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IN A PRISONER'S DILEMMA GAME

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ABSTRACT

The goal of this paper is to explore the possibility that the costs and benefits of legal representation are structured so that each individual party seeks legal representation in the hope of exploiting the other party, while knowing full well that failing to do so will open up the possibility of being exploited. The first part of the paper shows how the structure of the incentives faced by the parties may be estimated, and the second describes the results of empirical tests in several different settings. The empirical results strongly suggest that the parties do face "prisoner's dilemma" incentives, although no attempt is made to determine whether the parties respond to these interviews.

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Lawyers as Agents of the Devil in a Prisoner's Dilemma Game

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The nickname Prisoner's Dilemma, attributed to A.W. Tucker, derives from the original anecdote used to illustrate the game. Two prisoners, held incommunicado, are charged with the same crime. They can be convicted only if either confesses. Further, if only one confesses, he is set free for having turned state's evidence and is given a reward to boot. The prisoner who has held out is convicted on the strength of the other's testimony and is given a more severe sentence than if he had also confessed. It is in the interest of each to confess whatever the other does. But it is in their collective interest to hold out. Rapoport and Chammah (1965)

It is often asserted that a substantial fraction of the U.S. economy's output is devoted to unproductive legal services. Accompanying these claims are chilling stories (and jokes!) told about highly compensated lawyers who are the only beneficiaries of some economic, political, or social dispute.[2] How, in a well defined competitive market for lawyer services, could any such inefficiency arise?

The purpose of this paper is to explore the possibility that the parties to a typical dispute face incentives very similar to those faced by the prisoners in the classic dilemma described above. In short, the goal is to explore the possibility that the costs and benefits of legal representation are structured so that each individual party seeks representation in the hope of exploiting the other party, while knowing full well that failing to do so will open up the possibility of being exploited.

In the prisoner's dilemma the players are faced with incentives that lead to behavior that is not in the best interests of either party. The incentive structures embedded in such institutions provide a payoff to each party for engaging in noncooperative behavior. The mere existence of such incentives is not enough to produce the prisoner's dilemma, however. In order to produce inefficiency the payoffs to noncooperative behavior must be larger than the costs. Determining whether a particular institution embodies the incentives associated with the

1

prisoner's dilemma thus requires determining whether the individual benefits to engaging in noncooperative behavior are likely to exceed the costs.

The first part of this paper shows how it is possible to test for the presence of an incentive structure like the one in a prisoner's dilemma game in a typical dispute resolution system. The goal is to measure the payoff matrix faced by the parties, but no attempt is made to determine how the parties respond to the incentives they face. Although the analysis is framed in the context of an arbitration system it could equally as well be applied to any dispute resolution system, including the court system. The second part of the paper reports estimates of the incentives for the parties to obtain legal representation in wage disputes that were settled by final-offer arbitration in New Jersey. The third part of the paper reports briefly on similar studies of data from (1) the arbitration of discharge grievances, (2) the arbitration of court-annexed disputes in Pittsburgh, and (3) the settlement of child custody disputes in California. All of these data provide evidence that the parties face strong individual incentives to obtain legal representation. Whether these incentives lead to excessive legal representation that has no social benefit is discussed in the final section of the paper.

I. The Incentives for Noncooperation

In the analysis set out here the employer seeks the highest net value added (the value of the workers output less their costs) consistent with recruiting enough workers, and the union seeks to receive the highest labor costs consistent with the continued viability of the employer. In the typical case where arbitration is used to settle such labor disputes, workers and employers have long term relationships that they would like to see continue indefinitely. However, it is necessary to change the terms of the employment agreement as the external labor market changes, and this causes disputes over just how much the compensation of these workers should increase.

To avoid costly strikes, arbitration is sometimes used as the procedure to resolve these compensation disputes. It is now widely agreed that if the parties submit their disputes to arbitration, they will be facing some uncertainty over just what wage increase the arbitrator will select.[3] Suppose, therefore, that we may characterize the distribution from which the arbitral awards will come as normal, having mean u and standard deviation s.

If the old wage rate is w and employment is e, then the increase in the wage bill that the parties may expect if they go to arbitration without employing agents is weu. Now let us consider the payoff to the union if the union employs an agent, but the

3

employer does not. Suppose that by employing an agent the union may expect to improve the mean of the distribution from which the arbitrators' awards are drawn by the quantity a. It follows that if the union proceeds to arbitration and employs an agent it will expect to receive the wage bill we(u+a). Assuming the agent's fee is x', the net wage bill expected if an agent is retained is we(u+a)-x'. The increase in the wage bill that the union may expect from employing an agent is thus wea-x', and the proportionate increase is a-x (where x=x'/we, the proportion that legal costs are of the wage bill.)

The employers net value added if the union engages an agent, but the employer does not, is z-we(u+a), where z represents the value of the union's work. The employer's net value added if neither party engages an agent is z-weu. The increase in the net value added to the employer as a proportion of the wage bill is thus -a for the case where the union employs an agent and the employer does not.

The upper right hand corner of the matrix in Table 1 contains the payoffs to the employer (the first entry) and the union (the second entry) as calculated above for the case where the union retains an agent and the employer does not. (The payoffs are expressed relative to the case where neither party retains an agent and the payoffs in this latter case are normalized to zero.) The remaining parts of the payoff matrix are easily

4

filled in by the same type of analysis. For simplicity it is assumed that if an employer retains an agent it has the same effect on the distribution of arbitral awards as when the union retains an agent. This makes the payoff matrix symmetric, but it is by no means necessary.

The payoff matrix in Table 1 represents a prisoner's dilemma if $(a-x) > 0$. For in this case it pays for the union to retain an agent regardless of what the employer does. If the employer does not retain an agent, the union receives a wage bill increase of a-x, which is greater than 0. (The payoff a-x is called "the temptation" in the extensive literature on the prisoner's dilemma.) Likewise, if the employer does retain an agent, the union is certainly better off doing so also (because $-x > -a$.) (The quantity -a is called the "sucker's payoff"!) In sum, the union is better off employing an agent regardless of what the employer does.

It is easy to see that when $a-x > 0$, precisely the same reasoning applies to the employer's choices. In this case the employer is also better off employing an agent regardless of what the union does. The end result: If the union and the employer do what is in their individual best interests they both retain agents and expend the resources 2x, but the arbitration results are precisely the same as what would have occurred if neither union nor employer had retained agents. The private demand for legal

services generated in this way is clearly socially inefficient. The goal in this paper is to estimate the parameter a so as to test the hypothesis $a-x=0$.

It is well known that the existence of a payoff matrix like the one in Table 1 creates incentives for the parties to arrive at cooperative contracts. It is also clear, however, that making such contracts may well be impossible if the parties do not have repeated disputes. There is an enormous literature in experimental psychology that attempts to clarify the conditions under which cooperation may be expected. (See Rapoport (1965) and Axelrod (1984), for example.) Suffice it to say here that in the experimental literature the parties do often manage to arrive at the cooperative result. Moreover, cooperation tends to increase with experience and with the extent to which the parties appreciate the social dilemma in which they are trapped, while it tends to decrease with the magnitude of "the temptation" to cheat.

It is easy to generalize the payoff matrix and still keep the basic structure of a prisoner's dilemma game. For example, there is no reason why the payoff to retaining an agent must be the same for each party. Suppose that the mean arbitral award is increased by a" when the union alone retains an agent, and that the mean arbitral award is decreased by a' when the employer alone retains an agent. The upper right hand corner of the payoff matrix then contains the elements (-a", a"-x), while the lower left

6

hand corner of the payoff matrix contains the elements $(a'-x, -a')$. These payoffs represent a prisoner's dilemma if $a'-x > 0$ and $a''-x > 0$, since in this case "the temptation" to behave noncooperatively exists for both parties. Moreover, the dominant strategies, where both parties retain agents, is strictly inefficient only if $a'-a''-x < 0$ and $a''-a'-x < 0$.

Another modification of the payoff matrix may be appropriate if the amount of the parties expenditure on legal resources influences the amount by which the mean of the distribution of arbitral awards is shifted when an agent is retained. For example, suppose that the payoff to the union, in the case where the employer does not retain an agent, increases with additional expenditure on the agent. That is, suppose that $a=a(x)$, with $da/dx > 0$. The union will calculate that the optimal amount to spend on their agent requires that $a(x)-x$ be maximized, which occurs when $da/dx = 1$. As a first approximation, this implies that $da=dx$, or that the incremental payoff to retaining an agent be equal to the costs of doing so. In this scenario, the improvement in the outcome that the parties obtain by retaining an agent is, at the margin, appropriated by the agent. This suggests that an indirect way to measure the fee an agent receives may be available from an analysis of the empirical payoff matrix. In short, a (or a' and a") may well be indirect measures of the magnitude of the agents' fees.

7

II. Lawyers and the Arbitration of Wage Disputes

A. The Estimation Procedure

In some cases it may be possible to quantify explicitly the payoffs a and a-x by contrasting the numerical outcomes of a dispute resolution system in each of the four cases indicated by the matrix. In other cases it is only possible to observe who is adjudged the victor in some dispute. This is the situation in final-offer arbitration.

In particular, under final-offer arbitration each party submits a proposed wage increase. The arbitrator must select one or the other of these offers without compromise. A simple model that has been remarkably successful in several applications assumes that the arbitrator first decides what would be a reasonable award, and then selects whichever offer is closest to it.[4] If we denote the arbitrator's numerical award by y, and the employer and union offers by m and n ($m < n$), the employer's offer is selected if $y-m < n-y$, which is true if $y < (m+n)/2$. Since y has a normal distribution with mean u and standard deviation s, it follows that the probability that the employers offer is selected is $Pe = F\{[(m+n)/2s]-u/s\}$, where $F\{.\}$ is the value of the cumulative unit normal distribution function. $Pe = F\{.\}$ is a probit function, with argument $(m+n)/2$, the mean of the employer and union offers. The constant in this probit function, $-u/s$, is the negative of the (standardized) mean of the distribution of

8

arbitrator awards, while the slope, 1/s, is the reciprocal of the standard deviation of this distribution.

With this setup it is a relatively easy matter to determine what the payoff matrix must look like in terms of the underlying probability of an employer victory. In particular, suppose that p represents the value of Pe that results when neither union nor employer retain an agent. Then, to first order, the probability that the employer will be victorious (holding constant both the employer and union offers) when only the union retains an agent is p-fa/s, where f is the unit normal density function (evaluated at the same point as p.) In effect the mean of the distribution of arbitrator awards is increased by a when the union retains an agent, and this decreases the probability of an employer victory by (f/s)a (since -f/s is the derivative of Pe with respect to u.) By the same reasoning, when the employer retains an agent, but the union does not, the probability of an employer victory increases by fa/s. Finally, when both parties retain agents the probability of an employer victory is identical to the case when both parties refrain from engaging agents.

Table 2 contains the payoff matrix translated into the implied probabilities of an employer victory as a function of each of the strategies available to the parties. The symmetry of the payoff matrix translates into symmetry in the probabilities of an employer victory. The most important difference between the

9

payoff matrix and the table of implied probabilities of an employer victory is the absence of any role for the agent's fees in the latter. This is an important point, because in some applications it is not possible to measure the payoff matrix directly. A necessary condition for the presence of a prisoner's dilemma payoff structure is that $fa/s > 0$, which occurs if $a > 0$. This condition will be satisfied if the probability of a union victory, given that the employer does not retain an agent, is greater when the union employs an agent than when it does not. However, finding this to be the case is not sufficient to guarantee that the prisoner's dilemma incentive structure exists. It is also necessary that the union's increased payoff be greater than the cost of obtaining it. That is, we require that $a-x > 0$, not just that $a > 0$. Unfortunately, it is not possible to determine whether this is the case from an examination of the probability structure alone. In the case of final-offer arbitration there is a fairly natural method for translating from the observed probabilities to the underlying payoff structure, but this need not always be the case.

Asymmetry in the payoff matrix will translate into asymmetry in the probability of an employer victory. If the decrease in the mean of the distribution of arbitral awards is a' when the employer retains an agent, the probability of an employer victory when the employer retains an agent and the union does not becomes $p + fa'/s$. Similarly, if the increase in the

10

mean of the distribution of arbitral awards is a" when the union retains an agent, the probability of an employer victory when the union retains an agent but the employer does not becomes p-fa"/s. The probability of an employer victory when both parties retain an agent is thus p+f(a'-a")/s.   Although the matrix of probabilities no longer retains the symmetric simplicity of Table 2, it is still the case that the probability in the lower right hand cell of the matrix is a simple linear combination of the probabilities in the remaining three cells of the matrix. This is, of course, a restriction that may be tested.

B. The Empirical Results

Table 3 contains some simple summary statistics on the cases resolved by final-offer arbitration in New Jersey in 1981-1984. This procedure is available for the settlement of contract disputes by all public safety workers (mainly police officers) in New Jersey.[5] The table reveals two interesting facts. First, the arbitrators have typically been more likely to select the union's offer than the employer's offer. Employers have won about 40% of the cases submitted to arbitration in every year since 1978.[6] This result is inconsistent with the notion that the equilibrium outcome in this dispute resolution system is a simple 50% victory rate for the employer. Moreover, the probability of obtaining these results if p=.5 is extremely small. This suggests that either

11

the parties are not behaving symmetrically when they submit their final offers, or that the arbitrators are not treating the parties offers symmetrically. Ashenfelter and Bloom (1984) show that, in fact, there is evidence that the parties are not behaving symmetrically and that the unions are systematically submitting offers that are conservative.

The data in Table 3 suggest an alternative explanation for these unbalanced win/loss records. These data indicate that union bargainers are far more likely to enlist the assistance of a professional agent in selecting an arbitrator, preparing the arbitration case, and in presenting this case to the arbitrator. If the parties obtain an advantage from retaining an agent, then the fact that the unions are much more likely to retain an agent than are the employers may account for the greater probability that their offer is selected by the arbitrator.

Table 4 provides the empirical analogue to the matrix of predicted probabilities contained in Table 2. This matrix is remarkably similar to the predicted one. The probabilities along the diagonal are nearly equal, and the matrix is fairly close to symmetric. In fact, the advantage to the employer of retaining an agent (an increased win rate of 29 percentage points), is slightly greater than the advantage to the union of retaining an agent (an increased win rate of 21 percentage points.) In an additive model this implies that the employer win rate when both parties retain

an agent should be 52%, while it is actually only 46%. Despite these small discrepancies, a formal statistical test does not reject the symmetry hypothesis.

Although the results in Table 4 are suggestive, they suffer from two deficiencies. First, they do not control for the offers that the parties have made. If these offers are correlated with the probability that the parties retain an agent, then the results in Table 4 may simply reflect the possibility that the parties who retain agents make less aggressive offers than those who don't. Second, the probability matrix in Table 4 does not allow comparison of the financial payoffs associated with retaining an agent against the costs.

Table 5 remedies these problems. It contains the results of fitting probit functions to the actual arbitrator selections. The probit function contains the mean of the parties' final offers, $(m+n)/2$, and dummy variables indicating whether the union or employer retained an agent. The coefficients of these dummy variables are estimates of the shifts in the distribution of arbitral awards that result from retaining an agent, and they control for the offers made by the parties. The results indicate that when the union retains an agent the distribution of awards is shifted upward by between .5% and 2.0%. Likewise, the results indicate that when the employer retains an agent the distribution of awards is

shifted downward by between .3% and 1.9%. Five of these eight shifts are statistically significant (at the .05 significance level.)

These empirical results provide strong evidence that a > 0, and that each party increases the chance their offer will be accepted when they retain agents. There still remains the question of whether the benefits are worth the cost, however. It seems very likely that they are. A permanent increase in the compensation of a police officer by 1% would have a discounted present value of perhaps $2,000 to $3,000. Legal fees are typically said to be about $5,000 per case for the union, and up to $15,000 per case for the employer.[7] It would take a bargaining unit of only 5 to 10 employees to make it well worth the cost for each party individually to retain an agent. In short, their is little doubt that the incentive structure in the New Jersey final-offer arbitration system creates a prisoner's dilemma.

III. The Incentives to Retain Agents in Other Systems

A. Discharge Grievances

Union contracts commonly specify that if an employee is unfairly treated, he or she may formally object to the treatment. The employee does this by filing a grievance. If the grievance cannot be settled through negotiation, then it is usually presented to an arbitrator for decision.

14

Grievances may be filed for many different reasons, but a common case is one where an employee has been discharged for some behavior that is unacceptable to the employer. Block and Stieber (1987) have reported a very thorough study of a sample of discharge grievances, which includes arbitrator decisions that are both published and unpublished. In their study Block and Stieber estimated the probability that a discharge grievance would be denied (the union loses) as a function of whether the parties did or did not retain attorneys to assist in the selection of the arbitrator, and in the preparation and presentation of their case to the arbitrator. The results of their study are contained in the probability matrix in Table 6.

The results in Table 6 are similar to those in Table 4, and they are consistent with the prisoner's dilemma incentive structure of Table 2. As before, arbitrator decisions favor unions in more than 50% of disputes, even when both parties retain lawyers. Like the New Jersey final-offer arbitration cases, the probability matrix here is somewhat asymmetric, but here the asymmetry indicates that the probability of a union victory is changed by more when the union retains a lawyer than when the employer retains a lawyer.

One unusual feature of the Block and Stieber study is the presence in the data of many disputes decided by the same arbitrator. The results in Table 6 control (through the

introduction of arbitrator dummy variables) for the arbitrator in the case. As a result, the results in Table 6 imply that the effectiveness of the lawyers in changing outcomes is not due primarily to their ability in helping the parties to select arbitrators that will be more favorably disposed toward their cases.

It is not possible to convert the probabilities in Table 6 into a payoff matrix of the form in Table 1 because it is difficult to attach a valuation to a union or employer victory. Presumably, the union worker's loss is the discounted present value of the difference between his or her wage in the unionized job and his or her wage elsewhere. Union wage premiums are generally estimated to be around 10%, so a job that would otherwise pay $25,000 may generate a premium of $2,500 per year, or a discounted present value of perhaps $25,000. Since the union increases its victory rate by .18 by hiring a lawyer, the legal fee for a discharge case could approach $5,000 before the payoff would no longer make it worthwhile for the union to retain a lawyer. Precisely how to value the employer's victory in such a case is an open question.

In sum, the data from the grievance arbitration cases suggests that the effect of retaining legal representation on the probability of each party being victorious is substantial. Reasonable calculations suggest that it is quite possible that the

incentive structure in the grievance arbitration system represents a prisoner's dilemma.

B. Arbitration of Court Claims

For a variety of reasons several courts have adopted a procedure whereby the parties in a civil lawsuit submit their claims to arbitration. Adler, Hensler, and Nelson (1983) have reported the results of a study of the outcomes of such an arbitration system that has been operating in Pittsburgh for over thirty years. In their study, Adler, Hensler, and Nelson estimate the percentage of a plaintiff's claim that is awarded to the plaintiff as a function of whether the parties have retained a lawyer. The results of this study are contained in the estimated payoff matrix in Table 7. These data have very similar implications to those contained in Tables 4 and 6. Again, the payoff matrix is only approximately symmetric. Here the advantage to the use of a lawyer is greater for the defendant than for the plaintiff.

An especially useful feature of the data in Table 7 is that they are a very natural representation for the payoff matrix. Suppose, for example, that the plaintiff's attorney is paid on the traditional contingent fee basis. In this form of payment the plaintiff's fee is established as one-third of the award, if any. According to Table 7, a plaintiff who retains a lawyer may expect to obtain 82% of his or her claim if the defendant does not use a

lawyer. Such a plaintiff must expect to pay about 27% of the claim to the lawyer, however. On the other hand, the expected advantage to the plaintiff of retaining a lawyer is 22% (82%-60%) of the claim. The result: The advantage to the plaintiff is just about equal to the cost.

The payoff matrix in Table 7 also demonstrates the real costs of legal representation. Suppose that the plaintiff pays his or her attorney in accord with the contingent fee system. If the plaintiff retains an attorney and the defendant does not, then the plaintiff expects to have a net payoff of 55% (81%-27%) of the claim. This is slightly below the 60% of the claim that the plaintiff may expect if the defendant does not retain a lawyer. On the other hand, if the plaintiff and the defendant both retain attorneys, then the plaintiff may expect to receive only 43% (65%-22%) of the claim. Nevertheless, if the plaintiff does not retain an attorney, he or she may well be stuck with the "sucker's payoff" of only 24% of the claim. After a careful study of lawyer's costs, Adler, Hensler, and Nelson conclude that, "...taking into account the amount they spend on legal fees, represented litigants can expect to obtain better net outcomes, on average, than litigants who appear pro se" (that is, unrepresented by lawyers.)[8]

This, of course, is precisely what we should expect if the incentive structure in the Pittsburgh arbitration system represents a prisoner's dilemma.

C. Child Custody Disputes

Among the most difficult disputes to study are those that arise from the breakup of the family. Among other problems, monetary valuations of the various outcomes of the dispute are difficult, if not impossible, to establish by an outside observer. One of the most contentious issues in such disputes is the question of who will retain physical custody of the child of two divorced parents. In a recent empirical study, Mnookin, Maccoby, Depner, and Albiston (1989) have presented some data on the outcomes of such disputes as a function of whether the mother and father retain lawyers.   These data are arrayed in the probability matrix in Table 8.

The results in Table 8 have very similar implications to those in the previous tables. The likelihood that a mother or father prevails in retaining the physical custody of the child is clearly related to whether they retain a lawyer. Although the probability matrix is asymmetric it is consistent with an additive structure for the payoff matrix. For example, under an additive structure the predicted percentage of cases where the mother retains custody of the child when both parents retain lawyers is

60%. This may be contrasted against the 65% of cases where the mother actually retained custody in these circumstances.

There are many potential problems in using the results of Table 8 to make inferences. For example, Mnookin, et. al. report that in virtually every case the mother wished to have physical custody of the child. However, it is not clear that fathers are so interested in this matter. Thus, it is possible that whether the father retains a lawyer is simply a signal that the father wishes to obtain custody of the child. If this is the case, then Table 8 may overstate the impact on the outcomes when the father retains a lawyer as compared to the case when the father does not retain a lawyer. A more complete statistical analysis is required before these results should be accepted at face value. Despite these reservations, it is seems possible that the court system for dealing with marital disputes over child custody may also contain the incentive structure of a prisoner's dilemma.

IV. Conclusion

The analysis in this paper spells out how the demand for legal services may arise from a set of incentives like those contained in the classical prisoner's dilemma game. When incentives are so structured it is in the individual's interests to behave in a way that makes the parties jointly worse off. Although there are obvious incentives for the parties to reach

20

enforceable contracts when the incentives are like those in a prisoner's dilemma, it is far from clear that it is possible to implement such contracts.

All of the data available on differential outcomes in the dispute resolution systems studied here are consistent with the incentives present in a prisoner's dilemma. In short, the data all imply that it is individually rational for the parties to retain costly agents so as to increase the likelihood that they will prevail, even though there is little evidence that the result will be any different from what would occur if both parties did not retain agents. The primary potential problem with these data is the possibility that some omitted variable is influencing the outcomes, and that it is correlated with whether the parties retain an agent. In this case the estimated differential payoffs to retaining an agent may be systematically biased. Apart from implementing a field experiment with randomized trials, however, this is a potential problem for all empirical studies. At a minimum, it appears that the tests of the prisoner's dilemma incentive structures set out here should be used to investigate other dispute resolution systems, including the court system.

If these empirical results do accurately portray the incentive structures the parties face in most dispute resolution systems, they raise three important questions. First, do the parties respond to these incentives and employ an excess amount

of legal services? None of the empirical material in this paper addresses this issue. The experimental psychology literature indicates that the mere presence of a prisoner's dilemma incentive structure does not automatically lead to noncooperative behavior, even in situations where it would be most expected. (Indeed, this is often considered a major deficiency in the usefulness of game theoretic solutions as positive predictions about behavior. Game theoretic solutions strongly predict that noncooperative behavior should be the result in a prisoner's dilemma game. See Luce and Raiffa (1957).) It is likely that behavior in ongoing dispute resolution systems parallels the experimental behavior to some extent. For example, some union-employer contracts specify "expedited arbitration" for certain grievances. Expedited arbitration usually prohibits the use of lawyers by the parties, and specifies that the arbitrator's decision in such cases will have no value in setting "a precedent." Apparently some bargaining pairs are able to cooperate in the presence of a prisoner's dilemma payoff structure, while others are not. It would be interesting to know just how common such cooperation actually is. It seems likely that cooperative behavior will be easier to encourage when the parties have the experience of repeated disputes, when it is possible to alter the temptation to cheat, and when the parties are aware of the social dilemma they face.

Second, it is natural to ask just what mechanism it is that produces the prisoner's dilemma incentive structures in dispute resolution systems. There are many possibilities. For example, the lawyer's expertise may be used to select the third-party decision-maker in a dispute resolution system. In the courts the lawyer will help the client to "shop for the most favorable judge" or to "select the favorable jury." In arbitration the lawyer will assist in the selection of the most favorable arbitrator. In both cases the lawyer must expend resources to obtain the information to engage in helpful judge shopping or jury or arbitrator selection. Of course, if the other party engages in the same behavior then the mean result will be unchanged, and both parties will have paid a lawyer's fee without any corresponding gain in the mean result. On the other hand, it is likely that the variance in the outcomes of the dispute resolution process will be reduced if both the parties engage in this behavior, and this may be an unintended benefit to the process. Of course, this leaves open the question of whether such judge, jury, and arbitrator shopping has benefits great enough to justify the social costs.

Finally, the empirical results in this paper raise questions about the efficiency of Anglo-American legal procedures that are provocative and apparently very controversial. Gordon Tullock (1980) has argued for the superiority of continental (or "inquisitorial") trials over Anglo-American (or "adversarial")

trials primarily on the grounds that the adversarial system sets up prisoner's dilemma incentives that lead to over-investment in legal resources. Despite some arguments to the contrary[9], most of the empirical issues raised by Tullock are rarely addressed by legal scholars. As Tullock observes, lawyers are not generally encouraged to acknowledge this problem or to study it, perhaps because it is not in the best financial interests of the legal profession.[10] The fact that the legal profession has a vested interest in the legal system, however, raises questions about the role of institutional structures in the law and the motivation for their existence. It would be interesting to consider whether some of the existing rules of legal procedure act to enforce the prisoner's dilemma incentive structure and thereby increase the demand for legal services.

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26

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1. An early draft of this paper was written while Ashenfelter was a Fellow at the Center for Advanced Study in the Behavioral Sciences. The authors are grateful to the Russell Sage and Alfred P. Sloan Foundations for financial support.

2. The famous Texaco-Pennzoil dispute is one of the most widely discussed. Cutler and Summers (1988) estimate, from the decline in the stock market's valuation of the pair of companies, that this pair of firms declined in value by several hundred million dollars as a result of their dispute. A more systematic study of the wealth effect of lawsuits by Bhagat, Brickley, and Coles (1992) finds about a 1% decline in the combined stock market valuation of two firms that engage in a lawsuit. Finally, Magee, Brock and Young (1978) and Murphy, Shleifer, and Vishny (1991) both report evidence that the proportion of law graduates in a country's population is inversely related to the country's growth rate of gross domestic output.

3. See Ashenfelter and Bloom(1986), Farber and Bazerman(1986), Bloom (1986), Olson, Dell'Omo, and Jarley (1989), and Ashenfelter (1987) for a brief survey.

4. See Ashenfelter and Bloom (1986), Farber and Bazerman (1986), Ashenfelter, Dow, and Gallagher (1986), and Olson, Dell'Omo and Jarley (1989).

5. My colleague Richard Lester participated in the design of this arbitration system, and he has

followed its development continuously since its founding in 1978. For details see Lester (1989).

6. For the data for 1978-1980 see Ashenfelter and Bloom (1986).

7. See Lester (1989).

8. Adler, Hensler, and Nelson do not consider the possibility that this may lead to a prisoner's dilemma incentive structure, and their analysis of net costs takes into account the actual empirical frequency of the other parties use of legal representation. As a result, instead of a study of the payoff matrix, they are reporting estimates of the net payoffs actually received by the parties. The question that Adler, Hensler, and Nelson's findings raise is, why don't the unrepresented parties retain lawyers? This, of course, is precisely the puzzle that is raised in all the extensive empirical literature about the prisoner's dilemma. Adler, Hensler, and Nelson do not discuss this question.

9.See especially Landes and Posner(1979). A more general theoretical discussion of some related issues is contained in Jack Hirshleifer (1987).

10.Tullock (1980, p. 97), despite acknowledging that he is a lawyer, is more blunt: "A change from our system to the Continental system would eliminate a sizable part of the demand for lawyers.... A sharp fall in the demand for lawyers would, of course, impoverish the present profession. Many lawyers would become vacuum-cleaner salesmen, law schools would be compelled to close... Under the circumstances, the opposition of

the lawyers to the type of legal system used on the Continent is understandable."

Table 1

Proportionate Effects on the Net Wage Bill and Net Value Added of Union and Employer Strategies Using a Lawyer (or Agent)*

Union Uses:

		No Lawyer	Lawyer
Employer Uses:	No Lawyer	0, 0	-a, a-x
	Lawyer	a-x, -a	-x, -x

*The first entry represents the employer's payoff and the second entry represents the union's payoff.

a = the shift in the mean of the distribution of arbitrator awards resulting from the use of a lawyer (or agent)

x = the cost (as a percentage of the wage bill) of using a lawyer (or agent)

Table 2

Predicted Effects on the Percentage of Employer Victories in Final-Offer Arbitration
of Union and Employer Strategies Using a Lawyer (or Agent)

Union Uses:

	No Lawyer	Lawyer
Employer Uses: No Lawyer	p	p − fa/s
Lawyer	p + fa/s	p

f =   normal density

a =   the shift in the mean of the distribution of arbitrator awards resulting from the use of a lawyer (or agent)

s =   standard deviation of arbitrator awards

Table 3

Unions and Employers Represented by Law Firms (or Agents)
in New Jersey Final–Offer Arbitration Cases, 1981–1984

	1981	1982	1983	1984
Number of Final–Offer Arbitration Awards	49	64	45	59
Percent of Employer Victories	38%	41%	30%	38%
Percent of Cases in Which Union Uses Lawyer	64%	64%	50%	59%
Percent of Cases in Which Employer Uses Lawyer	21%	29%	25%	36%

Table 4

Employer Victories in Final–Offer Arbitration

Union Uses:

	No Lawyer	Lawyer
No Lawyer	44%	23%
Lawyer	73%	46%

Employer Uses:

Table 5

Estimates of the Parameters of the Distribution of Arbitrators (Preferred) Wage Change Awards, 1981-1984

(Estimated Standard Errors in Parentheses)

	1981	1982	1983	1984
Mean (u)	6.4%	8.0%	7.4%	7.9%
	(.65)	(.27)	(.29)	(.35)
Standard Deviation(s)	1.5%	.76%	1.02%	1.00%
	(.37)	(.14)	(.24)	(.23)
Effect of Employer Having Lawyer on Mean Award	-1.9%	-1.6%	-.34%	-1.0%
	(.65)	(.29)	(.35)	(.31)
Effect of Union Having Lawyer on Mean Award	2.3%	.54%	1.4%	.46%
	(.72)	(.31)	(.45)	(.25)

Table 6

Percentage of Discharge Grievvances Sustained
(for the Union) in 755 Arbitrations, 1979 and 1982

Union Uses:

	No Lawyer	Lawyer
No Lawyer	57%	75%
Lawyer	46%*	65%+

Employer Uses:

*This award rate is significantly different from the rates where neither party uses a lawyer (using the .05 level).

+This award rate is not significantly different from the award rate where neither party uses a lawyer (at the .05 level).

Source: Adler, Hensler, and Nelson (1983), Table 5.

Table 7

The Percentage of Plaintiff Claims (Debt Collection, Personal Injury,
Breach of Contract, Property Damage) Awarded by Arbitrators in Pittsburgh

Plaintiff Uses:

	No Lawyer	Lawyer
No Lawyer	60%	82%*
Lawyer	24%*	65%+

(Defendent Uses: — row labels on left)

*This award rate is significantly different from the rates where neither
party uses a lawyer (using the .05 level).

+This award rate is not significantly different from the award rate where
neither party uses a lawyer (at the .05 level).

Source: Adler, Hensler, and Nelson (1983), Table 5.

Table 8

Percentage of Mothers Awarded Child Physical Custody
in San Mateo and Santa Clara Counties, California, 1984–85

Mother Uses:

	No Lawyer	Lawyer
No Lawyer	75%	86%
Lawyer	49%	65%

Father Uses:

Source: Mnookin, Maccoby, Depha, and Albiston (1989).