Costly Pretrial Agreements

Luca Anderlini, Leonardo Felli, and Giovanni Immordino

ABSTRACT

Settling a legal dispute involves some costs that the parties have to incur ex ante for the pretrial negotiation and possible agreement to become feasible. Even in a full-information world, if the distribution of these costs is sufficiently mismatched with the distribution of the parties' bargaining powers, a pretrial agreement may never be reached even though litigation is overall wasteful. Our results shed light on two key issues. First, a plaintiff may initiate a lawsuit even though the parties fully anticipate that it will be settled out of court. Second, the likelihood that a given lawsuit goes to trial is unaffected by how trial costs are distributed among the litigants. The choice of fee-shifting rule can affect only whether the plaintiff files a lawsuit in the first place. It does not affect whether it is settled before trial or litigated.

1. INTRODUCTION

1.1. Overview

Potential legal disputes become actual ones when a plaintiff ($\mathcal{P}$) files a suit against a defendant ($\mathcal{D}$).[1] After a suit is filed, it can either be settled before it goes to court or be litigated. Throughout the process, $\mathcal{P}$ can drop the suit at any point in time. Our highly stylized model below captures these basic elements.

Litigation is generally a wasteful way to resolve disputes, as it involves

LUCA ANDERLINI is Professor of Economics at Georgetown University. LEONARDO FELLI is Professor of Economics at the London School of Economics. GIOVANNI IMMORDINO is Professor of Political Economy at the University of Naples Federico II. We are grateful to William Hubbard and two anonymous referees for their very insightful comments. We are indebted to Carlo Angelici, Giuseppe Dari-Mattiacci, Luis Garicano, Eric Langlais, and seminar participants at the Amsterdam Center of Law and Economics, the Università di Napoli Federico II, and the 11th annual conference of the Italian Society of Law and Economics for very helpful discussions. Some of the work was carried out while Anderlini was visiting the Einaudi Institute for Economics and Finance in Rome. He gratefully acknowledges the generous hospitality.

1. Of course, there could be multiple plaintiffs and/or multiple defendants, but that is not our focus here.

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large costs. Settling out of court also involves costs, but these are generally lower than court costs, and this is what we assume throughout. The fact that these costs are present is often ignored but plays a key role in our analysis.

If litigation is inefficient, and the parties are fully informed, is there ever a good reason for a lawsuit to be litigated? Will it not be the case that some version of the Coase theorem (Coase 1960) prevents litigation from ever taking place?

We present here a robust reason for some disputes between rational fully informed parties to be inefficiently litigated. Our model also sheds light on two key features of how disputes are initiated and subsequently handled.

First, in some cases $\mathcal{P}$ will initiate a lawsuit even though he fully anticipates that it will be settled out of court. Very roughly speaking, this is because filing a suit changes the outcome in case of disagreement in the bargaining process leading to the out-of-court settlement.

Second, contingent on $\mathcal{P}$ deciding to file a lawsuit against $\mathcal{D}$, the likelihood that it is litigated versus settled out of court does not depend on how the court costs are apportioned between $\mathcal{P}$ and $\mathcal{D}$ but only on the total litigation costs. In other words, the choice of fee-shifting rule does not affect whether a given suit is settled before trial or litigated.[2] This is because the parties' negotiation will fully anticipate and compensate any shift in the court costs, which will be fully reflected in the amount that $\mathcal{P}$ pays $\mathcal{D}$ if the suit is settled out of court. Fee shifting, however, can affect whether $\mathcal{P}$ files a lawsuit in the first place. So why do some disputes between fully informed parties end up being inefficiently litigated? As noted above, this requires a failure of the Coase theorem.

The bare-bones mechanism that generates a failure of the Coase theorem in this paper is similar to what happens in a rather different context in Anderlini and Felli (2006). Key to our result is the observation that parties to a dispute may have to incur certain costs prior to any potential settlement negotiation. That is, parties may have to pay ex ante transaction costs (for example, invest some time) to prepare for the negotiation that might lead to a settlement. The need to incur these costs prior to the negotiation implies that these costs are sunk by the time the pretrial

2. We consider the four systems discussed by Shavell (1982): the American rule (each side bears its own costs), the English rule (the losing side bears all costs), the rule favoring the plaintiff (he pays only his own cost if he loses and nothing otherwise), and the rule favoring the defendant (she pays only her own costs if she loses and nothing otherwise).

negotiation takes place, and hence they will not be taken into account in the negotiation. What this means is that the parties find themselves in a version of the holdup problem. In other words, it is the parties' strategic interaction in the presence of ex ante costs that might lead to trial. We regard this rationale for fully rational agents to end up in court as complementary to existing explanations, based on the parties' disagreement over the likelihood of prevailing at trial or the inefficiency associated with parties' private information.

The vast literature on litigation, pretrial negotiation, and fee shifting began with the economic theory of litigation developed by Landes (1971), Posner (1973), and Gould (1973). Those authors conclude that risk perception is the main determinant of whether a case is settled outside of court. Together with Shavell (1982), they explain costly litigation as the result of different views on the likelihood of prevailing at trial. In this setting, fee shifting amplifies the effect of optimism, which makes litigants less likely to settle. "Under the English rule, a litigant is forced to take into account the other side's litigation costs to the extent that she risks losing the case, making her more willing to settle. But conversely, she is freed of her own litigation cost to the extent that she hopes to win, making her less likely to settle. Since litigants are disproportionately drawn from the population of optimists, the latter effect tends to outweigh the former. Indeed, in the limiting case when both parties are fully confident of winning, neither expects to pay any costs at all and settlement is impossible" (Katz and Sanchirico 2012, p. 14).[3] This literature has been criticized on the ground that it assumes that each party knows the other party's reservation value.

A second group of models focus on disagreements generated by the parties' private information, allowing for rational beliefs (Bebchuk 1984; Dari-Mattiacci and Saraceno 2015; Nalebuff 1987; P'ng 1983; Schweizer 1989; Spier 1992, 1994b), and explores the effects of fee-shifting rules (Gong and McAfee 2000; Reinganum and Wilde 1986; Spier 1994a). Asymmetric-information models confirm the disagreement model's result that the English rule generally discourages settlement when the private information concerns the likelihood of the plaintiff's prevailing at trial (Bebchuk 1984) but provide exactly the opposite prediction when the asymmetric information is about the opponent's litigation costs (Cho-

3. Other papers extend this setting by endogenizing the level of trial expenditures should a trial take place (see Braeutigam, Owen, and Panzar 1984; Plott 1987; Cooter and Rubinfeld 1989; Froeb and Kobayashi 1996).

pard, Cortade, and Langlais 2010) or the level of damages suffered by the plaintiff (Reinganum and Wilde 1986).

We are not the first to conclude that the likelihood of a trial is independent of the fee-shifting rule. Reinganum and Wilde (1986), Donohue (1991a, 1991b), and, more recently, Dari-Mattiacci and Saraceno (2015) reach the same conclusion. The probability of trial is a function of only the total litigation costs, and different fee-shifting rules do not alter this probability. In particular, in Donohue (1991a, 1991b) the irrelevance of fee-shifting rules is a direct consequence of the Coase theorem: rules are irrelevant as long as the involved parties are free to sign a private contract specifying the Pareto-optimal rule applicable to the court.[4] What is surprising is that we find the same result in a setting where the Coase theorem does not hold precisely because parties have to incur some ex ante costs before they reach the stage in which the negotiation occurs.

Finally, Hubbard (2015) analyzes the effects of sinking trial costs at an ex ante stage to force or deter settlement. Like the present paper, Hubbard (2015) is based on a complete-information model. Unlike what happens here, all suits are settled out of court. We return to the relationship between Hubbard (2015) and our work in Section 6.2.

1.2. Outline

The rest of the paper is organized as follows. To help the intuition concerning some of the key insights, in Section 2 we provide an illustrative numerical example of our full-fledged model. In Section 3 we describe the model in detail. In Section 4 we characterize the (generally unique) equilibrium of the model as a function of its parameters (the pretrial and trial costs, among others). Section 5 is devoted to a discussion of fee-shifting rules and includes descriptions of the four polar cases that we consider. In Section 6 we discuss the implications of our characterization of Section 4 in terms of the impact of changes in the parameters and fee-shifting rules on the equilibrium outcome of the model. In Section 7 we summarize and contrast our findings vis-à-vis related models with asymmetric information. Section 8 briefly concludes. Seeking a more streamlined exposition, we gather some formal material in the Appendix.

4. The fact that the parties have come to litigation in the first place may cast doubts on the presumption that they are bargaining in a Coasean fashion though (Katz and Sanchirico 2012, p. 5).

2. A NUMERICAL EXAMPLE

2.1. Setup

Plaintiff $\mathcal{P}$ files a suit against defendant $\mathcal{D}$. If the case goes to trial, $\mathcal{P}$ will receive expected damages of $\mathcal{I} = 100$. In what follows, we distinguish between the damages if $\mathcal{P}$'s suit is successful, denoted I, and the probability that $\mathcal{P}$ wins, denoted p. Clearly, $\mathcal{I} = pI = 100$.

A pretrial settlement is possible if and only if both parties pay the costs necessary to enter a pretrial negotiation equal to $c_{\text{A}}^{\mathcal{P}} = 10$ and $c_{\text{A}}^{\mathcal{D}} = 10$. If either or both do not pay such costs, the suit is litigated. In that case, $\mathcal{P}$ incurs a cost of $c_{\text{T}}^{\mathcal{P}} = 20$, while $\mathcal{D}$ incurs a cost of $c_{\text{T}}^{\mathcal{D}} = 20$.[5] Clearly, litigating is inefficient since it is associated with a total cost $c_{\text{T}} = c_{\text{T}}^{\mathcal{P}} + c_{\text{T}}^{\mathcal{D}} = 20 + 20 = 40$, while a pretrial settlement is associated with a lower total cost $c_{\text{A}} = c_{\text{A}}^{\mathcal{P}} + c_{\text{A}}^{\mathcal{D}} = 10 + 10 = 20$.

To drive home the main point, we need to consider two different distributions of bargaining power across $\mathcal{P}$ and $\mathcal{D}$. Let β be the bargaining power of $\mathcal{P}$ and $1 - \beta$ be that of $\mathcal{D}$. We consider the case of $\beta = 1/2$ and the case of $\beta = 1/10$. In other words, in one case the bargaining power is evenly distributed, while in the other it is skewed in favor of $\mathcal{D}$.[6]

Using these values for the bargaining power in the generalized Nash bargaining that is specified later (see Section A1 in the Appendix for details), we obtain that the size of the settlement $\mathcal{S}$, if a pretrial agreement is achieved, is $\mathcal{S} = 100$ if $\beta = 1/2$ and $\mathcal{S} = 84$ if $\beta = 1/10$.

2.2. Outcomes

We begin with the case $\beta = 1/2$, which as we noted implies a settlement of $\mathcal{S} = 100$. Intuitively, in this case the values of the pretrial negotiation costs and of bargaining power are aligned—they are both evenly distributed across $\mathcal{P}$ and $\mathcal{D}$.

If both $\mathcal{P}$ and $\mathcal{D}$ pay their pretrial agreement costs, the case is settled out of court with $\mathcal{S} = 100$. Hence, in this case $\mathcal{D}$ ends up with a payoff of $-\mathcal{S} - c_{\text{A}}^{\mathcal{D}} = -100 - 10 = -110$. As for $\mathcal{P}$, the payoff in this case is $\mathcal{S} - c_{\text{A}}^{\mathcal{P}} = 100 - 10 = 90$. If either side does not pay its pretrial agreement cost, then the case is litigated. The payoff from deviation for $\mathcal{D}$ is $-\mathcal{I} - c_{\text{T}}^{\mathcal{D}} = -100 - 20 = -120$. The payoff from deviation for $\mathcal{P}$

5. We picked equal cost values across $\mathcal{P}$ and $\mathcal{D}$ purely for simplicity.

6. What matters here is that costs are equal across $\mathcal{P}$ and $\mathcal{D}$ while, in one case, bargaining power is skewed. Whether it is skewed in favor of $\mathcal{P}$ or $\mathcal{D}$ does not matter.

instead is $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} = 100 - 20 = 80$. Hence, neither $\mathcal{P}$ nor $\mathcal{D}$ finds it profitable to deviate, and the case is settled out of court.[7]

Next, consider the case in which $\beta = 1/10$. If both $\mathcal{P}$ and $\mathcal{D}$ pay their pretrial agreement costs, the case is settled out of court. In this case, the new value of $\mathcal{S}$ is 84. Hence, $\mathcal{D}$ ends up with a payoff of $-\mathcal{S} - c_{\mathrm{A}}^{\mathcal{D}} = -84 - 10 = -94$, while the payoff of $\mathcal{P}$ is $\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}} = 84 - 10 = 74$.

The payoff for $\mathcal{P}$ if he decides not to participate in the settlement negotiation by not paying cost $c_{\mathrm{A}}^{\mathcal{P}}$ and instead goes to court is $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} = 100 - 20 = 80$. So in this case $\mathcal{P}$ finds it profitable to deviate from paying $c_{\mathrm{A}}^{\mathcal{P}}$. It follows that a pretrial agreement is not possible in equilibrium and hence that the case will be litigated, which yields a payoff of $-\mathcal{I} - c_{\mathrm{T}}^{\mathcal{D}} = -100 - 20 = -120$ for $\mathcal{D}$ and a payoff of $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} = 100 - 20 = 80$ for $\mathcal{P}$.

Two comments are in order. First, the outcome when $\beta = 1/10$ and the case is litigated is inefficient. This stems directly from the fact that the total litigation costs of $c_{\mathrm{T}} = 40$ are greater than the total costs $c_{\mathrm{A}} = 20$ needed for a pretrial negotiation. Second, the inefficiency when $\beta = 1/10$ is due to the misalignment between the distribution of pretrial agreement costs and bargaining power. In this case, the low bargaining power of $\mathcal{P}$ skews the settlement $\mathcal{S}$ and hence does not make it worthwhile for $\mathcal{P}$ to settle out of court, even though $c_{\mathrm{A}}^{\mathcal{P}} = 10 < c_{\mathrm{T}}^{\mathcal{P}} = 20$.

Before finishing our numerical example, we highlight that our choice of values is such that, regardless of β, it is in $\mathcal{P}$'s interest to file suit against $\mathcal{D}$—in both cases $\mathcal{P}$'s payoff is positive. Clearly, this need not be the case, as costs and damages vary. The decision to file or not to file plays an important role in what follows. The channels that affect the decision to file are deliberately shut down in this example so as to focus on the role that negotiation costs and the parties' bargaining power play in determining whether a settlement is achieved even if it is efficient to do so.

3. THE MODEL

3.1. Court Costs and Pretrial Agreement Costs

We start by taking it as given that a suit has in fact been filed. We also abstract from the possibility that $\mathcal{P}$ could drop the suit after filing it, which

7. A coordination failure could lead to neither side paying and the case being litigated. This is something that cannot happen in the full-fledged model discussed below.

Table 1. Summary of Payoffs to the Players

	Costs Paid $c_{\mathrm{A}}^{\mathcal{D}}$	Costs Not Paid $c_{\mathrm{A}}^{\mathcal{D}}$
Costs paid $c_{\mathrm{A}}^{\mathcal{P}}$	$\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}}, -\mathcal{S} - c_{\mathrm{A}}^{\mathcal{D}}$	$\mathcal{I} - c_{\mathrm{A}}^{\mathcal{P}} - c_{\mathrm{T}}^{\mathcal{P}}, -\mathcal{I} - c_{\mathrm{T}}^{\mathcal{D}}$
Costs not paid $c_{\mathrm{A}}^{\mathcal{P}}$	$\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}}, -\mathcal{I} - c_{\mathrm{A}}^{\mathcal{D}} - c_{\mathrm{T}}^{\mathcal{P}}$	$\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}}, -\mathcal{I} - c_{\mathrm{T}}^{\mathcal{D}}$

instead is considered at every stage of the timeline below. All parties are risk neutral. Table 1 summarizes our notation and presents the payoffs to the players as a consequence of the pretrial costs being paid or not and the suit being litigated or settled before going to court.[8] The first assumption we make stipulates that a pretrial agreement is efficient. In particular, both parties are potentially better off by avoiding a costly trial.

Assumption 1: Efficiency of Pretrial Agreements. The total cost of a pretrial agreement is lower than the total cost of going to court. In other words $c_{\mathrm{T}} > c_{\mathrm{A}}$.

Assumption 1 implies that negotiating a settlement and not going to trial generates a positive surplus $c_{\mathrm{T}} - c_{\mathrm{A}}$. Notice, however, that after the costs c_{A}^{i} are sunk, the only relevant cost during the negotiation is c_{T}, the total amount the parties can save by not going to court. The settlement negotiated in the pretrial agreement $\mathcal{S}$ is then the outcome of generalized Nash bargaining between $\mathcal{P}$ and $\mathcal{D}$ over a surplus of size c_{T}. We return to the details of the bargaining in Section 3.3.

Before we proceed further, it is important to emphasize again that the pretrial agreement costs in our setup are ex ante costs, as in Anderlini and Felli (2006). The key feature of these costs is that they are sunk by the time the settlement negotiation begins, and as such they are not the subject of negotiation. Notice, however, that these costs are critical in each party's decision whether to participate in the pretrial negotiation or to go to court. The prime example of these costs is associated with the fact that, to reach the negotiation stage, the parties have to invest cognitive and examination effort and clear their schedules in order to meet. That clearly carries an opportunity cost given by the value of their alternative use of time.

An obvious question is then what happens to our setup if at least part of these ex ante costs can be paid at a later stage, after the pretrial negotiation has taken place. The answer is that, provided at least part of these

8. Although Table 1 is reminiscent of a normal-form game, it is not one since the choices are made sequentially in a way to be specified below.

costs cannot be postponed, the qualitative nature of our results is unaffected. We return to this issue in Section 6.2.

3.2. Timeline

The timeline of decisions is represented in Figure 1.[9] In addition to what we discussed in Section 3.1, here we see that the parties have the chance to pay the pretrial negotiating costs sequentially (with $\mathcal{D}$ choosing first) and that $\mathcal{P}$ has the opportunity to drop the suit at every stage. Importantly, we now also introduce an initial node where $\mathcal{P}$ decides whether to file a suit against $\mathcal{D}$.

At time $t = 0$, plaintiff $\mathcal{P}$ decides whether to sue defendant $\mathcal{D}$. If $\mathcal{P}$ decides not to file suit, the game ends and all parties have their outside option normalized to 0. If instead $\mathcal{P}$ decides to sue $\mathcal{D}$, the game moves to the following period, $t = 1$.

At $t = 1$, $\mathcal{D}$ decides whether to pay the pretrial negotiating cost $c_{\mathrm{A}}^{\mathcal{D}}$ discussed in Section 3.1.[10] If $\mathcal{D}$ decides to pay, the game moves to $t = 2$. If $\mathcal{D}$ decides instead not to pay, the move goes to $\mathcal{P}$, who decides whether to drop the suit. If $\mathcal{P}$ drops the suit, both $\mathcal{P}$ and $\mathcal{D}$ earn a payoff of 0.[11]

If $\mathcal{P}$ does not drop the suit, the dispute is litigated. In that case, as discussed above, the payoffs for $\mathcal{P}$ and $\mathcal{D}$ are $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}}$ and $-\mathcal{I} - c_{\mathrm{T}}^{\mathcal{D}}$, respectively. At $t = 2$, it is $\mathcal{P}$ who decides whether to pay his pretrial negotiating cost $c_{\mathrm{A}}^{\mathcal{P}}$. If $\mathcal{P}$ decides to pay, a pretrial bargaining negotiation becomes feasible, and the game moves to $t = 3$. In symmetry with the previous node, if $\mathcal{P}$ decides not to pay, he then has the chance to drop the suit. If the suit is dropped, $\mathcal{P}$ ends up with a payoff of 0, while $\mathcal{D}$ earns a payoff of $-c_{\mathrm{A}}^{\mathcal{D}}$. If $\mathcal{P}$ does not drop the suit, the dispute is tried in court. Then the payoffs for $\mathcal{P}$ and $\mathcal{D}$ are $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}}$ and $-\mathcal{I} - c_{\mathrm{A}}^{\mathcal{D}} - c_{\mathrm{T}}^{\mathcal{D}}$, respectively.

9. The tree in Figure 1 is not an extensive-form game in the ordinary sense of the term. The reason is that at the top right node, we generalize Nash bargaining taking place. This is depicted as both players taking action at that point, which is clearly not admissible in a standard extensive-form game. For added emphasis, the lines following the node are dotted rather than solid.

10. The choice of giving $\mathcal{D}$ (as opposed to $\mathcal{P}$) the choice to pay the pretrial negotiation cost first is inessential. The fact that the choices of whether to pay these costs are sequential (as opposed to simultaneous) is not. In particular, it simplifies the analysis by avoiding the emergence of a possible coordination failure equilibrium in which neither party pays simply because it expects the other side not to pay (Anderlini and Felli 2006).

11. If $\mathcal{P}$ were to incur a positive cost to drop the suit, there would be no qualitative changes in our results.

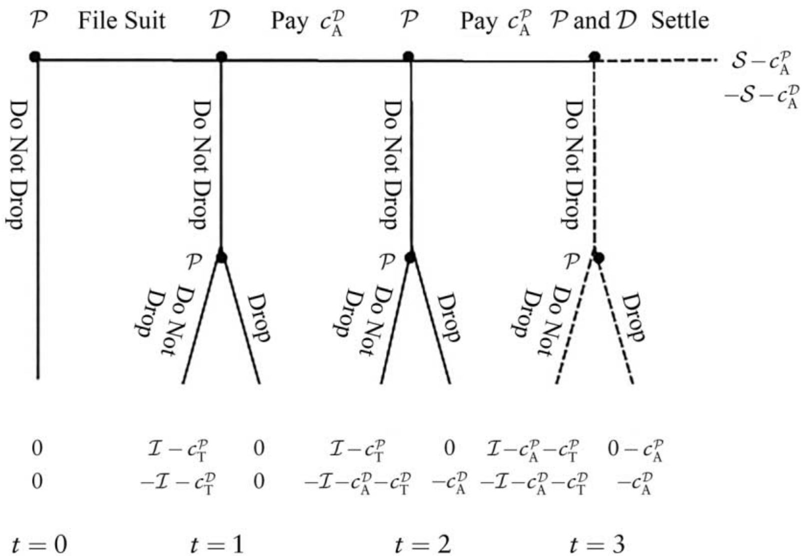

Figure 1. Timeline of decisions

3.3. Generalized Nash Bargaining and the Disagreement Payoffs

If $\mathcal{P}$ files a suit against $\mathcal{D}$ and both parties pay their pretrial negotiating costs, a pretrial bargaining negotiation becomes feasible. The game moves to $t = 3$ and the top right-most node in Figure 1. To conclude the description of the model, we need to flesh out what happens following this node.

The parties bargain over the surplus created by avoiding a costly trial, namely, $c_T = c_T^{\mathcal{P}} + c_T^{\mathcal{D}}$. Notice that all of c_T is available in the generalized Nash bargaining, since $c_A^{\mathcal{P}}$ and $c_A^{\mathcal{D}}$ are sunk by the time the bargaining takes place.

The dotted lines descending from the top right-most node in Figure 1 should be interpreted as follows. As the time to strike a deal approaches, the process can in principle break down, and the parties will obtain their disagreement payoffs.[12] However, should the Nash bargaining veer toward the disagreement, $\mathcal{P}$ always retains the option of dropping the suit.

12. It should be noted that in a generalized Nash bargaining situation the possibility of disagreement is purely counterfactual, provided that an agreement yields positive surplus relative to the disagreement point. In our case, the fact that the surplus from an agreement is positive is guaranteed by assumption 1. The distinction between Nash disagreement and extensive-form outside options has been scrutinized before in considerable detail within contract theory. See, for instance, de Meza and Lockwood (1998).

If $\mathcal{P}$ decides not to drop the suit, it will be litigated, and the disagreement payoffs for $\mathcal{P}$ and $\mathcal{D}$ will therefore be $\mathcal{I} - c_{\mathrm{A}}^{\mathcal{P}} - c_{\mathrm{T}}^{\mathcal{P}}$ and $-\mathcal{I} - c_{\mathrm{A}}^{\mathcal{D}} - c_{\mathrm{T}}^{\mathcal{D}}$, respectively. If instead $\mathcal{P}$ drops the suit, there will be no transfer between the parties. Given the costs already incurred, in this case the disagreement payoffs for $\mathcal{P}$ and $\mathcal{D}$ will therefore be $-c_{\mathrm{A}}^{\mathcal{P}}$ and $-c_{\mathrm{A}}^{\mathcal{D}}$, respectively.

Should the generalized Nash bargaining break down, $\mathcal{P}$ will not drop the suit and will go to court if and only if[13]

$$\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} > 0. \tag{1}$$

As we show in the Appendix (Section A1 and in particular remark A1), this means that, contingent on reaching the top right-most node in Figure 1, the parties' dispute will be settled out of court with $\mathcal{S}$ determined as follows. If expression (1) is satisfied, then

$$\mathcal{S} = \mathcal{I} + \beta c_{\mathrm{T}}^{\mathcal{D}} - (1-\beta) c_{\mathrm{T}}^{\mathcal{P}}. \tag{2}$$

If, on the other hand, expression (1) is violated, then $\mathcal{S} = 0$.

4. CHARACTERIZATION

4.1. The Decision to Settle

As we note in some detail in the Appendix (Section A3), expression (1) is a necessary condition for $\mathcal{P}$ to file a suit against $\mathcal{D}$. Assume then that expression (1) is in fact satisfied. A settlement out of court is feasible if and only if the parties reach the top right-most node in Figure 1, which means that $\mathcal{P}$ did file a suit and that subsequently $\mathcal{D}$ and $\mathcal{P}$ paid their ex ante pretrial negotiating costs.

In effect, settlement out of court means that the parties split the total surplus c_{T} generated by the fact that court costs are not incurred according to their bargaining powers β and $1 - \beta$ (see remark A3 in the Appendix). This is convenient for both $\mathcal{P}$ and $\mathcal{D}$ if and only if

$$\beta c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{P}} \quad \text{and} \quad (1-\beta) c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{D}}. \tag{3}$$

Notice that the set of inequalities (3) says precisely that the gain from not

13. We assume that when $\mathcal{P}$ is indifferent, he chooses not to go to court. This is completely inessential, but somehow it seems the natural route to follow.

going to court should be no less than the ex ante cost of a pretrial agreement for both $\mathcal{P}$ and $\mathcal{D}$.[14]

We conclude our characterization of the decision to settle out of court by noticing that if either of the two inequalities is violated, then the suit will not be settled and will not be dropped. It will be adjudicated in court because $\mathcal{P}$ will not drop it at any stage since expression (1) is satisfied.

4.2. The Decision to File Suit

We have seen that if expression (1) is violated, then $\mathcal{P}$ will not file a lawsuit against $\mathcal{D}$. Suppose next that expression (1) holds. Then it is necessary to consider two further possibilities. The first is that the set of inequalities (3) is violated, and hence if a suit is filed it will be tried in court, while the second is that the set of inequalities (3) holds, and hence if a suit is filed it will be settled out of court.

Clearly if expression (1) holds and the set of inequalities (3) is violated, then expression (1) is the only relevant condition. Hence, in that case $\mathcal{P}$ will file suit if and only if expression (1) holds, and the case will be litigated in court. If expression (1) holds and the set of inequalities (3) holds, then $\mathcal{P}$ will file suit if and only if

$$\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} + \beta c_{\mathrm{T}} - c_{\mathrm{A}}^{\mathcal{P}} > 0, \qquad (4)$$

in which case the suit will be settled out of court (see remark A4 in the Appendix).

Hence, in our complete-information model a suit may be filed for two distinct reasons: because $\mathcal{P}$ expects that it will be settled out of court or because $\mathcal{P}$ expects that it will, in fact, go to trial. Thus, the decision to file suit is the result both of the direct comparison of court costs and expected damages $\mathcal{I}$ and of the conditions that determine whether the suit will go to trial or be settled out of court.

4.3. Main Characterization

Combining our findings of Sections 4.1 and 4.2, we have a full characterization of the equilibria of our model. We state the following result without any further proof since it is obtained simply by collecting our findings so far.

14. In the spirit of what we assumed about filing suit and going to court (see note 13), we assume that when either party is indifferent between paying and not paying the pretrial negotiating cost, they will choose to pay it. As before, this is completely inessential.

Proposition 1: Main Characterization. As the parameters vary, three equilibrium outcomes are possible in our model:

N = plaintiff $\mathcal{P}$ does not file a suit against $\mathcal{D}$, and the game terminates immediately;

C = plaintiff $\mathcal{P}$ files a suit against $\mathcal{D}$, and the case is litigated; and

S = plaintiff $\mathcal{P}$ files a suit against $\mathcal{D}$, and the case is settled out of court.

Case N obtains if expression (1) either does not hold or holds, the set of inequalities (3) holds, and expression (4) is violated. Case C obtains if expression (1) holds and the set of inequalities (3) is violated. Case S obtains if expression (1) holds, the set of inequalities (3) holds, and expression (4) holds.[15]

5. TRIAL COSTS AND FEE-SHIFTING RULES

The trial costs $c_{\mathrm{T}}^{\mathcal{P}}$ and $c_{\mathrm{T}}^{\mathcal{D}}$ play a critical role in our model. Together with expected damages $\mathcal{I}$, they determine the disagreement point of the bargaining problem that identifies settlement $\mathcal{S}$. As shown above, they also motivate the parties to reach a pretrial agreement via assumption 1.

Below we consider four main rules for allocating trial costs. These are well known in the legal literature (Katz and Sanchirico 2012), and of course many nuanced versions and hybrids of these four basic rules can be constructed and are in fact observed in different legal systems around the world.

We introduce new notation to denote the raw trial costs (mainly attorneys' fees, but other court costs too where appropriate) that naturally burden $\mathcal{P}$ and $\mathcal{D}$—let these be $\hat{c}_{\mathrm{T}}^{\mathcal{P}}$ and $\hat{c}_{\mathrm{T}}^{\mathcal{D}}$, respectively, and note that necessarily $c_{\mathrm{T}} = \hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}$. Therefore, under a rule (in fact one of the four we explicitly consider below) that stipulates that each party pays its own trial costs, the trial costs we used so far would be $c_{\mathrm{T}}^{\mathcal{P}} = \hat{c}_{\mathrm{T}}^{\mathcal{P}}$ and $c_{\mathrm{T}}^{\mathcal{D}} = \hat{c}_{\mathrm{T}}^{\mathcal{D}}$. Under a putative rule that stipulates that the plaintiff always pays all trial costs, we would have $c_{\mathrm{T}}^{\mathcal{P}} = \hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}$ and $c_{\mathrm{T}}^{\mathcal{D}} = 0$, and so on.

In general, a fee-shifting rule Φ is a map that takes as inputs the raw costs $\hat{c}_{\mathrm{T}}^{\mathcal{P}}$ and $\hat{c}_{\mathrm{T}}^{\mathcal{D}}$ and returns a pair of actual trial costs to be paid by each side with the obvious restriction that all costs must be paid by one side

15. The conditions listed are exhaustive of all combinations of expression (1), the set of inequalities (3), and expression (4) holding or being violated. Hence, the statement of proposition 1 is exhaustive of all possibilities.

or the other so that $\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}} = c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}} = c_{\mathrm{T}}$.[16] As mentioned above, the four polar cases for Φ that we consider are the English rule, the American rule, and two further cases that we refer to as the plaintiff-biased rule and the defendant-biased rule.[17] As made clear in Section 6.4, our results regarding the irrelevance of fee shifting apply to all possible arrangements, not just to these four canonical cases.

Under the American rule, denoted Φ^{US}, each side pays its own costs regardless of the court's decision. In this case, we have $c_{\mathrm{T}}^{\mathcal{P}} = \hat{c}_{\mathrm{T}}^{\mathcal{P}}$ and $c_{\mathrm{T}}^{\mathcal{D}} = \hat{c}_{\mathrm{T}}^{\mathcal{D}}$, and, using equation (2), the settlement is[18]

$$\mathcal{S}(\Phi^{\mathrm{US}}) = \mathcal{I} + \beta\hat{c}_{\mathrm{T}}^{\mathcal{D}} - (1-\beta)\hat{c}_{\mathrm{T}}^{\mathcal{P}}. \tag{5}$$

Under the English rule, denoted Φ^{UK}, the loser pays the costs of both sides. In this case, we have $c_{\mathrm{T}}^{\mathcal{P}} = (1-p)(\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}) = (1-p)c_{\mathrm{T}}$ and $c_{\mathrm{T}}^{\mathcal{D}} = p(\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}) = pc_{\mathrm{T}}$, and, using equation (2), the settlement is

$$\mathcal{S}(\Phi^{\mathrm{UK}}) = \mathcal{I} + \beta p c_{\mathrm{T}} - (1-\beta)(1-p)c_{\mathrm{T}}. \tag{6}$$

Under the plaintiff-biased rule, denoted $\Phi^{\mathcal{P}}$, the plaintiff pays $\hat{c}_{\mathrm{T}}^{\mathcal{P}}$ if he loses and pays nothing otherwise. In this case, we have $c_{\mathrm{T}}^{\mathcal{P}} = (1-p)\hat{c}_{\mathrm{T}}^{\mathcal{P}}$ and $c_{\mathrm{T}}^{\mathcal{D}} = p\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}$, and, using equation (2), the settlement is

$$\mathcal{S}(\Phi^{\mathcal{P}}) = \mathcal{I} + \beta(p\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}) - (1-\beta)(1-p)\hat{c}_{\mathrm{T}}^{\mathcal{P}}. \tag{7}$$

Under the defendant-biased rule, denoted $\Phi^{\mathcal{D}}$, the defendant pays $\hat{c}_{\mathrm{T}}^{\mathcal{D}}$ if he loses and pays nothing otherwise. In this case, we have $c_{\mathrm{T}}^{\mathcal{P}} = \hat{c}_{\mathrm{T}}^{\mathcal{P}} + (1-p)\hat{c}_{\mathrm{T}}^{\mathcal{D}}$ and $c_{T}^{\mathcal{D}} = p\hat{c}_{T}^{\mathcal{D}}$, and, using equation (2), the settlement is

$$\mathcal{S}(\Phi^{\mathcal{D}}) = \mathcal{I} + \beta p\hat{c}_{\mathrm{T}}^{\mathcal{D}} - (1-\beta)[\hat{c}_{\mathrm{T}}^{\mathcal{P}} + (1-p)\hat{c}_{\mathrm{T}}^{\mathcal{D}}]. \tag{8}$$

6. IMPLICATIONS

In this section we examine more closely the implications of proposition 1 as the raw parameters and the fee-shifting rule change. We seek a set of statements of the type "as this change occurs in the raw parameters or in

16. We also take all four costs $\hat{c}_{\mathrm{T}}^{\mathcal{P}}$, $\hat{c}_{\mathrm{T}}^{\mathcal{D}}$, $c_{\mathrm{T}}^{\mathcal{P}}$, and $c_{\mathrm{T}}^{\mathcal{D}}$ to be nonnegative.

17. The dominant terminology to distinguish between what we refer to as plaintiff biased and defendant biased is one-way fee shifting between the two parties. We use the shorthand term since it seems efficient in our context.

18. In calculating settlement $\mathcal{S}$ for any given rule, we assume that expression (1) holds and hence that $\mathcal{S}$ is given by equation (2). This is because, as we saw in proposition 1, if expression (1) is violated, then $\mathcal{P}$ does not file against $\mathcal{D}$, and the game terminates immediately.

the fee-shifting rule (or both), this outcome becomes more or less likely or remains equally likely."

It should be noted that the word "likely" in these statements has a specific meaning that, while common, does not directly map onto standard probabilities. If we say that a particular equilibrium outcome $\mathbf{X} \in \{\mathrm{N, C, S}\}$ becomes more (less) likely as a result of a certain parameter(s) (say) increasing, we mean that the set of (other) raw parameters under which the outcome **X** obtains before the change is a subset (superset) of the one that yields outcome **X** after the change. If the set is the same before and after the change, we say that the likelihood of **X** has not changed.[19]

6.1. Filing Suit

What are the implications of proposition 1 for the number of legal disputes in society as measured by the frequency of lawsuits that are filed? How does the likelihood of outcome C or S change as the raw costs and the fee-shifting rule Φ vary?

For the sake of clarity, we divide our claims into those that concern the effects of a change in the parameters and those that concern the effects of the fee-shifting rule Φ for given raw costs. All our assertions in this section are stated without proof since they are a direct consequence of proposition 1 and of the relevant inequalities (1), (3), and (4).[20]

Proposition 2: Legal Disputes and Expected Damages. Legal disputes become more likely as the size of expected damages $\mathcal{I}$ increases. This is so both for lawsuits that are initiated with a view to end up in court (outcome C) and for those that are initiated with a view to settle out of court (outcome S).

While proposition 2 is straightforward, it is worth noticing that the effect of an increase in $\mathcal{I}$ on the likelihood of lawsuits that are initiated with a view to settle out of court (outcome S) is due to the effect of the increase in $\mathcal{I}$ on the settlement size $\mathcal{S}$ via equation (2).

Proposition 3: Legal Disputes, Trial and Pretrial Costs, and Bargaining Power. Legal disputes become less likely as the plaintiff's trial costs $c_{\mathrm{T}}^{\mathcal{P}}$ increase and as his pretrial costs $c_{\mathrm{A}}^{\mathcal{P}}$ increase. Legal disputes become more

19. This way of proceeding is consistent with placing a prior distribution with full support on the set of possible parameters and then drawing a configuration of parameters (a particular case) at random, all while remaining agnostic about the precise distribution governing the draw.

20. Expression (4) can be rewritten as $\mathcal{I} - (1-\beta)c_{\mathrm{T}}^{\mathcal{P}} + \beta c_{\mathrm{T}}^{\mathcal{D}} - c_{\mathrm{A}}^{\mathcal{P}} - c_{\mathrm{A}}^{\mathcal{D}} > 0$.

likely as the defendant's trial costs $c_{\mathrm{T}}^{\mathcal{D}}$ increase. Finally, legal disputes become more likely as the plaintiff's bargaining power β increases.

Proposition 3 is again straightforward. It should be clarified that while in proposition 2 we could be explicit about both types of lawsuits (both outcome C and outcome S), this is no longer possible for the parameter changes hypothesized in proposition 3.[21] This is because the terms $c_{\mathrm{T}}^{\mathcal{P}}$, $c_{\mathrm{A}}^{\mathcal{P}}$, $c_{\mathrm{T}}^{\mathcal{D}}$, and β also appear in the set of inequalities (3), and the hypothesized changes could determine a switch from a case being settled out of court to being litigated.[22] A change in the fee-shifting rule leaves $c_{\mathrm{T}} = c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}}$ unchanged and hence does not affect the set of inequalities (3).[23] It follows that we can be specific, once again, about outcome C and outcome S in the case of a change in Φ.

Proposition 4: Legal Disputes and Fee-Shifting Rules. Let a set of raw costs be given and consider a change in the fee-shifting rule from, say, Φ' to Φ''. Suppose that under Φ'' we have that $c_{\mathrm{T}}^{\mathcal{P}}$ is lower than under Φ'. Then the change from Φ' to Φ'' increases the likelihood of legal disputes. This is so both for lawsuits that are initiated with a view to proceed to litigation (outcome C) and for those that are initiated with a view to settle out of court (outcome S).

Going back to the four polar cases we introduced in Section 5, using equations (5), (6), (7), and (8), we easily see the following two corollaries of proposition 4.

Corollary 1: Legal Disputes: Plaintiff-Biased, American, and Defendant-Biased Rules. The likelihood of legal disputes of both types (outcome C and outcome S) decreases as we switch from a plaintiff-biased rule $\Phi^{\mathcal{P}}$ to the American rule Φ^{US} or to the defendant-biased rule $\Phi^{\mathcal{D}}$.

A direct comparison of the English rule Φ^{UK} and the American rule Φ^{US} is more nuanced.

Corollary 2: Legal Disputes: American and English Rules. Recall that $c_{\mathrm{T}}^{\mathcal{P}}$ is equal to $\hat{c}_{\mathrm{T}}^{\mathcal{P}}$ under the American rule and to $(1-p)(\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}})$ under the English rule. Legal disputes of both types (outcome C and

21. The claims in proposition 3 refer to the shrinkage or expansion of the union of the sets of parameters giving rise to outcomes C and S.

22. The set of inequalities (3) can be rewritten as $\beta(c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}}) = \beta c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{P}}$ and $(1-\beta)(c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}}) = (1-\beta)c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{D}}$.

23. This observation is key to our analysis in Section 6.4.

outcome S) are more likely under Φ^{UK} than they are under Φ^{US} if $\hat{c}_{\mathrm{T}}^{\mathcal{P}} > (1-p)(\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}) = (1-p)c_{\mathrm{T}}$.

If we hypothesize (Shavell 1982) that low trial costs c_{T} are typically a sign of small claims, we conclude that the English rule works to encourage lawsuits by plaintiffs with relatively small claims but relatively high probabilities of victory p. Conversely, the American rule, since the litigation costs do not depend on p, encourages plaintiffs with possibly lower p. This brings our comparison of Φ^{UK} and Φ^{US} in line with that of Shavell (1982). We conclude by noting that an ingredient that is potentially important but is absent from our setup is that when lawsuits are discouraged by plaintiffs' costs, this may have an adverse effect on the potential defendants' incentives to comply with the law in the first place (Shavell 1982).

6.2. Going to Trial versus Settling and Mismatched Bargaining Power

One of the main findings of this paper is that even in a world of complete and perfect information, there are circumstances in which rational parties to a legal dispute will litigate even though it is costly and hence wasteful. Going to court (assumption 1) is more expensive than settling out of court.

As we pointed out above, going to court is a failure of the Coase theorem (Coase 1960). There we also mentioned that this failure is generated by a mismatch between the distribution of the parties' bargaining power and the distribution of the ex ante costs that must be paid for the pretrial negotiation to become feasible. This mismatch creates a version of the holdup problem. This prevents one of the parties from paying its ex ante cost and hence leaves litigation as the only way to end the legal dispute. Using proposition 1, we now substantiate in detail our claim that going to court is generated by the mismatch we described.

From proposition 1 we know that $\mathcal{P}$ will file against $\mathcal{D}$ and the dispute will be litigated if and only if the set of inequalities (3) is violated and expression (1) holds. Purely for the sake of convenience, we restate the former conditions here:[24]

$$\beta(c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}}) = \beta c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{P}} \quad \text{and} \quad (1-\beta)(c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}}) = (1-\beta)c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{D}}. \quad (3')$$

If the first inequality is violated, then $\mathcal{P}$ will find it profitable to deviate unilaterally from paying the ex ante cost $c_{\mathrm{A}}^{\mathcal{P}}$ that makes the pretrial agreement negotiation possible. If the second inequality is violated, then

24. See note 22.

$\mathcal{D}$ will find it profitable to deviate unilaterally from paying the ex ante cost $c_A^{\mathcal{D}}$ that makes the pretrial agreement negotiation possible.

Because of assumption 1, the set of inequalities (3) cannot be violated at once. However, it is also clear that for any fixed quadruple of costs $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ satisfying assumption 1, there exist values of $\beta \in (0, 1)$ such that set of inequalities (3) is violated. Indeed, by simple inspection it is clear that, for any given $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ satisfying assumption 1, we can find a (low) range of values of $\beta \in (0, 1)$ such that the first inequality in the set of inequalities (3) is violated. Alternatively, we can find a (high) range of values of $\beta \in (0, 1)$ such that the second inequality in inequalities (3) is violated. Similarly, if we fix a value of $\beta \in (0, 1)$, it is always possible to find a quadruple of costs $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ satisfying assumption 1 such that the set of inequalities (3) is violated.[25] Since expression (1) can be satisfied for any quadruple of costs $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ by taking $\mathcal{I}$ to be sufficiently large, we can state proposition 5 without further proof.

Proposition 5: Trials and the Mismatch of β and Ex Ante Costs. Suppose that expression (1) is satisfied. The parties will not sign a pretrial agreement and hence go to trial whenever either one of the inequalities in set of inequalities (3) is violated. It follows that, for any fixed quadruple of costs $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ satisfying assumption 1, there exist values of $\beta \in (0, 1)$ such that a pretrial agreement will not be signed, and the parties will go to trial. Finally, for any given value of $\beta \in (0, 1)$, there exists a vector of costs $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ satisfying assumption 1 such that a pretrial agreement will not be signed, and the parties will go to trial.

By the time the plaintiff and defendant reach the negotiation table for the pretrial agreement, they already have paid (sunk) the costs needed to prepare for such a negotiation. Therefore, such costs are effectively off the table: neither party has any incentive to compensate the other party for paying these ex ante costs since by that time the costs have already been paid. It is then possible to envisage a range of situations in which one of the two parties will be able to guarantee himself a share of the surplus that is on the pretrial negotiation table that does not cover the preliminary costs needed to participate in the negotiation. This may be because either the party does not have enough bargaining power in the pretrial negotiation or the ex ante costs are too high. In both cases, the

25. Again, by simple inspection, for any $\beta \in (0, 1)$ we can find a quadruple of costs $(c_A^{\mathcal{P}}, c_A^{\mathcal{D}}, c_T^{\mathcal{P}}, c_T^{\mathcal{D}})$ satisfying assumption 1 such that the first inequality in inequalities (3) is violated as well as one that ensures that the second inequality is violated.

result is that the parties will not settle out of court, and the trial will take place.

If the parties can shift some of the ex ante costs to a later stage, after the pretrial negotiation, the negotiation will take the ex post costs into account when deciding the settlement, and hence the likelihood of a settlement will increase. However, it seems uncontroversial that at least some of these costs cannot be reasonably shifted to a later stage. This is clearly true in the case of cognitive or opportunity costs associated with the time necessary to prepare for the settlement negotiation. Clearly some of these costs can be monetized by hiring an expert or a lawyer, but, provided the costs need to be paid independently of the outcome, the result is unchanged. If anything, agency problems might lead to an increase in the ex ante costs and hence in the likelihood of going to trial.

It is legitimate at this point to ask what would happen if the pretrial agreement ex ante costs are productive, as in Hubbard (2015), where the parties can choose to sink part of the trial costs at an ex ante stage. In this sense, the ex ante costs are productive, as they carry a (one-for-one) reduction in trial costs. In our model one could imagine transforming some or all of the trial costs into pretrial agreement ex ante costs. These are preparation costs (for example, evidence collection) that help both during a pretrial negotiation and at the trial stage.

Reducing trial costs and correspondingly increasing the pretrial agreement costs in our model has a twofold effect.[26] It increases the likelihood that a suit is filed, and it increases the likelihood that a suit goes to trial as opposed to being settled out of court. While the sign of these effects is intuitive in both cases since trials are less expensive, it is worth remarking that the greater likelihood of trial versus settlement has two sources. The set of inequalities (3) is harder to satisfy both because the trial costs decrease and because the pretrial negotiation ex ante costs increase. Trials are cheaper, and the negotiations that lead to pretrial agreements are harder.

6.3. Class Actions

While systematic evidence of the effect of the mismatch between bargaining powers and pretrial agreement costs may be difficult to compile, the available evidence on class actions in the United Sates in our view is extremely suggestive in support of the qualitative behavior of our model.

26. Our claims here are immediate from proposition 1, and we omit further details.

When a class action is certified, the bargaining power of the plaintiffs is greatly enhanced against what is usually a powerful firm that would otherwise easily overwhelm individual plaintiffs. After this takes place, the judicial paths "invariably lead to class settlements" (Willging and Lee 2010, p. 782; see also Morabito and Caruana 2013; Grimaldi 2017). Just as our model predicts, the implicit shift in bargaining power leads to an increase (considerable in this case) in the likelihood that the case will be settled before a full trial takes place.

In the United States, certification of a class action in accordance with rule 23 of the Federal Rules of Civil Procedure of course significantly increases the settlement costs for the plaintiff's side. It should, however, be noted that our model allows for the change in bargaining power in favor of the plaintiff to overwhelm the increase in settlement costs so as to generate what is observed in practice—namely, that class actions are almost invariably settled out of court. To make this point more explicit, it is useful to go back to our numerical example in Section 2. There, an increase in bargaining power for $\mathcal{P}$ from $\beta = 1/10$ to $\beta = 1/2$ resulted in a case that is tried (when $\beta = 1/10$) to a case that is settled out of court (when $\beta = 1/2$). A quick reexamination of the numerical values shows that if we increase β to 1/2 and at the same time increase $c_{\mathrm{A}}^{\mathcal{P}}$ from 10 to 19, we still obtain a case that is settled out of court.[27]

To close our consideration of class actions, we notice that there is a copious literature (see, for instance, Fitzpatrick [2010] and the references therein) on the fact that the class members reap scant rewards from class action suits, while their lawyers take the lion's share of the proceeds. This is not our focus here, as it pertains to an analysis of the relative bargaining powers of class members and their legal representatives. A richer model of this interaction is needed to shed more light on this issue. What matters for our purposes is that the bargaining power of the plaintiff side (class members and their lawyers) is enhanced by the class action certification.

6.4. Changes in Fee-Shifting Rules and Likelihood of Trial

As we saw in proposition 4, for given raw parameters, a change in the fee-shifting rule Φ determines a change in the likelihood of legal disputes.

27. With the numbers in Section 2, when $\beta = 1/2$ and $c_{\mathrm{A}}^{\mathcal{P}} = 10$, the payoff to $\mathcal{P}$ from settling out of court is 90, while if he defects and forces a trial he obtains a payoff of 80. When $\beta = 1/2$ and $c_{\mathrm{A}}^{\mathcal{P}} = 19$, the payoff to $\mathcal{P}$ from settling out of court is 81, while if he defects and forces a trial he obtains a payoff of 80.

In essence, any change in Φ that decreases the plaintiff's court costs increases the likelihood of legal disputes—both those that are settled before trial (outcome S) and those that are tried in court (outcome C).

On the other hand, as noted above, a change in the fee-shifting rule leaves $c_{\mathrm{T}} = c_{\mathrm{T}}^{\mathcal{P}} + c_{\mathrm{T}}^{\mathcal{D}} = \hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}$ unchanged and hence does not affect the set of inequalities (3). This observation suggests that there should be a sense in which fee shifting is irrelevant in determining whether a given lawsuit will be settled out of court or litigated. This is in fact true in our setup, provided we are careful enough in making the claim precise and taking into account that we are making it for a given lawsuit. In other words, we need to filter out of the irrelevance claim the effect that a change in the fee-shifting rule may have in the plaintiff's decision to file a suit or not. To ease the exposition and keep the notation simple, we proceed with an informal statement that is made precise in the Appendix (see Section A6 and in particular proposition A1, which is a formal restatement of proposition 6).

Proposition 6: Irrelevance of Fee Shifting. Conditional on the parameters of the model being such that $\mathcal{P}$ wants to file a suit against $\mathcal{D}$, a change in the fee-shifting rule cannot possibly determine a switch of any given case from being settled out of court to being tried in court or vice versa.

In our complete-information setup, conditional on $\mathcal{P}$ filing against $\mathcal{D}$, fee shifting is irrelevant. Conditional on the plaintiff filing a suit, the likelihood of going to trial is the same; however, the trial costs are apportioned between $\mathcal{P}$ and $\mathcal{D}$.

As noted above, proposition 6 is driven by the set of inequalities (3) that identifies under which condition either party will pay the ex ante costs and a settlement will be reached out of court. Indeed, the set of inequalities (3) implies that while the likelihood of ending up in court does depend on the distribution of the parties' bargaining power in the settlement negotiation, β, and on the distribution of their ex ante costs $c_{\mathrm{A}}^{\mathcal{P}}$ and $c_{\mathrm{A}}^{\mathcal{D}}$, this likelihood depends only on the total amount of trial costs c_{T} and hence is independent of the distribution of such costs.

By the time a pretrial negotiation is reached, the ex ante costs $c_{\mathrm{A}}^{\mathcal{P}}$, $c_{\mathrm{A}}^{\mathcal{D}}$ are sunk. Therefore, the outcome of the negotiation does not depend on the costs. The negotiation of a pretrial agreement simply divides the surplus generated by avoiding a costly trial (see assumption 1)—namely, c_{T}—between $\mathcal{P}$ and $\mathcal{D}$ according to their respective bargaining powers β

and $1 - \beta$. The set of conditions (3) requires that, out of the bargaining, both $\mathcal{P}$ and $\mathcal{D}$ receive a share of the surplus that covers their ex ante costs $c_A^{\mathcal{P}}$ and $c_A^{\mathcal{D}}$.

This is a natural point to remark that our results imply that if courts were to try to affect the decision to settle versus going to trial by adopting a fee-shifting rule that somehow takes the pretrial negotiation ex ante costs into account, they would not succeed. For instance, say that the plaintiff, as a rule, was forced to pay back the defendant's pretrial agreement ex ante costs $c_A^{\mathcal{D}}$; clearly, in this case the total trial cost c_T is unchanged since this is a pure transfer from $\mathcal{P}$ to $\mathcal{D}$. Hence, as with any other fee-shifting rule, while the likelihood of filing suit changes, conditional on a suit being filed the likelihood of a settlement versus a trial is unchanged. In terms of the four polar cases laid out in Section 5, proposition 6 obviously implies the following:

Corollary 3: Equivalence of American, English, Plaintiff-Biased, and Defendant-Biased Rules. Any switch between the American, English, plaintiff-biased, and defendant-biased fee-shifting rules defined in Section 5 is irrelevant in the sense of proposition 6. Conditional on the plaintiff filing a suit regardless of the switch, the likelihood of going to trial or settling out of court is unaffected by the change in fee-shifting rule.

While in the pretrial negotiation literature the irrelevance of fee-shifting rules is associated with some version of the Coase theorem (Donohue 1991b), in our setting the irrelevance of fee shifting holds exactly when the Coase theorem fails—in our setup the parties go to court when the Coase theorem fails because of the presence of ex ante costs. As mentioned above, one could of course ask whether an advanced agreement between the parties about how to distribute their ex ante costs may prevent them from going to trial. The answer is that if this preliminary negotiation is itself associated with some ex ante costs, there will still exist circumstances in which the parties will end up in court.[28]

We conclude this section by returning to the fact that our fee-shifting irrelevance result is conditional on suits being filed. In reality, we observe only suits that have been filed, and conditional on those suits being filed,

28. In the context of a bargaining model in which ex ante costs are associated with bargaining parties' decision to participate in the negotiation and hence the Coase theorem fails, Anderlini and Felli (2006) show that adding a preliminary stage in which parties negotiate over whether future bargaining costs will be paid does not necessarily restore the Coase theorem. As in the pretrial settlement context, the key to this result is the fact that the preliminary negotiation stage may itself be associated with ex ante costs.

we can distinguish if they end up in trial or in settlement. Therefore, in principle our result for the irrelevance of fee shifting can and has been tested. However, the evidence is sparse, and our reading of the literature is that the extant empirical studies do not reach consensus on the effects of fee shifting on the probability of settlement out of court. We refer the reader to Katz and Sanchirico (2012) for a survey.

6.5. Relevance of Fee Shifting for Settlement Size

Except for its possible effect on $\mathcal{P}$ filing against $\mathcal{D}$, the fee-shifting rule is irrelevant in determining whether the equilibrium outcome is C or S. It follows that it must be relevant for settlement size. To see this, consider for instance a case $\hat{\Omega}$ and fee-shifting rule that induce an outcome of S. Suppose for concreteness that the fee-shifting rule is $\Phi^{\mathcal{D}}$, the defendant-biased rule. Proposition 4 tells us that the outcome will still be S if we change the fee-shifting rule to be $\Phi^{\mathcal{P}}$, the plaintiff-biased rule.

Under $\Phi^{\mathcal{D}}$, the defendant's court costs $c_{\mathrm{T}}^{\mathcal{D}}$ are considerably lower than under $\Phi^{\mathcal{P}}$.[29] However, since the equilibrium outcome is S under both fee-shifting rules, it must be that $\mathcal{D}$ prefers to pay the ex ante cost and settle over going to court before and after the increase in $c_{\mathrm{T}}^{\mathcal{D}}$. It therefore must be the case that the change in fee-shifting rule implies a compensating change in settlement size. The logic of the above example generalizes. The following is a direct consequence of equations (5), (6), (7), and (8), and hence it is stated without proof.

Proposition 7: Settlement Size. The settlement is always greater under the plaintiff-biased rule than under the defendant-biased rule for any set of raw parameters of the model. In other words,

$$\mathcal{S}(\Phi^{\mathcal{P}}) > \mathcal{S}(\Phi^{\mathcal{D}})$$

for any given $\hat{\Omega}$.

The comparison between the size of the settlement under the English and American rules instead depends on (some of) the elements of $\hat{\Omega}$. In particular,

$$\mathcal{S}(\Phi^{\mathrm{UK}}) - \mathcal{S}(\Phi^{\mathrm{US}}) = p\hat{c}_{\mathrm{T}}^{\mathcal{P}} - (1-p)\hat{c}_{\mathrm{T}}^{\mathcal{D}}.$$

Hence, if p is sufficiently large or $\hat{c}_{\mathrm{T}}^{\mathcal{D}}$ is sufficiently small (or both), then the settlement under the English rule is larger than under the American rule.

29. As noted in Section 5, they are $c_{\mathrm{T}}^{\mathcal{D}} = p\hat{c}_{\mathrm{T}}^{\mathcal{D}}$ under $\Phi^{\mathcal{D}}$ and $c_{\mathrm{T}}^{\mathcal{D}} = p\hat{c}_{\mathrm{T}}^{\mathcal{P}} + \hat{c}_{\mathrm{T}}^{\mathcal{D}}$ under $\Phi^{\mathcal{P}}$.

The empirical effects of moving from the American rule to the English rule are analyzed in the existing literature on fee shifting (Katz and Sanchirico 2012). In particular, the evidence presented in Hughes and Snyder (1995) suggests that the size of the settlement is significantly higher under the English rule than under the American rule. The key issue is that there exist very few natural experiments in which the legal system moved from one fee-shifting rule to another. An exception is represented by Florida's experiment with the English rule in medical malpractice cases in the 1980s.[30] Consistent with the predictions of our analysis above, Hughes and Snyder (1995) find, using data from that experiment, that the difference in settlement size is positively correlated with the probability of the plaintiff winning in court and negatively correlated with the defendant's raw trial costs.

7. ASYMMETRIC INFORMATION

Our model postulates complete and symmetric information. Since most of the literature related to this paper uses models with asymmetric information (see Section 1.1 for references and an overview of these contributions), before concluding we think it is appropriate to summarize where our conclusions stand relative to those models.

Our conclusions go against the received wisdom that going to trial is only the result of informational asymmetries. This is not so in our setup, in which it is a failure of the Coase theorem that takes the parties to an inefficient trial. Of course, our results do not say that informational frictions cannot be responsible for on-path trials but simply that they are not necessary for them to materialize. While we do not overturn any existing results, we add a robust rationale for inefficient trials taking place.

In a somewhat similar vein, our results indicate that the effect of fee shifting is intimately related to informational frictions. In our setup, a shift in the way legal costs are apportioned is completely neutralized by the resulting change in the settlement that emerges from the Nash bargaining in which the parties engage, which anticipates the change in fees. Asymmetric information changes the picture dramatically. For instance, in Spier (1994a) a fee shift can create powerful incentives to settle or go

30. See Snyder and Hughes (1990) for a description of the Florida experiment and the associated data set.

to trial. The choice of how legal fees are apportioned can be thought as a problem of mechanism design.[31]

In Spier (1992), and more recently in Daughety and Reinganum (2011), informational asymmetries interplay with the dynamics of the model. Therefore, the issues they address differ quite substantially from the ones we address in our static model with complete and symmetric information. In Spier (1992), a deadline effect yields a U-shaped pattern of pretrial settlements, which are more likely to begin with and then again as the trial date approaches. Daughety and Reinganum (2011) instead focus on the bandwagon effect that can arise when new plaintiffs can decide to join an existing suit.

To conclude, we mention Schmitz (2016), who studies a model that is a version of Anderlini and Felli (2006) with incomplete information about surplus size. He finds that in some cases incomplete information in the presence of transaction costs might indeed facilitate an agreement between the parties. His analysis would be a good starting point to incorporate some incomplete information in our setup.

8. CONCLUSIONS

This paper identifies a reason why rational parties to a legal dispute may end up in court in spite of full information and the opportunity to reach an efficient pretrial settlement. The reason is the existence of ex ante costs associated with the pretrial negotiation and in particular the mismatch between the distribution of the ex ante costs and the parties' bargaining power in the pretrial negotiation.

The model yields two further insights. In a model with rational fully informed actors, some lawsuits will be filed even though it is fully anticipated that they will be settled out of court. These are in addition to lawsuits that will be litigated in court.

Finally, a change in fee-shifting rule may have an effect on whether a lawsuit is in fact filed. However, such a change in fee-shifting rule has no effect on whether the suit is litigated or settled beforehand.

31. Spier (1994a) solves a mechanism design problem in which the probability of settlement out of court is maximized. She then argues that the resulting mechanism resembles Fed. R. Civ. P. 68.

APPENDIX: PROOFS

A1. The Determination of $\mathcal{S}$

Given the payoffs we posited in Section 3, and contingent on the game in Figure 1 reaching the top right-most node, we can conclude that $\mathcal{S}$ will be determined by generalized Nash bargaining with disagreement payoffs for $\mathcal{P}$ and $\mathcal{D}$ given respectively by

$$d^{\mathcal{P}} = \mathcal{I} - c_{\mathrm{A}}^{\mathcal{P}} - c_{\mathrm{T}}^{\mathcal{P}} \quad \text{and} \quad d^{\mathcal{D}} = -\mathcal{I} - c_{\mathrm{A}}^{\mathcal{D}} - c_{\mathrm{T}}^{\mathcal{D}} \tag{A1}$$

if expression (1) is satisfied. If instead expression (1) is violated, the disagreement payoffs are

$$d^{\mathcal{P}} - c_{\mathrm{A}}^{\mathcal{P}} \quad \text{and} \quad d^{\mathcal{D}} = -c_{\mathrm{A}}^{\mathcal{D}}. \tag{A2}$$

According to the generalized Nash bargaining solution, for given values of $d^{\mathcal{P}}$ and $d^{\mathcal{D}}$, the settlement amount will be chosen so as to solve

$$\mathcal{S} = \arg\max_{\mathcal{S}} (\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}} - d^{\mathcal{P}})^{\beta} (-\mathcal{S} - c_{\mathrm{A}}^{\mathcal{D}} - d^{\mathcal{D}})^{1-\beta}. \tag{A3}$$

Problem (A3) is completely standard. Taking logs and differentiating, it is immediate to see that the first-order conditions imply that

$$\mathcal{S} = (1-\beta)(c_{\mathrm{A}}^{\mathcal{P}} + d^{\mathcal{P}}) - \beta(c_{\mathrm{A}}^{\mathcal{D}} + d^{\mathcal{D}}). \tag{A4}$$

Remark A1. Suppose that expression (1) is satisfied. We can then substitute the set of inequalities (A1) into expression (A4) to obtain equation (2). If instead expression (1) is not satisfied, we can substitute payoffs (A2) into expression (A4) to obtain $\mathcal{S} = 0$, as required.

A2. Formal Definition of Equilibrium

We take the tree in Figure 1 as being substituted by one in which the top right-most node is replaced by payoffs for $\mathcal{P}$ and $\mathcal{D}$ being given by $\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}}$ and $-\mathcal{S} - c_{\mathrm{A}}^{\mathcal{D}}$, respectively, with $\mathcal{S}$ as in equation (2) if expression (1) is satisfied and $\mathcal{S} = 0$ if expression (1) is violated. This is an extensive-form game in the standard sense of the term for any given set of parameters.

Definition A1. The tree in Figure 1—with the substitution mentioned above—yields an extensive-form game of complete and perfect information that, in general, for any given set of parameters, admits a unique backward-induction solution. This is what we refer to as the (subgame-perfect) equilibrium of our model (or equilibria, as the parameters vary) and what we characterize and interpret throughout the paper.

A3. Preliminary Remark

Remark A2. Suppose that expression (1) is violated. Then all payoffs to $\mathcal{P}$ aside from the one he obtains by terminating the game immediately are nonpositive. Since we assume that in case of indifference $\mathcal{P}$ chooses not to sue $\mathcal{D}$, this confirms that if expression (1) is violated, $\mathcal{P}$ will choose not to file against $\mathcal{D}$, and hence the game will terminate immediately.

Notice that the claim in remark A2 is immediate by inspection of the payoffs in Figure 1 and by noticing that if expression (1) is violated then $\mathcal{S} = 0$.

A4. The Decision to Settle

Remark A3. If expression (1) is satisfied, then provided $\mathcal{P}$ files the suit at $t = 0$, the parties pay their respective pretrial costs, and the suit is settled out of court if and only if[32]

$$\beta c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{P}} \quad \text{and} \quad (1-\beta)c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{D}}. \tag{A5}$$

Recall that since expression (1) is satisfied, $\mathcal{S}$ is as in equation (2). To see why the claim in remark A3 holds, we can then reason backward as follows.

At $t = 2$, after $\mathcal{D}$ has paid $c_{\mathrm{A}}^{\mathcal{D}}$, if $\mathcal{P}$ pays $c_{\mathrm{A}}^{\mathcal{P}}$ and proceeds to the settlement bargaining stage, he gets a payoff of $\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}}$. If he does not pay $c_{\mathrm{A}}^{\mathcal{P}}$ and chooses not to drop the suit (which is clearly what he would do because expression [1] is satisfied), the suit will be adjudicated in court, and he will get a payoff of $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}}$. Hence, he will pay $c_{\mathrm{A}}^{\mathcal{P}}$, and the suit will be settled out of court if and only if

$$\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}} \geq \mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} \Leftrightarrow \beta c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{P}}. \tag{A6}$$

Now proceeding backward to $t = 1$, again since expression (1) is satisfied, if $\mathcal{D}$ does not pay $c_{\mathrm{A}}^{\mathcal{D}}$, subsequently $\mathcal{P}$ does not drop the suit. Hence, the case proceeds to trial in court, and $\mathcal{D}$ receives a payoff of $-\mathcal{I} - c_{\mathrm{T}}^{\mathcal{D}}$.

If instead $\mathcal{D}$ pays $c_{\mathrm{A}}^{\mathcal{D}}$, then the game proceeds to $t = 2$, and as we have seen, the suit is settled out of court. Hence, in this case $\mathcal{D}$ receives a payoff of $-\mathcal{S} - c_{\mathrm{A}}^{\mathcal{D}}$. Thus, he will pay $c_{\mathrm{A}}^{\mathcal{D}}$, and the play proceeds with the suit settled out of court if and only if

$$-\mathcal{S} - c_{\mathrm{A}}^{\mathcal{D}} \geq \mathcal{I} - c_{\mathrm{T}}^{\mathcal{D}} \Leftrightarrow (1-\beta)c_{\mathrm{T}} \geq c_{\mathrm{A}}^{\mathcal{D}}. \tag{A7}$$

Combining the right-hand sides of expressions (A6) and (A7) yields the claim in remark A3.

A5. The Decision to File

Remark A4. Suppose that expression (1) holds and that the set of inequalities (3) is violated. Then $\mathcal{P}$ will file suit if and only if

32. Recall that we assume that paying the pretrial negotiating cost is the choice when indifferent. See note 14.

$$\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} > 0. \tag{A8}$$

Suppose that expression (1) holds and the set of inequalities (3) holds. Then $\mathcal{P}$ will file suit if and only if

$$\mathcal{I} + \beta c_{\mathrm{T}}^{\mathcal{D}} - (1-\beta)c_{\mathrm{T}}^{\mathcal{P}} - c_{\mathrm{A}}^{\mathcal{P}} = \mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}} + \beta c_{\mathrm{T}} - c_{\mathrm{A}}^{\mathcal{P}} > 0. \tag{A9}$$

To see why the claim in remark A4 holds we can reason as follows. Suppose that expression (1) holds and the set of inequalities (3) is violated. Then if the suit is filed, it will not be settled out of court. Hence, using the payoffs in Figure 1, the payoff to $\mathcal{P}$ will be $\mathcal{I} - c_{\mathrm{T}}^{\mathcal{P}}$. Hence, $\mathcal{P}$ will file suit if and only if expression (A8) holds.

Suppose that expression (1) holds and the set of inequalities (3) holds. Then if a suit is filed, it will be settled out of court. It follows that $\mathcal{P}$'s payoff if he files is $\mathcal{S} - c_{\mathrm{A}}^{\mathcal{P}}$, which, using equation (2), is equal to $\mathcal{I} + \beta c_{\mathrm{T}}^{\mathcal{D}} - (1-\beta)c_{\mathrm{T}}^{\mathcal{P}} - c_{\mathrm{A}}^{\mathcal{P}}$. Hence, if expression (1) and the set of inequalities (3) hold, then $\mathcal{P}$ will file suit if and only if equation (A9) holds.

A6. The Irrelevance of Fee Shifting

Some extra notation is needed. Refer to an array of the type $\Omega = (I, p, c_{\mathrm{A}}^{\mathcal{P}}, c_{\mathrm{A}}^{\mathcal{D}}, c_{\mathrm{T}}^{\mathcal{P}}, c_{\mathrm{T}}^{\mathcal{D}}, \beta)$ as a set (or a configuration) of parameters of the model.[33] Clearly proposition 1 fully characterizes under which configurations of parameters each of the N, C, and S equilibrium outcomes will occur. When instead the raw trial costs $\hat{c}_{\mathrm{T}}^{\mathcal{P}}$ and $\hat{c}_{\mathrm{T}}^{\mathcal{D}}$ as in Section 5 are specified, we begin with a set of raw parameters $\hat{\Omega} = (I, p, c_{\mathrm{A}}^{\mathcal{P}}, c_{\mathrm{A}}^{\mathcal{D}}, \hat{c}_{\mathrm{T}}^{\mathcal{P}}, \hat{c}_{\mathrm{T}}^{\mathcal{D}}, \beta)$. As in Section 5, given a set of raw parameters and a fee-shifting rule Φ, we obtain a set of actual parameters $\Omega = (I, p, c_{\mathrm{A}}^{\mathcal{P}}, c_{\mathrm{A}}^{\mathcal{D}}, c_{\mathrm{T}}^{\mathcal{P}}, c_{\mathrm{T}}^{\mathcal{D}}, \beta)$. The latter, via proposition 1, determines the equilibrium outcome of the model.

Suppose we have a given case $\hat{\Omega}$, and consider a change in the fee-shifting rule from, say, Φ' to Φ''. Let us call the resulting parameters after fee shifting is taken into account $\Omega' = \Phi'(\hat{\Omega})$ and $\Omega'' = \Phi''(\hat{\Omega})$. Suppose also that we know that the change from Φ' to Φ'' has no effect on whether $\mathcal{P}$ decides to file a suit against $\mathcal{D}$. In particular, suppose that we know that $\mathcal{P}$ will file a lawsuit against $\mathcal{D}$ under both parameters Ω' and Ω''.[34] Then, since the switch from Ω' to Ω'' leaves the set of inequalities (3) unaffected, it must be that either the suit is settled out of court or it is tried in court with both parameters Ω' and Ω''. Building on our analysis so far, we can safely state the following result without further proof.

Proposition A1. A change in the fee-shifting rule cannot possibly determine a switch of any given case from being settled out of court to being tried in court or vice versa. In other words, let a set of raw parameters (a case) $\hat{\Omega}$ be given, and

33. All of the cost terms are assumed to be positive, and β is assumed to be a number in (0, 1). The quadruple $(c_{\mathrm{A}}^{\mathcal{P}}, c_{\mathrm{A}}^{\mathcal{D}}, c_{\mathrm{T}}^{\mathcal{P}}, c_{\mathrm{T}}^{\mathcal{D}})$ is further restricted by assumption 1.

34. The case in which $\mathcal{P}$ does not file against $\mathcal{D}$ is obviously not interesting here.

consider two possible fee-shifting rules Φ' to Φ'' with corresponding parameters $\Omega' = \Phi'(\hat{\Omega})$ and $\Omega'' = \Phi''(\hat{\Omega})$. Assume that the equilibrium outcome associated with Ω' is either C or S. Assume that the equilibrium outcome associated with Ω'' is also either C or S. Then the equilibrium outcome associated with Ω' and with Ω'' is the same.

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