

# Strategic Decisions on Lawyers' Compensation in Civil Disputes\*

Kyung Hwan Baik<sup>a</sup>, In-Gyu Kim<sup>b,\*\*</sup>

<sup>a</sup>*Department of Economics, Sungkyunkwan University, Seoul 110-745, Korea*

<sup>b</sup>*Department of Economics, Hallym University, Chunchon 200-702, Korea*

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## Abstract

We study a model of civil dispute with delegation in which a plaintiff's lawyer works on a contingent-fee basis but a defendant's lawyer on an hourly fee basis. We first derive the condition under which delegation to the lawyers brings both litigants more payoffs compared with the case of no delegation. We then show that under this profitable delegation condition, the contingent-fee fraction for the plaintiff's lawyer is about one-third. Next, allowing the plaintiff to choose between the two fee arrangements, we show that under the profitable delegation condition, the plaintiff chooses the contingent fee, given that the defendant adopts the hourly fee.

*Keywords:* Delegation; Tort cases; Contingent and hourly fees; One third of the recovery

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\*\*Corresponding author. Tel.: +82-33-248-1817; fax: +82-33-256-3424.  
*E-mail address:* igkim@hallym.ac.kr (I.-G. Kim)

## 1. Introduction

A plaintiff and a defendant usually bargain to settle a civil dispute. When they cannot reach a settlement, the case goes to trial. Naturally, through the settlement and trial stages, the litigants behave strategically. A few researchers study such a situation by developing contest models.<sup>1</sup> Examples include Plott (1987), Katz (1988), Farmer and Pecorino (1999), Wärneryd (2000), and Hirshleifer and Osborne (2001). There exists, however, some discrepancy between the contest models and the mainstream papers in the law and economics literature. The contest models deal with "the legal battle *itself*" (to use words of Hirshleifer and Osborne, 2001). By contrast, the mainstream papers focus on *one* or *some* of the important aspects of the negotiation and litigation process such as the likelihood of settlement, the reasons for lawsuits, the efficient levels of precautions, the burden of proof, the comparison of alternative fee-shifting systems, and the compensation for lawyers in the presence of an agency problem.<sup>2</sup>

This paper attempts to reconcile the two strands a bit further. To do so, we develop a contest model in which the negotiation and litigation stages are combined, as in the previous contest models, but unlike the previous ones, two lawyers – one for a plaintiff and the other for a defendant – are introduced. Using this contest model with delegation, we are able to analyze some of the important issues in legal disputes. For instance, a plaintiff's lawyer in the United States routinely charges one-third of the award if his client wins, and nothing if his client loses. A natural question – which we can address using our model – is then why the lawyer's contingent fee is not one-half of the award, nor two thirds, but one-third. Using our model, we can also address the following issues. Does the plaintiff have an incentive to choose an hourly fee arrangement if feasible? Does delegation to the lawyers increase the total legal expenditure of the plaintiff and defendant compared with the case of no delegation?

Why do a plaintiff and a defendant hire lawyers in litigation? A straightforward reason for such delegation is that a litigant can benefit by hiring a lawyer who has more capacity than herself. (Throughout the paper, we use "she" to refer to a litigant and "he" to refer to a lawyer.) Another explanation is that a litigant can benefit by achieving strategic commitments through

delegation. Specifically, the litigant can change her opponent's behavior in her favor by using a lawyer whose objective function differs from hers. Baik and Kim (1997) consider a contest model that carries both aspects of delegation for the first time in the delegation literature. But the idea that strategic delegation benefits a "main" player has long been emphasized in many contexts. Examples include Schelling (1960), Fershtman and Judd (1987), Katz (1991), and Wärneryd (2000).

This paper extends the delegation model of Baik and Kim (1997) to the case where a plaintiff's lawyer works on a contingent-fee basis but a defendant's lawyer on an hourly fee basis.<sup>3</sup> We assume that the litigants and lawyers are risk neutral. To be more precise, our two-stage game runs as follows. In the first stage, knowing that the defendant adopts the hourly fee, the plaintiff determines the contingent-fee fraction for her lawyer, and announces it publicly. In the second stage, the lawyers exert their effort simultaneously and independently to win the lawsuit. The plaintiff's lawyer chooses the effort level on his own, but the effort level of the defendant's lawyer is chosen by the defendant. The defendant has to incur a monitoring cost because she hires her lawyer under the hourly fee. We use logit-form probability-of-winning functions.

After solving for the subgame-perfect equilibrium of the game, we first derive the condition on relevant parameters under which delegation to the lawyers brings both litigants more payoffs compared with the case of no delegation. The profitable delegation condition is that given a relatively small monitoring cost, an hourly fee for the defendant's lawyer is about two to three times hourly wages of the litigants.

We then find that under the profitable delegation condition, the equilibrium contingent-fee fraction for the plaintiff's lawyer is about one-third, which is very descriptive of the real world. Based on this result, we argue that the contingent-fee practice of charging one-third of the award comes from the plaintiff's strategic behavior and is indeed an equilibrium outcome. Many law and economics scholars study contingent fees for lawyers: see Danzon (1983), Dana and Spier (1993), Gravelle and Waterson (1993), Rubinfeld and Scotchmer (1993), Miceli

(1994), Bebchuk and Guzman (1996), Hay (1997), Rickman (1999), Emons (2000), Santore and Viard (2001), Choi (2003), Helland and Tabarrok (2003), and Polinsky and Rubinfeld (2003). To the best of our knowledge, however, no attention has been devoted to the economic rationale for the conventional one-third practice in civil litigation.<sup>4</sup>

Our intuitive explanation for the contingent-fee fraction's being about one-third is based on the plaintiff's payoff-maximizing behavior. There is a trade-off. Given the hourly fee rate for the defendant's lawyer, raising the contingent-fee fraction allows the plaintiff's lawyer a more share of the award and thus motivates him to exert more effort. This contributes to an increase in the plaintiff's probability of winning, which in turn may raise her expected payoff. But raising the contingent-fee fraction also implies that the plaintiff has to concede her lawyer a more portion of the award when she wins, which may lower her expected payoff. In short, the former effect tends to raise the plaintiff's expected payoff and the latter tends to lower it. Her resolution of this trade-off results in the contingent-fee fraction's being about one-third.

We also find that under the profitable delegation condition, the equilibrium effort level of the defendant's lawyer is greater than that of the plaintiff's lawyer and that the equilibrium probability of winning for the plaintiff's lawyer is less than one-half. We provide an explanation of the results and discuss their real-world evidence. Finally, we show that delegation always reduces the total legal expenditure of the litigants compared with the case of no delegation. Our explanation for this utilizes the fact that the plaintiff adopts the contingent fee and the defendant has a higher marginal cost of increasing effort when they hire their lawyers.

Next, we consider a modified model in which the plaintiff is allowed to choose between the two fee arrangements and may face a credit constraint. We show that under the profitable delegation condition, the plaintiff wants to stick with the contingent fee, regardless of the possible credit constraint, as long as the defendant adopts the hourly fee. In the litigation literature, the dominant rationale for the plaintiff's use of the contingent fee is that it is a response to her credit constraint and/or to her incentive to share a risk with her lawyer (see, e.g., Dana and Spier, 1993). Our result suggests a different rationale which makes sense even in a

situation where there is no credit constraint or risk-sharing incentive: The plaintiff adopts the contingent fee in order to achieve strategic advantage over the defendant who uses the hourly fee for her lawyer. Indeed, by choosing the contingent fee, the plaintiff motivates her lawyer more strongly to win the lawsuit and thus increases her payoff.

The paper proceeds as follows. Section 2 considers a contest without delegation that provides the benchmark for the subsequent analyses. In Section 3, we set up and analyze the delegation model. In Section 4, we consider the modified model. Section 5 offers our concluding remarks.

## 2. A contest without delegation: the benchmark

In this section, we consider the following noncooperative game. Two risk-neutral players, 1 (a plaintiff) and 2 (a defendant), expend their own effort simultaneously and independently to win a prize (lawsuit).<sup>5</sup> Put differently, the two players compete by themselves without delegation. The players' effort consists of monetary (such as filing fees and consulting fees of experts) and non-monetary components (such as the players' time spent), though we make no distinction between the two components.

Let  $x_1$  and  $x_2$  be the players' effort levels in units commensurate with the prize, and let  $q_1$  be the probability that player 1 wins. We assume that the probability-of-winning function for player 1 is:<sup>6</sup>

$$\begin{aligned} q_1 &= x_1/(x_1 + x_2) && \text{for } x_1 + x_2 > 0 \\ &1/2 && \text{for } x_1 + x_2 = 0. \end{aligned} \tag{1}$$

Function (1) implies two things. First, the winning probability in the contest depends solely on the players' effort. This implies that in our example of the tort case, the litigants have the same degree of fault.<sup>7</sup> Second, the players have equal ability: The probability of winning for player 1 when player 1 expends  $a$  and player 2 expends  $b$  is equal to that for player 2 when player 1 expends  $b$  and player 2 expends  $a$ .

The players value the prize at  $V$ .<sup>8</sup> Then, the payoff function for player 1 is

$$\Pi_1 = q_1 V - x_1 \tag{2}$$

and that for player 2 is

$$\Pi_2 = (1 - q_1)V - x_2. \tag{3}$$

Player  $i$  exerts effort  $x_i$  to maximize her expected payoff  $\Pi_i$ , taking her opponent's effort as given. Algebraically, this maximization results in player  $i$ 's reaction function. Using the two reaction functions, we obtain a unique Nash equilibrium of this game. We denote it by  $(x_1^N, x_2^N)$ .

**Lemma 1.** *At the Nash equilibrium, the effort levels of the players are  $x_1^N = x_2^N = V/4$  and the expected payoffs of the players are  $\Pi_1^N = \Pi_2^N = V/4$ .*

We shall use Lemma 1 as the benchmark to study the effects of delegation on the effort levels and the expected payoffs of the players.

### 3. The delegation model

Consider the case where each player hires her own agent (lawyer) to represent her in the contest. To reflect the typical compensation structure for lawyers in the United States, we assume a contingent fee for agent 1 (the plaintiff's lawyer) and an hourly fee for agent 2 (the defendant's lawyer). Specifically, agent 1 receives the fee that is proportional to  $V$  only if he wins, while agent 2 receives the fee – based on his effort level and hourly fee rate – regardless of the outcome of the contest.

Agents are risk neutral. Let  $y_i$  be agent  $i$ 's effort level, and let  $p_1$  be the probability that agent 1 wins. Then, the probability-of-winning function for agent 1 is given by

$$\begin{aligned} p_1 &= y_1/(y_1 + y_2) && \text{for } y_1 + y_2 > 0 \\ &1/2 && \text{for } y_1 + y_2 = 0. \end{aligned} \tag{4}$$

Agent 1's contingent fee is  $\beta V$ , where  $0 < \beta < 1$ . Because it is paid only if agent 1 wins the contest, there is no need for player 1 to monitor agent 1's effort level. In order to use the hourly fee, however, it must be true that player 2 can observe agent 2's effort level; otherwise, she could not deal with his moral hazard. We thus assume that player 2 can observe agent 2's effort level by expending a monitoring cost of  $\delta y_2$ , where  $\delta > 0$ . This monitoring cost implies that if player 2 asks agent 2 to work more, then she should exert more effort to monitor the longer time. Let  $h$  be agent 2's hourly fee rate. To satisfy agent 2's participation constraint, we assume that  $h \geq 1$ . Then, delegation costs player 2 a total amount of  $(h + \delta)y_2$ . Henceforth, we call  $h + \delta$  player 2's "total" hourly fee rate in order to distinguish it from agent 2's hourly fee rate  $h$ . We assume that  $h$  and  $\delta$  are exogenously given and publicly known.

We formally consider the following two-stage game. In the first stage, knowing that player 2 adopts the hourly fee, player 1 determines the contingent-fee fraction for agent 1 and announces it publicly. In the second stage, agent 1 and player 2 choose the effort levels simultaneously and independently that agents 1 and 2 will expend, respectively. Note that agent 1 chooses the effort level on his own but agent 2 does not. Because agent 2 is hired under the hourly fee, it is player 2 who chooses the effort level. After the agents expend their effort levels, the winner is determined, and the players pay compensation to their agents according to their contracts.

Let  $\pi_i$  represent the expected payoff for agent  $i$ . Then, the payoff function for agent 1 is  $\pi_1 = p_1\beta V - y_1$  and that for agent 2 is  $\pi_2 = (h - 1)y_2$ . The payoff function for player 1 is

$$\Pi_1 = p_1(1 - \beta)V \quad (5)$$

and that for player 2 is

$$\Pi_2 = (1 - p_1)V - (h + \delta)y_2. \quad (6)$$

Lemma 2 reports the outcomes in the subgame-perfect equilibrium of the two-stage game (see the Appendix for their derivations).

**Lemma 2.** *In the subgame-perfect equilibrium, the contingent-fee fraction is*

$\beta^* = \{(1 + h + \delta)^{1/2} - 1\}/(h + \delta)$ . *The effort levels of agents 1 and 2 are, respectively,*

$y_1^* = \{(1 + h + \delta)^{1/2} - 1\}^2 V / (h + \delta)(1 + h + \delta)$  *and*

$y_2^* = \{(1 + h + \delta)^{1/2} - 1\} V / (h + \delta)(1 + h + \delta)$ .

*The probability of winning for agent 1 is  $p_1^* = \{(1 + h + \delta)^{1/2} - 1\} / (1 + h + \delta)^{1/2}$ .*

*The expected payoffs of players 1 and 2 are, respectively,  $\Pi_1^* = \{(1 + h + \delta)^{1/2} - 1\}^2 V / (h + \delta)$*

*and  $\Pi_2^* = V / (1 + h + \delta)$ .*

It is easy to see that the equilibrium contingent-fee fraction,  $\beta^*$ , is monotonically decreasing in  $h + \delta$ . To put this result differently, as player 2's total hourly fee rate  $h + \delta$  increases, player 1 lowers the contingent-fee fraction for agent 1. This can be explained as follows. With a higher total hourly fee rate, player 2 has an incentive to decrease her agent's effort level, and actually, she makes her agent less aggressive by asking him to work less. Expecting that her agent will face a less aggressive agent of the opponent, player 1 in turn eases up so that she lowers the contingent-fee fraction for her agent.

As explained above, agent 2's equilibrium effort level,  $y_2^*$ , is decreasing in  $h + \delta$  and so is the equilibrium contingent-fee fraction. But it follows immediately from Lemma 2 that the probability of winning for agent 1,  $p_1^*$ , is increasing in  $h + \delta$ . Why does this happen? As  $h + \delta$  increases, the equilibrium effort ratio  $y_1^*/y_2^*$  increases so that the probability of winning for agent 1 – which can be written as  $p_1^* = (y_1^*/y_2^*) / (y_1^*/y_2^* + 1)$  – increases. Note that as  $h + \delta$  increases, agent 1 may slacken off due to the corresponding decrease in the contingent-fee fraction, but even in this case, the equilibrium effort ratio,  $y_1^*/y_2^*$ , increases.

We obtain directly from Lemma 2 that  $\Pi_1^*$  is monotonically increasing in  $h + \delta$ , whereas  $\Pi_2^*$  is monotonically decreasing in  $h + \delta$ . We can obtain or explain this using what we have from the previous two paragraphs. From expression (5), we have  $\Pi_1^* = p_1^*(1 - \beta^*)V$ . The previous two paragraphs show that as  $h + \delta$  increases,  $\beta^*$  decreases but  $p_1^*$  increases. Hence, we obtain that  $\Pi_1^*$  is monotonically increasing in  $h + \delta$ . Next, from expression (6), we have

$\Pi_2^* = (1 - p_1^*)V - (h + \delta)y_2^*$ . As  $h + \delta$  increases, player 2's gross expected payoff  $(1 - p_1^*)V$  decreases – because  $p_1^*$  increases – and her costs  $(h + \delta)y_2^*$  either increase or decrease. In the case where her costs increase, we conclude immediately that  $\Pi_2^*$  decreases. In the other case – where her costs decrease – we obtain that the decrease in her gross expected payoff outmeasures the decrease in her costs, which leads to the same conclusion.

Finally, we find that  $\Pi_1^* > \Pi_2^*$  holds if  $(h + \delta) \geq 2.39$  and  $\Pi_1^* < \Pi_2^*$  holds if  $1 < (h + \delta) \leq 2.38$ . (Throughout the paper, all decimal fractions are rounded off to two decimals.)

Now, to make the delegation model more convincing, we restrict our attention to the case where both players' expected payoffs resulting in the delegation model are greater than those in the model without delegation. Besides, such profitability due to delegation assures the institutional stability of the delegation structure. Using Lemmas 1 and 2, we obtain Proposition 1, which shows the range of values of  $h + \delta$  in which delegation leads to greater expected payoffs to both players – let us call it the profitable delegation range.

**Proposition 1.** *If  $1.78 \leq (h + \delta) < 3$ , then delegation yields greater expected payoffs to both players compared with the case of no delegation.*

Proposition 1 is illustrated in Figure 1. The players' equilibrium expected payoffs in the model without delegation,  $\Pi_1^N$  and  $\Pi_2^N$ , are equal to  $V/4$  (see Lemma 1) and thus remain unchanged as  $h + \delta$  increases. Player 1's equilibrium expected payoff  $\Pi_1^*$  in the delegation model is initially less than  $\Pi_1^N$ , her equilibrium expected payoff in the model without delegation, and as explained below Lemma 2, it is monotonically increasing in  $h + \delta$ . On the other hand, player 2's equilibrium expected payoff  $\Pi_2^*$  in the delegation model is initially greater than  $\Pi_2^N$  and is monotonically decreasing in  $h + \delta$ . We find that if  $1.78 \leq (h + \delta) < 3$ , then  $\Pi_i^*$  is greater than  $\Pi_i^N$  for  $i = 1, 2$ .<sup>9</sup>

Proposition 1 says that delegation yields greater expected payoffs to *both* players compared with the case of no delegation, only if player 2's total hourly fee rate  $h + \delta$  is "moderate." If  $h + \delta$  is low, as Figure 1 shows, player 1's equilibrium expected payoff in the delegation model is less than the one in the model without delegation. On the other hand, if  $h + \delta$  is high, player 2's equilibrium expected payoff in the delegation model is less than the one in the model without delegation.

Consider first the case where  $h + \delta$  is low. Due to her low total hourly fee rate, player 2's situation in the delegation model is not much different from her situation in the model without delegation. Player 1, however, faces a quite different situation in the delegation model. Player 1 hires agent 1 with the contingent fee, and agent 1 decides how much effort to exert on his own. Since agent 1's share of the prize is much less than  $V$ , agent 1 who competes against agent 2 on behalf of player 1 in the delegation model is much less motivated to win the prize than player 1 in the model without delegation.<sup>10</sup> Thus, in the delegation model, player 1 ends up with the equilibrium expected payoff which is less than the one in the model without delegation.

Next, consider the case where  $h + \delta$  is high. As we see immediately in Equation (6), player 2's marginal cost of increasing her agent's effort level is then high. Due to this cost handicap, competing against player 1 for the prize, player 2 fails to use a "large" amount of effort from agent 2. This eventually entails player 2's equilibrium expected payoff which is less than the one in the model without delegation.

A comparison of Equations (3) and (6) shows that the hourly "wage" rate for the players in Equation (3) is implicitly assumed to be unity. Then, the profitable delegation condition,  $1.78 \leq (h + \delta) < 3$ , specified in Proposition 1 is interpreted to require that in equilibrium player 2's total hourly fee rate (agent 2's hourly fee rate  $h$  plus the monitoring cost rate  $\delta$ ) be between the players' hourly wage rate times 1.78 and that times 3.<sup>11</sup> Is this condition likely to hold in the real world? In his study of the law industry in the United States, Kritzer (1990, 135-61) observes that the median hourly fee for lawyers ranges from \$36 to \$58. In this case, if  $\delta$  is small and

hourly wages of their clients are, for example, about \$20, then the condition seems to hold. To the best of our knowledge, however, data on the hourly wages of clients are not available.

In the next proposition, we look at the equilibrium contingent-fee fraction,  $\beta^*$ , in the profitable delegation range.

**Proposition 2.** *If  $1.78 \leq (h + \delta) < 3$ , then we have  $1/3 < \beta^* < 0.38$ .*

In order to understand Proposition 2 precisely, recall from Lemma 2 and footnote 10 that the equilibrium contingent-fee fraction,  $\beta^*$ , is at most 0.41 and is monotonically decreasing in  $h + \delta$ . That is, player 1 lowers the contingent-fee fraction for her agent as player 2's total hourly fee rate,  $h + \delta$ , increases.

Proposition 2 says that as player 2's total hourly fee rate is between 1.78 and 3, the equilibrium contingent-fee fraction for agent 1 is between 1/3 and 0.38. Surprisingly, this range of the contingent-fee fraction is very descriptive of the real world. For example, in a typical tort case in the United States, the plaintiff (player 1) usually pays her lawyer (agent 1) about one-third of the award if the case is won and nothing if it is lost.<sup>12</sup> Now, based on Proposition 2, we argue that this conventional one-third practice in civil litigation comes from strategic behavior of player 1 and is indeed an equilibrium outcome.

How do we intuitively explain for the contingent-fee fraction's being about one-third? Of course, our explanation is based on player 1's payoff-maximizing behavior (see Equation (5)). Facing player 2 with a moderate total hourly fee rate, if player 1 chooses a contingent-fee fraction less than 1/3 for her agent, it increases her *actual* payoff in case of her winning the contest due to the contingent-fee saving, but its overall effect on her *expected* payoff is negative because she ends up with a lower probability of winning due to a lower effort level from her less motivated agent. On the other hand, if player 1 chooses a contingent-fee fraction much greater than 1/3, it increases her probability of winning due to a higher effort level from her more

motivated agent, but its overall effect on her expected payoff is negative because her actual payoff, when winning the contest, decreases much due to the higher contingent-fee fraction.

Next, we look at the agents' equilibrium effort levels,  $y_1^*$  and  $y_2^*$ , and the equilibrium probability of winning for agent 1,  $p_1^*$ , in the case where  $h + \delta$  is in the profitable delegation range.

**Proposition 3.** *If  $1.78 \leq (h + \delta) < 3$ , then we have (a)  $y_1^* < y_2^*$  and (b)  $p_1^* < 0.5$ .*

We obtain Proposition 3 using Lemma 2. Note that part (a) implies part (b) due to Equation (4). That is, if  $y_1^* < y_2^*$  holds, then the equilibrium probability of winning for agent 1,  $p_1^*$ , is less than one-half because each agent's probability of winning is equal to his effort level divided by the sum of their effort levels. It is straightforward to see that both parts (a) and (b) also hold for the extended range,  $1 < (h + \delta) < 3$ , and that  $y_1^* \geq y_2^*$  and  $p_1^* \geq 0.5$  hold if  $(h + \delta) \geq 3$ .

Proposition 3 says that given that player 2's total hourly fee rate is moderate, agent 2's equilibrium effort level is greater than agent 1's. Why? This is because player 2 – who values the prize at  $V$  and hires agent 2 with the hourly fee – is able to buy a "large" amount of effort from agent 2 due to her moderate cost, whereas agent 1 – who works under the contingent fee – values his winning at much less than  $V$  and thus exerts relatively low effort. Is it true that in the real world, a defendant's lawyer (or an hourly fee lawyer) exerts more effort than a plaintiff's lawyer (or a contingent-fee lawyer)? Interestingly, Kritzer (1990, 135-61) reports that on average, hourly fee lawyers spent 49.5 hours and contingent-fee lawyers 45.7 hours in civil litigation in the United States.<sup>13</sup>

Part (b) says that in the case where player 2's total hourly fee rate is moderate, the equilibrium probability of winning for agent 1 is less than one-half. An interesting question is then: In the real world, do individual plaintiffs in civil litigation have less than one-half chance of prevailing on their claims? The answer seems to be positive. Using a measure of success,

Kritzer (1990, 135-61) argues that for 65 percent of defendants in civil cases, litigation was successful.<sup>14</sup>

Finally, we compare the players' equilibrium expenditures in the delegation model with those in the model without delegation. In the delegation model, player 1's equilibrium *expected* expenditure equals  $E_1^* = p_1^* \beta^* V$  and player 2's equilibrium expenditure  $E_2^* = (h + \delta)y_2^*$ . In the model without delegation, the equilibrium effort levels of the players are  $x_1^N = x_2^N = V/4$  (see Lemma 1). Using Lemma 2, we obtain that  $E_1^* < x_1^N$  and  $E_2^* \leq x_2^N$  hold in the whole range of values of  $h + \delta$ , which yields Proposition 4.<sup>15</sup>

**Proposition 4.** *In the whole range of values of  $h + \delta$ , including the profitable delegation range, the players' equilibrium total expenditure in the delegation model is less than the one in the model without delegation.*

Proposition 4 says that delegation reduces the players' total expenditure compared with the case of no delegation, regardless of how high player 2's total hourly fee rate is.<sup>16</sup> We explain this with two things. The first is that in the delegation model, player 1 adopts the contingent fee. Under the contingent fee, player 1 pays agent 1 the contingent fee  $\beta^* V$  only if he wins the contest. In other words, she expends nothing unless her agent wins the contest. This, together with the fact that  $\beta^*$  is at most 0.41, yields that player 1's equilibrium expected expenditure in the delegation model is always less than her equilibrium effort level in the model without delegation. The second is that in the delegation model, player 2 has a higher marginal cost of increasing effort; she actually competes with agent 1 who values his winning far less than player 1 does in the model without delegation. In this less competitive environment, player 2 "needs" less effort than she does in the model without delegation. This eventually yields that player 2's equilibrium expenditure,  $(h + \delta)y_2^*$ , in the delegation model is at most the same as her equilibrium effort level in the model without delegation.

#### 4. Endogenizing fee arrangements

In Section 3, we assumed that player 1 adopts the contingent fee arrangement for agent 1 and player 2 the hourly fee arrangement for agent 2. In this section, we allow player 1 to choose between the contingent fee and hourly fee arrangements. Given that player 2 adopts the hourly fee, which fee arrangement does player 1 choose?<sup>17</sup> To address this question, we first analyze the situation in which both players adopt the hourly fee and then compare player 1's expected payoff resulting from that situation with her payoff from Lemma 2.

When player 1 adopts the hourly fee arrangement, we introduce two possible asymmetry parameters between the two players. First, unlike player 2 (usually a firm), player 1 (usually an individual) may need to get a loan for her monetary expenses in the contest. Because of imperfect capital markets, however, player 1's ability to borrow against future expected income may be severely limited.<sup>18</sup> It is called a credit constraint or a financial barrier. To reflect such an asymmetry, we assume that player 1 has to pay a financing cost of  $ry_1$  to finance her agent's hourly fee  $hy_1$ . The parameter  $r \geq 0$  describes the difference between player 1's financing cost and player 2's opportunity cost. Thus,  $r = 0$  means that player 1 has no financial barrier or that the two players face the same rate of the financing cost. Second, in the real world, an individual plaintiff has usually less experience in monitoring a lawyer's effort compared to a corporate defendant. To reflect this asymmetry, we assume that player 1's monitoring cost parameter  $\delta_1$  is greater than or equal to player 2's: In terms of symbols,  $\delta_1 \geq \delta$ . Put differently, player 1's monitoring technology is inferior or equal to that of player 2.

When both players adopt the hourly fee arrangement for their agents, the game has only one stage. Agents 1 and 2 expend their effort levels simultaneously. Note that, because the agents are hired with the hourly fee arrangement, it is the players who choose the effort levels. Let  $\hat{\Pi}_i$  represent the expected payoff for player  $i$ . Then, the payoff function for player 1 is

$$\hat{\Pi}_1 = p_1V - \{(1+r)h + \delta_1\}y_1, \quad (7)$$

where  $p_1$  is defined as in Equation (4). The payoff function for player 2 is the same as in Equation (6):  $\hat{\Pi}_2 = (1 - p_1)V - (h + \delta)y_2$ .

Since the analysis of this game is very similar to the one in Section 3, we here report only the results, omitting the derivations.

**Lemma 3.** *In equilibrium, the effort levels of agents 1 and 2 are*

$$\hat{y}_1^* = (h + \delta)V / \{(2 + r)h + \delta + \delta_1\}^2 \text{ and } \hat{y}_2^* = \{(1 + r)h + \delta_1\}V / \{(2 + r)h + \delta + \delta_1\}^2,$$

*respectively, and the expected payoffs of players 1 and 2 are*

$$\hat{\Pi}_1^* = [(h + \delta) / \{(2 + r)h + \delta + \delta_1\}]^2 V \text{ and } \hat{\Pi}_2^* = [\{(1 + r)h + \delta_1\} / \{(2 + r)h + \delta + \delta_1\}]^2 V,$$

*respectively.*

To compare Lemmas 2 and 3, we look at the following four possible cases: (a)  $r = 0$  and  $\delta_1 = \delta$ , (b)  $r > 0$  and  $\delta_1 = \delta$ , (c)  $r = 0$  and  $\delta_1 > \delta$ , and (d)  $r > 0$  and  $\delta_1 > \delta$ . First, consider the case where  $r = 0$  and  $\delta_1 = \delta$  – that is, the case where players 1 and 2 are symmetric. In this case, we have  $\hat{\Pi}_1^* = V/4$  from Lemma 3. This together with Figure 1 shows that  $\hat{\Pi}_1^*$  is less than  $\Pi_1^*$  in the profitable delegation range,  $1.78 \leq (h + \delta) < 3$ . This means that player 1 prefers the contingent-fee arrangement to the hourly fee.

Next, consider the other three cases. An increase in the value of  $r$  and/or an increase in  $\delta_1$  lower the size of  $\hat{\Pi}_1^*$  below  $V/4$ . This is obvious because the increase in the value of  $r$  and/or the increase in  $\delta_1$  lead to the increase in player 1's cost. Using this fact and Proposition 1, we obtain Proposition 5.

**Proposition 5.** *In the profitable delegation range  $1.78 \leq (h + \delta) < 3$ , player 1 prefers the contingent fee to the hourly fee provided player 2 adopts the hourly fee. A possibility of player 1's credit constraint does not affect her preference for the contingent fee.*

In the litigation literature, the dominant opinion on player 1's (the plaintiff's) use of the contingent fee is that it is a response to her credit constraint and/or to her incentive to share a risk with her agent (see, e.g., Dana and Spier, 1993). Contrary to the conventional arguments, Proposition 5 demonstrates that the contingent fee is a better choice for player 1 even when there is no credit constraint or risk-sharing as long as player 2 sticks with the hourly fee. Player 1 adopts the contingent fee in order to achieve strategic advantage over player 2 who uses the hourly fee for her agent. Indeed, by choosing the contingent fee, player 1 motivates her agent more strongly to win the prize and thus increases her expected payoff.

## **5. Concluding remarks**

We modeled civil disputes as contests with delegation. We considered two delegation models. The first is the one in which player 1 adopts the contingent fee-arrangement for agent 1 and player 2 the hourly fee arrangement for agent 2. The second is the one in which the plaintiff is allowed to choose between the two fee arrangements and may face a financial constraint; player 2 adopts the hourly fee arrangement for agent 2.

In the first delegation model in Section 3, we found the following. First, delegation to the agents brings both players more payoffs compared with the case of no delegation, if the total hourly fee rate is moderate. Second, under the profitable delegation condition, the equilibrium contingent-fee fraction for agent 1 is about one-third, which is very descriptive of the real world; the equilibrium effort level of agent 2 is greater than that of agent 1. Third, delegation always reduces the total legal expenditure of the players compared to the case of no delegation.

In the modified delegation model in Section 4, we demonstrated that under the profitable delegation condition, player 1 prefers the contingent fee arrangement to the hourly fee given that player 2 adopts the hourly fee arrangement. Based on this, we may argue that, in the United States, plaintiffs in tort litigation have no incentive to change their fee arrangements from the contingent fee to the hourly fee as long as defendants stick with the hourly fee arrangement.

Some extensions of our models seem interesting: (a) considering the case in which player 2 has better access to the pool of agents than player 1, (b) considering a model with the probability-of-winning functions reflecting different degrees of fault for the players, and (c) looking at the equilibrium contingent-fee fractions covering different stages – settlement, trial, and appeal – of a civil dispute. We leave these extensions for future research.

## Appendix

In this Appendix, we provide the derivations of Lemma 2. To solve the two-stage game, we work backward. In the second stage, the value of  $\beta$  is publicly known. Agent 1 exerts effort  $y_1$  to maximize his expected payoff  $\pi_1$ , taking agent 2's effort as given. But agent 2 exerts effort  $y_2$ , which maximizes player 2's payoff in Equation (6), taking agent 1's effort as given. That is, player 2 computes  $y_2$  and has agent 2 implement it. Algebraically, this maximization results in each agent's reaction function.

Using the two reaction functions, we derive a unique Nash equilibrium in the second stage of the game. We denote it by  $(y_1(\beta), y_2(\beta))$ . Then, we have

$$\begin{aligned} y_1(\beta) &= \beta^2(h + \delta)V/\{\beta(h + \delta) + 1\}^2; \\ y_2(\beta) &= \beta V/\{\beta(h + \delta) + 1\}^2. \end{aligned} \tag{A1}$$

Let  $p_1(\beta)$  be the probability that agent 1 wins at the Nash equilibrium of the second stage. Using Equations (4) and (A1), we obtain

$$p_1(\beta) = \beta(h + \delta)/\{\beta(h + \delta) + 1\}. \tag{A2}$$

Using Equations (5), (6), (A1), and (A2), we obtain the expected payoffs for the players at the Nash equilibrium of the second stage:

$$\begin{aligned} \Pi_1(\beta) &= \beta(1 - \beta)(h + \delta)V/\{\beta(h + \delta) + 1\}; \\ \Pi_2(\beta) &= V/\{\beta(h + \delta) + 1\}^2. \end{aligned} \tag{A3}$$

Next, consider the first stage in which player 1 decides on the contingent-fee fraction  $\beta$ . In this stage, player 1 chooses  $\beta$  to maximize her payoff  $\Pi_1(\beta)$ . Let us denote its optimal value by  $\beta^*$ . Then, we obtain

$$\beta^* = \{(1 + h + \delta)^{1/2} - 1\}/(h + \delta). \tag{A4}$$

Finally, plugging (A4) into Equations (A1) – (A3), we obtain Lemma 2.

**Footnotes**

1. A contest is a situation in which players compete with one another by expending irreversible effort to win a prize. Contests have been studied by many economists. Examples include Tullock (1980), Appelbaum and Katz (1987), Dixit (1987), Baik and Shogren (1992), Leininger (1993), Nitzan (1994), Hurley and Shogren (1998), Konrad (2000), and Baik, Kim, and Na (2001).
2. See Cooter and Rubinfeld (1989) who provide a comprehensive but lucid survey on these issues. See also the references quoted therein.
3. In the United States, most of the plaintiffs in tort litigation hire their lawyers under a contingent fee, while defendants' lawyers are usually paid under an hourly fee (see Dana and Spier, 1993; Bebchuk and Guzman, 1996).
4. Hay (1997) agrees with critics of contingent fees that the conventional one-third of the recovery is too much. On the other hand, Posner (1998, 624-32) argues that contingent fees seldom, if ever, are exorbitant. But Hay (1997) as well as Posner (1998) warns that regulatory caps on contingent fees may bring about some side effects.
5. There are some reasons why we model a civil dispute as a contest with logit-form probability-of-winning functions. Consider, for example, a tort case. First of all, an award or recovery of the case corresponds to a prize in a contest. Namely, a plaintiff seeks the award, while a defendant tries to defend it. Second, to obtain the award, both litigants bear their own legal costs even if one of them loses the case. Similarly, players in a contest expend irreversible effort to win the prize but only one of them wins. Third, a litigant who expends higher effort is not guaranteed victory but rather has a greater likelihood of victory. The logit-form probability-of-winning functions are appropriate for the description of such a likelihood.
6. This logit-form probability-of-winning function is extensively used in the contest literature. See, for example, Tullock (1980), Appelbaum and Katz (1987), Hirshleifer (1989), Leininger (1993), Baik and Kim (1997), and Hurley and Shogren (1998).

7. In lawsuits, relative success might depend on both the true degree of fault and the two opposing parties' effort; thus, it could be more realistic to assume a different degree of fault for each litigant. In this paper, however, we do not pursue this aspect in order to focus on the effort levels of the both parties. In criminal litigation, on the other hand, the different degrees of fault play an important role in determining the winning probability or the probability of being guilty (see Hirshleifer and Osborne, 2001).

8. Player 1 tries to win  $V$ , while player 2 wants to defend  $V$ . Hence, winning the lawsuit is worth  $V$  for both players.

9. If  $(h + \delta) \geq 3$ , player 2 may want to deviate from delegation as her equilibrium payoff with delegation is less than the one without delegation. The same goes for player 1 if  $(h + \delta) < 1.78$ . In this paper, however, we do not analyze the players' deviation incentive by assuming that delegation to the lawyers is institutionally given. See Baik and Kim (1997) for the players' endogenous decisions on delegation.

10. Lemma 2 says that in equilibrium, the maximum value of  $\beta^*$  (agent 1's contingent-fee fraction) is at most 0.41, which is obtained as the value of  $h + \delta$  goes down to 1.

11. We have used  $\delta$  to describe the problem associated with agent 2's moral hazard. But there might be another way to describe it: The parameter  $\delta$  could be used to denote a possible overcharge rate instead of the monitoring cost rate. Exploiting his informational advantage on  $y_2$ , for instance, agent 2 could overcharge his fee by an amount of  $\delta y_2$ . If so, in equilibrium, his "actual" hourly fee rate would not be  $h$  but  $h + \delta$ .

12. More specifically, in accidental injury suits in the United States, the contingent-fee fraction ranges from 0.25 to 0.33 for settlement before trial and from 0.33 to 0.40 if trial is necessary (Bebchuk and Guzman, 1996). Note, however, that the settlement and trial stages are not separated in this paper.

13. Kritzer (1990, 135-61) also mentions that hourly fee lawyers have an incentive to devote excessive time to a case in order to increase the billable hours. In their empirical study of the impact of contingent fees on the expected time to settlement, Helland and Tabarrok (2003) find

that lawyers have a greater incentive to increase the time to settlement under hourly fees as compared to contingent fees.

14. But this does not necessarily imply that 65 percent of plaintiffs lost. This is because, in reality, civil litigation may not be a zero-sum game. As Kritzer (1990, 135-61) correctly points out, if a defendant believes that she has more to lose than a plaintiff believes she has to win, then it is possible for both litigants to see themselves as winners. He also admits that assessing success in terms of winning and losing is problematic since the notion of success is very different for plaintiffs as compared to defendants.

15. We also find that  $y_1^* < x_1^N$  and  $y_2^* < x_2^N$  hold true in the whole range of values of  $h + \delta$ . That is, agent 1's equilibrium effort level in the delegation model is less than player 1's in the model without delegation; the equilibrium effort level which player 2 buys from agent 2 in the delegation model is less than her own equilibrium effort level in the model without delegation.

16. This does not necessarily imply that lawyers contribute to reducing legal costs to the society. Note that there is another legal cost we exclude from the current analysis, the effort level exerted by the plaintiff's lawyer. Besides, lawyers in the real world are often blamed for creating lawsuits.

17. What would be player 2's incentive regarding her choice of a fee arrangement? Because player 2 has no financial barrier which will be explained soon, she can freely choose between the two fee arrangements. As mentioned in footnote 3, in the United States, most of the defendants prefer the hourly fee to the contingent fee. This may imply that given the plaintiff's choice of the contingent fee, the defendant (player 2) is better off under the hourly fee than under the contingent fee. Why does this happen in the real world? A possible explanation for this is that a corporate defendant, say, an auto insurance company as a liability insurer, has much more experience in dealing with a lawsuit than an individual plaintiff, say, an injured person. In fact, the liability insurer is involved in litigation as a matter of routine. Thus, the corporate defendant as a repeat player can easily acquire the "know-how" of keeping a lawyer under the hourly fee, while the individual plaintiff as an one-time player may not.

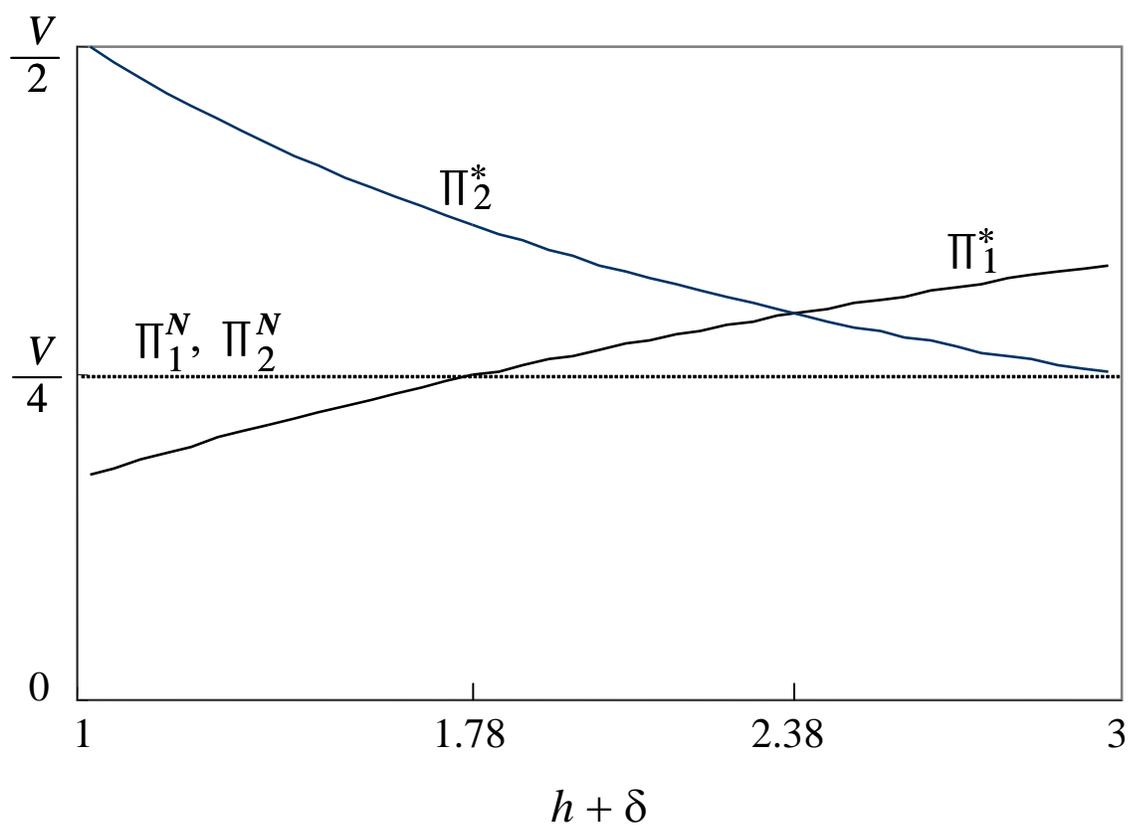
18. A potential plaintiff who cannot afford the monetary expenses (from her pocket or by borrowing money) may be obliged to give up a suit. In this case, her expected payoff would go down to zero. This implies that the lower bound of the profitable delegation range for player 1,  $h + \delta$ , can go down to 1, because  $\Pi_1^* > 0$  even when  $h + \delta = 1$  (see Figure 1).

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**Figure 1.** The players' equilibrium expected payoffs.