrepreneur π.

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

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

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

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

than one from the bank. More loans from friends should be observed when judiciaries worsens.

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

Proof. See appendix for proof. ■

1.4 Dynastic Management

Dynastic management is the inter-generational transmission of control over assets 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 examine the control structure of the 20 largest publicly traded companies in 27 (mostly wealthy) economies in 1995. On average, family ownership across these countries is the control structure of 30% of companies. The numbers for middle-income countries in the sample are especially striking: 65% in Argentina, 50% in Greece, 100% in Mexico, 45% in Portugal. They suggest that widely held corporations are 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 lose control due to a takeover or market accumulation of shares by a raider. Consequently, they are more likely to cut their ownership of voting rights by selling shares to raise funds or to diversify.

However, the firms studied here are small firms with less than ten employees and are certainly not floated on stock markets. Another explanation, perhaps better adapted to these firms, is provided by Caselli, Gennaioli (2002). Their reasoning proceeds in two steps. First, heirs to family firms have no obvious talent for managerial decision making: dynastic management is a potential source of inefficiency. Second, a firm owner, realising that his heir is untalented, prefers transfering control to more 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. Imperfect judicial systems in developing countries may cause the prevalence of family-owned firms and therefore these countries' poor economic performance. Hence:

Proposition 4 *There are more family-owned firms in states with inefficient judiciaries.*

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

2 Background

This paper's purpose is to relate the quality of the judiciary to firms' contracting behaviour. To do this, I use 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 single Supreme Court at the federal level; High Courts in each state; and, at lower levels, district judges for civil cases and sessions judges for criminal cases. 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 each state.

Data on cases pending in courts indicate that there were 3.1 million cases pending in 21 High Courts and 20 million in subordinate courts in 2000.[6] Examples of judicial slowness are striking:

> the highest court in the country, the Supreme Court, took 11 years to acquit the headmaster of a school on the charge of taking a bribe for signing the salary arrears bill of his school. In another case of judicial delay, the victim was former Union Law Minister, Dr. B.R.Ambedkar. The judgement came in his lifetime but it took 47 years for the Maharashtra government to

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

One reason for judicial delays is a 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 have a positive impact on the speed of trials. One major positive legal principle 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 judicial backlog. But other provisions in place have a negative impact. For instance, the Code of Civil Procedure states that litigants need not appear in court in person. Litigants may send pleaders instead. But a 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 plaints must include complete claims. However, amendments of original pleadings are impossible. Thus, the language of statements is prolific, allowing for wide interpretations of plaints during proceedings. This reduces the clarity of plaints.

Speed has thus been identified as a key problem in India's judiciary, one which dominates other problems such as fairness, predictability and judicial access. I measure judicial speed 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. However, the measure I employed here has the advantage of being an objective measure of judicial efficiency. Overall pendency (in civil and criminal cases) is an illuminating statistic since it captures the perceived efficiency of the judicial system and it is this perceived efficiency that affects firms' contracting behaviour.

An attractive feature of this data is state variation in pendency percentage. This is due to the common law system, which, compared with civil law, is much less codified. This liberty enables judiciaries to interpret laws 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, gives judges considerable discretion in regards to streamlining trails or making them more complex. Thanks to the common law system, High Courts decisions concerning disputes over statutes of the Code of Civil Procedure set precedents for 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 a 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 since it shows that different interpretations of the same law in different states have an impact on judicial speed.[9]

It is often claimed that the judicial system has only a limited impact on the economy since people resort to alternative dispute resolution institutions, particularly 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 over land usage, tenure and commons. As locally-bound institutions, they are highly efficient since they are familiar with situations and litigants at the village level. Correspondingly, the level of acceptance among the population is high. In dispute resolutions, Panchayats may impose only limited sanctions, but social pressure created by judgements serves as a strong incentive to comply. Rural planning commissions submit proposals for infrastructure projects such as water dwelling and road improvement to the respective state's authorities. Their involvement ensures broad participation on the part of affected populations, and provides the basis for the distribution of public goods and services according to the needs of the poor. They are the first contact point for administrative complaints, and thus prevent disputes before projects are implemented. I therefore collected information on the number of these entities, and used this as a control in my regressions.

My aim here is to relate these measures of judicial efficiency to firms' contract behaviour. To do this, I will now 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 collected in 1999/2000 for small non-agricultural firms.[10] Several characteristics of this dataset 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 whether it found the non-recovery of service charges, fees or credit to be a major obstacle to its operation. I interpret this problem as a breach of contract. Second, a detailed questionnaire about the type of contracts used is also available. I know whether or not the firm operated on a contract basis, and if so, the type of contract it used. For example, I know whether 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 access to credit markets. Each firm was asked whether it found the shortage of capital to be a major problem to its operation. Related to this, a wealth of information on the source of loans is reported. I know whether the loan was granted from a central and state-level term lending institution, a government (central, state or local), public sector

banks, commercial banks, other institutional agencies, money lenders, business partners, suppliers/contractors, or friends and relatives. Fourth, I have information on firm ownership, whether it is a partnership with household members 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 (according to the 5-digit level in the National Industry Classification).

3 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; this will first 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 contracting behaviour outcomes and pendency percentages, and then incrementally adds control variables to that regression in order to check the robustness of the result.

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); state school enrolment and literacy rates (to control for educational attainment); state amount of credit per capita (to control for the financial sector's overall development); state expenditure on state organs and the unit cost per policemen (to control for that part of the state budget devoted to enforcing law and order); state length of roads

per capita and access to safe drinking water (to control for infrastructure quality); and finally, state death rates and state male life expectancy (to control for health sector development).

Firm-level variables (X_{ijs})[12] consist of the following: indebtedness (to control for the disciplinary effect of increased indebtedness on the use of available funds); the level of interest payments as a proportion of firms' profits (to control for the likelihood of bankruptcy); the amount of capital accruing from financial institutions (to control for the ability of firms to gain access to sources of financing); the proportion of temporary to total employment in the firm (to control for for labour productivity[13]); the owner's gender (to control for gender-specific effects on firm performance[14]; the 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 business's level of informality).

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 since 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).

3.1 Basic Results

Table 1 examines the relationship between contracting behaviour and the quality of the judiciary. The dependent variable is the occurrence of contract breaches and the sole determinant is the pendency percentage. The dependent variable was obtained from a list of problems commonly experienced by firms. One such problem is the 'non-recovery of service charges/ fees/ credit'. This relates to cases in which a breach of contract has occured. I therefore construct a dummy variable equal to 1 in cases where the firm experienced this type of problem as one of its main problems, and 0 if it did not. 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, a fact that strengthens the claim that there is a significant relationship between pendency rates 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 somewhat weak and, although statistically significant, seems economically insignificant. However, the ranges of pendency percentages in India must be kept in mind. In 1999, the pendency percentage variation among states was 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 examines the nature of contracts as a function of judicial quality. The dependent variable represents whether or not a firm operates on a contractual basis and the explanatory variable represents the pendency percentage. As discussed earlier, the dataset contains detailed information on the contractual environment in which these firms operate. I thus constructed a dummy variable equal to 1 in cases where the firm worked on a contract basis and 0 if it did not. Column (1) of Table 2 indicates no 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 of the judiciary on the number of contracts entered into, it is more instructive to assess the impact of the judiciary on contract

design. The dataset contains additional information on the nature of these contracts. In particular, firms were asked three questions: 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 a contract as a relationship-specific investment contract in cases where these three questions were answered affirmatively. 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 significant loss of value. In columns (2) to (5) of Table 2, I consider only firms working on a contract basis, some of which signed a relationship-specific investment contract. By reducing the size of the sample, I hope to pinpoint a significant relationship between the quality of the judiciary and the likelihood of signing relationship-specific investment contracts. 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 firms' 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 in cases where the firm experienced a shortage of capital as one of its problems, and 0 otherwise. A higher pendency means more problems of this 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 found 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 points harder to obtain a loan from formal financial institutions in states with slow judiciaries. 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. Since there are very few firms in the category where loans are from friends, relatives and business partners (column (5)), I thus restricted attention to the sample of firms having obtained a loan. In this subset, 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 pendency rates are higher. The average firm having obtained a loan is 16 percentage points more likely to have obtained it from a relative than from other sources in states where the judiciary is the slowest, as opposed to the quickest. This result is consistent with Proposition 3, which holds that agents obtain more loans from friends and less from banks in situations where there is a slow judiciary.

Table 4 looks at the nature of firm ownership as a function of judicial quality. I restrict the sample to firms engaged in partnerships as opposed to single-ownership firms, as partnerships firms provide further data on 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. 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 slow judiciaries. 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 as compared to the fastest. This is consistent with Proposition 4, which states that family firms should be more prevalent in states with slower judiciaries.

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. Need for the judicial system will be measured by these firms' vertical integration. A highly vertically integrated firm does not rely on the judicial system since all activities are internalized. A non vertically integrated firm, in contrast, relies on many suppliers or customers and is therefore more dependent on the judicial system. Vertical integration of firms will be measured by the ratio of the value added generated in the firm to the total sales. An indicator of 1 means that all value creation comes from within the firm. An indicator of 0 means that a firm is not highly vertically concentrated. Following Rajan and Zingales (1998), I make two very important assumptions. First, I consider that the judicial system is optimal in the United States. This method allows me to identify a sector's technological demand for a judicial system. Second, I assume that this technological demand carries over to other countries. I then examine whether industries more dependent on judicial systems experience more problems of breach of contract, undertake fewer relationship-specific investments, suffer from capital shortages 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 the ISIC Code (Revision 3) put together by the United Nations Statistical Division.[16] I then constructed 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 dependent on the judicial system in the US is more likely to be family run than a firm in a sector not dependent on the judiciary. I verified that my results did not depend on the choice of benchmark country by gathering data for Canada. The last four columns of table 5 show that the result is comparable and in

accordance to expectations.

This extension provides the additional insight that the effect of the judiciary depends on ta firm's demand for justice by a firm. Sectors typically more dependent on judiciaries suffer more from judicial inefficiency.

3.2 Robustness checks

To lend support to the previous set of estimates, I will 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 judicial quality used. Table 6 looks at the relationship between occurrences of breaches of contract and judicial quality using various measures of judicial quality 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 trials in High Courts 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 in using the pendency rate as a measure of judicial quality is the possibility of out of court settlements. If contracting parties are aware that they are unlikely to achieve an expeditious verdict, they may be more inclined to resolve disputes by way of settlement. This could artificially reduce the backlog of cases treated by the judiciary. The pendency rate may be influenced by settlements and a low pendency rate

would thus not be evidence of an efficient judiciary.

A similar problem might arise if the assumption made in Section 1.1, regarding random matchings between seller and 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 resolve information asymmetry. This would enable him to deal only with patient and cooperative agents, thereby creating a business network, as opposed to the anonymous market where players are matched randomly. Kali (1999) develops a theory of business networks in which the latter 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 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 this 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 judicial efficiency used relates to the demand for, 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 before the courts (the demand for justice). I am interested in the effect of the supply of justice on firms' contracting behaviour, but this 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 is not evidence of an increasingly inefficient judiciary but merely reflects the litigious nature of agents.

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

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

This indicator only reflects the capacity of judges to solve cases. A high ratio indicates that many pending cases are being treated. Column (7) of Table 6 shows that this indicator is positively correlated with breaches of contract. In fact, 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 in which judges solve 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 means scarceness is the number of judges 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 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 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 by using alternative dispute resolution mechanisms. The impact of the latter 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 works in the respective state or not, as the majority of institutions are not imposed by the government and thus only come into existence when supported by the population itself. Table 8 includes the number of Panchayats and rural planning commissions as additional state controls. In column (1), the dependent variable is the occurrence of breaches of contract. We see that the pendency percentage variable retains its significance. Surprisingly, 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 of a firm undertaking a relationship-specific investment. The quality of the judiciary loses its statistical significance and 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 percentage remains significant.

4 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 of firm

owners. It is a dummy variable equal to one if the firm is expanding or constant, to zero if the firm is shrinking.

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 firm performance even when control variables are incrementally added. From Table 9 column (4), we see that the effect on economic performance is considerable. The average firm in the average state will be less likely by 10 percentage points to expand if the judiciary is the slowest as opposed to the quickest in India. In Column (5), I included variables corresponding to alternative dispute resolution mechanisms. We saw that the pendency percentage remains significant and that other variables are insignificant. I also carried out the robustness checks of Section 3. I used different measures for both pendency percentage and the efficiency of the judiciary (solved/pending) and found similar results.

I also applied the methodology of Rajan and Zingales (1998) to firm performance. The intuition is that good judiciaries disproportionately help firms typically dependent on the judicial system for growth. We can see from Table 10 column (1) that Indian firms involved in sectors more dependent on judiciaries in the USA grow less in states with inefficient judiciaries. Another possibility is that firms may simply move to other states or that people decide not to undertake judicially dependent activities. 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 in sectors requiring good judicial systems in states where judicial system are defective. Unfortunately, this does not allow me to discriminate between the two hypotheses 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 other states, though it is clear that bad judicial systems certainly have an impact on firms in regards to their industrial organization. As in Section 3, these findings are robust to the use of Canadian data (columns (3) and (4)).

5 Conclusion

This paper has shown that the quality of judicial institutions in Indian states matters for both small firms' contracting behaviour and economic performance of small firms. My findings are in line with an emerging, largely macroeconomic literature (Djankov et al (2002), Acemoglu et al (2001), Rodrik et al (2002), for example), underlining the importance of institutions in economic performance. My firm-level data is unique in the sense that it contains much information on non-recovery of service charges/fees/credit, contract design, whether a firm is capital constrained, sources of borrowing and forms of ownership. This type of information is typically not available in most firm-level databases.

When I related these specific measures to state pendency rates, I found that slower judiciaries are 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 judiciaries across Indian states plays an important role in shaping economic activity in this important sector of the economy. Moreover, I found that having slower courts is negatively associated with firm performance. My results are consistent with a simple game theoretic model illustrating how slower judiciaries affect agents' behaviour in contracting relationships. This theory's key insights are that firm owners in slow judiciary environments are more likely to break contracts, less likely to engage in relationship-specific investment, more likely to be credit constrained, less likely to have access to formal credit and more likely to keep firms under family ownership.

This research leaves important questions open. First, we would like, for example, to know more about what determines judicial speed. In particular, we would like to identify specific policy measures which would enhance judicial efficiency. This is a problem both for India and for many countries suffering under slow courts (Djankov et al, 2003). A key implication from this paper is that the quality of the judiciary has significant effects on economic performance. Finding specific means of speeding up courts is therefore an important area for future work. In India, the common law system seems to suggest that

the actions of High Court judges may be an important determinant of judicial speed. Linking the rulings of these judges to court functioning is an area of research I plan to take up in the future. Another unanswered question concerns whether the effects of a slow judiciary vary across sectors of an economy. One can imagine for example that firms in India's registered or formal manufacturing sector may have fewer contracting problems than informal firms I examined in this paper. 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.

References

[1] Acemoglu, Daron, Johnson, Simon and James Robinson, [2001], "The Colonial Origins of Comparative Development: An Empirical Investigation", *The American Economic Review*, V.91, 1369-1401.

[2] Besley, Timothy and Robin Burgess, [2004], "Can Labor Regulation Hinder Economic Performance? Evidence From India", *The Quarterly Journal of Economics,* V.119(1), 91-134.

[3] Caselli, Francesco and Nicola Gennaioli, [2003], "Dynastic Management", *NBER Working Paper* No. w9442.

[4] Dixit, Avinash, [2003], "Trade Expansion and Contract Enforcement", *Journal of Political Economy*, V.111(6), 1293-1318

[5] Djankov, Simeon, La Porta, Rafael, Lopez-De-Silanes, Florencio and Andrei Shleifer, [2002], "The Regulation of Entry", *The Quarterly Journal of Economics,* V.117(1), 1-37.

[6] Djankov, Simeon, La Porta, Rafael, Lopez-de-Silanes, Florencio and Andrei Shleifer, [2003], "Courts", *The Quarterly Journal of Economics,* V.118(2), 453-517.

[7] Greif, Avner, [1993], "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Trader's Coalition", *The American Economic Review*, V.83(3), 525-548.

[8] Hall, R. E. and C.I. Jones, [1997], "Levels of Economic Activity Across Countries", *American Economic Review*, V.87(2), 173–77.

[9] Hall, R. E. and C.I. Jones, [1999], "Why Do Some Countries Produce so Much More Output per Worker than Others?", Quarterly Journal of Economics, V.114(1), 83-116.

[10] Kali, Raja, [1999], "Endogenous Business Network", *Journal of Law and Economic Organizations*, V.15, N.13.

[11] Klein, Benjamin, Crawford, Robert and Armen Alchian, [1978], "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process", *Journal of Law & Economics*, V.21(2), 297-326.

[12] Knack, Stephen and Philip Keefer, [1995], "Institutions and Economic Performance: Cross Country Tests Using Alternative Institutional Measures", Economics and Politics, V.7(3).

[13] Koehling, Wolfgang, [2002], "The Economic Consequences Of A Weak Judiciary: Insights From India", *Law and Economics 0212001, Economics Working Paper Archive at WUSTL.*

[14] Kranton Rachel, [1996], "Reciprocal Exchange: A Self-Sustaining System", *The American Economic Review*, V.86(4), 830-851.

[15] La Porta, Rafael, Lopez-De-Silanes, Florencio and Andrei Shleifer, [1999], "Corporate Ownership Around the World", *The Journal of Finance*, V,LIV(2).

[16] Mauro P., [1995], "Corruption and Growth", *Quarterly Journal of Economics,* V.110(3), 681–712.

[17] Moulton, Brent, [1990], "An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units", *The Review of Economics and Statistics*, V.72(2), 334-338.

[18] North, Douglass C., [1990], "Institutions, Institutional Change, and Economic Performance", *Cambridge University Press*, New York.

[19] Pagano, Marco, Bianco, Magda and Tullio Jappelli, [2002], "Courts and Banks: Effects of Judicial Enforcement on Credit Markets" *CEPR Discussion Paper* no. 3347, forthcoming in *the Journal of Money, Credit and Banking.*

[20] Rajan, Raghuram and Luigi Zingales, [1998], "Financial Dependence and Growth", *The American Economic Review*, V.88(3), 559-586.

Notes

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

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

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

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

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

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

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

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

[6]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

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

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

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

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

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

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

[13]The expected effect of this variable on productivity is ambiguous. It is possible that there are greater incentives for a firm to earmark resources for investment in human capital in cases of full-time working relationships. Alternatively, temporary labour might provide a firm with increased flexibility to adapt to changes in its environment. Fur-

thermore, it could be argued that temporary workers have an incentive to make greater efforts in the hope of becoming permanent.

[14]The impact of female ownership on firm performance is ambiguous. Many studies indicate that businesses owned by women underperform those owned by men. One difficulty women face in operating small businesses is family responsibilities, which limit their working hours.

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

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

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

Appendix

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

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

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

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

G corresponds to the gross gain:

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

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

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

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

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

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

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

as to avoid paying fines. Using these refinements:

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

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

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

and therefore:

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

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

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

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

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

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

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

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

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

A2. Proof of proposition 3

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

The game is as described in Section 1.3:

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

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

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

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

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

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

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

An additional result comes from the comparison between an entrepreneur's two loan sources. Let us now assume that banks act in a competitive manner and set their interest

rates so that their profits equal to zero. Thus, no credit is granted for $\phi < \phi^*$, but the interest rate is $r = \frac{-p-(1-p)\phi c+1+\bar{r}}{p}$ for $\phi > \phi^*$ (equality in the incentive constraint of the bank). It can be shown that $r_{bank} > r_{friend} \Leftrightarrow \phi < \phi^* \frac{1-p\delta}{1-p} = \phi^{**}$.

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

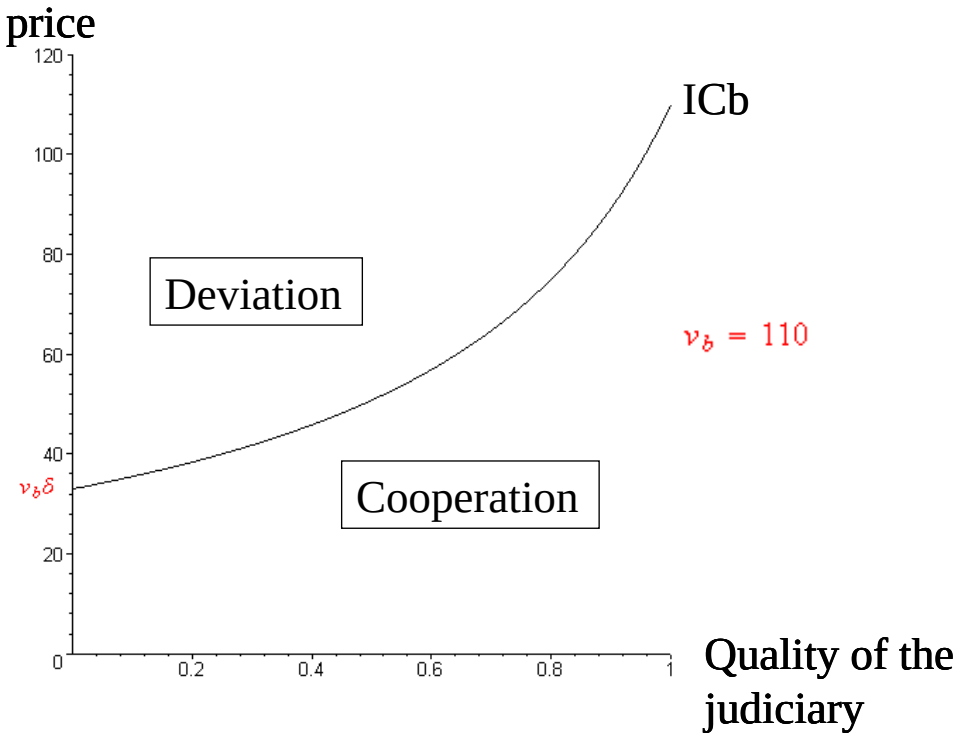

Figure 1: price offered by the buyer as a function of the quality of the judiciary in order to cooperate (ICb: Incentive Constraint of the buyer)

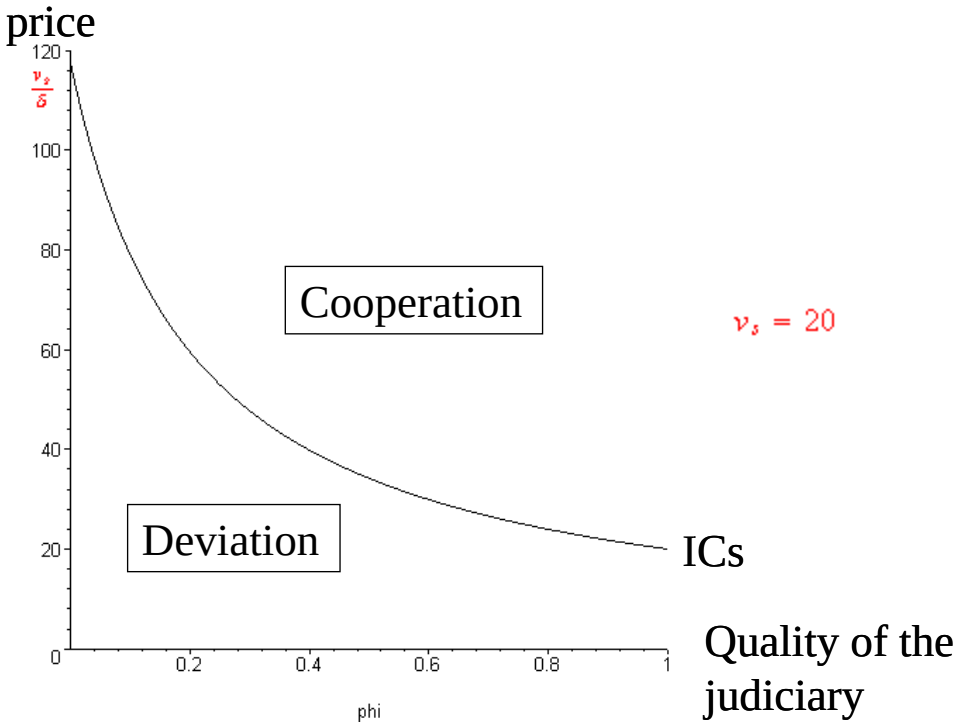

Figure 2: price asked by the seller as a function of the quality of the judiciary in order to cooperate (ICs: Incentive Constraint of the seller)

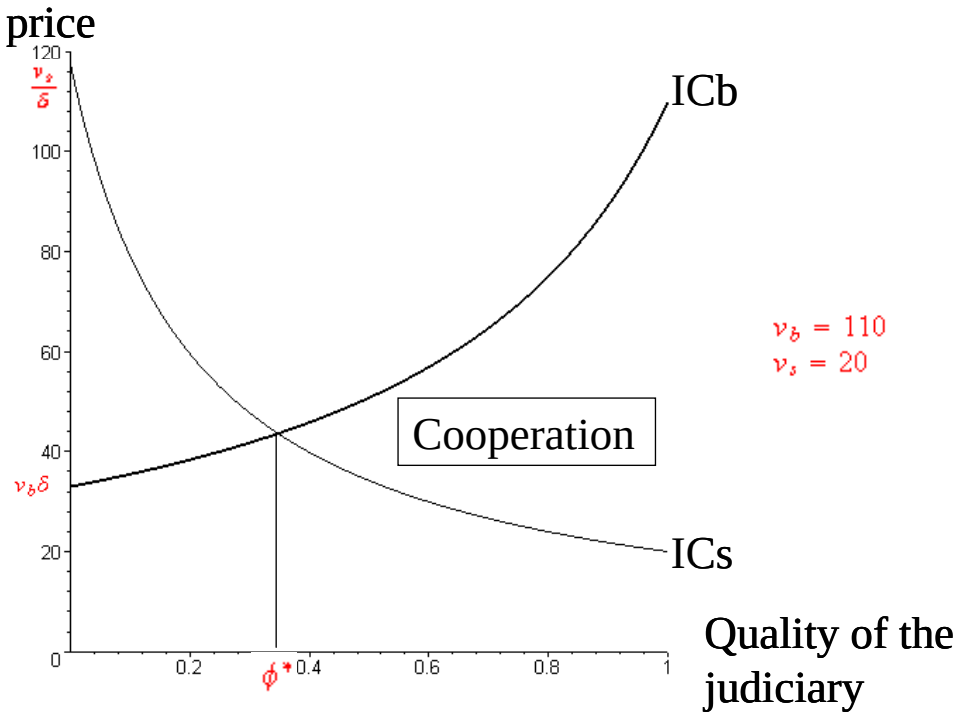

Figure 3: a potential matching between two individuals and the zone of cooperation

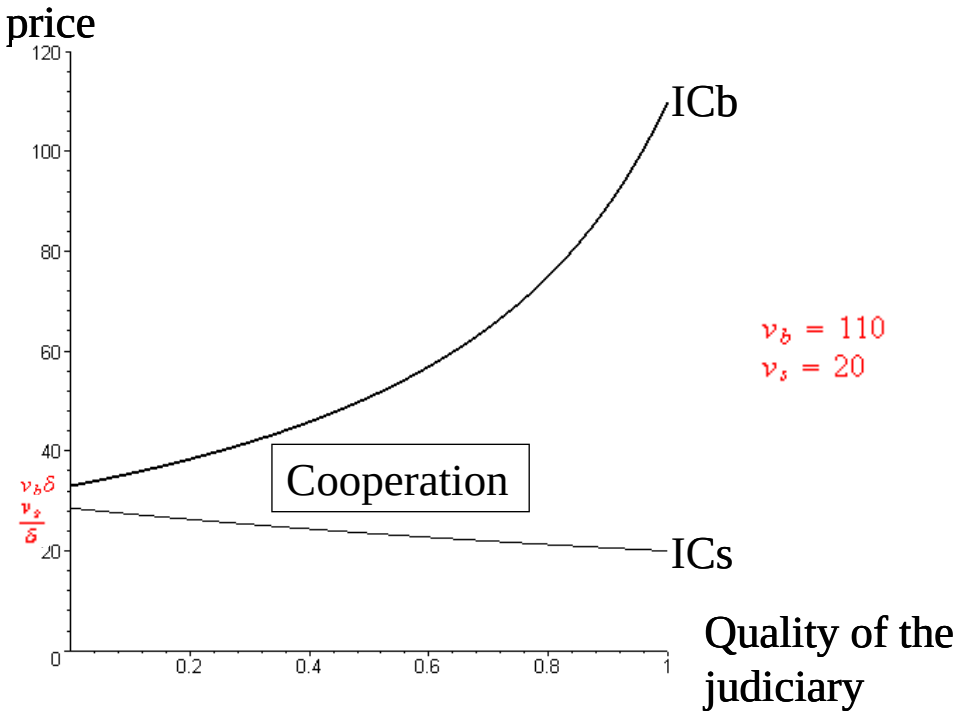

Figure 4: a matching between two individuals who could work in a business network

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

	(1)	(2)	(3)	(4)
Dependent Variable	non-recovery of service charges, fees, credit			
pendency percentage of total	0.1546	0.0948	0.1012	0.1113
cases in High Courts in 1999	(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	0.1080	-0.0231	-0.1255	-0.1837	-0.1144
cases in High Courts in 1999	(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 entreprise 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	0.4105	-0.0519	-0.0406	-0.0189	0.3347
cases in High Courts in 1999	(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 different sources of 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 obtained a loan; =0 otherwise.•[3]formal loan: =1 if the entreprise obtained a loan from lending institutions, government, banks; =0 otherwise.•[4]business loan: =1 if the entreprise obtained a loan from suppliers/contractors and moneylenders; =0 otherwise.•[5]"relative" loan: =0 if the entreprise obtained a loan from friends and relatives or the business partner; =0 otherwise (among the entreprises which obtained 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 types of ownership

	(1)	(2)	(3)	(4)
Dependent Variable		dynasty[1]		
pendency percentage of total	0.2937	0.4487	0.3118	0.2937
cases in High Courts in 1999	(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 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 interaction between pendency and the demand for justice on the contracting behaviour of firms

	(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 pendency percentage	0.0132	0.2783	0.4549	0.6008	0.172	-0.2006	0.2676	0.5649
in 1999 and 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	0.1113						
in High Courts in 1999	(4.28)***						
pendency percentage of total cases		0.1350					
in High Courts in 1998		(7.41)***					
expected duration of a trial			0.0169				
in High Court in 1996[1]			(8.98)***				
pendency rate in 96[2]				0.0568			
				(5.86)***			
expected duration of a trial					0.0184		
in High Court in 1995[1]					(8.70)***		
pendency rate in 95[2]						0.0553	
						(5.65)***	
number of cases solved divided by							-0.0513
number of cases pending in1999							(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 (end 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		-2.0597		17.7354
education expenditure		(1.21)		(1.53)
Four-year lagged per capita		0.0113		0.8461
health expenditure		(0.01)		(0.14)
Four-year lagged per capita		9.5364		-57.7160
other expenditure		(2.03)*		(1.35)
Four-year lagged state taxes as a		5.3878		-49.3674
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	0.3266	-0.3609	1.6541	2.0902
cases in High Courts in 1999	(3.45)***	(1.52)	(3.29)***	(2.80)***
number of panchayats per	0.0007	-0.0012	0.0042	0.0047
million inhabitants[5]	(2.04)**	(1.40)	(2.29)**	(1.74)
number of planning commissions	0.0005	-0.0070	0.0144	0.0106
per million inhabitants[5]	(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 quality of the judiciary on 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	-0.2151	-0.3215	-0.3065	-0.3025	-0.5203
cases in High Courts in 1999	(6.07)***	(3.72)***	(3.61)***	(3.73)***	(2.14)**
number of panchayats per million capita					-0.0010
					(1.15)
number of planning commissions					-0.0010
per million capita					(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.