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PRETRIAL BARGAINING AND FEE-SHIFTING MECHANISMS: A THEORETICAL FOUNDATION FOR RULE 68

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ABSTRACT

This paper shows that legal rules for allocating the private costs of civil litigation, or "fee-shifting" rules, provide powerful incentives for settlement when the litigants possess private information about the trial's outcome. Within the context of a direct revelation mechanism, the fee-shifting rule that leads to the highest probability of settlement resembles Rule 68 of the Federal Rules of Civil Procedure. Furthermore, in a simple extensive form game it is shown that if the litigants disagree about the level of damages or the degree of comparative negligence, then Rule 68 increases the rate of settlement.

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INTRODUCTION

This paper analyzes legal rules for allocating the private costs of civil litigation between a plaintiff and a defendant. Although the United States has traditionally adopted the rule that each side bears its own costs (the "American Rule"), there are a number of exceptions.[1] One of the most notable is Rule 68 of the Federal Rules of Civil Procedure, which stipulates that if a plaintiff refuses to accept a settlement offer prior to the trial and later receives a less favorable judgment from the court, then the plaintiff must compensate the defendant for the costs he incurs after the settlement offer is made.[2] The most commonly cited purpose of this rule is to encourage settlement. In the words of Justice Powell, "...parties to litigation and the public as a whole have an interest - often an overriding one - in settlement rather than the exhaustion of protracted court proceedings. Rule 68 makes available to defendants a mechanism to encourage plaintiffs to settle burdensome lawsuits."[3]

When the litigants disagree about the level of damages or the degree of comparative negligence, then a "fee-shifting" rule that is based upon the settlement offers made before the trial in addition to the trial's outcome has very powerful incentive properties. First, I explore the impact of Rule 68 on the settlement rate in a simple extensive form game. Next, I consider the class of direct revelation mechanisms and jointly characterize the pretrial bargaining game and fee-shifting

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[1] Leubsdorf (1984) presents a historical analysis of the American Rule. Exceptions include Alaska Civil Rule 82 (discussed by Hause, 1989). The Alaska Supreme Court has explicitly stated that a primary purpose of Rule 82 is to encourage settlement (see Miklautsch V. Dominick 452 P2d 438, Alaska 1969). Another example is Florida, which implemented a mandatory fee-shifting statute for medical malpractice litigation between 1980 and 1985 (Snyder and Hughes, 1990).

[2] Rule 68 reads: "At any time more than 10 days before the trial begins, a party defending against a claim may serve upon the adverse party an offer to allow judgment to be taken against him for the money or property or to the effect specified in his offer, with costs then accrued. ... If the judgment finally obtained by the offeree is not more favorable than the offer, the offeree must pay the costs incurred after the making of the offer."

[3] Delta Air Lines. Inc. v. August, 450 U.S. 346,352 (1981).

rule that lead to the highest probability of settlement.[4] The rule that emerges is strikingly similar to a "two-sided" version of Rule 68, where either litigant may be penalized for rejecting a more favorable offer prior to the trial.[5]

The settlement rate is highest when the court uses the information it receives from the settlement negotiations to generate a cutoff for its own findings. If the court's later assessment of the damages is above this cutoff, then the defendant bears all of the costs of litigation. If the court's assessment of damages is below, then the plaintiff bears all of the costs. The intuition is straightforward: when asymmetric information hinders settlement, fee-shifting facilitates the credible transmission of information between the litigants, which in turn increases the likelihood of settlement. The plaintiff, for example, is deterred from making excessive demands prior to the trial, for he may have to pay the defendant's costs if the case proceeds to court. If the court's damage assessment is low relative to the plaintiff's claims, then the court will behave as if the plaintiff had been exaggerating or lying and fine him accordingly. In this way, the litigants are given the incentive to negotiate in good faith prior to the trial.

Rules for shifting the costs of litigation from the winner to the loser have existed for thousands of years. Under early Roman law, for example, each party contributed money to an account, and the winner was refunded his deposit at the trial's conclusion.[6] This early legal system set the stage for the legal developments in much of Europe. Although each European country has

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[4] The analysis formally abstracts from a number of other important policy issues, including plaintiff's incentive to bring suit and the defendant's ex ante incentives, although these issues will also be discussed.

[5] The 1983 proposal for amendments to the Federal Rules suggests this more balanced arrangement. It also recommends extending the window from 10 to 30 days prior to the trial, and expanding the definition of costs to include attorney's fees.

[6] If the defendant refused to acknowledge liability prior to the trial and was subsequently found to be lying, then the defendant could be held liable for twice the total costs. This discussion is strongly based on Pfennigstorf (1984).

its own well-developed system of rules and procedures, every country has provisions for the winner to receive reimbursement for court costs and attorney's fees. Since it is often difficult to distinguish a winner from a loser, many countries have allowances for "partial indemnity;" if the plaintiff prevails in some aspects of the case but loses in others, then the costs may be borne proportionally. There are also interesting exceptions. For example, if the defendant acknowledges liability and offers to settle early in the process, then the plaintiff may be forced to bear the defendant's costs even if the plaintiff prevails (notice the similarity to Rule 68).[7]

Many economists and legal scholars have analyzed the consequences of alternative fee-shifting rules using the non-strategic model pioneered by Landes (1971), Posner (1973), and Gould (1973). In this approach, the litigants have subjective beliefs about the likelihood of prevailing in court and the magnitude of the award. Shavell (1982) showed that (under certain assumptions) a shift from the American Rule to the English Rule (where the loser pays the winner's costs) leads to fewer out of court settlements. When the litigants are mutually optimistic, then a shift to the British system decreases the parties' subjective assessments of their expected costs, and hence settlement becomes less likely.[8] Miller (1986) demonstrated that the main effect of Rule 68 is to make the outcome more favorable to the defendant, while the effect on the settlement rate is ambiguous.

More recent theoretical analyses have explicitly modeled the asymmetric information, and have allowed the litigants to behave strategically. Using a game-theoretic approach with one-sided incomplete information about the probability of winning, Bebchuk (1984) showed that when the

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[7] There are also situations in which the litigants split the costs regardless of who wins, especially in contract disputes and circumstances in which the law is ambiguous or unclear.

[8] This is not necessarily true when the costs are endogenous; see Katz (1987), Breutigam, Owen, and Panzar (1984), and Hause (1989).

uninformed player makes a single offer, the English rule will decrease the likelihood of settlement.[9] When liability is in dispute, the English rule tends to exaggerate the effect of asymmetric information by making strong cases stronger and weak cases even weaker. In a model where the informed player makes a final offer, Reinganum and Wilde (1986) demonstrated that if the probability of winning is common knowledge then the English and American rules lead to precisely the same amount of settlement.

All previous studies of fee-shifting have restricted attention to relatively simple extensive form bargaining games, and have focussed upon very specific rules. This paper, on the other hand, allows for a more general class of rules which may be sensitive to the pretrial activity, and constructs the rule that maximizes the probability of settlement. In this way, we characterize the rule that achieves a Pareto frontier for the bargaining game. Despite its abstraction, the mechanism-design approach generates clear and intuitively appealing results about settlement behavior, and produces a realistic fee-shifting rule that works for a variety of bargaining specifications.

The first section describes the model and its assumptions. The second section illustrates the effects of Rule 68 in a well-known screening model (a signalling model with similar results is presented in the Appendix). The third section establishes a general inefficiency result, and jointly characterizes the fee-shifting rule and bargaining game that form the efficiency frontier. Concluding remarks follow.

1. THE MODEL

Suppose a plaintiff and a defendant are negotiating prior to a costly trial. They are risk neutral and each possesses private information about the future behavior of the court. The plaintiff,

[9] Cooter, Marks, and Mnookin (1982) have a similar result.

for example, may have first-hand information about the value of his damages, and the defendant may have better knowledge of the extent of his liability or degree of negligence. The plaintiff's private information, denoted by x, is drawn from a probability density function, $f_X(x)$, which is strictly positive on the support $[\underline{x}, \bar{x}]$ and zero elsewhere. Similarly, the defendant's private information, y, is drawn from $f_Y(y)$ on the support $[\underline{y}, \bar{y}]$. $F_X(x)$ and $F_Y(y)$ denote the cumulative distribution functions. If the parties go to trial, the court will observe a signal, z, which is drawn from the density function $h(z|x,y)$, and the litigants will incur private costs k_P and k_D (let $K = k_P + k_D$). The signal z is interpreted as the level of damages and penalties (net of legal costs) for which the defendant is liable. If the parties go to trial, we suppose the court must enforce a transfer of z from the defendant to the plaintiff, and allocate the litigants' costs according to a prespecified fee-shifting rule.[10]

If the parties have symmetric information concerning the trial's outcome, then the negotiations are likely to succeed in resolving the dispute. There may be many offers and counter-offers, but if one of the litigants has the opportunity to make a final offer, then the parties (being rational and symmetrically informed) will settle rather than proceed to court. Asymmetric information, however, may seriously impede the pretrial negotiation process. If the parties reach the final stage of bargaining in which one party makes a final offer, then typically some types will proceed to trial (Bebchuk, 1984, Reinganum and Wilde, 1986, and Nalebuff, 1987). Perhaps surprisingly, extending the game to include many periods of bargaining does not change this result (Spier, 1992). Since these models feature common values, in general there will not exist a game in which asymmetrically informed parties always settle their dispute (Spulber, 1990, Spier, 1989, and Schweitzer, 1990). The following sections build upon this literature by illustrating how offer-based

[10] The settlement rate would increase even further if amounts in excess of the actual costs could be shifted. So long as the litigants are liquidity constrained, however, the optimal mechanism will exhibit the same qualitative features.

fee-shifting rules can facilitate informational exchange during negotiations and thereby increase the likelihood of settlement.

2. THE EFFECT OF RULE 68 IN A SCREENING GAME

This section analyzes a simple sequential game with one-sided incomplete information. The defendant's type, y, is common knowledge. The plaintiff privately observes the strength of his case, x, and the court's award, z, is such that $E(z|x) = x$ (so higher x's are more favorable to the plaintiff). The uninformed defendant makes a single offer to the plaintiff prior to the trial, which the plaintiff can either accept or reject. The structure of this game is similar to Bebchuk (1984), but considers a more general technology and a more elaborate fee-shifting rule.

Under the American Rule, the plaintiff accepts an offer, S, if and only if it exceeds what he expects to receive in court minus his costs,

$$S \geq x - k_P \ . \tag{1}$$

Assuming that the solution is interior, the equilibrium settlement rate is $F_X(x^*)$, where x^* solves

$$(k_P + k_D) f_X(x^*) - F_X(x^*) = 0 \ . \tag{2}$$

This expression may be understood intuitively. The benefit to the defendant from raising his offer is reflected in the first term: the likelihood of acceptance increases, and on the margin the defendant saves his cost, k_D, and is able to extract k_P from the plaintiff. The second term reflects the corresponding cost: by raising the offer, the defendant pays more to those types who accept the offer.

Under Rule 68, the equilibrium offer serves as a cutoff for the allocation of costs. If the court's award, z, is below, then the plaintiff pays the defendant's costs, and if z is above then the defendant pays his own costs. The plaintiff accepts S if and only if

$$S \geq x - k_P - k_D H(S|x) \ , \tag{3}$$

which implies that

$$\frac{dx^*}{dS} = \frac{1 + k_D \, h(S|x^*)}{1 - k_D \, \frac{\partial H(S|x^*)}{\partial x^*}} \ . \tag{4}$$

The equilibrium cutoff is characterized by

$$(k_P + k_D) \frac{dx^*}{dS} f_X(x^*) - F_X(x^*) + k_D \int_{x^*}^{\bar{x}} h(S|x) \ f_X(x) \ dx = 0 \ . \tag{5}$$

As before, the first term reflects the defendant's benefit from inducing more settlement through a higher offer, and the second is the increased payment to those who accept the offer. The third term, however, represents an additional benefit to the defendant: the plaintiff types who opt for a trial are more likely to bear the defendant's costs. By increasing his offer, the defendant both reduces the probability of a trial and reduces his expected cost contingent upon reaching trial.

Comparing equations (2) and (5) we find that if the hazard rate is monotonic, $F_X(x)/f_X(x)$ is increasing in x, then $dx^*/dS \geq 1$ is a very weak sufficient condition for Rule 68 to lead to a higher settlement rate. For example, if x shifts the mean of $h(z|x)$ without changing the other characteristics, then $\partial H(S|x)/\partial x = - h(S|x)$ and this condition is satisfied. We conclude that if the litigants disagree about damages but liability is acknowledged, then Rule 68 will tend to increase the likelihood of settlement.

When the litigants disagree about liability but damages are known, however, then Rule 68 will tend to decrease the likelihood of settlement. Suppose that z is binary: the plaintiff will either recover damages, D, or get nothing (here, x is proportional to the probability of winning). Notice that if the settlement offer is between 0 and D then Rule 68 is similar to the English Rule: when the plaintiff loses, he pays the defendants costs, and when the plaintiff wins they each bear their own. Clearly the third effect described in equation (5) has no power: a small change in the settlement offer does not effect the probability that z will fall below the offer. Moreover, $dx^*/dS < 1$ implying that the first effect is weaker. This re-establishes Bebchuk's (1984) result for the English Rule: when liability is in dispute, fee-shifting tends to exaggerate the asymmetric information, making strong plaintiffs stronger and weak ones even weaker.

The implications discussed in this section also hold when the defendant has private information and makes a take-it-or-leave-it offer to the uninformed plaintiff. This alternative specification is presented in the Appendix.

3. DIRECT REVELATION MECHANISMS

What type of fee-shifting rule will provide the litigants with the strongest incentives to settle their case out of court? To address this question, one might choose a particular extensive form bargaining game and construct the fee-shifting rule that maximizes the probability of settlement. This approach would not be very fruitful, however. First, the rule would be sensitive to the timing of the game (there is no "correct" specification for the sequence of offers) and second, to the structure of the asymmetric information. In the previous example, the rule would essentially enforce a particular offer and cutoff region by punishing the litigants if they deviated.

Instead of analyzing a particular sequential bargaining game, this section addresses these issues in a more abstract and more general framework. To start, notice that each fee-shifting rule that the court could adopt corresponds to a least upper bound on the likelihood of settlement: given the rule, every pretrial bargaining game will lead to a probability of settlement below this limit. This section uses mechanism-design techniques to construct the fee-shifting rule that establishes the highest limit for the settlement rate, or the Pareto frontier.

By the Revelation Principal (see Myerson, 1979), any Bayesian equilibrium of any sequential bargaining game may be achieved as a truth-telling equilibrium of a direct revelation mechanism which maps the players' private information directly into outcomes. In our context, the litigants simultaneously make announcements of their "types," $\hat{x}$ and $\hat{y}$, and the mechanism maps these announcements into the vector $\{p(\hat{x},\hat{y}), S(\hat{x},\hat{y}), C_P(\hat{x},\hat{y},z), C_D(\hat{x},\hat{y},z)\}$, which will be abbreviated $\{p,S,C\}$. The first two instruments in this vector are independent of the court's signal: $p(\hat{x},\hat{y})$ is the probability that the case will proceed to trial, and $S(\hat{x},\hat{y})$ is a transfer from the defendant to the plaintiff. $S(\hat{x},\hat{y})$ is interpreted as the settlement amount, and without loss of generality we restrict $S(\hat{x},\hat{y}) = 0$ if the case goes to trial. $C_P(\hat{x},\hat{y},z)$ and $C_D(\hat{x},\hat{y},z)$ characterize the fee-shifting rule, or the costs borne by the plaintiff and defendant, respectively. These costs are constrained to be non-negative, and to sum to K. This instrument may depend upon the court's signal as well as the pretrial announcements.

When analyzing bargaining mechanisms, it is necessary to specify what happens in the event that the parties refuse to participate. In other words, we need to specify "outside options" for the litigants. We assume that if a player opts out of the mechanism then the case goes to trial and each litigant bears his own legal costs. The outside option payoffs for the plaintiff and defendant, respectively, are $E_Y E_Z\,[z-k_P|x,y]$ and $E_X E_Z\,[-z-k_D|x,y]$.[11] This assumption is made in the spirit of Rule 68, where if no offer is served by the defendant then the American Rule is applied.

Within the class of direct revelation games, we construct the mechanism that minimizes the ex ante sum of the expected costs borne by the two parties, or, equivalently, maximizes the settlement rate. This mechanism jointly characterizes the bargaining game and fee-shifting rule that achieves an upper bound on the settlement rate. In addition to establishing the pareto frontier, this approach also has several independent interpretations. First, imagine that the litigants bargain in

[11] One can imagine alternative outside options that depend upon the trial's outcome, z, and the identity of the deviator. If, for example, a deviator is forced to bear all of the costs, then the settlement rate could be even higher. These alternative specifications lead to similar results, but complicate the analysis.

a decentralized fashion, and the court commits to a fee-shifting rule. If we believe that bargaining is approximately interim efficient, and if the mechanism is robust to small perturbations in the bargaining environment, then the fee-shifting rule that maximizes the settlement rate will approximate the one that we derive.[12] Second, imagine that the litigants may privately contract upon the allocation of legal costs, but have no discretion over the court's award. One would expect to see private offer-based fee-shifting arrangements, or contracts specifying the allocation of costs contingent upon z and the pretrial activity. For example, the defendant might state: "my private information tells me that I don't owe you a cent. To help convince you of this, I promise to pay your fees in the event that this case goes to court and you receive a large award."[13] Although this illustration makes the intuition clear, strictly speaking this paper would require that the litigants design the mechanism at the ex ante stage (before their types are realized).

The approach and techniques used here are similar to those used in Myerson and Satterthwaite's (1983) analysis of mechanisms for bilateral trade. However, the fee-shifting rule introduces an additional instrument which is analogous to an optimal auditing technology (Baron and Besanko, 1984) since the probability of a trial plays the same role as the probability of a costly audit.[14] One difference from the optimal auditing literature is that two agents are being audited simultaneously, so a punishment for one agent corresponds to a reward for the other.

We assume that the distribution of the court's award, $h(z|x,y)$, satisfies the monotone-likelihood ratio property (MLRP): higher litigant types are associated with stronger cases. In

[12] It is not clear why the litigants should necessarily play a game that maximizes the probability of settlement, or how the most "efficient" bargaining mechanism may be implemented as an equilibrium of a sequential game. Spulber (1990) verifies in a model without fee-shifting that neither the "split-the-difference" game nor the "first-and-final offer" game implement the Pareto frontier.

[13] Donohue (1991) discusses private incentives to contract around given fee-shifting rules.

[14] Also see Mookherjee and P'ng (1989) and Border and Sobel (1987).

particular, $(\partial h(z|x,y)/\partial x)/h(z|x,y)$ is increasing in z, and $(\partial h(z|x,y)/\partial y)/h(z|x,y)$ is decreasing in z. This condition has a simple interpretation: for any prior distribution over types, a high signal generates posterior beliefs in which the expectation of x is higher and the expectation of y is lower.

If a plaintiff has true type x and announces that his type is $\hat{x}$, then his expected payoff from participating in the mechanism is

$$E_Y\{\,(1-p(\hat{x},y))\;S(\hat{x},y)\;+p(\hat{x},y)\;E_Z[z-C_P(\hat{x},y,z)\,|x,y]\;\}\,. \tag{6}$$

Similarly, a defendant who has true type y and announces $\hat{y}$ receives

$$E_X\{\,-\,(1-p(x,\,\hat{y})\;S(x,\hat{y})\;-p(x,\hat{y})\;E_Z[z+C_D(x,\hat{y},z)\,|x,y]\;\}\,. \tag{7}$$

Let $V^P(\hat{x},x)$ and $V^D(\hat{y},y)$ denote the "rents" received by the plaintiff and defendant, respectively, defined as their expected payoffs less their payoffs from the outside option.

$$V^P(\hat{x},x)\;=E_Y\{\,(1-p(\hat{x},y))\;\;[S(\hat{x},y)\;-E_Z(z|x,y)]\;-p(\hat{x},y)E_Z[C_P(\hat{x},y,z)\,|x,y]\}\,+k_P\,. \tag{8}$$

$$V^D(\hat{y},y)\;=E_X\{\,-(1-p(x,\hat{y}))\,[S(x,\hat{y})\;-E_Z(z|x,y)]\;-p(x,\hat{y})\;E_Z[C_D(x,\hat{y},z)\,|x,y]\}\,+k_D\,. \tag{9}$$

Interim individual rationality requires that the mechanism gives the plaintiff and defendant at least their status quo payoffs, so the rents in (8) and (9) must be greater than or equal to zero when the litigants announce their true types. Incentive compatibility requires that truth-telling is always an optimal strategy, i.e. that a litigant's rents are maximized when he announces his true type. Under the assumption that the mechanism {p, S, C} is almost everywhere continuously differentiable (an assumption we will maintain throughout this analysis), it follows (see, for example, Guesnerie and Laffont, 1984) that the mechanism is incentive compatible if and only if

$$\frac{dV^P}{dx}\;(x,x)\;=\;\frac{\partial V^P(\hat{x},x)}{\partial x}\Big|_{\hat{x}=x}\,,\qquad \frac{dV^D}{dy}\;(y,y)\;=\;\frac{\partial V^D(\hat{y},y)}{\partial y}\Big|_{\hat{y}=y}\,, \tag{10}$$

and

$$\frac{\partial^2 V^P(\hat{x},x)}{\partial \hat{x}\partial x}\Big|_{\hat{x}=x} \geq 0 \quad , \quad \frac{\partial^2 V^D(\hat{y},y)}{\partial \hat{y}\partial y}\Big|_{\hat{y}=y} \geq 0 \ . \tag{11}$$

(10) gives the first order conditions, and (11) gives the second order conditions for truth-telling to be the optimal strategy. Differentiating the expressions in (8) and (9) enables us to write the first order conditions as:

$$\frac{dV^P(x,x)}{dx} = \int_Y \int_Z \{-[1 - p(x,y)]z - p(x,y)\ C_P(x,y,z)\ \}\ \frac{\partial h(z|x,y)}{\partial x}\ f_Y(y)\ dz\ dy$$
$$\tag{12}$$
$$\frac{dV^D(y,y)}{dy} = \int_X \int_Z \{[1 - p(x,y)]z - p(x,y)\ C_D(x,y,z)\ \}\ \frac{\partial h(z|x,y)}{\partial y}\ f_X(x)\ dz\ dx\ .$$

The litigants have a natural inclination to overstate their types: the plaintiff would like to convince the defendant that the damages are large in order to induce a more favorable settlement, and the defendant would like to convince the plaintiff that his level of care was high. For this reason, the mechanism must give positive rents to the lower types in order to induce truth-telling. In the absence of fee-shifting, incentive compatibility (12) implies that the rents will be decreasing in type. Fee-shifting has the power to weaken these incentive compatibility constraints: the rents need not decrease as fast, and the probability of a trial may consequently be reduced. It is interesting to note that since the rents given to the plaintiff are declining at a slower rate in the presence of fee-shifting than under the American Rule, a plaintiff with a very weak case will not be able to exploit the pretrial negotiation to his advantage, and fee-shifting may discourage low-merit cases from being pursued.

If the court is very costly, then incentive compatibility and individual rationality are trivially satisfied by a mechanism that specifies that the case settles out of court for, say, one penny.[15] The plaintiff is better off receiving a penny than going to trial and paying huge fees. When the costs are small, however, it is impossible for the litigants to resolve their dispute without the intervention of the legal system. In order to prove this general result (Proposition 1) we need the following lemma.

Lemma 1: If the direct mechanism {p, S, C} is incentive compatible and individually rational, then

$$\int_X \int_Y \int_Z \{ K[1 - p(x,y)] - [(1-p(x,y))z + p(x,y)\ C_P(x,y,z)] \} \ldots \phi(x,y,z)\ h(z|x,y)\ f_X(x)\ f_Y(y)\ dz\ dy\ dx \geq 0 \tag{13}$$

where

$$\phi(x,y,z) = \frac{\partial h(z|x,y)/\partial x}{h(z|x,y)} \frac{F_X(x)}{f_X(x)} - \frac{\partial h(z|x,y)/\partial y}{h(z|x,y)} \frac{F_Y(y)}{f_Y(y)} \ . \tag{14}$$

proof: In the Appendix.

Proposition 1: When K is sufficiently small, no incentive compatible, individually rational mechanism exists in which the probability of going to court is zero.

proof: Suppose not: there exists an incentive compatible, individually rational mechanism with p(x,y) = 0 for all x,y. By Lemma 1 we have $E_{X,Y,Z}[(K - z)\ \phi(x,y,z)] \geq 0$. Since (MLRP) implies first order stochastic dominance, $E_Z[z\ \phi(x,y,z)] > 0$ for all x and y. Therefore (13) is violated when K is small. ■

[15] If the court's sole objective were to maximize the settlement rate, it could do so by making the use of the court prohibitively expensive. The court does not do this because it is trading off the cost of providing an enforcement technology against other social goals, such as the provision of optimal penalties.

Unlike the results of Myerson and Satterthwaite (1983), breakdowns occur despite common knowledge that there exist gains from trade. Here, the litigants know that by settling they can save legal costs, while in the bilateral trade example with independent private values the result holds only when the supports for the buyer's valuation and the seller's cost overlap. Furthermore, one-sided asymmetric information is sufficient to generate our result. (Samuelson, 1984, has similar results for bilateral trade with common values and one-sided incomplete information.)

We now characterize the incentive compatible, individually rational mechanism that minimizes the probability that the case will go to court. This mechanism is the solution to program (P1):

$$\max_{\{p,\, S,\, C\}} \; -\int_X\int_Y p(x,y)\; f_X(x)\; f_Y(y)\; dy\; dx\,. \tag{P1}$$

$$\text{s.t.}\quad \begin{array}{ll} V^P(x,x) \geq V^P(\hat{x},x) & \forall\, x,\ \hat{x} \in [\underline{x},\bar{x}] \\ V^D(y,y) \geq V^D(\hat{y},y) & \forall\, y,\ \hat{y} \in [\underline{y},\bar{y}] \end{array} \tag{15}$$

$$\begin{array}{ll} V^P(x,x) \geq 0 & \forall\, x \in [\underline{x},\bar{x}] \\ V^D(y,y) \geq 0 & \forall\, y \in [\underline{y},\bar{y}] \end{array} \tag{16}$$

$$p(x,y) \in [0,1] \qquad \forall x \in [\underline{x},\bar{x}]\,,\ \forall\, y \in [\underline{y},\bar{y}]\,. \tag{17}$$

$$\begin{array}{ll} C_i(x,y,z) \in [0,K] & i = P,D \\ C_P(x,y,z) + C_D(x,y,z) = K & \end{array} \tag{18}$$

Rather than solve this program directly, we will follow the approach of Myerson and Satterthwaite (1983) and relax the program by replacing the incentive compatibility and individual rationality constraints with inequality (13) from Lemma 1.

$$\max_{p,\, C} \quad -K \int_X \int_Y p(x,y)\ f_X(x)\ f_Y(y)\ dy\ dx\ . \tag{P2}$$

s.t. (13), (17), (18).

The following Lemma gives conditions under which the solution to program (P2) is the solution to the original problem, (P1). In particular, if the solution to (P2) satisfies the second order conditions in (11), and furthermore if the implied rents are non-increasing in type, then it is also the solution of the unrelaxed program (P1).

<u>Lemma 2</u>: Suppose the functions p(x,y), $C_P(x,y,z)$, $C_D(x,y,z)$ are such that (11) and (13) are satisfied. Furthermore, suppose that $V^P(x,x)$ and $V^D(y,y)$ are non-increasing. Then there exists a transfer function S(x,y) such that the mechanism {p, S, C} is incentive compatible and individually rational.

<u>proof:</u> In the Appendix.

By specifying a Lagrange multiplier, λ, for the constraint (13), (P2) may be solved by pointwise maximization. It follows from Lemma 1 that the constraint must bind when K is sufficiently small (otherwise p(x,y) = 0 for all types and (13) is violated). The following proposition characterizes the mechanism that solves the relaxed program (P2). The simple proof, which will not be presented, involves simple pointwise maximization.

<u>Proposition 2</u>: If K is sufficiently small, then the solution to the relaxed program (P2) is characterized by:

$$p(x,y) = 1 \quad \Leftrightarrow \quad E_z\{\,[z - C_p(x,y,z)]\ \phi(x,y,z)\,\} > \frac{1}{\lambda} + K$$

$$C_p(x,y,z) = K \quad \Leftrightarrow \quad p(x,y)\ \phi(x,y,z) \le 0\ .$$

Furthermore, if this mechanism has the property that:

(i) The second order conditions (11) are satisfied, and

(ii) $V^P(\bullet)$ and $V^D(\bullet)$ are non-increasing in x and y, respectively,

then the solution to (P2) is also the solution to (P1).

The solution to the relaxed program given in Proposition 2 has an interesting feature: given the litigants' pretrial announcements $\hat{x}$ and $\hat{y}$, the court establishes a cutoff value for its signal which we denote by $z^*(\hat{x},\hat{y})$, such that when z exceeds this value the defendant bears the plaintiff's costs, and when z is below this value the plaintiff bears the defendant's costs. This property follows immediately from the monotone likelihood ratio assumption (MLRP) for $h(z|x,y)$, which implies that $\phi(x,y,z)$ is increasing in z. It is also quite intuitive: under (MLRP), high values for z correspond to high x's and low y's. When z is high relative to the litigant's announcements the court treats the situation as if the defendant lied and under-reported his type, while if z is low relative to the announcements, the court treats the plaintiff as a liar and forces him to bear the entire cost of litigation. We are dealing with truth-telling mechanisms, so no lying occurs in equilibrium - the court commits to behave in this way because of the helpful incentive properties it provides.

In this general specification it is difficult to characterize how the cutoff $z^*(x,y)$ changes as x and y change. Furthermore, it is difficult to verify that the solution to (P2) is also the solution to (P1). If z is normally distributed, however, then a very appealing rule emerges: the cutoff for the signal defined by Proposition 2 is simply the mean of the distribution conditional upon the announcements of the players, $m(\hat{x},\hat{y})$. Intuitively, given the statements made by the litigants before the trial, the court forms expectations about the true level of damages. If the observed damages exceed this expectation, then the defendant is penalized and if the observed damages fall short of this expectation, the plaintiff is penalized. It is also relatively straightforward to check conditions (i) and (ii) for this specification.

Proposition 3: Suppose z is normally distributed with mean m(x,y) and variance σ^2, and K is not too large. Furthermore, suppose m(x,y) is a differentiable function with partial derivatives $\partial m(\bullet)/\partial x > 0$, $\partial m(\bullet)/\partial y < 0$. Then the solution to (P2) specifies that the defendant bears the plaintiff's costs when $z \geq m(\hat{x},\hat{y})$, and the plaintiff bears the defendant's costs when $z < m(\hat{x},\hat{y})$.

Furthermore, if this mechanism has the property that:

(i) p(x,y) is weakly increasing in x and y, and

(ii) $V^P(\bullet)$ and $V^D(\bullet)$ are non-increasing in x and y, respectively,

then the solution to (P2) is also the solution to (P1).

proof: In the Appendix.

The solution to (P2) corresponds to the solution to (P1) under two conditions. First, p(x,y) is non-decreasing in its arguments. The probability of going to trial serves as an instrument for inducing truth-telling; when a litigant exaggerates the strength of his case the likelihood of going to trial should increase, along with the likelihood of bearing his opponent's costs. This first condition will be satisfied when the sum of the inverse hazard rates weighted by the partial derivatives of the mean function is monotonic in its arguments (see equation (36) in the Appendix). (If this condition is not satisfied then, as is typical in the literature, some bunching will arise.)

The second condition in Proposition 3 is that the rents are non-increasing in their arguments. Since each litigant has a natural inclination to exaggerate the strength of his case, the mechanism should give rents to the weaker types to induce truth-telling. This condition will be satisfied by the solution to (P2) when the expected (interim) probability of a trial is not too large for every litigant type (see equations (38) and (39) in the Appendix). Intuitively, if a defendant believes that a trial is highly likely then, taking our fee-shifting rule as given, he has an incentive to understate rather than overstate his type. By understating his type, the defendant makes it look as if the plaintiff lied and hence the defendant is less likely to bear the costs of litigation. This presents a problem, for it may no longer be true that individual rationality will only bind at the top. (Our solution technique assumed that these constraints only bound at the top.) A more general analysis of this problem would have to allow for the possibility that the individual rationality constraints bind in the interior of the supports.

In the following functional specification, we may easily find conditions on the parameter values such that both conditions are satisfied, i.e. that Proposition 3 fully characterizes the solution to program (P1). Suppose m(x,y) = n + x - y, where x and y are uniformly distributed on [0,1] and n an arbitrary constant. The solution to (P2) is characterized by:

$$\begin{aligned} p(x,y) &= 1 \quad \leftrightarrow \quad x+y \geq \frac{1/\lambda+K}{1+K/(\sqrt{2\pi}\sigma)} = \beta \\ C_p(x,y,z) &= K \quad \leftrightarrow \quad z < c+x-y \,, \end{aligned} \tag{19}$$

where the value for the Lagrange multiplier, λ, may be found by evaluating the constraint (13) when it holds with equality. After some manipulation we have λ implicitly given by

$$K\left[12\beta - 6 - 3\beta^2 + \frac{6}{\sqrt{2\pi}\sigma}\right] + \left[1 + \frac{K}{\sqrt{2\pi}\sigma}\right][2 - 6\beta^2 + 2\beta^3] = 0 \,, \tag{20}$$

where β is defined in (19).

Totally differentiating (20), we find that if K falls or σ rises (the signal becomes less accurate), then β falls (the likelihood of settlement falls). The intuition for the first effect is straightforward: when K decreases (i.e., the gains from settling out of court are smaller), it becomes more difficult to design a mechanism for which settlement is very likely. The role of σ, the standard deviation, is more subtle. When σ increases, the distribution of z is more dispersed and the marginal cost from over-announcing in the direct mechanism is reduced. As a consequence, the fee-shifting rule becomes less powerful in inducing settlement and the likelihood of settlement falls.

Condition (i) of Proposition 3 is satisfied by the mechanism in (19) since p(x,y) is monotonic in x and y. We need to find conditions on the parameter values to satisfy condition (ii), that the rents are non-increasing in type. Using (38) and (39) from the appendix, this condition is given by

$$\beta \geq 2 - \frac{1}{1 + \frac{K}{\sqrt{2\pi}\sigma}} . \tag{21}$$

For this to be true, we need a mechanism in which the probability of going to trial is not too large. In other words, there must be a big enough chance that even the strongest case settles out of court. Intuitively, K cannot be too small: in the extreme, if K = 0 all cases proceed to court and monotonicity is violated.

<u>Proposition 4:</u> Suppose z is normally distributed with mean m(x,y) = n + x - y and variance σ^2, where x and y are uniformly distributed on [0,1]. For each K $\in$ (2/3, 1], there exists σ^*(K) such that for all $\sigma \geq \sigma^*$(K) the mechanism in (19) solves both the relaxed program (P2) and the unrelaxed program (P1).

<u>proof:</u> Given K and σ, the corresponding β defined by (20) must satisfy (21). When $\sigma \rightarrow \infty$, inequality (21) becomes $\beta \geq 1$ and evaluating equation (20) we have that if K = 2/3 then $\beta = 1$, and if K = 1 then $\beta = 2$. By continuity, for σ sufficiently large every K $\in$ (2/3, 1) satisfies $\beta \in [1, 2]$. Furthermore, when K = 1, $\beta = 2$ for all $\sigma > 0$. ■

To illustrate, suppose $K = .7$ and $\sigma = .35$. From (20) we find that $\beta = 1.5$ and $\lambda = .5$, and this satisfies condition (21). These parameter values correspond to a litigation rate of 14%. Under the American Rule, the standard deviation is irrelevant for the litigants, since they only care about the expected value of z. The solution for β in this case is obtained from (20) by setting all of the terms involving σ equal to zero. For the very same values, the American Rule would lead to $\beta = 1.05$, or a litigation rate of 45%.

CONCLUSION

Fee-shifting rules that depend upon the pretrial activity in addition to the trial's outcome serve as powerful instruments to facilitate settlement. The most prominent example of offer-based fee-shifting is Rule 68 of the Federal Rules of Civil Procedure, which differs from the English rule because "winning" and "losing" are not absolute in nature but are relative to the offers and demands of the litigants prior to the trial. It was shown in the context of an extensive form bargaining game that when litigants disagree about damages or comparative negligence, Rule 68 provides them with an additional incentive to settle their case out of court. In a more abstract analysis, we showed that the offer-based fee-shifting rule that minimizes the total costs of litigation, and enables the litigants to reach the Pareto frontier through bargaining, resembles a two-sided version of Rule 68.[16]

Despite the differences in abstraction between the two approaches, the predictions and insights gained from each are similar. Litigants are deterred from exaggerating their claims for two reasons: exaggeration (1) increases the likelihood of a trial, and (2) increases the expected costs

[16] One difference is that the two-sided version of Rule 68 would feature a range between the offers where the American Rule prevails, while the mechanism features a single cutoff. A possible reason for this difference is that in reality, settlement offers serve as simple rules of thumb, while determining a precise cutoff between the offers is more difficult for the court, especially since the court may have very imprecise knowledge of the information asymmetry.

contingent upon reaching trial. "Exaggeration" can either be thought of in the context of settlement negotiations (i.e. making offers and deciding whether to accept or reject them), as well as in the context of direct revelation mechanisms.

Although Rule 68 encourages settlement when the litigants disagree about a continuous variable, when the outcome is either "win" or "lose" then Rule 68 does not encourage settlement. In fact, Rule 68 resembles the English rule in these settings, and actually discourages settlement. This suggests that offer-based fee-shifting rules are valuable when the litigants are disputing damages, but not when they are disputing strict liability.

Many other issues are very important in the fee-shifting debate, but are beyond the scope of this analysis. If the primary goal of the court system is to improve social efficiency, then the court will also be concerned with a host of issues not addressed here, including ex ante incentives to take precautions, and the incentive of the plaintiff to bring suit (including the effects on nuisance litigation). If the sole objective of the court were to facilitate settlement, it could easily achieve this goal by making the costs of using the court prohibitively high or by making the delay infinitely long. A more general model of court behavior is left to future research.

It is reasonable to conjecture, however, that the impact of Rule 68 on such things as the plaintiff's incentive to bring suit and precaution-taking by the defendant is small. Although the rule is currently pro-defendant, it applies only to small costs incurred after the offer was made, and does not include attorney's fees. Although it is hard to imagine that Rule 68 could serve such social objectives as deterring nuisance litigation, it may well have a significant impact on the settlement rate. The degree of asymmetric information is likely to become smaller and smaller as the trial approaches, especially due to discovery. Although the Rule 68 costs are small in absolute magnitude, they may be significant when compared with the size of the remaining disagreement. As a result, settlement will be more likely, and the settlement amount will be close to what the court is likely to award. Moreover, since the social costs of proceeding with a trial are large (the judge and the jury are publicly provided), it is natural to expect that the court would have a strong desire to see such minor disagreements resolved before trial.

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APPENDIX A: THE EFFECT OF RULE 68 IN A SIGNALLING GAME

Suppose the defendant has private information, x, and the plaintiff's type is known. As in section 2, we assume $E(z|x) = x$. Following Reinganum and Wilde (1986), we look for a fully separating equilibrium where the defendant's final offer makes the plaintiff indifferent between accepting and rejecting. (This equilibrium is the unique "universally divine" sequential equilibrium, see Banks and Sobel, 1987.)

$$S(x) = x - k_P \; . \tag{22}$$

Let p(S) denote the probability of rejection given an offer, S. The defendant maximizes his payoff over the choice of S taking p(S) as given. Setting the probability that the plaintiff rejects the highest offer equal to zero (using "universal divinity") gives

$$p(S) = 1 - \exp\left[\frac{S - \bar{x} + k_P}{K}\right] . \tag{23}$$

Similarly, under Rule 68 the equilibrium settlement offer is

$$S(x) = x - k_P - k_D \, H(S|x) \; , \tag{24}$$

and the probability that the plaintiff rejects this offer and goes to trial is

$$p(S) = \frac{1}{K} \int_S^{\bar{S}} \exp\left\{\frac{-r+S}{K} - \frac{k_D}{K} \left[H(r|x) - H(S|x)\right]\right\} dr \; . \tag{25}$$

When the upper and lower bounds of the support for x are sufficiently close to one another, differentiating the mixed strategy p(S) with respect to x gives a sufficient condition: Rule 68 leads to a higher settlement rate if $dS(x)/dx \leq 1$. As with the screening model in the text, this condition is satisfied when the private information only shifts the mean, that is, when the dispute is over damages. When the dispute is over liability, however, and the defendant's private information concerns the probability of success then the American Rule leads to a higher settlement rate.

APPENDIX B: PROOFS

Proof of Lemma 1: Integrating the first order conditions (12) gives:

$$V^P(x,x) = V^P(\bar{x},\bar{x}) + \int_x^{\bar{x}}\int_Y\int_Z \{[1 - p(t,y)]z + p(t,y)\ C_P(t,y,z)\}\ \frac{\partial h(z|t,y)}{\partial t}\ f_Y(y)\ dz\ dy\ dt \tag{26}$$

$$V^D(y,y) = V^D(\bar{y},\bar{y}) + \int_y^{\bar{y}}\int_X\int_Z \{[1 - p(x,r)]z - p(x,r)\ C_D(x,r,z)\}\ \frac{\partial h(z|x,r)}{\partial r}\ f_X(x)\ dz\ dx\ dr\ .$$

Taking expectations over x and y, respectively, allows us to represent the total expected rents given to the litigants as:

$$V^P(\bar{x},\bar{x}) + V^P(\bar{y},\bar{y}) + \int_X\int_Y\int_Z \{\ [1 - p(x,y)]\phi(x,y,z) + p(x,y)$$

$$\ldots \left[C_P(x,y,z)\frac{\partial h(z|x,y)/\partial x}{h(z|x,y)}\ \frac{F_X(x)}{f_X(x)} + C_D(x,y,z)\frac{\partial h(z|x,y)/\partial y}{h(z|x,y)}\ \frac{F_Y(y)}{f_Y(y)}\right] \} \tag{27}$$

$$\ldots\ h(z|x,y)\ f_X(x)\ f_Y(y)\ dz\ dy\ dx\ \ .$$

where $\phi(x,y,z)$ is given in (14). $C_D(x,y,z)$ is eliminated from this expression using the fact that $C_P(x,y,z) + C_D(x,y,z) = K$. Noting that

$$\int_Z \frac{\partial h(z|x,y)}{\partial y} dz = 0,$$

the total expected rents can be rewritten as:

$$V^P(\bar{x},\bar{x}) + V^D(\bar{y},\bar{y}) + \int_X\int_Y\int_Z \{\ [1-p(x,y)]z$$

$$\ldots + p(x,y)C_P(x,y,z)\ \}\ \phi(x,y,z)\ h(z|x,y)\ f_X(x)\ f_Y(y)\ dz\ dy\ dx\ \ . \tag{28}$$

Using the definitions of $V^P(x,x)$ and $V^D(y,y)$ in (8) and (9), an alternative expression for the total rents is:

$$K \int_X\int_Y\int_Z [1 - p(x,y)]\ h(z|x,y)\ f_X(x)\ f_Y(y)\ dz\ dy\ dx\ . \tag{29}$$

This is the total expected costs savings from participating in the mechanism. These expressions must be equal, so we have

$$V^P(\bar{x},\bar{x}) + V^D(\bar{y},\bar{y}) = \int_X\int_Y\int_Z \{ K[1 - p(x,y)] - [(1-p(x,y))z \tag{30}$$

$$.... + p(x,y)C_p(x,y,z)]\phi(x,y,z)\} \, h(z|x,y) \, f_X(x) \, f_Y(y) \, dz \, dy \, dx \ .$$

Individual rationality for the highest types completes the proof.

Proof of Lemma 2: Given p(x, y), C_P(x, y, z), and C_D(x, y, z), the following transfer function will satisfy individual rationality and incentive compatibility when the conditions stated in the Lemma are satisfied:

$$(1 - p(x,y)) \, S(x,y) \;\; = \; -\int_x^{\bar{x}} \frac{dV^P(t,t)}{dt} \, dt + \int_y^{\bar{y}} \frac{dV^D(r,r)}{dr} \, dr \ldots$$

$$+ E_Z \{ [1 - p(x,y)]z + p(x,y) \; C_p(x,y,z) \} + E_X \{ K \, [1 - p(x,y)] \} + constant. \tag{31}$$

The first two terms on the right hand side of the equation are as given in (12).

To establish this result, first substitute the transfer function (31) into the definition of the defendant's rents, equation (9), and let the constant in (31) be such that individual rationality binds for the highest type of defendant. When the inequality in (13) holds, we easily establish individual rationality for the highest type of plaintiff. The supposition that V^P(x,x) and V^D(y,y) are non-increasing everywhere allows us to conclude that no type incurs negative rents.

Proof of Proposition 3: ϕ(x,y,z) can be written:

$$\phi(x,y,z) = \frac{[z - m(x,y)]}{\sigma^2} \left\{ \frac{\partial m(x,y)}{\partial x} \, \frac{F_X(x)}{f_X(x)} - \frac{\partial m(x,y)}{\partial y} \, \frac{F_Y(y)}{f_Y(y)} \right\}. \tag{32}$$

From Proposition 1, it is clear that if p(x,y) > 0, then C_P(x,y,z) = K if and only if ϕ(x,y,z) $\leq$ 0. Since ∂m(•)/∂x > 0 and ∂m(•)/∂y < 0 and f_X(x) and f_Y(y) are strictly positive on their supports, equation (32) implies that $\phi(x,y,z) < 0$ if and only if $z - m(x,y) < 0$.

Substituting $\phi(x,y,z)$ into the first expression in Proposition 2 gives $p(x,y) = 1$ if and only if

$$\int_Z [z - C_P(x,y,z)]\, [z - m(x,y)]\, h(z|x,y)\, dz \geq \alpha(x,y)\, (\frac{1}{\lambda} + K) \; . \tag{33}$$

where

$$\alpha(x,y) = \sigma^2 \left[\frac{\partial m(x,y)}{\partial x} \frac{F_X(x)}{f_X(x)} - \frac{\partial m(x,y)}{\partial y} \frac{F_Y(y)}{f_Y(y)} \right]^{-1} . \tag{34}$$

Using the form of $C_P(x,y,z)$ defined in Proposition 3, we rewrite the left-hand side of (33):

$$\int_Z z\, [z - m(x,y)]\, h(z|x,y)\, dz - K \int_{-\infty}^{m(x,y)} [z - m(x,y)]\, h(z|x,y)\, dz \; . \tag{35}$$

The first term equals σ^2, and the second equals $K\sigma/\sqrt{2\pi}$, and this gives us that

$$p(x,y) = 1 \;\leftrightarrow\; 1 + \frac{K}{\sqrt{2\pi}\,\sigma} \geq \frac{1/\lambda + K}{\left[\frac{\partial m(x,y)}{\partial x} \frac{F_X(x)}{f_X(x)} - \frac{\partial m(x,y)}{\partial y} \frac{F_Y(y)}{f_Y(y)} \right]} \; . \tag{36}$$

It remains to be shown that the mechanism satisfies the second order conditions given in (11). One can do this directly for the plaintiff by evaluating:

$$\lim_{\hat{x} \to x} E_y \left\{ \left[\frac{p(\hat{x},y) - p(x,y)}{\hat{x} - x} \right] \int_Z z \frac{\partial h(\bullet)}{\partial x} dz - \frac{K}{\hat{x} - x} \left[p(\hat{x},y) \int_{-\infty}^{m(\hat{x},y)} \frac{\partial h(\bullet)}{\partial x} dz - p(x,y) \int_{-\infty}^{m(x,y)} \frac{\partial h(\bullet)}{\partial x} dz \right] \right\} \tag{37}$$

Using the supposition (i) in the proposition and MLRP establishes that this expression is positive. Similarly, the second order condition holds for the defendant. The derivatives of the rents may be derived from (12):

$$\frac{dV^P(x,x)}{dx} = E_Y \left\{ \frac{\partial m(x,y)}{\partial x} \left[-1 + p(x,y) \left(1 + \frac{K}{\sqrt{2\pi}\,\sigma} \right) \right] \right\} \tag{38}$$

and

$$\frac{dV^D(y,y)}{dy} = E_X \left\{ - \frac{\partial m(x,y)}{\partial y} \left[-1 + p(x,y) \left(1 + \frac{K}{\sqrt{2\pi}\,\sigma} \right) \right] \right\} . \tag{39}$$