Contingent Fees, Signaling and Settlement Authority

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Conventional wisdom suggests that under contingent fee contracts, attorneys have an excessive incentive to settle the case; therefore, a plaintiff should retain the authority over settlement decisions. We show, by contrast, that when the plaintiff possesses private information about the outcome of a trial and makes a take-it-or-leave-it settlement demand, delegating settlement authority to an attorney under a contingent fee contract increases the probability of settlement and the plaintiff's equilibrium payoff. We also show that contingent fee contracts with attorney control over settlement are more efficient than hourly fee contracts, as the former involve a higher probability of settlement. The intuition behind these results is that the attorney's greater reluctance to go to trial allows him to more effectively signal the plaintiff's type through the settlement demand.

1. INTRODUCTION

Conventional wisdom has it that contingent fee contracts provide the attorney excessive incentives to settle the case to the detriment of the plaintiff. Under a contingent fee contract, the attorney collects a share of either a court award or settlement, but nothing if the case is lost at trial.[1] Because the attorney incurs litigation costs only if the case proceeds to trial but is paid even if the case settles, the attorney would likely be keen to settle the case. A major concern is, therefore, that an attorney retained on a contingent fee basis might agree to a settlement lower than that in the best interest of the plaintiff.[2] This concern is especially

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[1] Most tort claims in the U.S. are filed under contingent fee arrangements. In personal injury cases, contingent fees have become the dominant financing method (see Rubinfeld and Scotchmer, 1998:415-416).

[2] A recent exception is Polinsky and Rubinfeld (2002). A different concern has to do with the attorney's sub-optimal incentive to invest in the case, assuming that the marginal increase in the

acute under a flat (or unitary) contingent fee, whereby the attorney's share of the settlement is equal to his trial share.[3] The adverse effects of attorneys' incentives under contingent fee contracts have long been recognized (see, for example, Miller, 1987; Gravelle and Waterson, 1993). Recently, Polinsky and Rubinfeld (2003) have put forward a financial mechanism under which the attorney is reimbursed some of his litigation costs so that his (percentage) share of litigation costs is equal to his (percentage) share of a court award or settlement. This, so the argument goes, will benefit the plaintiff by aligning the interests of the plaintiff and her attorney regarding settlement of the case.

In practice, plaintiffs oftentimes leave major decisions regarding the conduct of a lawsuit, including the decision of whether to settle the case, to their attorney's good judgment.[4] For example, based on an assortment of studies, Kritzer (1998) reports that attorneys often control the lawyer-client relationship. Choi (2003) likewise refers to oft-cited accounts of plaintiffs' supposed apathy regarding settlement and litigation matters once these are handed over to their attorneys. Plaintiffs' deference to attorneys' discretion on settlement decisions is particularly puzzling with respect to contingent fee contracts. Given attorneys' interest in settling the case promptly, what do plaintiffs gain by letting their attorneys decide whether to settle the case?

This article provides insight into this question by pointing to the strategic effect of contingent fee contracts in settlement negotiations. The main proposition is that owing to the different payoff schedules, the attorney is better able to convey the plaintiff's private information regarding the expected trial award in the case of contingent fee contracts. This, in turn, increases the probability of settlement compared to the case in which the plaintiff negotiates a settlement on her own

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plaintiff's court award is decreasing with the attorney's efforts. Note that contingent fee contracts are a specific case of revenue sharing arrangements, whereby the agent would equate his marginal disutility of effort with his share of marginal product rather than, as dictated by efficiency, with total marginal product.

[3] A *flat* contingent fee is probably the most common attorney compensation scheme in the U.S. See Rubinfeld and Scotchmer (1998:415).

[4] Although plaintiffs legally have the right to decide whether to settle or go to trial (see Rule 1.2(a) of the ABA Annotated Model Rules of Professional Conduct (2003) ("2003 ABA Model Rules")), the question as to whether a plaintiff can delegate settlement authority to her attorney is a matter of state substantive law. Courts have recognized different means by which a client may delegate settlement authority to her attorney. First, a client may expressly authorize her attorney to settle a case through a provision in the retainer agreement. Second, the attorney authority to settle the case may be implied from the client's instruction. Third, some courts have recognized the attorney's authority to settle the case based on "apparent authority," in cases in which the client's own actions have led a third party to believe that the attorney was authorized to enter a settlement agreement. See 2003 ABA Model Rules, at 33. For a detailed discussion of attorneys' authority to settle cases, see ABA/BNA Lawyers' Manual on Professional Conduct, 31:301.

under either a contingent fee contract or an hourly fee contract. The plaintiff's equilibrium payoff under a contingent fee contract is consequently higher when the attorney—rather than the plaintiff—retains the settlement authority. In addition, the plaintiff's equilibrium payoff may be higher under a contingent fee contract with attorney control over settlement as compared to an hourly fee contract (regardless of the allocation of settlement authority).

To substantiate this argument, we study the role of the plaintiff's attorney in a setting taken from Reinganum and Wilde (1986). In this setting, the plaintiff possesses private information about the outcome of a trial and the defendant knows the distribution of plaintiffs' expected court award but not the plaintiff's true type (that is, the plaintiff's court award). The plaintiff then makes a take-it-or-leave-it settlement demand to the defendant, which the latter can either accept or reject. Rejection of the settlement demand is followed by a trial where the plaintiff's true type is determined by the court. Reinganum and Wilde show that the outcome of settlement negotiations when the plaintiff negotiates directly with the defendant is a unique separating equilibrium wherein the settlement demand reveals the plaintiff's true type. The defendant's equilibrium strategy, in turn, is to accept lower settlement demands with a higher probability than he would accept higher demands. Thus, the higher the plaintiff's settlement demand, the greater the probability with which the defendant will reject the demand and the case will come to trial. It is the defendant's mixed strategy in response to settlement demands—the higher the settlement demand, the lower the probability with which the defendant accepts the demand—that ensures the truthfulness of settlement demands in equilibrium.

The essential property of this equilibrium can be restated informally as follows. If the plaintiff presents a high settlement demand, the likelihood is greater that the parties will reach a stalemate. If the plaintiff's demand is low, by contrast, the chance that a settlement will be reached is greater. This equilibrium outcome thus captures the notion that a settlement demand in itself is a source of information for the defendant. This outcome also has an intuitive appeal in that settlement negotiations are more likely to succeed when the plaintiff makes a low as compared to a high settlement demand. The rationale behind the separating property of this equilibrium is that the cost of negotiations breakdown is higher for plaintiffs with expected low court awards, who have less to gain from going to trial, than it is for plaintiffs with expected high court awards, who gain more from going to trial. This enables plaintiffs to signal their type through the settlement demand.

Here we allow the *plaintiff's attorney* to negotiate a settlement on behalf of the plaintiff by making a settlement demand to the defendant. We carry out the analysis by comparing the probability of settlement and the plaintiff's

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equilibrium payoff under different fee contracts and different allocations of settlement authority. In particular, we consider the case in which the attorney is assigned an active role of making a take-it-or-leave-it settlement demand to the defendant. In addition, we treat settlement negotiations as a three-player game in which the plaintiff's choice of fee contract and allocation of settlement authority between the plaintiff and her attorney affect not only the plaintiff and the attorney but the defendant as well.[5]

We show that delegating settlement authority to an attorney retained on a contingent fee benefits the plaintiff and that the resulting equilibrium is more efficient than that which is obtained under either an hourly fee or a contingent fee contract with plaintiff control over settlement.[6] The intuition behind this result is fairly simple. Because he incurs the plaintiff's litigation costs but obtains only a fraction of the court award, the attorney is more reluctant than the plaintiff to go to trial. As a result, the defendant is able to induce truthful revelation of plaintiff types by threatening to break off negotiations with a lower probability. That is, *the attorney's greater reluctance to go to trial enables him to more effectively signal the plaintiff's type through the settlement demand.* Thus, the probability of settlement and the plaintiff's equilibrium payoff under contingent fee contracts with attorney control over settlement are higher compared to both contingent fee contracts with plaintiff control over settlement and hourly fee contracts. Notice that the lower the fee rate, the greater the attorney's reluctance to go to trial (because the attorney gains a lower fraction of the court award but still bears the entire plaintiff's litigation costs). Thus, the increase in the probability of settlement that arises from delegating settlement authority to the attorney is decreasing in the fee rate. It should be stressed that settlement demands are revealing under any fee contract and any allocation of settlement authority; different fee contracts vary only with respect to the probability of settlement and the plaintiff's equilibrium payoff. It should also be emphasized that although the model is restricted to the case in which the plaintiff possesses the entire bargaining power, its qualitative results would hold if bargaining power were allocated randomly between the plaintiff and the defendant (see Section 6.2).

A possible interpretation of the probability of settlement in our model is that it captures the 'credibility' of the settlement demand: the higher the probability of settlement, the more credible the settlement demand is. In evaluating the credibility of a settlement demand, the defendant has to consider the

[5] For the sake of simplicity, we treat the defendant and his attorney as one player, thereby ignoring a potential conflict of interest between them.

[6] Signaling effects also play out in a model with two-sided information asymmetry (see Daughety and Reinganum, 1994). Our qualitative results therefore survive the introduction of private information of the defendant (see also Farmer and Pecorino, 2005).

consequences of negotiations breakdown for the proposer. Since negotiations breakdown are more costly for the attorney under contingent fees than for the plaintiff under either hourly fees or contingent fees, the attorney's settlement demand is more credible than the plaintiff's.

The remainder of the article is organized as follows. Section 2 reviews the relevant literature. Section 3 sets up a model with hourly fee contracts. Section 4 introduces flat contingent fees and derives the probability of settlement, the attorney's fee rate and the plaintiff's payoff under plaintiff control over settlement and attorney control over settlement. Section 5 compares the probability of settlement, the plaintiff's payoff and social welfare under different fee structures and allocations of settlement control. Section 6 considers implications and extensions of the analysis. Section 7 concludes.

2. RELATED LITERATURE

As noted above, this paper builds on Reinganum and Wilde's (1986) signaling model wherein an informed plaintiff who bears his own litigation cost makes a take-it-or-leave-it settlement demand to an uninformed defendant. Farmer and Pecorino (2005) extend Reinganum and Wilde's model to examine the effect of contingent fees on settlement rate. Throughout their analysis, however, Farmer and Pecorino assume that *plaintiffs* retain settlement authority. This paper further extends the Reinganum and Wilde analysis by comparing hourly fee contracts to contingent fee contracts with plaintiff as well as attorney control over settlement. In doing so, this paper refines Miller's (1987) analysis on the conflict of interest between the plaintiff and her attorney under contingent fee arrangements. Whereas Miller emphasizes the agency problem between the plaintiff and her attorney in a symmetric information setting, this paper stresses the advantage of delegation when settlement negotiations are characterized by information asymmetry.

To put our analysis into perspective, it will be helpful to survey other relevant literature. One branch of articles explores the role of the plaintiff's attorney as an independent player in settlement negotiations characterized by asymmetric information. Watts (1994) considers an uninformed plaintiff who makes a single take-it-or-leave-it demand to an informed defendant. The plaintiff can either hire an expert attorney or negotiate with the defendant on her own. Watts shows that hiring an attorney increases the plaintiff's payoff by allowing the attorney to make a more accurate settlement demand to the defendant. Watts' results do not depend on the attorney's compensation scheme, but rather on the attorney's expertise in acquiring information about the defendant's type. Thus, her model does not consider the *strategic* effect of the fee contract on settlement negotiations.

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Rickman (1999) examines the strategic effect of a contingent compensation scheme in a dynamic setting in which an attorney hired on a contingent fee basis responds to two consecutive settlement offers made by an uninformed defendant. One equilibrium outcome is for an attorney representing a low-type plaintiff to employ a mixed strategy whereby a low (first) settlement offer is rejected with some positive probability and for an attorney representing a high-type plaintiff to always reject a low settlement offer. Rickman shows that bearing litigation costs vests the attorney's rejection of the first settlement offer with greater credibility, which, in turn, induces a high settlement offer in the first stage of negotiation more often. This 'hard bargaining effect' is offset by the fact that the presence of litigation costs lowers the attorney's reservation value of settlement, thereby allowing the defendant to lower the settlement offer. The overall effect of increasing litigation costs on the plaintiff's equilibrium payoff when the attorney negotiates a settlement is thus indeterminate.

Here, by contrast, the credibility of the plaintiff's attorney is measured in the defendant's response to a settlement demand. Also, the result that the plaintiff prefers delegation is unqualified so long as the plaintiff possesses the entire bargaining power (see Section 6.2 for an analysis of the case in which the plaintiff does not possess the entire bargaining power). Moreover, since it is the attorney who makes the settlement demand, an increase in the plaintiff's litigation costs does not affect the equilibrium settlement amount, but rather increases the probability of settlement.

A different stream of research explores the optimal allocation of settlement authority between the plaintiff and the attorney under contingent fee contracts when there is perfect information as to the outcome of trial. Bebchuk and Guzman (1996) point to the strategic advantage of retaining settlement authority by the *plaintiff* under a flat contingent fee contract. In particular, the attorney's commitment to bear legal costs if the case goes to trial makes the plaintiff indifferent between settlement and trial (when the plaintiff retains settlement authority), and therefore enhances the plaintiff's ability to extract a higher settlement when compared to an hourly (or a fixed) fee arrangement. The attorney, because he is more reluctant to go to trial, is placed in a weaker bargaining position relative to the plaintiff.

Choi (2003) explores the optimal allocation of settlement authority under a bifurcated fee contract. In an attempt to explain why settlement authority is often placed with the attorney, Choi argues that delegating settlement authority to an attorney paid on a bifurcated contingent fee basis increases the plaintiff's payoff from settlement if bargaining power shifts to the defendant. The idea is that rewarding the attorney with a high fee rate if the case goes to trial and a low fee rate if the case settles increases the attorney's reservation value for settlement.

Thus, given that his settlement share is lower than his trial share, the attorney will only agree to a settlement high enough to make him indifferent between settlement and trial. The strategic advantage of delegating settlement authority to the attorney is confined to bifurcated fee contracts. Under a flat contingent fee contract, by contrast, the plaintiff is better off retaining settlement authority because the attorney's preference for settlement lowers his reservation value for settlement, resulting in a lower payoff for the plaintiff.

Taken together, Bebchuk and Guzman (1996) and Choi (2003) provide support for the view that plaintiffs should retain settlement authority under flat contingent fees so as to improve their bargaining position vis-à-vis the defendant. This article, in contrast, assumes that the plaintiff possesses the entire bargaining power, thereby focusing on the role of asymmetric information in settlement negotiations. It thus arrives at the opposite conclusion regarding the optimal allocation of settlement authority under flat contingent fees.

The article differs from previous analyses in two primary respects: First, the model here results in an equilibrium where the *settlement demand* is identical under different fee contracts and different allocations of settlement authority. The different fee contracts differ by the *probability of settlement* in equilibrium, which is higher under contingent fee contracts with attorney control over settlement when compared to other fee arrangements. Second, the model here presupposes that the plaintiff's contract choice affects the attorney's expected profit—and hence the equilibrium contingent fee—as well as the defendant's equilibrium strategy.

3. EQUILIBRIUM WITH HOURLY FEES

The basic model uses the Reinganum and Wilde (1986) framework. Assume that a plaintiff's expected court award is distributed on $[\underline{j}, \bar{j}]$, where $\underline{j} > 0$, according to a density function $f(j)$. The plaintiff's private information relates either to the probability of prevailing at trial or to the actual damages suffered by her or to both.[7] We denote the plaintiff's type (*i.e.*, her expected court award) by j.[8] Let

[7] A note on the information structure is in order. Although the plaintiff has an incentive to reveal favorable private information to her opponent prior to trial, she may not do so for two reasons. For one thing, the plaintiff may not be able to credibly convey her private information prior to trial. For example, the reliability of witnesses may not be ascertained outside the courtroom. For another, the plaintiff may hesitate to reveal her private information prematurely out of concern that the defendant will be better able to set up a preemptive evidentiary strategy if the case eventually proceeded to trial. This suggests that information asymmetry regarding the plaintiff's private information is likely in settlement negotiations.

[8] The plaintiff's expected court award is equal to the judgment for the plaintiff if the plaintiff wins at trial multiplied by the probability that the plaintiff wins at trial.

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$c_p, c_d > 0$ denote the plaintiff's and the defendant's litigation costs, respectively. Assume that the plaintiff always has a credible threat to go to trial ($\underline{j} > c_p$).

We further assume that the plaintiff can effectively monitor the attorney's investment in the case. This assumption ignores a potential conflict of interests between the plaintiff and the attorney with respect to the level of effort invested in the case by the attorney. We make this assumption in order to focus attention on the information asymmetry between the plaintiff and the defendant. Finally, we assume that all parties are risk-neutral.

Settlement negotiations commence after the plaintiff has entered into a fee contract with her attorney. Denote by s the plaintiff's settlement demand and let $\underline{s} = \underline{j} + c_d$ and $\bar{s} = \bar{j} + c_d$. We let the plaintiff make the settlement demand, thereby avoiding a potential conflict of interest between the plaintiff and her attorney as to whether to settle the case or proceed to trial. Note that settlement decisions under an hourly fee contract are susceptible to a conflict of interest diametrically different from the one commonly attributed to a contingent fee arrangement. Thus, because the attorney is paid only if the case reaches trial under an hourly fee contract, the attorney might seek to go to trial whereas the plaintiff would rather settle the case. Relaxing the assumption that the plaintiff controls settlement decision, however, would strengthen our results.

The plaintiff's strategy is a function that specifies the settlement demand, s, that she makes. The defendant's strategy consists of a strategy and a belief. The defendant's strategy is a function, $p(s)$, which specifies the probability that the defendant will accept the plaintiff's demand based on his belief about the plaintiff's type. The defendant's belief, $b(s)$, defines the plaintiff's type as a function of the settlement demand.

As long as the defendant's belief is that the plaintiff's demand is equal to the plaintiff's true type plus the defendant's litigation costs—the defendant is indifferent between any mixed strategy of accepting or rejecting the settlement demand. In addition, the defendant's best response is to reject any settlement demand that the defendant believes exceeds the plaintiff's true type plus the defendant's litigation costs and to accept any settlement demand that the defendant believes falls short of that amount.

The defendant's equilibrium strategy must also be such that the plaintiff maximizes her expected profit given the plaintiff's strategy. The plaintiff chooses a settlement demand *s* to solve the following maximization problem:

$$\max_{s} \; p(s)s + (1 - p(s)) \cdot (j - c_p). \tag{1}$$

The first-order condition to maximum with respect to the settlement demand s is:

$$(2) \qquad p'(s)(s - j + c_p) + p(s) = 0 .$$

In a separating equilibrium, the plaintiff's demand is truthful; that is, $s = j + c_d$. It must therefore be that

$$(3) \qquad p(s) = -p'(s)(c_p + c_d) .$$

The general solution to (3) is given by $p(s) = C \cdot e^{-s/(c_p + c_d)}$, where C is a constant of integration. The boundary condition is obtained by setting the probability that the defendant accepts the lowest settlement demand, $\underline{s} = \underline{j} + c_d$, at one. The solution of (3) is therefore

$$(4) \qquad p^*(s) = e^{-(s-\underline{s})/(c_p + c_d)} .$$

To complete the characterization of the equilibrium, off-equilibrium strategies and corresponding beliefs need to be specified. For $s < \underline{s}$, let $b^*(s) = \underline{s} - c_d$; for $s > \bar{s}$, let $b^*(s) = \bar{s} - c_d$ (note that these off-equilibrium beliefs are not unique). Accordingly, for $s < \underline{s}$, $p^*(s) = 1$; and for $s > \bar{s}$, $p^*(s) = 0$.[9]

The relevant results are summarized in Lemma 1

LEMMA 1 (Reinganum and Wilde, 1986)

Under hourly fee contracts:

(a) *For $s \in [\underline{s}, \bar{s}]$, the probability of settlement is decreasing in the settlement demand and increasing in both parties' litigation costs.*

(b) *The plaintiff's equilibrium payoff is $j + p^*(s^*)c_d - (1 - p^*(s^*))c_p$, where $s^* = j + c_d$.*

(c) *The defendant's equilibrium payoff is $-(j + c_d)$.*

Proof. See the Appendix.

[9] Note that the defendant's equilibrium strategy is weakly dominated by the same strategy except that the highest settlement demand, $\bar{s}$, is rejected with probability one. This is because the defendant is indifferent between accepting and rejecting the settlement demand $\bar{s}$ only if it is made by plaintiff $\bar{j}$, but strictly prefers to reject $\bar{s}$ if it is made by any other plaintiff. This can be solved by considering only settlement demands such that $s \in [\underline{s}, \bar{s})$ (see Reinganum and Wilde, 1986:561, n. 3).

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4. EQUILIBRIA WITH CONTINGENT FEES

4.1. THE FEE ARRANGEMENTS AND THE PLAYERS' PAYOFFS

Before proceeding to characterizing the equilibrium under contingent fee contracts, let us make a general note on the effect of the fee arrangement on the players' payoffs. Since the equilibrium outcome wherein the plaintiff makes the settlement demand is revealing (or separating), it follows that under *any* fee arrangement between the plaintiff and her attorney, the defendant equilibrium payoff is equal $-(j+c_d)$. That is, whether the defendant accepts the settlement demand or goes to trial, the defendant always pays the plaintiff's true court award plus his litigation costs. The defendant's equilibrium payoff, therefore, is invariant to the fee arrangement between the plaintiff and her attorney. It follows that only the probability of settlement and the plaintiff's payoff are taking different values under different fee arrangements. As will be clear below, these variables are interrelated.

Next we consider the effect of the allocation of settlement authority under contingent fee contracts on settlement negotiations. We consider two types of settlement mechanisms: plaintiff control over settlement decision and attorney control over settlement decision. We provide the following results. First, under contingent fee contracts, the probability of settlement and plaintiff's equilibrium payoff are higher with attorney control over settlement when compared to plaintiff control over settlement. Second, the probability of settlement is higher under contingent fee contracts with attorney control over settlement when compared to hourly fee contracts. Third, the plaintiff's equilibrium payoff under contingent fee contracts with attorney control over settlement may be either higher or lower, depending on the plaintiff's type, when compared to hourly fee contracts.

4.2. ASSUMPTIONS AND SEQUENCE OF EVENTS

We make the following assumptions about contingent fee contracts: First, we assume that the defendant observes the plaintiff's contract choice. In particular, we assume the defendant observes the fee rate between the plaintiff and her attorney. This assumption may be justified by the fact that attorneys often have reputation for taking cases on hourly fee or contingent fee basis. Second, we assume that plaintiffs observe their types only after the attorney have learned the case and informed them on the value of their claim (see, e.g., Miller, 1987; Dana and Spier, 1993). This, in turn, implies that attorneys are not able to devise a contractual mechanism to separate different types of plaintiffs. This assumption also implies that the defendant cannot update his information

about the plaintiff's type by observing the fee contract between the plaintiff and her attorney. Last, we assume that attorneys cannot renegotiate the fee rate after observing the plaintiff's type nor can they, after learning the case, pay the plaintiff to settle the case for a lower amount instead of going to trial. Reasons for this effect include, for example, attorneys' concerns for their reputation.[10]

The sequence of events preceding settlement negotiations unfolds as follows. In the first stage, attorneys announce a fee rate, r. We assume the fee rate is exogenously fixed; we comment in Section 6.3 on the case in which the fee rate is determined endogenously. In the second stage, plaintiffs decide whether to hire the attorney. In the third stage, if the plaintiff chooses to hire the attorney, the attorney observes the plaintiff's type. In the fourth stage, the plaintiff or her attorney—according to the allocation of settlement authority—makes a settlement demand to the defendant. In the fifth stage, the defendant accepts or rejects the settlement demand. The sixth and final stage depends on the outcome of the fifth stage: if the defendant rejects the settlement demand, the case proceeds to trial. We next analyze the equilibrium probability of settlement and the plaintiff equilibrium payoff under different allocations of settlement authority between the plaintiff and the attorney.

4.3. Equilibrium with Plaintiff Control over Settlement with Contingent Fee Contract

We begin by considering the case in which the plaintiff controls the settlement decision under a contingent fee contract. Consider the plaintiff's choice of settlement demand. The plaintiff chooses s to solve the following maximization problem:

$$\max_{s}(1-r)\cdot[p(s)s+(1-p(s))j]. \tag{5}$$

The first-order condition to maximum with respect to the settlement demand s is:

$$(1-r)\cdot[p'(s)(s-j)+p(s)]=0. \tag{6}$$

In equilibrium, the defendant's belief must be correct, that is, $s=j+c_d$. Therefore, it must be that

$$p(s)=p'(s)c_d. \tag{7}$$

[10] See, for example, Bebchuk and Guzman (1996) who suggest that reputational constraints may prevent attorneys from offering plaintiffs a payment to induce them to accept a settlement rather than go to trial.

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The boundary condition for (7) is obtained by setting the probability that the lowest settlement demand, $\underline{s} = \underline{j} + c_d$, is accepted at 1. The solution of (7) is therefore

$$(8) \qquad p^*_{cp}(s) = e^{-(s-\underline{s})/c_d},$$

where the subscript denotes contingent fees with plaintiff control over settlement.

We summarize the relevant results in Lemma 2 (the defendant's off-equilibrium behavior is similar to that under hourly fee contracts).

LEMMA 2 (Farmer and Pecorino, 2005)

Under contingent fees with plaintiff control over settlement:

(a) *For* $s \in [\underline{s}, \bar{s}]$, *the probability of settlement is decreasing in the settlement demand, increasing in the defendant's litigation costs, and is independent of the plaintiff's litigation costs and the fee rate.*

(b) *The plaintiff's equilibrium payoff is* $(1-r)(j + p^*_{cp}(s^*)c_d)$, *where* $s^* = j + c_d$.

(c) *The defendant's equilibrium payoff is* $-(j + c_d)$.

Proof. See the Appendix.

4.4. EQUILIBRIUM WITH ATTORNEY CONTROL OVER SETTLEMENT WITH CONTINGENT FEE CONTRACT

We now turn to the case in which the attorney controls the settlement decision under a contingent fee contract. The attorney chooses s to solve the following maximization problem:

$$(9) \qquad \max_s \; p(s|r)rs + (1 - p(s|r)(rj - c_p).$$

The first-order condition to maximum with respect to the settlement demand s is:

$$(10) \qquad p'(s|r)(rs - rj + c_p) + p(s|r)r = 0.$$

The defendant's belief is correct in equilibrium, that is, $s = j + c_d$; it must be therefore that

$$(11) \qquad p(s|r)r = -p'(s|r)(rc_d + c_p).$$

The left-hand side is the attorney's *marginal benefit* of increasing the settlement demand. This is equal to the attorney's settlement share multiplied by the probability that the increased settlement demand will be accepted by the defendant. The right-hand side is the attorney's *marginal cost* of increasing the settlement demand, which results from the lower likelihood that the defendant will accept the higher settlement demand. Remember that the attorney's costs of going to trial are equal to the attorney's share multiplied by the defendant's litigation costs plus the plaintiff's litigation costs. This is so because by going to trial, the opportunity to extract the defendant's litigation costs is lost and the attorney has to incur the plaintiff's litigation costs. The attorney will reveal the plaintiff's true type through the settlement demand if his marginal benefit of increasing the settlement demand is exactly offset by his marginal cost of doing so.

The boundary condition for (11) is obtained by setting the probability that the lowest settlement demand, $\underline{s} = \underline{j} + c_d$, is accepted at 1. The solution of (11) is therefore:

$$(12) \qquad p^*_{ca}(s \mid r) = e^{-r(s-\underline{s})/(c_p + rc_d)},$$

where the subscript denotes contingent fees with attorney control over settlement.

Note that contrary to the case of hourly fees and contingent fees with plaintiff control over settlement, the defendant's strategy here depends on *both* the settlement demand and the attorney's fee rate.

We summarize the relevant results in Lemma 3 (the defendant's off-equilibrium behavior is similar to that under hourly fee contracts).

LEMMA 3

Under contingent fees with attorney control over settlement:

(a) *For* $s \in [\underline{s}, \bar{s}]$, *the probability of settlement is decreasing in the settlement demand and the fee rate, increasing in litigation costs, and is more sensitive to the plaintiff's litigation costs than to the defendant's litigation costs.*

(b) *The plaintiff's equilibrium payoff is* $(1-r)(j + p^*_{ca}(s^*)c_d)$, *where* $s^* = j + c_d$.

(c) *The defendant's equilibrium payoff is* $-(j + c_d)$.

Proof. See the Appendix.

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5. COMPARISON OF EQUILIBRIA

5.1. COMPARISON OF PROBABILITIES OF SETTLEMENT

Proposition 1 below considers the equilibrium probability of settlement under contingent fees with attorney control over settlement, plaintiff control over settlement and hourly fee contracts.

PROPOSITION 1

(a) *The equilibrium probability of settlement is highest under contingent fee contracts with attorney control over settlement, lowest under contingent fee contracts with plaintiff control over settlement and in-between in hourly fee contracts.*

(b) *Contingent fee contracts with attorney control over settlement are Pareto superior to hourly fee contracts, which in turn are Pareto superior to contingent fee contracts with plaintiff control over settlement.*

Proof.

(a) The equilibrium probabilities of settlement under contingent fees with attorney control over settlement, hourly fees, and contingent fees with plaintiff control over settlement are $e^{-r(s-\underline{s})/(c_p+rc_d)}$, $e^{-(s-\underline{s})/(c_p+c_d)}$, and $e^{-(s-\underline{s})/c_d}$, respectively (see Lemmas 3(a), 1(a) and 2(a), respectively). Note that the function e^{-x} is decreasing in x. We therefore need to show that $r(s-\underline{s})/(c_p+rc_d) < (s-s)/(c_p+c_d) < (s-\underline{s})/c_d$, for $r \in (0,1)$. The right inequality is trivial. To prove the left inequality, multiply the nominator and the denominator of $(s-s)/(c_p+c_d)$ by r.

(b) Social welfare depends on the probability of trial times the amount of litigation costs. Note that the amount of litigation costs does not depend on the fee arrangement between the plaintiff and her attorney or the allocation of settlement authority. Since the equilibrium probability of settlement is highest under contingent fees with attorney control over settlement and lowest under contingent fees with plaintiff control over settlement, it follows that social welfare is lowest under the former arrangement and highest under the latter.

The intuition behind part (a) is as follows. The probability of settlement depends on the proposer's (i.e., the plaintiff or the plaintiff's attorney) benefit from settlement—the difference between her settlement demand and the lowest settlement demand—and the opportunity cost of trial—the *difference* between the proposer's settlement payoff and trial payoff (note that the cost of trial does not

depend on the plaintiff's type, but rather on the proposer's identity, the fee arrangement, and the allocation of settlement authority). The greater the proposer's benefit from the proposed settlement, the lower must be the probability of acceptance necessary to induce separation of types. In addition, the greater the opportunity cost of trial, the higher the probability of acceptance required to induce separation of types. The equilibrium probability of settlement depends on the *ratio* between the proposer's benefit from settlement and the opportunity cost of trial. The higher this ratio, the greater the probability of settlement required to induce a truthful settlement demand. This ratio is highest when the attorney controls the settlement decision under contingent fee contracts because the attorney receives only a portion of a settlement recovery but bears all the plaintiff's litigation costs if the case goes to trial. As a result, the defendant is able to induce truthful revelation of the plaintiff's type by resorting to a weaker threat to break off negotiations when the plaintiff's attorney makes the settlement demand under a contingent fee contract, relative to the cases when the plaintiff makes the settlement demands under either a contingent fee or an hourly fee contract. Thus, it is the attorney different payoff schedule that renders his settlement demand more credible than that of the plaintiff.

Proposition 1(a) is illustrated in Figure 1:

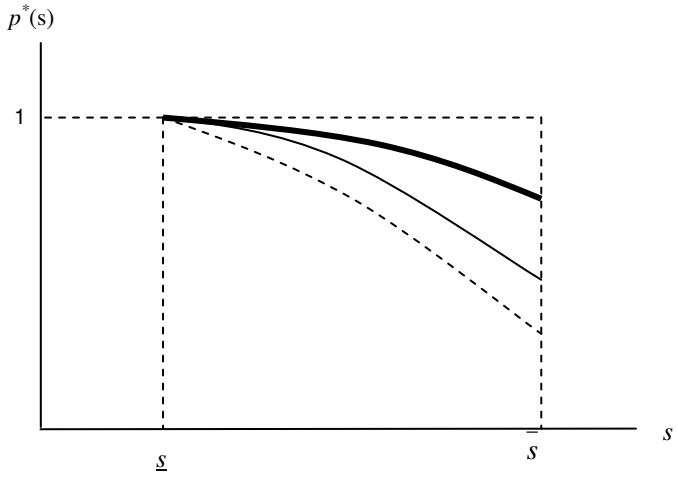

Figure 1: The probability of settlement under contingent fee contracts versus hourly fee contracts

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Figure 1 shows the probability of settlement under contingent fees with attorney control over settlement (the bold curve), hourly fees (the thin curve) and contingent fees with plaintiff control over settlement (the broken curve). Note that the differences between the equilibrium probabilities of settlement under the different fee contracts are dependant on the degree of information asymmetry between the plaintiff and the defendant. Specifically, as the support of the distribution of the plaintiff's expected court awards (i.e., $[\underline{j}, \bar{j}]$) increases,[11] the greater are the differences between the equilibrium probabilities of settlement under the different fee contracts.

5.2. COMPARISON OF PLAINTIFF'S EQUILIBRIUM PAYOFFS UNDER CONTINGENT FEES WITH PLAINTIFF VS. ATTORNEY CONTROL OF SETTLEMENT

PROPOSITION 2

The plaintiff's benefit from delegating--as compared to retaining--settlement control under a contingent fee contract is $c_d(1-r)[p^*_{ca}(s^*) - p^*_{cp}(s^*)]$, where $s^* = j + c_d$.

Proof. Recall from Lemmas 2(b) and 3(b) that the plaintiff's equilibrium payoffs under contingent fees with plaintiff and attorney control over settlement are $(1-r)[j + p^*_{cp}(s^*)c_d]$ and $(1-r)[j + p^*_{ca}(s^*)c_d]$, respectfully. Since $p^*_{ca}(s^*) > p^*_{cp}(s^*)$ (by proposition 1(a)), the difference between the first expression and the second expression is strictly positive and thus captures the plaintiff's benefit from delegating settlement control. The rationale behind Proposition 2 is as follows. CAs shown in Proposition 1(a), contingent fees with attorney control over settlement involves a higher probability of settlement as compared to contingent fees with plaintiff control over settlement. Since the transfer from the defendant to the plaintiff is higher if the case is settled, rather than tried (as the settlement transfer also includes the defendant's litigation costs), the combined expected payoff of the plaintiff and the attorney is higher under contingent fees with attorney control over settlement versus plaintiff control over settlement.

It is instructive to compare Proposition 2 with Bebchuk and Guzman (1996), who maintain that the plaintiff's retention of her settlement authority under contingent fee contracts improves the plaintiff's bargaining position vis-à-vis the defendant relative to hourly fees. Their reasoning is that since going to trial is a costless

[11] For example, if the probability that the court finds for the plaintiff increases.

alternative for the plaintiff under a contingent fee arrangement, the minimum settlement demand to be accepted by the plaintiff is higher than the settlement accepted in the case of an hourly fee contract. To illustrate this argument, consider a case in which the plaintiff does not have the entire bargaining power and the defendant does not incur litigation costs. Whereas under contingent fees the plaintiff's reservation value for settlement is equal to her expected court award, under hourly fees the plaintiff's reservation value for settlement is equal to her expected court award minus her litigation costs. The plaintiff's reservation value for settlement is therefore higher under contingent fees than under hourly fees. This argument assumes away asymmetry of information between the plaintiff and the defendant and presupposes that bargaining power in not possessed entirely by the plaintiff. Proposition 2, in contrast, is based on the assumptions that settlement negotiations are driven by asymmetric information and that bargaining power is possessed entirely by the plaintiff. When the plaintiff enjoys a superior bargaining position, delegating settlement authority to the attorney is beneficial to the plaintiff because the latter's indifference between settlement and trial forces the defendant to reject the plaintiff's settlement demand more often than she might reject the attorney's settlement demand. Thus, shifting the focus of the analysis from the plaintiff's relative bargaining power vis-à-vis the defendant to asymmetry of information between the litigants upsets the conclusion that the plaintiff should retain settlement authority.

The next proposition compares the plaintiff's equilibrium payoff under contingent fees with attorney control over settlement versus hourly fees.

PROPOSITION 3

The plaintiff's equilibrium payoff under contingent fee contracts with attorney control over settlement may be higher or lower than her equilibrium payoff under hourly fee contracts. In particular, the plaintiff's equilibrium payoff under contingent fee contracts with attorney control over settlement is higher (lower) than under hourly fee contracts if $c_d[(1-r)p^*_{ca}(s^*) - p^*(s^*)] > (<) rj - (1-p^*(s^*))c_p$, *where* $s^*(j) = j + c_d$.

Proof. Recall from Lemmas 1(b) and 3(b) that the plaintiff's equilibrium payoffs under hourly fee contracts and contingent fee contracts with attorney control over settlement are $j + p(s^*)c_d - (1-p(s^*))c_p$ and $(1-r)j + (1-r)p^*_{ca}(s^*)c_d$, respectively. Subtracting the latter expression from the former and rearranging terms yields the inequality stated in Proposition 4.

The interpretation of Proposition 3 is straightforward. The left hand-side of the inequality is the difference between the plaintiff's *shares in settlement* under contingent fees versus hourly fees. Recall from Proposition 1(a) that under contingent fees with attorney control over settlement the probability of

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settlement is higher relative to hourly fees (that is, $p^*_{ca}(s^*) > p(s^*)$). The higher the probability of settlement, in turn, the higher the plaintiff's expected payoff from settlement. Under contingent fees, however, the plaintiff has to share the defendant's litigation costs with her attorney. The plaintiff's settlement payoff, therefore, is multiplied by $(1-r)$. The right-hand side of the inequality in Proposition 3 is the difference between the plaintiff's litigation costs under contingent fees with attorney control over settlement (i.e., rj) and the plaintiff's litigation costs under hourly fees (i.e., $(1-p^*(s^*))c_p$).

Proposition 3 implies that although contingent fees with attorney control over settlement are more efficient, they may not always increase the plaintiff's expected profit as compared to hourly fees. Thus, plaintiffs who have little to signal—those with expected low court award—are better off under an hourly fee contract, thereby avoiding paying the attorney a "settlement rent" even at the cost of going to trial more often. Similarly, since the attorney's fee under contingent fee contracts is a fraction of the plaintiff's court award, legal fees under contingent fee contracts for high-type plaintiffs may be higher in comparison to hourly fee contracts irrespective of the higher probability of settlement under contingent fee contracts. High-type plaintiffs thus "suffer" from the information asymmetry between attorneys and plaintiffs with respect to the plaintiffs types. The decisive factors in comparing the plaintiff's expected payoff under different fee contracts are total legal fees and total surplus available to the plaintiff and her attorney under contingent fee versus hourly fee contracts.[12]

6. IMPLICATIONS AND EXTENSIONS

6.1. CONTINGENT FEES AND STRATEGIC DELEGATION

The results of the previous Section can be interpreted more broadly against the background of the strategic delegation literature. Strategic delegation refers to a state of affairs in which a principal is able to improve his equilibrium payoff (relative to his payoff absent delegation) by delegating authority to an agent. The benefits of delegation stem from the ability to commit oneself to a course of action. By conditioning the agent's payoff upon a certain outcome in an irrevocable and observable fashion, the principal can induce a third party to reply in a manner that increases the principal's equilibrium payoff relative to his no-delegation payoff. The benefits of delegate use in the context of bargaining were

[12] For a discussion on the signaling effect of the plaintiff's choice of fee contract, see Section 6.4.

stressed by Schelling (1960:29): "The use of a bargaining agent affects the power of commitment in at least two ways. First, the agent may be given instructions that are difficult or impossible to change…Second, an "agent" may be brought in as a principal in his own right, with an incentive structure of his own that differs from the principal's." To illustrate his point, Schelling invokes the following example of settlement negotiation with an auto insurance company: "The private citizen, in settling out of court, cannot threaten suit as effectively as the insurance company since the latter is more conspicuously obliged to carry out such threats to maintain its own reputation for subsequent accidents." Schelling's ideas about strategic delegation have been extensively explored and extended in numerous articles (see for example Fershtman and Gneezy, 2001).

This article proposes yet another case of strategic delegation, one that arises under circumstances involving transmission of private information. In such circumstances, an agent's different compensation schemes enable him to communicate private information to a third party more effectively, which results in a lower probability of negotiations breakdown. The savings in transaction costs can be shared between the principal and the agent. The analysis here can therefore be extended to other principal-agent settings in which the principal possesses private information and the agent's compensation is conditional on the outcome of a bargaining process.

6.2. Delegation When the Plaintiff Does Not Possess the Entire Bargaining Power

We restricted the analysis to the case in which the plaintiff has the entire bargaining power. Delegation was valuable in our model because it helped the attorney maintain credibility when the attorney made the settlement demand. If the defendant made the settlement offer and the plaintiff's attorney retained settlement authority, the attorney might accept lower offers than the plaintiff would because the attorney bears litigation costs but only gets a fraction of the judgment at trial. How would our results change if bargaining power were not possessed entirely by the plaintiff?

Before proceeding to answer this question, note that the attorney's incentive to accept lower settlement offers made by the defendant depends on the *degree* of information asymmetry between the plaintiff and the defendant as well as the fee rate. An attorney representing a high-type plaintiff would reject a low settlement offer since his payoff from taking the case to trial is higher than the settlement offer, notwithstanding the costs incurred by the attorney at trial. Thus, the pernicious effect of delegating settlement authority to the attorney when the defendant makes the settlement offer depends on the plaintiff's expected court award. In addition, the attorney is more likely to accept low

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settlement offers, the lower is the fee rate. The reason is that the attorney's expected profit from taking the case to trial is increasing with the fee rate. The higher the fee rate, therefore, the higher the settlement offer required to induce the attorney to settle the case.

Now consider the case in which the two litigants flip a weighted coin to determine who makes the settlement offer. The desirability of delegation (ex post) in this case depends on the plaintiff's type. For high-type plaintiffs, the benefit of signaling their type through delegation of settlement authority to the attorney outweighs the cost associated with the attorney accepting a lower settlement offer than is in the plaintiff's interest. Low-type plaintiffs, by contrast, are better of retaining settlement authority since the benefit of delegation is offset by the cost of delegation. Since the plaintiff does not know his type before the attorney learns the case, the plaintiff's decision of whether to delegate the case depends on his *expected* court award. Thus, the plaintiff may well prefer delegation even in a "random offeror" case because the benefit of delegation (i.e., conveying the plaintiff's private information and thereby saving litigation cost) exceeds its cost (i.e., inducing the attorney to accept a lower settlement demand than in the plaintiff's interest).

6.3. ENDOGENOUS FEE RATE

We have assumed throughout the analysis that attorneys' fee rate under contingent fee contracts is exogenously fixed, but our results would continue to hold if the fee rate were determined endogenously. Thus, assume that the market for attorneys is competitive so that attorneys' expected profit in equilibrium is zero (see Farmer and Pecorino, 2005).[13] Also assume that, prior to settlement negotiations, attorneys incur a cost k to learn the plaintiff's type.[14] Finally, assume that attorneys announce a fee rate based on the distribution of plaintiff types so that the fee exactly covers their cost of learning the plaintiff's type and their expected litigation costs.

As we prove in the Appendix, the *equilibrium* fee rate under contingent fee contracts is lower with attorney relative to plaintiff control over settlement. To see why, recall that the attorney's equilibrium profit under contingent fee contracts, given a truthful settlement demand, is $rE[j] + E_j[p_c^*(s^*)](c_d + c_p) - c_p - k$,

[13] For possible justifications of this assumption, see the discussion in Miceli and Segerson, 1991:383-387. See also Rubinfeld and Scotchmer, 1993, and Dana and Spier, 1993. Dana and Spier, however, assume that the attorney can drop the case after observing the plaintiff's type. Here, by contrast, we assume that in the absence of settlement, the attorney always goes to trial.

[14] This assumption ensures that the equilibrium fee rate under contingent fee contracts with attorney control over settlement is positive.

where $p_c^*(s^*)$ is the equilibrium probability of settlement under a contingent fee contract. Observe that the attorney's expected profit is increasing with the probability of settlement. It follows that the fee rate under which the attorney's expected profit is zero is decreasing in the probability of settlement. By proposition 1(a), the equilibrium probability of settlement is higher under contingent fees with attorney, as compared to plaintiff, control over settlement. Hence, the equilibrium fee rate under contingent fee contracts is lower with attorney relative to plaintiff control over settlement.

As we further show in the Appendix, the equilibrium fee rate under contingent fee contracts with plaintiff control over settlement is unique. The unique Pareto-efficient fee rate under contingent fee contracts with attorney control over settlement is the lowest fee rate under which the attorney's equilibrium payoff is zero.

6.4. ENDOGENOUS CHOICE OF FEE CONTRACT

We have assumed throughout the analysis that the plaintiff's choice of fee contract–i.e., hourly fee versus contingent fee contract–is given exogenously. This assumption was justified by the fact that the plaintiff observes her type *after* entering a fee contract with the attorney. Relaxing this assumption by letting the plaintiff observe her type *before* choosing a fee contract implies that the defendant's response to the plaintiff's–or the plaintiff attorney's–settlement demand would also be a function of the plaintiff's contract choice.

Specifically, recall from Proposition 3 that the plaintiff's equilibrium payoff may be higher or lower–depending on the plaintiff's type–under hourly fee contract as compared to contingent fee contract. It follows that the defendant can update his information about the plaintiff's type by observing the plaintiff's choice of fee contract. This will affect both the equilibrium probability of settlement as well as the plaintiff's contract choice. I particular, the equilibrium probability of settlement will be further increased by the information conveyed to the defendant by the plaintiff's fee contract. (A complete model of this case goes beyond the scope of this paper.)

6.5. COURT ERRORS

By assuming that the plaintiff' private information, j, concerns her *expected* court award, we have ignored the effect of court errors on settlement negotiations. To incorporate these effects into the analysis, let $\hat{j} \in [\underline{\hat{j}}, \overline{\hat{j}}]$ be the plaintiff's court award if the court finds for the plaintiff and π $(1-\pi)$ the probability that the court correctly (incorrectly) finds for the plaintiff

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(defendant). Then we have $j = \hat{j}\pi$; that is, the plaintiff's expected court award is equal to the plaintiff's court award if the plaintiff wins at trial times the probability that the court finds for the plaintiff.[15] Observe that the interval $[\underline{j}, \bar{j}]$ is increasing in π: as the court's decision becomes more accurate, the information asymmetry between the plaintiff and the defendant increases. This implies that the range of equilibrium settlement demands is increasing in π and that the probability of settlement for any equilibrium settlement demand is lower for π' than for π'', where $\pi' > \pi''$. Consequently, the *differences* between the equilibrium probabilities of settlement under the different fee contracts is *increasing* in π.[16] This implies that the plaintiff's benefit of delegating settlement control to the attorney under a contingent fee contract is increasing in the probability that the court correctly finds for the plaintiff.

7. CONCLUSION

The common view of contingent fee arrangements holds that the divergence of interests between the plaintiff and the attorney is detrimental to the plaintiff. In this paper we have shown that the different payoff schedules of the plaintiff and her attorney may benefit the plaintiff and result in more efficient pretrial bargaining. Thus, since under a contingent fee contract the plaintiff bears no costs in the event that the case goes to trial, her ability to signal private information through the settlement demand is hindered. And because of his payoff schedule, the attorney is better able than the plaintiff to *signal* the plaintiff's private information about the outcome of trial through the settlement demand. Moreover, the probability of trial under a contingent fee arrangement with attorney control over settlement is higher than under an hourly fee contract. This allows the plaintiff and her attorney to employ a contingent fee contract to share the saved litigation costs. These results may

[15] Note that the attorney obtains a positive payoff if the case goes to trial if and only if the plaintiff wins.

[16] To see this formally, recall that the equilibrium probabilities of settlement under contingent fees with attorney control over settlement, hourly fees, and contingent fees with plaintiff control over settlement are $e^{-r(s-\underline{s})/(c_p+rc_d)}$, $e^{-(s-\underline{s})/(c_p+c_d)}$, and $e^{-(s-\underline{s})/c_d}$, respectively, where $\underline{s} = \hat{\underline{j}}\pi + c_d$, and (in equilibrium) $s = \hat{j}\pi + c_d$. Note that, for any settlement demand, the equilibrium probability of settlement under the different fee contracts is decreasing in π. Since the *ratio* of the equilibrium probabilities of settlement under the different fee contracts is independent of π, it follows that the difference between the equilibrium probabilities of settlement under the different fee contracts is increasing in π.

cast light on the prevalent practice of plaintiffs to delegate settlement authority to attorneys under contingent fee contracts as well as to provide insight into plaintiffs' choice between different fee contracts.

Our results are related to the controversy on the nature of attorneys' role in dispute resolutions. A common view is that attorneys are likely to hinder an efficient dispute resolution because of their pecuniary interest in litigation. Gilson and Mnookin (1994), by contrast, advance the argument that lawyers may help to resolve legal disputes by developing reputation for cooperation. Clients in turn may be able to commit to cooperate by choosing lawyers who have reputation for cooperation. In a similar vein, Warneryd (2000) argues that when lawyers cannot be perfectly monitored, compulsory representation by lawyers of both litigants may help to restrict litigation expenditure by reducing the stakes of the dispute. Here we argue that lawyers play a similarly constructive role in resolving disputes by serving as 'information agents' who credibly convey private information and thereby decrease the frequency of litigation.

Appendix

Proof of Lemma 1

(a) The defendant's probability of acceptance is $p^*(s, c_p, c_d) = e^{-(s-\underline{s})/(c_p+c_d)}$. Differentiating with respect to s yields $\frac{\partial p^*(s,c_p,c_d)}{\partial s} = e^{-(s-\underline{s})/(c_d+c_p)} \times \frac{-1}{c_d+c_P} < 0.$ Thus, the probability of acceptance is decreasing in the plaintiff's settlement demand. Differentiating p^* with respect to c_p and c_d yields $\frac{\partial p^*(s,c_p,c_d)}{\partial c_p} = \frac{\partial p(s,c_p,c_d)}{\partial c_d} = e^{-(s-\underline{s})/(c_p+c_d)} \times \frac{(s-\underline{s})}{(c_p+c_d)^2} > 0.$ Thus, the probability of acceptance is increasing in both the plaintiff's and the defendant's litigation costs.

(b) The plaintiff's equilibrium payoff is equal to $p^*(s^*)(j+c_d) + (1-p^*(s^*))(j-c_p)$. The first term is the plaintiff's expected payoff if the case settles; the second term is the plaintiff's expected payoff if the case reaches trial. Simplifying and collecting terms yields $j + p^*(s^*)c_d - (1-p^*(s^*))c_p$.

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Proof of Lemma 2

(a) The defendant's probability of acceptance is $p^*_{cp}(s, c_d) = e^{-(s-\underline{s})/c_d}$. Differentiating with respect to s yields $\frac{\partial p^*_{cp}(s,c_d)}{\partial s} = e^{-(s-\underline{s})/c_d} \times \frac{-1}{c_d} < 0.$ Thus, the probability of acceptance is decreasing in the plaintiff's settlement demand. Differentiating with respect to c_d yields $\frac{dp^*_{cp}(s,c_d)}{dc_d} = \frac{e^{-(s-\underline{s})/c_d} \cdot (s-\underline{s})}{(c_d)^2} > 0.$ Thus, the probability of acceptance is increasing in the defendant's litigation costs.

(b) The plaintiff's equilibrium payoff is equal to her share in either a court award or a settlement (i.e., $1 - r^p$) multiplied by the sum of (i) the expected settlement recovery, $p^*_{cp}(j^* + c_d)$, plus (ii) the expected trial award $(1 - p^*_{cp}(s^*))j$. Thus the plaintiff's equilibrium payoff is $(1 - r^p)(j + p^*_{cp}(s^*)c_d)$.

Proof of Lemma 3

(a) The probability of settlement is $p^*_{ca}(s, c_p, c_d, r) = e^{-r(s-\underline{s})/(c_p + rc_d)}$. Differentiating with respect to s yields $\frac{\partial p^*_{ca}(s,c_p,c_d,r)}{\partial s} = e^{-r(s-\underline{s})/(c_p+rc_d)} \times \frac{-r}{c_p + rc_d} < 0.$ Thus, the probability of acceptance is decreasing in the settlement demand. Differentiating with respect to r yields $\frac{\partial p^*_{ca}(s,c_p,c_d,r)}{\partial r} = e^{-r(s-\underline{s})/(c_p+rc_d)} \times \frac{-(s-\underline{s})}{c_p + rc_d} < 0.$ Thus the probability of acceptance is decreasing in the fee rate. Differentiating with respect to c_p and c_d yields $\frac{\partial p^*_{ca}(s,c_p,c_d,r)}{\partial c_p} = e^{-r(s-\underline{s})/(c_p+rc_d)} \times \frac{r(s-\underline{s})}{(c_p+rc_d)}$ and $\frac{\partial p^*_{ca}(s,c_p,c_d,r)}{\partial c_d} = e^{-r(s-\underline{s})/(c_p+rc_d)} \times \frac{r^2(s-\underline{s})}{(c_p+rc_d)}$, respectively. Both expressions are greater than zero; thus, the probability of settlement is increasing in both the plaintiff's and the defendant's litigation costs.

Now, since $e^{-r(s-\underline{s})/(c_p+rc_d)} \times \frac{r(s-\underline{s})}{(c_p+rc_d)} > e^{-r(s-\underline{s})/(c_p+rc_d)} \times \frac{r^2(s-\underline{s})}{(c_p+rc_d)}$, the probability of settlement is more sensitive to the plaintiff's litigation costs than to the defendant's litigation costs.

(b) The derivation of the plaintiff's equilibrium payoff is analogous to that in Lemma 2(b).

Equilibrium fee rate under contingent fee contract with plaintiff versus attorney control over settlement (Section 6.3)

Let r^p be the attorney's fee rate under contingency fee contracts with plaintiff control over settlement. Then the attorney's expected payoff *ex ante* is $E_j[p^*_{cp}(s^*(j))] \cdot r^p \cdot (E[j] + c_d) + (1 - E_j[p^*_{cp}(s^*(j))]) \cdot (r^p E[j] - c_p) - k$. The first term is the attorney's expected payoff if the case settles; the second term is the attorney's expected payoff if the case goes to trial. Since the attorney's expected profit in equilibrium is zero, it follows that the fee rate must satisfy $r^p E[j] + E_j[p_{cp}(s^*(j))] \cdot (r^p c_d + c_p) - c_p - k = 0$. The assumption that $\underline{j} > c_p$ and the fact that the attorney's expected profit is increasing in r^p ensure that there exists a unique r^p that satisfies this equality.

Let r^a be the attorney's fee rate under contingent fee contracts with attorney control over settlement Then, the attorney's expected payoff *ex ante* is $E_j[p^*_{ca}(s^*)] \cdot r^a \cdot (E[j] + c_d) + (1 - E_j[p^*_{ca}(s^*)]) \cdot (r^a E[j] - c_p) - k$. The first term is the attorney's expected payoff if the case settles; the second term is the attorney's expected payoff if the case goes to trial; the third term is the attorney's learning cost. Since the attorney's expected profit in equilibrium is zero, it follows that the fee rate must satisfy $r^a E[j] + E_j[p_{ca}(s^*(j))] \cdot (rc_d + c_p) = c_p + k$. Observe that for $r^a \geq r^p$ the attorney's expected profit is positive and that for $r^a = 0$ the attorney's expected profit is negative. Since the attorney's expected profit is continuous with respect to the fee rate, by the Intermediate Value Theorem there exists (although not necessarily uniquely) a fee rate $r^a \in (0, r^p)$ such that the attorney's expected profit in equilibrium is zero. Since the plaintiff's equilibrium payoff is decreasing in the fee rate, the lowest fee rate is the Pareto-efficient one.

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