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EFFORT, INFORMATION,
SETTLEMENT, TRIAL

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ABSTRACT

Given the costs of litigation and the availability of pretrial discovery, the question arises why some cases fail to settle at any time in the pretrial period. To examine this problem, the article develops a model of litigation and settlement in which the efforts the parties invest in the case (1) partly determine the strength of the plaintiff's claim and (2) are partly shielded from disclosure. The parties pursue mixed strategies in equilibrium, which prevents them from settling in a certain fraction of cases.

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Why do legal disputes go to trial instead of settling? If the stakes are the same for both parties, going to trial is no better (ex ante) to the parties than settling for the expected value of the judgment. And settling saves litigation costs, generating a surplus that the parties can split between themselves. What makes parties forgo these savings in favor of going to trial?

The explanation explored in this paper emphasizes the role of asymmetric information about the likely outcome of trial. The plaintiff, for example, may have private information about the expected value of her claim at trial. Her bargaining position -- the amount she will take to settle the case -- will reflect what she knows about the claim's expected value at trial. If the information in her possession leads her to assign the claim a greater expected value at trial than the defendant has assigned it, the parties may be unable to agree on settlement terms.

Asymmetric information is not a novel explanation of parties' failure to settle; it is a central feature of existing models of settlement behavior. What has not been adequately explained, however, is why significant informational asymmetries between the parties would persist until the time of trial. Pretrial discovery rules generally compel the parties to disclose the evidence in their possession. Why then do not cases settle after discovery, if not before? It is not enough, in other words, to show that asymmetric information (if it exists) may prevent settlement; what needs to be shown is why asymmetries may

exist, and prevent settlement, throughout the pretrial period.

In approaching this problem, I use a simple model of litigation and settlement in which the plaintiff's likelihood of winning at trial depends in part on the level of effort she puts into preparation. The point of the model is to distinguish between exogenous and endogenous determinants of a claim's strength: the expected judgment in a case partly depends on factors beyond the parties' control, such as the amount and quality of potentially available evidence. But it also depends on the level of effort the parties put into preparing the case -- investigating the facts, doing legal research, planning trial strategy, and so forth. My aim is to show how trials may result from a combination of informational asymmetries concerning the exogenous and endogenous determinants of a claim's strength.

The argument is roughly as follows. Parties may have trouble settling after the period for case preparation has passed, because neither knows how well the other has prepared her case. Information about a party's case preparation is largely exempt from discovery; for tactical purposes, she may rationally refuse to disclose such information voluntarily; and for reasons I will examine, her opponent cannot easily infer the hidden information. In this setting, parties tend to pursue mixed strategies in both case preparation and settlement bargaining. As a result, I suggest, a fraction of cases that have made it this far will inevitably fail to settle.

But how do they make it that far? Uncertainty over a

party's preparation level may prevent settlement after she has invested in preparation; but there remains the possibility of settling before she has made the investment. Here asymmetric information regarding the evidence -- already emphasized by existing models -- becomes important. It may prevent settlement until major investments in preparation may have been made -- by which time new barriers to settlement have arisen. In brief, then, my argument is that asymmetries regarding exogenous determinants of claim strength may inhibit settlement early in the case, while asymmetries regarding endogenous determinants may inhibit settlement later in the case. Section I provides an overview of the problem to be examined. Section II presents the model and derives the main results of the paper. Section III discusses applications and interpretations.

I. CASE STRENGTH, INFORMATION, AND SETTLEMENT

A. Asymmetric Information vs. Discovery

The puzzle to be explained is why the parties to litigation sometimes forgo the benefits of settling. Suppose that if a given action for damages goes to trial, the expected judgment has value w . (This value represents the expected damage award following a verdict in the plaintiff's favor, discounted by the probability that there will be a verdict in the defendant's favor.) The parties' expected payoffs from going to trial are then given by the expected judgment net of each party's costs of taking the case to trial. Thus, the plaintiff's expected gain

from going to trial is given by w minus her anticipated litigation costs. The defendant's expected loss from going to trial, in contrast, is given by w plus his anticipated litigation costs. Each party is made better off (as compared to going to trial) by a settlement for any amount between these two figures. What prevents the parties from realizing these potential gains from trade?

Asymmetric information regarding the value of the expected judgment furnishes one ready explanation.² Suppose the plaintiff has private information about the strength of her case. If her information leads her to assign to w a higher value than that assigned by the defendant, the parties may fail to agree on a settlement amount. The defendant, we may imagine, offers the plaintiff an amount equal to his estimate of the plaintiff's net expected gain from going to trial. But that amount is lower than her estimate of her net expected gain from going to trial, so she rejects the offer; she is better off going to trial. Unless there is further bargaining in which the defendant ups his offer, the case will fail to settle.

² Others, not explored in this paper, include: (1) cognitive errors leading each party to overestimate his or her chances of winning at trial, (2) strategic behavior by the parties in attempting to agree on a division of the surplus from settlement, and (3) principal-agent problems in lawyers' representation of clients. See, for example, Robert H. Mnookin, *Why Negotiations Fail: An Exploration of Barriers to the Resolution of Conflict*, 2 Ohio St. J. Dispute Res. 235 (1993); Robert Cooter & Stephen Marks with Robert Mnookin, *Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior*, 11 J. Legal Stud. 225 (1982); Geoffrey P. Miller, *Some Agency Problems in Settlement*, 16 J. Legal Stud. 189 (1987).

This kind of explanation is plausible given the assumption that one party has private information about the expected judgment. But the assumption itself is troubling. How does it square with a legal system that, through rules of discovery, forces parties to disclose before trial the evidence in their possession? Many cases, it is fair to speculate, begin with the parties having private information about the evidence. (The defendant has superior access to the evidence concerning his compliance with the legal standard of care; the plaintiff has superior access to the evidence concerning the severity of her losses.) Such asymmetries may prevent settlement so long as they exist. But if they can be eliminated by discovery, the question is why a case would not settle at some point in the pretrial period -- after discovery, if not before.

This problem is particularly acute because parties normally have a strong incentive to take advantage of their right to discovery in cases where informational asymmetries are impeding settlement. For suppose that, in a given case, there is some information (such as a piece of evidence) whose content is known only to the plaintiff, and whose disclosure would make settlement more likely. The defendant will ask himself: why hasn't the plaintiff volunteered the information? Since disclosure would reduce the plaintiff's expected litigation costs,³ she would not conceal the information unless doing so enlarged the defendant's

³ This follows from the assumption that disclosure makes settlement more likely.

expected payment to her.⁴ But if concealment has that effect, the defendant should demand disclosure. In essence, the defendant should seek disclosure anytime the plaintiff prefers concealment.

The point can be demonstrated as follows. Assume that if the information is not disclosed, the case will settle with probability π ; if the case settles, the expected settlement payment is some amount s ; if the case goes to trial, the expected judgment is some amount w . Assume that if the information is disclosed, the case will settle with probability σ ; if it settles, the expected payment is s' , and if it goes to trial, the expected judgment is w' . Since disclosure is assumed to make settlement more likely, we assume σ is greater than π . Let c_p and c_d denote the plaintiff's and defendant's litigation costs, respectively.⁵

Now, the plaintiff will prefer not to disclose the information, when her expected payoff given nondisclosure exceeds the expected payoff given disclosure; that is, when

⁴ The plaintiff seeks to maximize the payment she collects from the defendant, net of litigation costs. By assumption, disclosure would lower her litigation costs. Therefore, if the plaintiff prefers nondisclosure to disclosure, it must be because nondisclosure enlarges the expected payment she receives from the defendant. (I put to one side plaintiff motives unrelated to enlarging her net recovery -- such as concealing for the sake of protecting personal privacy or business secrets.)

⁵ These costs are assumed to be the same whether or not disclosure occurs, and they are entirely avoided if the case settles.

$$\pi s - \sigma s' > (1-\sigma)(w'-c_p) - (1-\pi)(w-c_p); \quad (1)$$

Rearranging terms, she will prefer not to disclose when The defendant, on the other hand, will prefer to compel disclosure when his expected loss given nondisclosure is greater than his ~~expected~~ expected loss given disclosure; that is, when

$$\pi s + (1-\pi)(w c_p) > \sigma s' + (1-\sigma)(w' + c_p),$$

or, rearranging terms, when

$$\pi s - \sigma s' > (1-\sigma)(w' + c_p) - (1-\pi)(w c_p). \quad (2)$$

It is straightforward to show that (1) implies (2). For suppose not. If the former, but not the latter, were satisfied, then it would be the true that

$$(1-\sigma)(w' + c_p) - (1-\pi)(w c_p) > (1-\sigma)((w' - c_p) - (1-\pi)(w - c_p)),$$

or, simplifying, that

$$(1-\sigma)c_p - (1-\pi)c_p > (1-\pi)c_p + (1-\sigma)c_p,$$

which implies that

$$(\pi - \sigma)c_p > (\sigma - \pi)c_p,$$

which contradicts our assumption that $\underline{\sigma}$ is greater than $\underline{\pi}$.

Thus, whenever it is in the plaintiff's interest to withhold the information, it is in the defendant's interest to compel disclosure. The defendant can infer from the plaintiff's silence that he should demand the information.⁶

This does not prove that anytime asymmetries concerning discoverable information are preventing settlement, discovery of the information will occur.⁷ In some cases, the uninformed party may not know enough to ask for the information; in others, the informed party may not (fully) comply with a request for the information.⁸ But discovery rules allow requests phrased in general terms, so that the uninformed party can in effect ask for information of whose existence he is unaware.⁹ And noncompliance

⁶ A similar argument holds in the reverse situation, where it is the defendant who holds private information.

⁷ One obvious element the above analysis leaves out is the cost of seeking discovery, which are never zero -- though one suspects they are typically lower than the costs of going to trial, which may be the price of forgoing discovery if the information in fact bears on the expected outcome of trial.

⁸ A related point is that the party who obtains disclosure may not be able to verify the information (equivalently, the party making disclosure may not be able to warrant its veracity). For example, suppose the plaintiff discloses the (purported) existence of evidence very favorable to her case. From the defendant's perspective, the disclosure may be either genuine or phony; he has no way of knowing which, and will discount the disclosure accordingly. The result -- if the plaintiff is in fact telling the truth -- may be a trial. See Steven Shavell, *Sharing of Information Prior to Settlement or Litigation*, 20 RAND J. Econ. 183, 189-91 (1989).

⁹ Thus, though the uninformed party may not be aware of the existence of document X concerning subject Y, he can submit a request reading, "turn over all documents on subject Y" -- which should in principle oblige his opponent to turn over document X. (There are, however, rules against overly broad requests.)

Note also that discovery procedures may require a party to

with a request is risky, particularly when the informed party expects the information to emerge at trial.¹⁰ Hence it is fair to ask: Given the incentives of uninformed parties to seek discovery, how do asymmetries persist until the time of trial?

disclose information even in the absence of a request from the other party. See, for example, the recent amendments to F.R.C.P. 26(a).

¹⁰ Noncompliance with discovery requests may be less of an impediment to settlement than it initially seems. Let us consider two potential reasons an informed party might want to keep the information secret.

(1) It may be that she expects the information to come out at trial, and wants to conceal it for its surprise value. But this motivation seems unlikely to keep her from complying with a discovery demand. Such a strategy would be self-defeating, since noncompliance automatically calls attention to itself. Once the hidden evidence emerges at trial, it will be revealed that the informed party failed to comply with the defendant's discovery request. Sanctions -- exclusion of the evidence, if favorable to the informed party; money penalties; perhaps even a default judgment -- likely ensue if the court concludes that the information was intentionally withheld. Perhaps the informed party can sometimes persuade the court that the withholding was unintentional (she might claim that the information did not turn up until the time of trial). But it is questionable that this would be attempted with any frequency.

(2) Alternatively, it may be that the informed party considers the evidence relatively unfavorable to her case, and believes that by concealing it she can prevent it from coming to light. This motivation may indeed lead to noncompliance. A strategy of "deep-sixing" unfavorable evidence is not self-defeating; if it succeeds, no one need know the informed party failed to comply with the discovery request. But would such a strategy prevent settlement? If neither party expects the evidence to emerge at trial, then the content of the evidence has no bearing on the expected judgment. Asymmetric information about the content of the missing evidence then does not constitute asymmetric information about the expected value of the claim -- which is what matters for our purposes. Thus, even if noncompliance with discovery requests is common, it does not necessarily reduce the likelihood of settlement. (Perhaps the uninformed party would stave off settlement in the hopes of finding the missing evidence on his own. But would he go all the way through trial?)

B. Litigant Effort and Disclosure Limits

In approaching this problem I emphasize two features of the pretrial process in litigation. One is the relation between the parties' pretrial efforts on the expected judgment in a case. The other is the limits on disclosure of information regarding a party's pretrial efforts. Let me briefly describe each.

1. Determinants of Case Strength. - The strength of a party's case is partly, though never exclusively, a function of the effort put into the case. To borrow terms from the theory of the firm, a claim's expected value at trial has both "fixed" and "variable" components. The fixed component consists of those matters that are beyond the parties' power to affect once a dispute has arisen. The variable component consists of matters that are affected by the parties' litigation efforts.

To illustrate the distinction, consider a hypothetical case in which a consumer injured by a lawnmower brings a product liability suit against the manufacturer. The central disputed issues in the case, we may assume, are whether the lawnmower was defectively designed, whether the plaintiff was operating it properly, and how severe her injuries are. What determines the claim's strength at trial? One influential factor, certainly, is the pool of admissible evidence potentially available to the parties. On each issue that comes up at trial, the quality and quantity of available evidence may vary widely. On the defectiveness question, for example, there may be consensus or disagreement among engineering experts as to the soundness of the

lawnmower's design. On the contributory negligence question, there may be twenty disinterested eyewitnesses or none, and their recollections may support or refute the plaintiff's contention that she was operating the machine properly. On the damages question, the severity of the plaintiff's injuries may be easy or difficult to verify.¹¹ Each of these possibilities may bear heavily on the outcome of a trial; each may be largely beyond the power of the parties to control after the accident has occurred.¹²

Yet the outcome of trial also depends on what the parties make of this stock of evidence. In preparing a case, each party decides how many expert consultants to hire and how much research in the engineering literature to undertake; how much effort to put into investigating the background of eyewitnesses;¹³ how many doctors to talk to and (in the plaintiff's case) how many medical

¹¹ Some injuries, such as a broken bone, can be verified by mechanical means; verifying others, such as chronic pain, requires judgment calls and self-interested testimony by the plaintiff.

¹² I am aware that it oversimplifies matters to view the content of evidence as independent of party effort. (The content of a witness's testimony depends on what he is asked; what he is asked may depend on the parties' pretrial investigations and the like.) I discuss the relation between evidentiary content and party effort in greater detail below.

Other fixed components of a claim's value include the pool of existing legal materials (statutes, regulations, case law); the identity of the judge; the composition of the jury pool. These are less important to the analysis because the parties have the same access to information about them. (Note, however, that parties' knowledge of existing legal materials depends in part on their level of effort.)

¹³ Investigations may reveal, for example, that a key witness has a history of eyesight problems or a criminal record.

tests to undergo. Each decides how much to invest in reviewing the evidence and assembling it for trial; which witnesses to call and documents to introduce; what questions to ask on direct and cross-examination. These and other aspects of case preparation may have a considerable impact on the rulings of judge and jury.

The combination of fixed and variable components (determinants) of case strength is central to my analysis. In practice, the line between the two may be difficult to identify; it is implausible, for example, to view the content of evidence as being entirely independent of the effort the parties put into the case.¹⁴ But there is no need, for present purposes, to insist on drawing the line with any precision. It is enough to recognize that party effort has some effect on the expected outcome of a case while also acknowledging that certain elements of a case (such as the existence of certain documents or witnesses) are beyond the parties' control.

2. Limits on Disclosure. — Pretrial discovery rules rest on the belief that giving both parties access to the information relevant to their case improves, in general, the quality of the judicial process. The familiar difficulty here is that information is not self-creating; it is partly the product of the parties' competitive efforts. As designers of the discovery system have recognized, forcing each party to share with her opponent the product of her labors would, at the margin, simply discourage effort on her part. The quality of

¹⁴ See infra part II.

adjudication might suffer as a result; for in an adversary system, less litigant effort means less informed judgments.

The dilemma is the same as that facing any system of intellectual property: to enable full use of existing information (which favors forced sharing), while at the same time encouraging the production of new information (which favors property rights for the producer). And like the regimes of patent and copyright, discovery rules address the dilemma by distinguishing, in a very rough way, between preexisting information and information produced by the parties in the course of the litigation -- protecting from disclosure at least certain portions of the latter type.

Thus, the federal courts exempt a party's "work product" -- "trial preparation materials," as they are now called -- from the discovery system's disclosure requirements.¹⁵ The work product rule does not protect all fruits of a party's pretrial efforts. A party usually must, for example, turn over evidence that she finds in the course of preparing her case. (A document, or witness's identity, is not exempted from disclosure simply because a party learned of it in a pretrial investigation.) But the rule normally spares a party from demands to turn over her litigation files, and from questioning by her opponent concerning her assessment of the evidence, her litigation strategy, and her

¹⁵ See F.R.C.P. 26(b)(3), (b)(4). The exemption for work product isn't absolute; some otherwise-protected trial preparation materials can be discovered upon a showing of special need.

preparation for trial. Information regarding (or deriving from) her pretrial efforts is thus at least partially shielded from disclosure.

In contrast, practically all remaining information bearing on the case is subject to extensive disclosure requirements. Parties must turn over documents, identify witnesses, and answer opponents' interrogatories; witnesses must submit to depositions; injured plaintiffs must submit to physical exams. Not only all admissible evidence, but all information likely to lead to admissible evidence, is subject to discovery.¹⁶ Informed parties thus have a hard time concealing information other than work product that bears on a claim's expected value in court.

The upshot is that, broadly speaking, the fixed components, but not (all of) the variable components, of a claim's strength are likely to emerge in discovery. For suppose a given case has failed to settle before discovery. Each party has strong incentives, for reasons I have discussed, to demand the information in her opponent's possession that bears on the expected judgment. Since the fixed components of a claim's strength are by assumption not affected by the parties' efforts, they will not generally get the benefit of the work product rule.

¹⁶ Some materials outside of the work product category are protected from disclosure. The main category here is "privileged" materials -- such as statements covered by the attorney-client privilege or the privilege against self-incrimination. See F.R.C.P. 26(b)(1). Also, district courts have discretion to limit the scope of discovery in order to protect parties from such ills as "oppression" and "undue burden or expense." See F.R.C.P. 26(c).

One would thus expect them to be disclosed in the course of discovery; there is, at any rate, no clear reason to suppose that a case would go to trial without such information having been disclosed beforehand.¹⁷ But the work product rule shields at least some information regarding the variable components of case strength. These may accordingly remain private information throughout the pretrial period.¹⁸

Perhaps the work product rule helps account for informational asymmetries that persist until the time of trial. During the course of the litigation,¹⁹ each party investigates the claim, talks to expert consultants, does legal research, synthesizes the evidence, formulates a trial strategy, plans lines of cross-examination. In many cases, it is fair to speculate, each party would prefer to conceal some of these efforts, and their results, from the other side. (Disclosing trial strategies facilitates counterstrategies by the other side;

¹⁷ It is possible that a case would settle midway through discovery. My point is that in cases that make it all the way to trial, one would expect the parties to demand discovery of all discoverable information bearing on the expected outcome. (Here I ignore the costs of seeking discovery, which at the margin would discourage some discovery requests.)

¹⁸ It may be that parties are forced to disclose a certain amount of information about trial preparation through channels other than discovery -- for example, at a compulsory pretrial conference held by the court. My analysis requires only the assumption that parties are able to conceal some significant information about trial preparation.

¹⁹ Sometimes case preparation is done before the litigation commences. This makes no difference for purposes of the work product rule, which applies to information acquired "in anticipation of litigation or trial." See F.R.C.P. 26(b)(3).

disclosing plans for cross-examination helps hostile witnesses plan their answers.) If exempted from mandatory disclosure, this information about pretrial effort may therefore remain secret until trial. If we assume that a party's pretrial efforts bear on the expected judgment -- and if they didn't, why would the opponent want information about them? -- then a party's ability to conceal it affect the chances of settlement.

C. The Problem of Endogenous Case Strength

My approach to the settlement problem, then, focuses on the partially endogenous character of case strength, along with discovery rules that enable litigants to conceal some of their pretrial decisions until trial. This approach addresses some shortcomings of existing models, though it also raises some new difficulties.

Recognizing the endogenous aspects of case strength helps explain why rational litigants may, with some regularity, disagree about the expected judgment throughout the pretrial phase of a case. Economic analyses have long viewed disagreement over the expected outcome as an important reason cases fail to settle, but have never fully explained the existence of such disagreement. The earliest models of litigation and settlement, relying on the fact that the outcome of most cases is uncertain before trial, simply posited that in some fraction of cases the

litigants would form different estimates of the outcome.²⁰ These models did not attempt to explain the source of the parties' disagreement, and so left unanswered the question whether such disagreement would prevent settlement with any regularity.

Later models took a large step toward solving this problem by bringing asymmetric information into the picture.²¹ These models typically have the following structure. The expected judgment, w , in a given case is randomly drawn (or determined by "nature") from a distribution of possible values. One party knows the actual value of w ; the other party only knows the distribution of possible values. In the face of this informational asymmetry, the parties decide how much to offer, or accept, to settle the case. Using various, increasingly sophisticated, depictions of the bargaining process, these models have all shown that the existence of private information will

²⁰ The principal early models are William M. Landes, An Economic Analysis of the Courts, 14 J. L. & Econ. 61 (1971); John P. Gould, The Economics of Legal Conflicts, 2 J. Legal Stud. 279 (1973); Richard A. Posner, An Economic Approach to Legal Procedure and Judicial Administration, 2 J. Legal Stud. 399 (1973); and Steven Shavell, Suit, Settlement and Trial: A Theoretical Analysis under Alternative Methods for the Allocation of Legal Costs, 11 J. Legal Stud. 55 (1982).

²¹ Among the first articles to explore formally the effects of asymmetric information on settlement bargaining were Robert Cooter, Stephen Marks, and Robert Mnookin, Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior, 11 J. Legal Stud. 225 (1982); I.P.L. P'ng, Strategic Behavior in Suit, Settlement, and Trial, 14 Bell J. Econ. 539 (1983); and Lucian A. Bebchuk, Litigation and Settlement under Imperfect Information, 15 RAND J. Econ. 404 (1984). Posner, supra note 20, at 422-26, recognized the importance of asymmetric information, but did not build it into a formal model.

prevent settlement in a positive fraction of cases.²²

These models do not explain, however, why asymmetries concerning case strength would persist until the time of trial. If -- as the models assume -- a claim's expected value is determined exogenously, there is no clear reason to believe it would (with any regularity) remain private information throughout the pretrial period. Discovery rules target a case's exogenous elements for pretrial disclosure, precisely because they are not the product of party effort. Asymmetries concerning these elements may account for cases that fail to settle before the discovery phase of the pretrial process. But they do not obviously account for cases that proceed all the way to trial.²³

²² Bebachuk examined a simple bargaining game in which the uninformed party makes a single, final offer. See Bebachuk, supra note 21. Jennifer F. Reinganum and Louis L. Wilde, Settlement, Litigation, and the Allocation of Litigation Costs, 17 RAND J. Econ. 557 (1986), and Barry Nalebuff, Credible Pretrial Negotiation, 18 RAND J. Econ. 198 (1987), both consider more complex single-offer games in which the informed party is able, through her decision to make or reject a given offer, to send signals to her opponent about the strength of the claim. Urs Schweizer, Litigation and Settlement under Two-Sided Incomplete Information, 56 Rev. Econ. Stud. 163 (1989), looks at a single-offer game in which both sides have private information about case strength.

More recently, Kathryn E. Spier, The Dynamics of Pretrial Negotiation, 59 Rev. Econ. Stud. 93 (1992), introduces a dynamic model containing a series of bargaining rounds in which the uninformed party alone makes an offer. And in Andrew F. Daugherty and Jennifer F. Reinganum, Endogenous Sequencing in Models of Settlement and Litigation, 9 J. L. Econ. & Org. 314 (1993), both parties can make settlement offers or demands, and can in addition choose whether to become informed or to stay uninformed about the expected judgment.

²³ One can, of course, simply assume that the discovery process works imperfectly, permitting parties to conceal information that is formally subject to disclosure. See supra notes 9-10 and accompanying text. The argument to follow does

Focusing on the variable components of a claim's expected value offers some promise here. The work product rule explains why parties could conceal some information regarding their preparation for trial; and the tactical value of secrecy explains why they would choose to conceal it. To the extent trial preparation affects the outcome of trial, party decisions to keep it secret might produce sufficient disagreement about the expected judgment to prevent settlement.

Yet this approach has some difficulties of its own. Litigants make their trial preparation decisions strategically, each with a view (I assume) toward maximizing his or her net return from the litigation. A simple question arises: why cannot each party deduce the other's strategy, either after the fact or beforehand? Since the exogenous elements of the case are subject to discovery, it is hard for a party to conceal the benefits she derives from different trial preparation decisions; in this sense, discovery makes the payoffs in the game common knowledge to the parties. What then prevents each party from inferring, from the payoff structure, the other party's trial preparation decisions?

Let me give a simple example in which the plaintiff has private information about her preparation decisions.²⁴ Suppose the plaintiff has a set of different possible preparation

not require that assumption.

²⁴ For simplicity's sake we assume that the defendant undertakes no (unobservable) trial preparation.

strategies, numbered 1, 2, 3, ... n . The i th strategy costs the plaintiff c^i and, given the fixed components of the case, yields her an expected trial award of w^i . Suppose also that the defendant knows the strategies available to the plaintiff, as well as their payoffs.²⁵ If he assumes that the plaintiff chooses the preparation strategy that maximizes $(w - c)$, then the defendant -- knowing the value of w and c generated by each strategy -- might be able to guess the plaintiff's optimal strategy.

If such inference were possible, then the defendant's inability to observe the plaintiff's preparation decisions might have little effect on the likelihood of settlement. Being able to deduce what kind of preparation the plaintiff had undertaken, the defendant could perhaps infer the claim's expected value at trial -- in which case there would be no informational barrier to settlement. In what follows I confront this puzzle, and try to show that such a process of inference would not overcome the asymmetries produced by the work product rule.

II. MIXED STRATEGIES AND SETTLEMENT BARGAINING

The argument to follow relies on the concept of a mixed

²⁵ This requires the assumption that the defendant knows (perhaps from discovery) the fixed components of the claim's strength, and also the costs and productivity of alternative preparation strategies.

strategy equilibrium. In essence, the argument is that rational parties will put different levels of effort into preparing otherwise-identical cases. Their opponents, not knowing which level of effort has been chosen in a given case, are accordingly unsure of the expected judgment. In this setting, the opponents' rational strategy will be to insist on settlement terms that are likely to be rejected in a positive fraction of cases. The upshot is that some cases that have made it past discovery will go to trial.

The basic intuition behind this result is fairly simple. Suppose, in the example just discussed, that some preparation strategy j maximizes the plaintiff's expected return from trial net of litigation costs.²⁶ Suppose also that there is some other, less costly, preparation strategy k available to the plaintiff, and that the defendant has no way of observing whether the plaintiff has pursued strategy j or k .

Now, if the defendant believes that the plaintiff has pursued j , he will be prepared to offer a settlement payment reflecting the plaintiff's expected trial recovery w^j . But if the plaintiff expects the defendant to make that offer, she will be tempted to bluff, pretending to have pursued j when she has in fact pursued the (cheaper) strategy k . The defendant, anticipating this bluff, will then be tempted to make a lower settlement offer -- one reflecting the expected trial recovery

²⁶ Thus, $(w^j - c^j)$ is the maximum value of $(w - c)$.

w^k , which is less than w^j given our assumptions.²⁷ But then -- to complete the story -- the plaintiff, if she expects to get this low settlement offer, will be tempted to pursue j after all, forgoing settlement in favor of a trial.

Given this dynamic, there may be no equilibrium in which the plaintiff pursues either strategy with certainty (in game theory parlance, there may be no pure strategy equilibrium). Instead, in equilibrium the plaintiff may randomize among different strategies -- choosing j with some positive probability less than one; doing the same with k ; and perhaps doing the same with other possible strategies as well. In this mixed strategy equilibrium, the defendant -- unable to tell which strategy the plaintiff has chosen -- will sometimes offer (and stick to) settlement terms too low for the plaintiff to accept.

This outcome is possible anytime two conditions are met: (1) There are at least two preparation strategies available to the plaintiff, and the defendant is unable to observe (before trial) the plaintiff's choice among them; (2) of these strategies, the one that maximizes the plaintiff's net return from trial is not the one that minimizes her litigation costs. The first condition holds in those cases in which the work product rule has some bite. The second condition holds in those cases in which preparation efforts are costly, but produce positive marginal returns to the claim's expected value at trial.

²⁷ Thus, $c^j > c^k$. Since, by assumption, $w^j - c^j > w^k - c^k$, it follows that $w^j > w^k$.

Combined, the two conditions imply that some positive fraction of cases will fail to settle.

A. The Model

To analyze this dynamic, I construct a two-round litigation model with the following structure. In Round 1, the plaintiff files suit and the defendant has the opportunity to make a settlement offer before the case proceeds to discovery. If the parties fail to settle, the case proceeds to Round 2. In this second round, the parties undertake discovery and case preparation, after which the defendant again has the opportunity to make a settlement offer. Failure to settle at that point is assumed to result in a trial.²⁸ (The sequence of events is diagrammed in Figure 1.)

[FIGURE 1]

To keep the analysis tractable, I treat each round as a simple game (more precisely, subgame) of one-sided asymmetric information and single-offer settlement bargaining. In Round 1, one party -- arbitrarily, the plaintiff -- has some private information about the quality of available evidence in the case;

²⁸ The qualitative results of the analysis remain the same if we break Round 2 into a series of rounds in which the parties undertake some discovery and case preparation, then engage in settlement bargaining, then (if no settlement is reached) undertake more discovery and preparation, and so forth. See infra part IID.

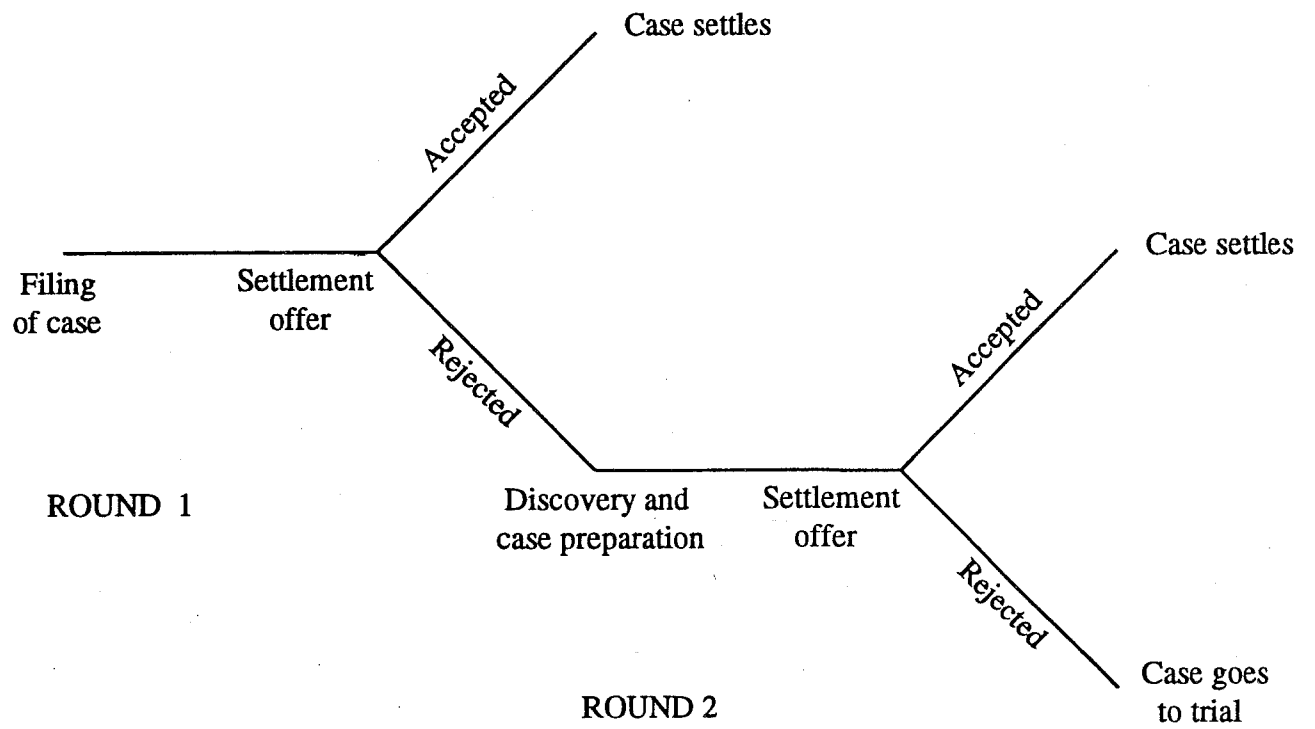


FIGURE 1

this information remains private until discovery takes place. Settlement bargaining takes the form of a single take-it-or-leave-it offer by the uninformed party (the defendant). In Round 2, one party -- again, arbitrarily, the plaintiff -- has some private information about her case preparation decisions; this information remains private until the case goes to trial. Settlement bargaining again consists of a single offer by the defendant.

In addition, I make three simplifying assumptions about the litigation. First, I assume that the quantity and content of the available evidence in a case is fixed at the time a dispute arises. The outcome of trial, however, is a function of both the evidence and the parties' case preparation efforts. Second, I assume that in discovery, the parties disclose all evidence of which they are aware.²⁹ The plaintiff is, however, able to shield some information concerning her case preparation. Third, I assume that discovery and case preparation occur roughly simultaneously. More precisely, by the time discovery is complete, the plaintiff's case preparation is assumed to be well under way.

These assumptions are not essential to the analysis; as I show later, each assumption can be weakened without changing my central conclusions. They do, however, help clarify the analysis

²⁹ This includes evidence that parties find at any time during the pretrial period. For example, if the plaintiff finds some piece of evidence the day before trial, she must disclose it to the defendant.

considerably. I begin by examining the parties' behavior in Round 2 of the model: given that a case has proceeded to the discovery and case preparation stage, what are the prospects for settlement? I then work backwards to Round 1, examining the prospects for settlement before discovery and case preparation occur.

B. Settlement Following Discovery

Suppose the plaintiff's case preparation decision is limited to choosing between two levels of investment, which we can call high and low.³⁰ Define the following notation:

$\underline{w}^L, \underline{c}^L$	=	Plaintiff's expected trial award and litigation cost, respectively, if she chooses a low level of preparation;
$\underline{w}^H, \underline{c}^H$	=	Plaintiff's expected trial award and litigation cost, respectively, if she chooses a high level of preparation;
$\Delta \underline{w}, \Delta \underline{c}$	=	Increase in plaintiff's expected trial award and litigation cost, respectively, from undertaking a high rather than low level of preparation; ³¹
\underline{t}	=	A party's costs of going to trial (assumed to be the same for plaintiff and defendant, and assumed to be independent of the plaintiff's preparation level).

³⁰ Since the defendant's preparation efforts are not secret in the model, we can -- without loss of generality -- normalize his preparation investment to zero.

³¹ These are assumed to be deterministic. There is no uncertainty about the extent to which a high investment will augment the plaintiff's net expected recovery from trial.

The marginal product (measured by its expected return at trial) of a high investment exceeds its marginal cost; thus, $\Delta w > \Delta c$. At either level of investment, the plaintiff's case has a positive expected return at trial; that is, $w^L - c^L - t > 0$, and $w^H - c^H - t > 0$. At the time the defendant makes his settlement offer, the above values are common knowledge to the parties,³² though the defendant cannot observe which investment level the plaintiff has in fact chosen.

1. The Parties' Decisions. - Begin by considering how the plaintiff's investment in preparation will affect her behavior in subsequent settlement bargaining. Since we have restricted the bargaining process to one take-it-or-leave-it offer from the defendant, the plaintiff will accept the offer of any amount equal to or exceeding her net expected recovery from trial.³³ Thus, if she has made a high investment, she will accept any offer of at least the expected judgment minus her trial costs,³⁴ or $w^H - t$. Similarly, if she has made a low

³² The plaintiff knows the above values at all times. The defendant is assumed to be uncertain of them until he has obtained discovery.

³³ Counteroffers not being permitted in the game, the plaintiff's only alternative to accepting the defendant's offer is going to trial. The plaintiff is better off accepting any offer exceeding her net expected trial recovery. (That would not necessarily be true if counteroffers were permitted, but this does not affect my central line of argument.) I assume, without loss of generality, that in cases where the offer is equal to the net expected trial recovery, the plaintiff accepts the offer

³⁴ Her preparation costs, being sunk at the time settlement bargaining occurs, do not affect her reservation price

investment, she will accept any offer of at least $w^L - t$.

Now consider the defendant's decision of what to offer. If he knew what investment the plaintiff had made, his problem would be easy. He would simply offer the plaintiff her reservation price for settling. Offering $w^H - t$ to the plaintiff who has invested high, and $w^L - t$ to the plaintiff who has invested low, is ideal for two reasons. It guarantees the case will settle, so that the defendant avoids the cost of trial. At the same time, the defendant pays no more than necessary to settle the case.³⁵

But when the defendant is uncertain about what investment the plaintiff has made, he does not know the plaintiff's reservation price. He therefore cannot ensure simultaneously that the plaintiff will accept his offer and that he pays the plaintiff no more than necessary to settle. Offering at least $w^H - t$ guarantees that the plaintiff will settle; but if the plaintiff has made only a low investment, the defendant winds up paying a windfall to her.³⁶ Capping the offer at $w^L - t$ ensures that the plaintiff gets no windfall, but it risks the costs of trial; if the plaintiff has made a high investment, she will

for settling.

³⁵ If the plaintiff has made a high investment, the defendant's expected cost of going to trial against such a plaintiff is $w^H + t$; the defendant is thus made better off by settling for $w^H - t$, the plaintiff's reservation price. If the plaintiff has made a low investment, settling for $w^L - t$, the plaintiff's reservation price, makes the defendant better off than going to trial (whose expected cost to him is $w^L + t$).

³⁶ The low-investing plaintiff would have accepted $w^L - t$ to settle, so the offer of $w^H - t$ "overpays" her by the amount Δw .

refuse the offer and force a trial. No offer amount is ideal; the defendant must choose among imperfect alternatives.

He can confine his decision, however, to choosing between the plaintiff's two possible reservation prices. He will want to offer either $w^H - t$ or $w^L - t$, but no other amount. To see this, observe first that an offer of $w^H - t$ is sure to achieve a settlement no matter what the plaintiff has invested. There would be no point in making any offer greater than that. Observe, next, that an offer of less than $w^H - t$ will be rejected if the plaintiff has made a high investment. The defendant may as well tailor his offer (if it is to be less than $w^H - t$) to the plaintiff who has made a low investment. Thus, an offer of $w^H - t$ dominates any offer greater than $w^H - t$, while an offer of $w^L - t$ dominates any other offer smaller than $w^H - t$.³⁷

³⁷ To make the point more systematically, let s represent the amount offered by the defendant, and assume that $s \neq w^H - t$ and $s \neq w^L - t$.

(1) Suppose that $s > w^H - t$. Then offering s is dominated by offering $w^H - t$; since the plaintiff would be willing to accept $w^H - t$, offering her more than that would be a needless expense to the defendant.

(2) Suppose, next, that $w^H - t > s > w^L - t$. Then offering s is dominated by offering $w^L - t$. For if the plaintiff has made a high investment, it makes no difference whether the defendant offers $w^L - t$ or instead offers s ; the plaintiff will turn down either offer. If, on the other hand, the plaintiff has made a low investment, it is preferable for the defendant to offer $w^L - t$, since that is enough to secure the plaintiff's acceptance; there would be no value to the defendant in offering more than that. If there is some positive probability that the plaintiff has made a low investment, the defendant is better off offering $w^L - t$ than offering s .

(3) Suppose, finally, that $s < w^L - t$. Then offering s is dominated by offering $w^L - t$. For if the plaintiff has made a high investment, it again makes no difference whether the defendant offers $w^L - t$ or instead offers s ; the plaintiff will reject the offer in any event. If instead the plaintiff has made a low

This analysis of the parties' decisions reduces Round 2 to the following game. The plaintiff begins by choosing between a high level and a low level of investment. The defendant then chooses between offering $w^H - t$ and offering $w^L - t$ to settle the case; we can designate these, respectively, the high offer and the low offer. If the defendant's offer is at least as great as the plaintiff's net expected recovery from trial, the case settles. (Figure 2 depicts the game in Round 2.)

[FIGURE 2]

2. Behavior in Equilibrium. — The unique solution to this game has the parties following mixed strategies -- the plaintiff sometimes investing high, sometimes low, the defendant (independently) sometimes offering high, sometimes low. We first demonstrate that there is no solution that has either party pursuing a pure strategy. We then derive the mixed strategy equilibrium for the game.

It is straightforward to show that no equilibrium exists in which both parties follow pure strategies. Suppose the plaintiff always made a high investment in case preparation. It would be a mistake for the defendant (believing the plaintiff had made

investment, she will reject an offer of s but accept an offer of $w^L - t$. Since it is preferable to settle for that amount than to go to trial (whose expected cost to the defendant would be $w^L + t$), the defendant is better off offering $w^L - t$ than offering s .

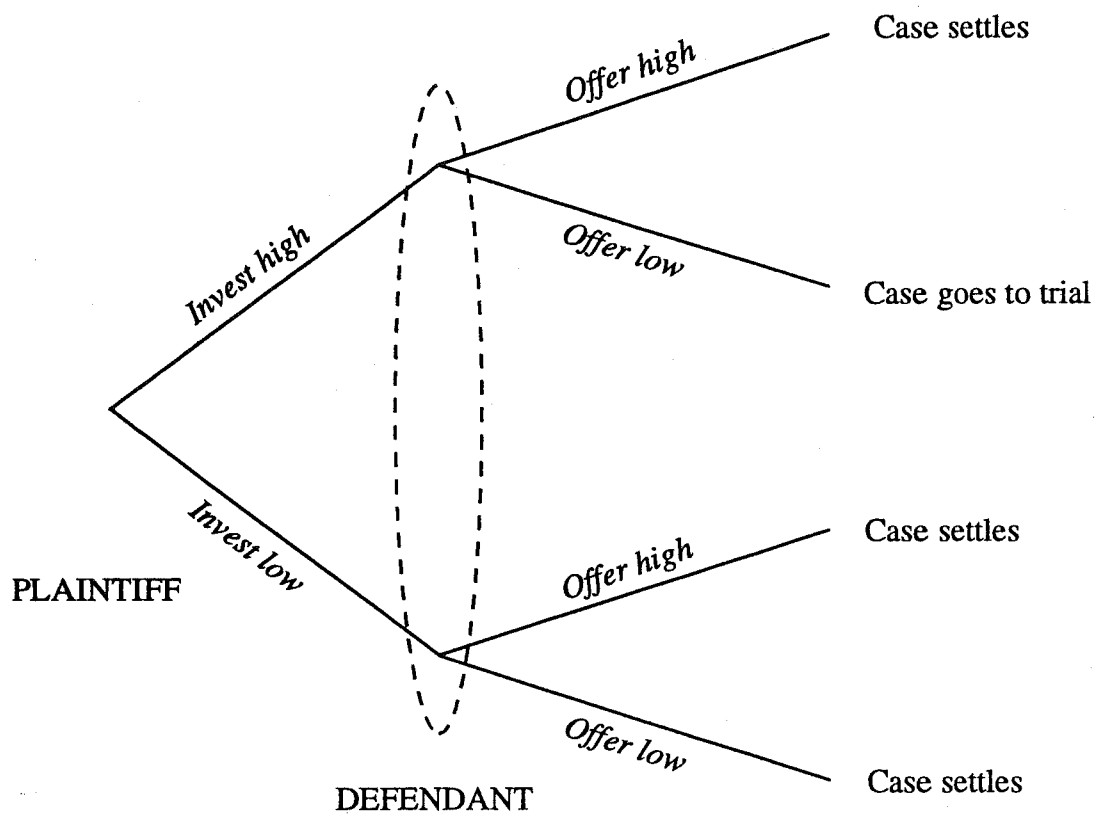


FIGURE 2

such an investment)³⁸ to respond by making a low offer, since the plaintiff would reject it and the case would go to trial. The defendant would be better off making a high offer, which would achieve a settlement.³⁹ Thus the pure strategy combination (invest high, offer low) cannot be a solution to the game; the defendant would deviate, switching to a high offer.

But this change does not yield a stable outcome. Suppose the defendant always makes a high offer. The plaintiff's response? She knows that she will accept the high offer offer regardless of her investment.⁴⁰ Expecting the case to settle out of court, she would then have no incentive to make a high investment in trial preparation.⁴¹ Thus the pure strategy combination (invest high, offer high) is not a solution to the game either; the plaintiff would deviate, switching to a low investment.

The resulting outcome is also unstable. Suppose the

³⁸ This analysis does not require the defendant to know how much a particular plaintiff has invested, which we have stipulated is unobservable. All it requires is the defendant to believe that plaintiffs always make the high investment.

³⁹ A low offer would lead to a trial, costing the defendant $w^H + t$. A high offer would lead to a settlement, costing the defendant $w^H - t$.

⁴⁰ A high offer ($w^H - t$) is equal to the plaintiff's net expected trial recovery if she has made a high investment, and exceeds her net expected trial recovery if she has made a low investment. At either investment level, she will find the offer acceptable.

⁴¹ Given that the case will settle for $w^H - t$, the plaintiff's gain from a low investment, $(w^H - t) - c^L$, exceeds that from a high investment, $(w^H - t) - c^H$.

plaintiff always made a low investment. Then the defendant would have no reason to make a high offer. The defendant would be needlessly paying the plaintiff a windfall, since she would have been willing to accept a low offer.⁴² Thus the pure strategy combination (Invest low, offer high) cannot be a solution; the defendant would deviate, switching to a low offer.

But this, finally, is also unstable. If the defendant always made a low offer, the plaintiff would lose her incentive to make a low investment. She would do better by making a high investment -- which optimizes the claim's strength at trial -- and rejecting the defendant's offer.⁴³ So the pure strategy combination (invest low, offer low) also fails as a solution; the plaintiff would deviate, switching to a high investment -- at which point we are back where we began. No possible pure strategy combination sustains an equilibrium.

More generally, there can be no equilibrium in which either party always makes the same decision.⁴⁴ Consider the plaintiff's decision. No solution to the game can have her consistently choose a high level of investment. For any such equilibrium

⁴² See note 37 supra.

⁴³ Given that the defendant always makes a low offer, the plaintiff's expected gain from investing low is $(w^L - t) - c^L$. If she instead invests high and goes to trial, her expected gain is $w^H - c^H - t$. By the assumption that $\Delta w > \Delta c$ (see text around note 33 supra), she is better off making the high investment and going to trial than settling for the low offer.

⁴⁴ The analysis to this point has only considered the possibility of an equilibrium in which both parties employ a pure strategy.

would have the defendant always making a high offer.⁴⁵ But that would invite the plaintiff to make a low investment while pretending to make a high investment. (The defendant's inability to observe an individual plaintiff's true preparation level makes the masquerade possible.)

But no solution can have her consistently making a low investment, either. In such an equilibrium, the defendant would always make a low offer. Yet the plaintiff's only motivation for making the low investment would be, in effect, to trick the defendant into making a high offer. If that settlement ploy is doomed to failure, the plaintiff has no reason to shirk on case preparation. She may as well get the most she can out of the claim at trial, by making a high investment.⁴⁶ Thus, at either investment level, a pure plaintiff strategy effectively undoes itself. If all plaintiffs choose to invest high, an individual plaintiff will find it to her advantage to invest low; if all choose to invest low, an individual will want to invest high.

And from this it follows that no equilibrium can have the defendant consistently making the same offer. If defendants always made the same offer, then plaintiffs would always choose the same investment level.⁴⁷ But we have just eliminated the latter possibility. That plaintiffs do not always make the same

⁴⁵ See note 40 supra.

⁴⁶ See note 44 supra.

⁴⁷ If defendants always offered high, plaintiffs would always invest low; if defendants always offered low, plaintiffs would always invest high.

investment rules out any equilibrium in which defendants always make the same offer.

The only equilibrium that does emerge in this game involves mixed strategies. a high offer to settle the case. To derive it, let us add the following notation. Let

α = probability that plaintiff makes a high investment;

β = probability that defendant makes a low offer.

Consider the plaintiff's investment decision. If she makes a high investment, then with probability β the defendant will make a low offer and the case will go to trial; and with probability $1-\beta$ the defendant will make a high offer, which the plaintiff will accept. The plaintiff will be indifferent between the two investment levels when her expected payoff from investing high, given by

$$\beta(w^H - t) + (1-\beta)(w^H - t) - c^H,$$

is the same as her expected payoff from investing low, given by

$$\beta(w^L - t) + (1-\beta)(w^H - t) - c^L.$$

Simplifying, we find that the plaintiff will be indifferent between the two investments when

$$\beta w^H - c^H = \beta w^L - c^L,$$

which obtains when

$$\beta = \frac{\Delta c}{\Delta w}. \quad (3)$$

Now consider the defendant's settlement offer decision. If he makes the high offer, the the plaintiff will accept no matter what she has invested. If he makes the low offer, the plaintiff will accept if and only if she has invested low. The defendant will be indifferent between the two offer amounts when his expected loss from offering high, given by

$$w^H - t,$$

is the same as his expected loss from offering low, given by

$$\alpha(w^H - t) + (1 - \alpha)(w^L - t).$$

Rearranging terms and simplifying, we find the defendant indifferent between the two offer amounts when

$$\alpha = \frac{\Delta w}{\Delta w + 2t}. \quad (4)$$

The conditions for Nash equilibrium are met when (3) and (4) are satisfied. Given that the defendant will make a low offer with a probability β satisfying (3), the plaintiff is equally happy investing high or investing low. She thus has no incentive to deviate from a (proposed) equilibrium in which she invests high with a probability α satisfying (4).

Likewise, given that the plaintiff invests high with probability α satisfying (4), the defendant is equally happy

offering high or offering low. He therefore has no incentive to deviate from a proposed equilibrium in which he offers high with a probability β satisfying (3). Since each party has an incentive to comply so long as the other one does, we have an equilibrium. This is the unique solution to the game.

3. Settlement vs. Trial. -- The upshot of all this is as follows. In equilibrium, the defendant -- unable to observe the plaintiff's investment decision -- will also be unable to deduce the investment level the plaintiff has chosen in a particular case. All the defendant can know is that the plaintiff has invested high with some probability. As a result, the amount the defendant offers in a given case will necessarily be independent of the plaintiff's reservation price for settling.

That makes trial inevitable in a certain fraction of cases. In the model, a trial is the result of a mismatch between the defendant's offer and the plaintiff's reservation reservation price. When a high plaintiff investment is met with a low defendant offer, the plaintiff elects to go to trial. The foregoing analysis establishes that this will occasionally occur; both α and β are positive in equilibrium.⁴⁸ Since neither party pursues a pure strategy, sometimes the plaintiff will invest high, and sometimes the defendant will offer low. And since the two events are independent, they will sometimes occur in the same case.

⁴⁸ They must be, provided that Δw , Δc , and t are positive.

The proportion of cases that go to trial can be determined from the values of α and β in equilibrium. Let q represent the fraction of cases that fail to settle in Round 2. The value of q is simply equal to the value of $\alpha\beta$ -- the conditional probability that a low offer will follow a high investment. Plugging in the figures from (3) and (4), we have

$$\alpha\beta = \frac{\Delta w}{\Delta w + 2t} \cdot \frac{\Delta c}{\Delta w},$$

which, simplifying, implies that

$$q = \frac{\Delta c}{\Delta w + 2t}. \quad (5)$$

As this expression indicates, the likelihood that a case will fail to settle in Round 2 varies with several case characteristics. Other things equal, the likelihood of a trial goes up as the marginal cost of case preparation increases; goes down as the marginal return of case preparation increases; and goes down as the cost of going to trial increases.⁴⁹

C. Settlement Before Discovery

The pursuit of mixed strategies explains why, in this model, some cases fail to settle after a plaintiff has invested in trial preparation. It does not, however, explain why cases fail to settle before she makes that investment. Since there is a unique equilibrium in Round 2, each party may be able to predict the

⁴⁹ That is, the value of q increases with Δc ; drops as Δw increases; and drops as t increases.

possible outcomes of the litigation, weighted by their probabilities. Why then don't they place the same expected value on the claim, and settle accordingly?

More concretely, suppose that the plaintiff has not yet decided what level of investment to make and the defendant has not yet decided what offer to make. We know that with probability $(1-\beta)$, the defendant will offer high in Round 2 and the case will settle (regardless of the plaintiff's investment level); that with probability $(1-\alpha)\beta$, the plaintiff will invest low and the defendant will offer low, yielding a settlement; and that with probability $\alpha\beta$, the plaintiff will invest high and the defendant will offer low, yielding a trial. Combining these probabilities and attaching the appropriate payoff to each, the plaintiff's total expected gain if the case proceeds to Round 2 is given by⁵⁰

$$\beta(1-\alpha)w^L + (1-\beta[1-\alpha])w^H - [\alpha c^H + (1-\alpha)c^L + t],$$

while the defendant's total expected loss is given by⁵¹

⁵⁰ The full expression of the plaintiff's expected gain is

$$\begin{aligned} & \alpha\beta(w^H - c^H - t) \\ & + (1-\alpha)\beta[w^L - c^L - t] \\ & + \alpha(1-\beta)[w^H - c^H - t] \\ & + (1-\alpha)(1-\beta)[w^H - c^L - t]. \end{aligned}$$

The expression in the text presents this in simplified form.

⁵¹ The full expression is

$$\beta(1-\alpha)w^L + (1-\beta[1-\alpha])w^H + \beta(2\alpha-1)t.$$

We can make these expressions more intelligible with the following simplifying notation. We will denote by \underline{W} the expected trial value of the claim given one or the other investment level, weighted by the probability of different outcomes in Round 2. Specifically, let

$$\underline{W} = \beta(1-\alpha)\underline{w}^L + (1-[\beta(1-\alpha)])\underline{w}^H.$$

We will denote by \underline{C}_p and \underline{C}_d , respectively, the plaintiff's and defendant's anticipated litigation costs in Round 2, again weighted by the probability of their occurrence. Specifically, let

$$\underline{C}_p = \alpha\underline{c}^H + (1-\alpha)\underline{c}^L + t$$

$$\underline{C}_d = \beta(2\alpha-1)t$$

Plugging these terms⁵² into the above expressions, we find that

$$\begin{aligned} & \alpha\beta[w^H+t] \\ & + (1-\alpha)\beta[w^L-t] \\ & + \alpha(1-\beta)[w^H-t] \\ & + (1-\alpha)(1-\beta)[w^H-t]. \end{aligned}$$

The expression in the text is equivalent.

⁵² Notice that the plaintiff in effect bears trial costs t with probability 1, even though the case (having made it to Round 2) only goes to trial with probability $\alpha\beta$. The reason for this is that the defendant gets to make the final settlement offer. In doing so, he "subtracts" from his offer the trial costs that the plaintiff would have to bear if the case fails to

the plaintiff's expected gain from Round 2 is

$$W \cdot C_p,$$

while the defendant's expected loss is

$$W \cdot C_d.$$

Since the defendant's loss always exceeds the plaintiff's expected gain, why do the parties not settle in Round 1?

Asymmetric information regarding evidence furnishes a ready explanation. If case preparation and discovery occur simultaneously, as we have assumed, then in the period before case preparation the parties may have private information about the content of the evidence. Asymmetries of this sort -- regarding the exogenous determinants of a claim's strength -- yield disagreement about the likely outcome of Round 2, inhibiting settlement before that round.

To build this into the model, I treat the strength of the plaintiff's case as a linear function of the quality of the evidence. Assume there are two possible states of the world: the evidence can be "strong," meaning it favors the plaintiff a lot, or it can be "weak," meaning it is less favorable to the plaintiff. So far, we have represented the plaintiff's case strength as w^i (where $i \in \{L, H\}$), which depends exclusively on the plaintiff's effort. Let us now represent the plaintiff's

settle. (Hence the offer amounts $w^H - t$ and $w^L - t$.) If the bargaining protocol were different, the payoffs would be as well -- though this would not affect the central line of argument.

case strength as $r^j w^i$, where

r^j = scalar multiple reflecting the quality of the evidence; $j \in \{L, H\}$.

In addition, let

Δr = difference between r^H and r^L .

The magnitude of r^H and r^L are assumed to be common knowledge. The plaintiff, but not the defendant, knows the quality of the evidence in a particular case.

1. The Parties' Decisions. — Since there is no investment in preparation in Round 1, the plaintiff's only action is to decide on acceptable pre-discovery settlement terms. Since she knows the quality of the evidence, she can determine the claim's expected value in Round 2. Accordingly, if the evidence is strong, the plaintiff's expected gain from Round 2 is given by⁵³ $r^H W - C_p$, and she will accept any settlement offer of at least this amount. If the evidence is weak, her expected gain is $r^L W - C_p$, and she will accept any offer of at least this amount.

Turning to the defendant's offer decision, he faces a problem identical to that encountered in the previous analysis.

⁵³ In our new notation, the plaintiff's expected gain from Round 2 is

$$\beta(1-\alpha)r^j w^L + (1-\beta[1-\alpha])r^j w^H - [\alpha c^H + (1-\alpha)c^L + t],$$

which reduces to $r^j W - C_p$.

Offering less than $r^H W - C_p$ invites rejection by the plaintiff with strong evidence, so that the defendant may later incur trial costs. But offering more than $r^L W - C_p$ means giving the plaintiff with weak evidence a needless windfall. No offer amount can eliminate both of these dangers.

However, for reasons we saw above,⁵⁴ the defendant can confine his choice to two possible offer amounts, $r^H W - C_p$ and $r^L W - C_p$. An offer of $r^H W - C_p$ dominates any greater offer amount, while an offer of $r^L W - C_p$ dominates any other amount less than $r^H W - C_p$. We can designate these two offer amounts high and low, respectively.

Round 1 can be treated, then, as a game with the following structure. The case begins with the plaintiff possessing strong or weak evidence to support her claim; the quality of the evidence is determined exogenously (by Nature). The defendant chooses between making a high offer and making a low one. If the offer amount is at least as great as the plaintiff's expected gain from proceeding to Round 2, the case settles. If the defendant's offer is smaller than that, the case enters the discovery and case preparation stage. (Figure 3 depicts this game.)

[FIGURE 3]

2. Behavior in Equilibrium. — The defendant's optimal

⁵⁴ See section B.1 supra.

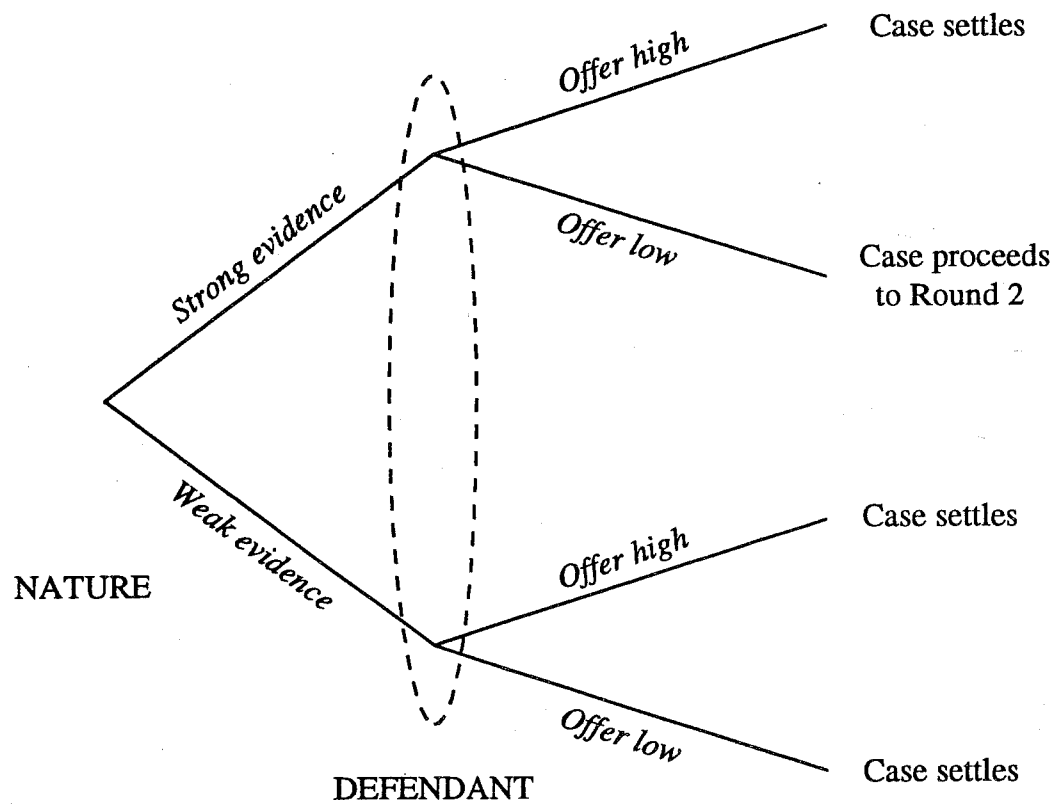


FIGURE 3

choice among the two offer amounts depends on the likelihood that Nature has chosen strong evidence for the plaintiff. Let

γ = defendant's estimate of the probability that the evidence is strong.

If the defendant makes a low offer, the plaintiff will only accept if she has weak evidence. If he makes a high offer, she will accept no matter what her evidence. The defendant will prefer making the low offer if its expected cost to him, given by

$$\gamma(r^H W + C_D) + (1-\gamma)(r^L W - C_P),$$

is less than his expected cost of making a high offer, given by

$$r^H W - C_P.$$

Rearranging terms, we find that he will offer low if

$$(1-\gamma)\Delta r W > \gamma(C_P - C_D), \quad (6)$$

and otherwise will offer high.⁵⁵ Notice that, unlike in Round 2, the equilibrium here has the defendant following a pure strategy. This is because in Round 1, the plaintiff is assumed to be unable to affect the value of her claim. The strength of the case at this point is purely exogenous. As a result, the defendant does not

⁵⁵ The left-hand side of this inequality represents the windfall payment entailed by a high offer in cases where the plaintiff has weak evidence. (A high offer overpays the plaintiff with weak evidence by the amount $\Delta r W$.) The right-hand side represents the opportunity cost of making a low offer in cases where the plaintiff has strong evidence: since the plaintiff will turn down the offer, the defendant incurs cost C_D , and passes up the chance to extract C_P from the plaintiff in settlement.

need to worry about adverse plaintiff reactions to pure offer strategies.

3. Litigation vs. Settlement. - A case fails to settle when the defendant makes a low offer to a plaintiff who has strong evidence. Of the cases in which (6) is satisfied, some will fail to settle in Round 1. For in these cases, the defendant will make a low offer; if the plaintiff has strong evidence, she will reject the offer. When (6) is satisfied, therefore, we have a separating equilibrium in which all cases involving weak evidence settle, while all cases involving strong evidence proceed to Round 2.

We can characterize the likelihood that a case will proceed to Round 2 as follows. Let p represent the fraction of cases that fail to settle in Round 1. Rewriting inequality (6), we see that the defendant will make a low offer when γ , the fraction of cases involving strong evidence, satisfies

$$\gamma < \frac{\Delta rW}{\Delta rW C_P + C_D}. \quad (7)$$

When this inequality holds, no case in which the plaintiff has high evidence will settle; when the inequality does not hold, all cases will settle. The fraction of cases that proceed to Round 2 is thus given by

$$p = \begin{cases} \gamma & \text{if } \gamma < \frac{\Delta rW}{\Delta rW C_P + C_D}, \\ 0 & \text{otherwise.} \end{cases} \quad (8)$$

As this expression indicates, the likelihood that a case will

survive Round 1 rises as the difference between strong and weak evidence grows larger;⁵⁶ rises as the stakes grow larger;⁵⁷ and drops as the costs of preparing for trial and going to trial grow larger.⁵⁸

D. Refinements

In this model, then, the existence of both exogenous and endogenous determinants of a claim's strength -- coupled with their concealment at different times in the litigation -- explain why some cases fail to settle. Settlement early in the litigation is impaired by asymmetries concerning exogenous factors; later on these asymmetries are (in theory) wiped out by discovery, but by then settlement is impaired by private information about endogenous factors. All cases would settle in this model if case strength were purely exogenous, for then the parties would have symmetric information after the discovery/case

⁵⁶ Here I refer to Δx , which might be termed the marginal productivity of evidence quality. As Δx increases, the cost (captured in (5)) to the defendant of making a high offer grows, making (6) easier to satisfy.

⁵⁷ Holding the quality of the evidence constant, the expected award in court varies directly with w^i , which can be thought of as the amount at stake in the case. As w^L and w^H increase, the cost to the defendant of making a high offer grows, making it less likely that the case will settle.

⁵⁸ As C_p and C_D -- which encompass the costs of both preparation and trial -- go up, the cost to the defendant of making a low offer (captured in (5) above) go up, making a high offer, and thus settlement, more likely. The comparative-static results discussed in this paragraph are similar to those reached in Bebchuk, note 21 supra, and Landes, note 20 supra, in models where case strength is entirely exogenous.

preparation phase. Likewise, all cases would settle in this model if case strength were purely endogenous, for then the parties would have symmetric information before the discovery/preparation phase.

The analysis has, however, simplified the settlement game in three respects: only one party has private information in a given round; the uninformed party makes the settlement offer; and the determinants of case strength are limited to two levels ("high" and "low") rather than having many possible levels. Eliminating these simplifications would not change my basic conclusions, though it would complicate the analysis. Without going into any detail, I will briefly show that these simplifying features are not essential to the model. My discussion here will focus on the parties' behavior in Round 2; most of the points I make also apply to behavior in Round 1.

1. Signalling Case Strength. - Begin by considering the assumption that the uninformed party makes the offer.⁵⁹ If we instead had the informed party making the offer, it might be possible for her offer to provide information about the strength of her case. Thus, returning to the Round 2 setting analyzed above (in which the plaintiff alone makes case preparation

⁵⁹ The above analysis would obviously apply, without modification, if the plaintiff's and defendant's roles were switched in either round, or in both. Indeed, perhaps the most plausible setting is one in which one party has private information regarding the evidence, and the other party invests in case preparation. The analysis remains essentially unchanged, provided that in each round, the uninformed party makes the settlement offer.

decisions), if the plaintiff were the one to make the offer, her offer might signal the level of preparation she had chosen. As we have seen, cases fail to settle in Round 2 because the defendant in essence mistakes a well-prepared plaintiff for a poorly-prepared plaintiff. But if plaintiffs who had made a high investment in preparation could somehow signal that fact through their offer, there would be no such mistakes; perhaps all cases would then settle.

It is straightforward to show, however, that mixed strategies of the sort identified above can exist -- and that, as a result, some cases will fail to settle -- even when plaintiffs are the ones making the offers. Let us restrict our attention to cases in which preparation has a return at the margin; in particular, using the notation of subsection A above, let us focus on cases where the following is true:

$$\Delta w > \Delta c \cdot 2t.$$

(9)

To show that such cases will sometimes fail to settle, it suffices to demonstrate that the parties will not follow pure strategies in equilibrium.

Begin by considering the defendant's decision whether to agree to a given settlement demand by the plaintiff. If the plaintiff has made a high investment, her expected gain from trial is $w^H - t$; this is the minimum amount the defendant will have

to pay to get such a plaintiff to settle the case.⁶⁰ If the plaintiff has made a low investment, the defendant's expected loss from trial w^L+t ; that is the maximum the defendant will have to pay to get such a plaintiff to settle. By (9) above, we have that $w^H-t > w^L+t$. The defendant will never agree to a settlement demand for an amount between these two figures.⁶¹ Rather, the defendant must choose between two courses of action: agreeing to a settlement demand of at least w^H-t ;⁶² or refusing any demand exceeding w^L+t .

He will not follow either course in all cases. Call a demand of at least w^H-t a high demand, and call a demand of no more than w^L+t a low demand. It cannot be that in equilibrium, the defendant always agrees to a high demand. For if he did, plaintiffs would rationally make a low investment and then make a

⁶⁰ The plaintiff would probably demand w^H+t , the defendant's expected loss from trial; but it is unnecessary to consider this issue here. What matters is that she will not demand less than w^H-t .

⁶¹ This is because such a demand would only come from a plaintiff who has made a low investment. A plaintiff who has made a high investment will demand a settlement amount of at least her expected gain from trial, w^H-t . Given that the demand is for less than that, the defendant should conclude that the plaintiff has made a low investment. But since, by assumption, the demand is for more than w^L+t -- the defendant's expected loss from a trial in which the plaintiff has made a low investment -- the defendant is better off going to trial than agreeing to the demand.

⁶² The defendant will never agree to a demand of more than w^H+t , his expected loss from a trial in which the plaintiff has made a high investment; therefore the plaintiff would never demand more than that. The analysis to follow implicitly incorporates that ceiling on plaintiff demands.

high demand.⁶³ Yet if plaintiffs always invest low, then the defendant will never agree to a high demand: rather, he will refuse anything but a low demand.⁶⁴ But it also cannot be that in equilibrium, the defendant always refuses anything but a low demand. If he did, plaintiffs would always make a high investment and go to trial.⁶⁵ Yet if plaintiffs always make a high investment, the defendant will agree to a high demand. Thus, neither pure strategy -- always agree to a high demand, or never do so -- can hold in equilibrium.

This reasoning also establishes that the plaintiff will neither always make a high investment nor always make a low investment. If plaintiffs always invest low, the defendant will always refuse any but a low demand -- in which case plaintiffs will switch to investing high. But if they do that, the defendant will always agree to a high demand -- in

⁶³ Let \bar{s} be the value of the high demand; $w^H + t \geq \bar{s} \geq w^H - t$. If the case always settles for \bar{s} , the plaintiff's expected payoff from investing high would be $\bar{s} - c^H$; from investing low, $\bar{s} - c^L$. The latter amount is greater. And since $\bar{s} \geq w^H - t$, she is no better off (in expected terms) investing high and going to trial than she is investing high and settling for \bar{s} . Thus, investing low and making a high demand is preferable, as the plaintiff sees things, to any other course of action.

⁶⁴ If a plaintiff has made a low investment, the defendant is better off going to trial than agreeing to a high demand. For inequality (9) in the text implies that $w^H - t$, the minimum value of a high demand, is greater than $w^L + t$, the defendant's expected loss from trial. The defendant should therefore refuse to settle for anything more than $w^L + t$.

⁶⁵ By (8) above, a plaintiff's expected gain from investing high and going to trial, which is $w^H - t$, exceeds his expected gain from investing low and making a low settlement demand, which is (at most) $w^L + t$.

which case plaintiffs will switch to investing low. There is no equilibrium in which the plaintiff follows a pure strategy of investing low or a pure strategy of investing high.

It follows, then, that plaintiffs will sometimes invest high; when they do, they will make a high demand. But defendants will sometimes refuse anything but a low demand. Since the defendant's decision is independent of the plaintiff's true investment level, there will be some cases in which the defendant refuses the high demand of a plaintiff who has made a high investment. A trial will result. Deriving the equilibrium level of trials in a signalling game of this sort is unnecessary for our purposes; it is enough to point out that there will inevitably be some trials when (9) is satisfied.

2. Two-Sided Asymmetric Information. - This analysis of also explains why the model's basic conclusions apply in cases where both parties, rather than just one, are making case preparation decisions. When both parties are making (and concealing) such decisions, then all offers are made by a party with private information about the case; the possibility thus arises that parties' offers will send signals about the strength of the case. As we have just seen, however, cases may still fail to settle when a (fully) informed party is the one to make the offer. A similar analysis governs settings involving two-sided informational asymmetries, in which a partially informed party makes the offer.

3. Preparation Levels. - The argument does not depend,

finally, on the assumption that there are only two possible preparation levels. Parties will no more follow pure strategies when there are many possible levels than when there are two. Suppose, for example, that there is a continuous distribution of possible investments, and that within this distribution there is an interval over which the marginal return to the claim from additional investment exceeds its marginal cost. The defendant (say), unable to observe the plaintiff's investment, will not follow a pure strategy of offering a particular amount. For if that amount corresponded to the minimum level of preparation on that interval, the plaintiffs would always make greater investments than that and go to trial -- meaning the defendant should increase his offer. But if instead the settlement offer corresponded to higher levels of investment, the plaintiffs would always make some lower investment -- meaning the defendant should lower his offer. For similar reasons, the plaintiffs are unlikely to follow pure strategies in choosing investment levels. And anytime the defendant makes an offer corresponding to a level of investment lower than the one actually made by the plaintiff, the case will fail to settle.

IV. INTERPRETATIONS

A. Assumptions

The argument developed in the previous two sections has rested on several more basic assumptions regarding the components

of case strength, the scope of disclosure, and the timing of events in litigation. One interpretive issue is whether these assumptions are plausible.

1. Components of Case Strength. - I have treated the evidence in a case as a fixed entity -- as something independent of the parties' case preparation. This is plainly an oversimplification. At the most obvious level, party effort is required to gather and present the evidence in court. Testimony and documentary evidence do not magically appear at trial; parties have to put their energies into tracking them down and bring them to the court's attention. At a more fundamental level, it might be pointed out that evidence in a case does not (or does not always) meaningfully exist independently of the parties' preparation efforts.⁶⁶ The documentary record must be assembled and organized; its evidentiary impact depends on how the parties undertake this task. The content of a witness's testimony depends on what she is asked, which in turn is a function of parties' pretrial efforts. Does it make sense, then, to speak of separate "fixed" and "variable" components of case strength?

I believe it does. There is some force to the idea that the content of evidence is hard to separate from the parties' effort in a case; but the point should not be overstated. The pool of available evidence is, at least in certain respects, beyond the

⁶⁶ See, for example, Fleming James, Jr., Geoffrey C. Hazard, Jr., & John Leubsdorf, Civil Procedure 255 (4th ed. 1992).

parties' power to affect. No amount of party effort can, for example, (legally) change the number of eyewitnesses to an accident -- though it can affect the impact of their testimony in court. Similarly, the content of documents (created before the dispute) bearing on the case -- a contract, say, or a premarketing crash test result -- is fixed, though their impact depends in part on how they are presented. To at least some extent, then, the pool of potential evidence resembles a fixed stock of capital for the parties. A party's "output" (case strength), to pursue the analogy, is determined jointly by her capital and labor inputs.

So far as the model is concerned, there is no need to insist that the content of the evidence be entirely fixed. Much of it can be treated as a function of party effort. All that matters is that there be some fixed aspects to the evidence, and that these remain concealed until the time of discovery -- a plausible enough assumption in many cases. This is enough to warrant the prediction that some cases will fail to settle before discovery.

2. Scope of Disclosure. - The argument has also assumed that the parties disclose no information about their case preparation, save for the evidence that turns up in the course of preparation. This too cannot be literally true. A party has ample opportunity to glean some information about her opponent's case preparation efforts: the evidence her opponent turns over in discovery may, for example, give some clues about the scope of her preparation; pretrial hearings and conferences will reveal

information about her opponent's legal theories and trial strategy. The protections created by the work product rule can never be complete in practice.

But they do not have to be, for purposes of the model. What matters is that parties be able to keep secret some information regarding the scope of their preparation that bears on the likely outcome of trial -- not necessarily all of that information. It is fair to speculate that some such secrets survive discovery and the pretrial conference period. For the scope of the work product rule remains a lively subject of litigation.⁶⁷ If the rule had no effect -- if the information it protects seeped out through channels other than discovery -- it is hard to see why anyone would fight in court about its scope.

3. Sequence of Events. - The third basic assumption of the model is that discovery and case preparation occur simultaneously. If they instead occur sequentially -- discovery first -- then the model would predict no trials. Cases would settle in the window following discovery, when asymmetries regarding the (pool of potential) evidence had been eliminated, and while it was still possible to place an expected value on the parties' Round 2 behavior. (Observe that, other things being equal, a party would prefer to defer investing in case preparation -- an unrecoverable expense -- as long as possible, in the hopes the case will settle first.)

⁶⁷ See, for example, 8 Charles A. Wright & Arthur R. Miller, Federal Practice and Procedure: Civil §§ 2021-34 (1970 & Supp. 1994), and cases cited there.

The true sequence of events is an empirical issue and must vary among cases. But there is reason to expect a fair amount of temporal overlap between discovery and case preparation. Even if there is only a single "wave" of discovery, it may take each party time to assimilate the information she has obtained from her opponent -- time during which she may be doing research, talking to experts, planning trial strategy, and making other case investment decisions. And the temporal overlap is even clearer in cases in which there are several waves of discovery.⁶⁸ This is enough to make the simultaneity assumption plausible in many cases.

B. Equilibrium

A central prediction of the model is that cases in which preparation makes a substantial difference at trial will sometimes go to trial, because parties will pursue mixed strategies. Exactly what does it mean to say that the parties will pursue mixed strategies in equilibrium. What does it mean, in other words, to claim that a plaintiff will make a high investment with probability α , and that the defendant will make a low offer with probability β ?

⁶⁸ Thus, for example, a party might make a discovery request following an initial investigation; use the fruits of that request to conduct more investigations, talk to consultants, and then make more requests; and so forth. This scenario does not make life entirely easy for the model, since (say) the plaintiff's successive discovery requests may send signals about her trial strategy or other aspects of her case preparation.

One appealing interpretation is to view the model as depicting a lawyer's management of a portfolio of cases. The lawyer (or law firm) representing the plaintiff, for example, might have a group of similar cases. The model's predictions would have the firm pursuing different courses of action in otherwise-similar cases -- investing a lot in case A, investing less in case B. Likewise, the defendant's lawyer might have a portfolio of similar cases; to say that the lawyer pursues a mixed strategy is to say that in some fraction of these cases, she makes (or recommends that her client make) a generous offer, and that in others she makes a lower offer.⁶⁹

An analogous interpretation involves organizational litigants embroiled in a slew of similar cases. These parties might take a different tack in otherwise-identical cases -- investing high in some but not others, or offering high in some but not others. Whether lawyers, or organizational litigants, behave in this fashion is an interesting empirical question.

An alternative interpretation would point to the existence of different lawyer types. Rather than having a lawyer randomize between different possible investment levels, the model could have two or more types of lawyer, each type defined by the investment level it chooses. Thus, one type of lawyer might consistently make a high investment, while another type might

⁶⁹ I put to one side the principal-agent issues raised by having the lawyer make the decision.

consistently make a low investment.⁷⁰ So long as the opponent has no way of telling which type he faces in a particular case, case outcomes will precisely match those predicted by the mixed strategy equilibrium -- even though no individual actually randomizes between different investment levels.⁷¹

V. CONCLUSION

Asymmetric information cannot be the only reason cases go to trial. There are too many other obstacles to settlement for this to be true: cognitive factors that prevent the parties or their lawyers from seeing the gains from settlement, even when information is symmetric; strategic bargaining that prevents the parties from agreeing on a division of gains they both know to exist; principal-agent problems that induce lawyers to reject settlement offers that their clients (if fully informed) would prefer to accept; and values that lead some litigants to prefer judicial resolution to settlement on any terms.⁷² But to the extent case strength is a joint function of exogenous factors and parties' litigation decisions, this article suggests informational asymmetries will cause some trials.

⁷⁰ The differences might be attributable to skill, diligence, or any number of factors.

⁷¹ On this approach to interpreting mixed-strategy equilibria, see John Harsanyi, Games with Randomly Perturbed Payoffs: A New Rationale for Mixed-Strategy Equilibrium Points, 2 Int. J. Game Th. 1 (1973).

⁷² See the articles cited in note 2 above. See also Owen M. Fiss, Against Settlement, 93 Yale L.J. 1073 (1984).

REFERENCES

- Bebchuk, Lucian A., "Litigation and Settlement under Imperfect Information," *Rand Journal of Economics*, 1984, Vol. 15, 404-15.
- Cooter, Robert, and Stephen Marks, with Robert Mnookin, "Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior," *Journal of Legal Studies*, 1982, Vol. 11, 225-54.
- Daugherty, Andrew F., and Jennifer F. Reinganum, "Endogenous Sequencing in Models of Settlement and Litigation," *Journal of Law, Economics, and Organization*, 1993, Vol. 9, 314-27.
- Fiss, "Against Settlement," *Yale Law Journal*, 1984, Vol. 93, 1073.
- Gould, John P., "The Economics of Legal Conflicts," *Journal of Legal Studies*, 1973, Vol. 2, 279-98.
- Harsanyi, John, "Games with Randomly Perturbed Payoffs: A New Rationale for Mixed-Strategy Equilibrium Point," *International Journal of Game Theory*, 1973, Vol. 2, 1.
- James, Fleming Jr., Geoffrey Hazard, and John Leubsdorf, *Civil Procedure*, 1992, 4th ed., 255.
- Landes, William M., "An Economic Analysis of the Courts," *Journal of Law and Economics*, 1971, Vol. 14, 61-97.
- Miller, Geoffrey P., "Some Agency Problems in Settlement," *Journal of Legal Studies*, 1987, Vol. 16, 189-213.
- Mnookin, Robert H., "Why Negotiations Fail: An Exploration of Barriers to the Resolution of Conflict," *Ohio State Journal of Dispute Resolution*, 1993, Vol. 2, 235-45.
- Nalebuff, Barry, "Credible Pretrial Negotiation," *Rand Journal of Economics*, 1987, Vol. 18, 198-211.
- P'ng, I.P.L., "Strategic Behavior in Suit, Settlement, and Trial," *Bell Journal of Economics*, 1983, Vol. 14, 539-55.
- Posner, Richard A., "An Economic Approach to Legal Procedure and Judicial Administration," *Journal of Legal Studies*, 1973, Vol. 2, 399-451.

- Schweizer, Urs, "Litigation and Settlement under Two-Sided Incomplete Information," *Review of Economic Studies*, 1989, Vol. 56, 163.
- Reinganum, Jennifer F., and Louis Wilde, "Settlement, Litigation, and the Allocation of Litigation Costs," *Rand Journal of Economics*, 1986, Vol. 17, 557-69.
- Shavell, Steven, "Suit, Settlement and Trial: A Theoretical Analysis under Alternative Methods for the Allocation of Legal Costs," *Journal of Legal Studies*, 1982, Vol. 11, 55-86.
- , "Sharing of Information Prior to Settlement or Litigation," *Rand Journal of Economics*, 1989, Vol. 20, 183, 189-91.
- Spier, Kathryn E., "The Dynamics of Pretrial Negotiation," *Review of Economic Studies*, 1992, Vol. 59, 93-101.
- Wright, Charles A., and Arthur R. Miller, "Federal Practice and Procedure," 1970 & Supp. 1994, 1970 & Supp. 1994, *Civil* §§ 2021-34.