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Reviewed work(s):

Source: *The Journal of Legal Studies*, Vol. 23, No. 1, Economic Analysis of Civil Procedure (Jan., 1994), pp. 435-463

Published by: [The University of Chicago Press](#) for [The University of Chicago Law School](#)

Stable URL: <http://www.jstor.org/stable/724329>

Accessed: 13/12/2012 12:50

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AN ECONOMIC MODEL OF LEGAL DISCOVERY

ROBERT D. COOTER and DANIEL L. RUBINFELD*

THE laws of procedure for state and federal courts in the United States permit each side in a dispute to submit questions that the other side must answer before the trial begins (“interrogatories”), interview the other side’s witnesses under oath (“depositions”), requisition documents, and inspect physical objects in dispute (“permission to enter land”). Requests for information can include any material relevant to the general subject of the dispute. Failure to respond fully and candidly to these requests can provoke a variety of sanctions by the court. As a whole, these laws are designed to enable each side to discover the other’s legal arguments and the facts on which they are based.

The American legal institution of discovery has been the subject of controversy since it developed this century, especially through reform of the federal rules of evidence in the 1930s.¹ The debate involves a variety of claims about the use and abuse of discovery.² From these claims, five

* Cooter and Rubinfeld are at the University of California, Berkeley. At various stages of this research we received helpful comments from Stephen Bundy and A. Mitchell Polinsky. John Leubsdorf read and corrected the article. The ideas in this article were initially presented at the first annual meeting of the American Law and Economics Association, in Champaign-Urbana, Illinois, May 1991, and at the Spring 1992 University of California, Berkeley, seminar on law, economics, and institutions. We also benefited from seminars at the law schools of the University of Virginia and the University of Michigan. Presented at the John M. Olin Program in Law and Economics Conference on “Economic Analysis of Civil Procedure” at the University of Virginia School of Law, March 26–27, 1993.

¹ See, for example, Mary Kay Kane & David I. Levine, *Civil Procedure in California: State and Federal* (1989); Jack H. Friedenthal, *A Divided Supreme Court Adopts Discovery Amendments to the Federal Rules of Civil Procedure*, 69 *Calif. L. Rev.* 806 (1981); Arthur R. Miller, *The Adversary System: Dinosaur or Phoenix?* 69 *Minn. L. Rev.* 1 (1984); and Jack B. Weinstein, *Comment: What Discovery Abuse? A Comment on John Setear’s The Barrister and the Bomb*, 69 *B.U.L. Rev.* 649 (1989).

² For commentary on the uses and abuses of discovery, see Wayne D. Brazil, *Views from the Front Lines: Observations by Chicago Lawyers about the System of Civil Discovery*, *Am. B. Found. Res. J.*, 1980, at 217; Stephen McG. Bundy & Einer Richard Elhauge, *Do Lawyers Improve the Adversary System? A General Theory of Litigation Advice and*

[Journal of Legal Studies, vol. XXIII (January 1994)]

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purposes of discovery can be distilled: (1) to increase the probability of settlement, (2) to increase the fairness and accuracy of settlements, (3) to improve the accuracy of trials, (4) to filter complaints better in order to terminate meritless disputes, and (5) to lower the transaction costs of resolving disputes.

This article sketches the contours of an economic analysis of legal discovery.³ The article is divided into two parts. Part I, the principle portion of the article, analyzes the five uses of discovery. Part II discusses two abuses of discovery and considers some tentative policy recommendations.

Before beginning our analysis, which is technical and detailed, we summarize its main conclusions. Trials occur when the parties are relatively optimistic about their outcome, so that each side prefers a trial rather than settlement on terms acceptable to the other side. When the parties are both optimistic (relative to the expected outcome with complete information), at least one of them is uninformed. Revealing information to correct the other side's false optimism creates an advantage in settlement bargaining for the disclosing party. This fact provides a strong incentive voluntarily to disclose facts correcting the other side's false optimism before trial. Consequently, discovery increases settlements and decreases trials by organizing the voluntary exchange of information.

Its Regulation, 79 Calif. L. Rev. 315 (1991); Frank H. Easterbrook, Comment: Discovery as Abuse, 69 B.U.L. Rev. 635 (1989); Geoffrey C. Hazard, Jr., Discovery Vices and Transsubstantive Virtues in the Federal Rules of Civil Procedure, 137 U. Pa. L. Rev. 2237 (1989); Francis E. McGovern & E. Allan Lind, The Discovery Survey, 51 L. & Contemp. Probs. 41 (1988); Note, Discovery Abuse under the Federal Rules: Causes and Cures, 92 Yale L. J. 352 (1982); John K. Setear, The Barrister and the Bomb: The Dynamics of Cooperation, Nuclear Deterrence, and Discovery Abuse, 69 B.U.L. Rev. 569 (1989); and David Shapiro, Some Problems of Discovery in an Adversary System, 63 Minn. L. Rev. 1055 (1979).

³ The analysis builds on the work of other economists: see Roger A. Bowles, Economic Aspects of Legal Procedure, in *The Economic Approach to Law* 191 (Paul Burrows & Cento G. Veljanovski eds. 1981); Robert D. Cooter & Daniel L. Rubinfeld, Economic Analysis of Legal Disputes and Their Resolution, 27 J. Econ. Lit. 1067 (1989); Louis Kaplow & Steven Shavell, Legal Advice about Information to Present in Litigation: Its Effects and Social Desirability, 102 Harv. L. Rev. 565 (1989); Thomas J. Miceli, The Impact of Pretrial Discovery on the Resolution of Legal Disputes (unpublished manuscript, Univ. Connecticut, Dep't of Economics, November 1990); Jeffrey Perloff & Daniel L. Rubinfeld, Settlements in Private Antitrust Litigation in *Private Antitrust Litigation* 149 (Lawrence White ed. 1988); Daniel L. Rubinfeld & David E. M. Sappington, Efficient Awards and Standards of Proof in Judicial Proceedings, 18 Rand J. Econ. 308 (1987); Steven Shavell, The Social versus the Private Incentive to Bring Suit in a Costly Legal System, 11 J. Legal Stud. 333 (1982); Steven Shavell, Sharing of Information prior to Settlement or Litigation, 20 Rand J. Econ. 183 (1989); Joel Sobel, Disclosure of Evidence and Resolution of Disputes: Who Should Bear the Burden of Proof? in *Game-theoretic Models of Bargaining* 341 (Alvin E. Roth ed. 1985); and Joel Sobel, An Analysis of Discovery Rules, 52 L. & Contemp. Probs. 133 (1989).

In contrast, each side loses an advantage in settlement bargaining by revealing information that corrects the other side's false pessimism. This fact provides a strong incentive to withhold information that corrects the other side's false pessimism. False pessimism about the outcome of trial promotes settlements. Consequently, discovery decreases settlements and increases trials by compelling the involuntary exchange of information.

A fair and accurate outcome requires courts to resolve cases by applying the law. A court has complete information when it possesses full knowledge of the law and all the facts that are relevant to the case. Complete information at trial results in a judgment that is accurate relative to existing law; to the extent that liability law is designed to internalize costs, accurate results will generate efficient incentives. Similarly, complete information in bargaining before trial promotes settlement on terms approximating the complete information judgment. By inducing a full exchange of information before trial, discovery can increase the accuracy and efficiency of settlements.

Discovery is misused when compliance costs more than the expected increase in the value of the requesting party's claim. Abuse is a knowing misuse. Under current law, the party making a discovery request does not pay all of the cost of complying with it. Thus current law promotes misuse and abuse by externalizing its costs. Discovery misuse and abuse can be eliminated by shifting the reasonable cost of compliance to the requesting party. A cost-shifting rule eliminates the need for courts to prevent discovery abuse or to assess the value of information to the requesting party.

When the parties agree to settle a dispute by dividing the bargaining surplus equally, the settlement corresponds to the expected judgment in the event of a trial, provided that the transaction costs of dispute resolution are equal for the two parties. In contrast, asymmetrical transaction costs distort the terms of settlement so that they do not correspond to the expected trial judgment. For example, if the plaintiff faces lower trial costs than the defendant, then the plaintiff can demand more than the expected judgment to settle the case.

Eliminating discovery abuse does not in itself align the terms of a rational settlement with the merits of the case. That alignment requires the parties with equal bargaining power to face equal transaction costs when resolving the dispute. To eliminate abuse and align settlements with the merits, we propose a two-part discovery rule in which the responding party bears the cost of compliance up to a specified level and the requesting party bears the reasonable cost of compliance with additional requests.

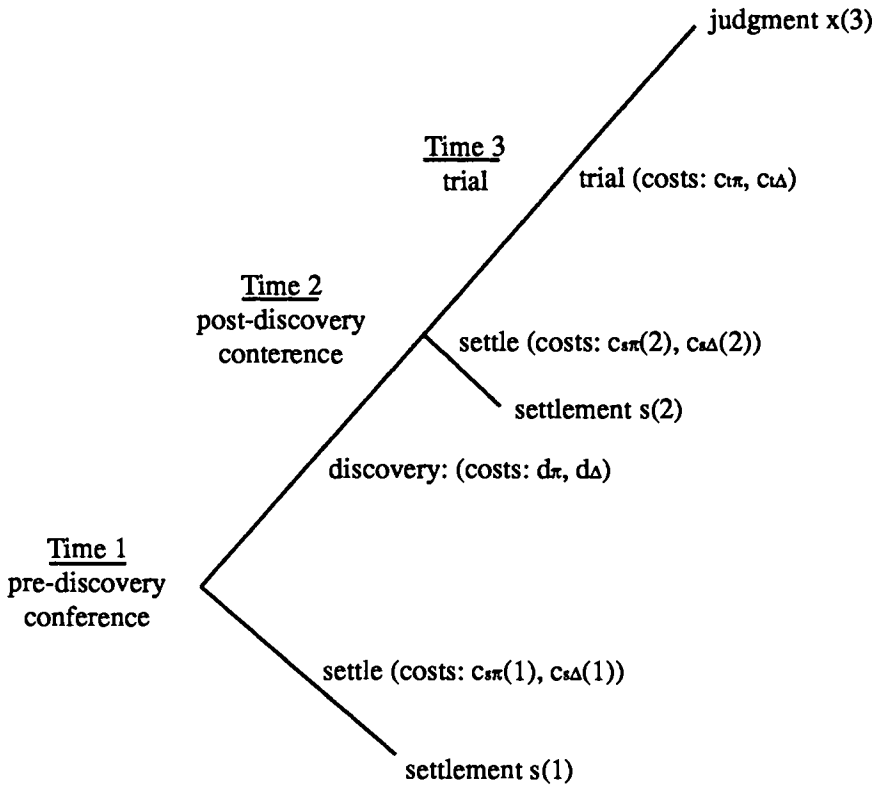


FIGURE 1.—The discovery game

These are our substantive conclusions. Now we describe the model from which they are derived. The model simplifies the stages of dispute resolution as depicted in Figure 1. At time 1 a complaint is filed, and the parties hold an initial conference. At this conference, they bargain successfully to a settlement $s(1)$, or they conduct discovery. If they conduct discovery, the parties hold another conference at time 2 after discovery, when they reach a settlement $s(2)$ or they go to trial. If the parties go to trial at time 3, it concludes in a monetary judgment, denoted $x(3)$.

In Figure 1, discovery either results in settlement at time 2 or trial at time 3. Part I of this article concerns the effect of discovery on the probability, cost, and terms of the settlement at time 2 or trial at time 3. Later, when we turn to discovery abuse, we consider how legal rules that regu-

late discovery influence its probability and extent. Consequently, Part II of the article examines the discovery-settlement split at time 1 in Figure 1.

I. PURPOSES OF DISCOVERY

The parties in a dispute have subjective expectations about the probable outcome of a trial. These subjective expectations are based on private information known only by one of the parties and shared information known by both of them. Discovery shares private information. If this process proceeds to its logical conclusion, all the information available to the parties is pooled. We begin our analysis of the purposes of discovery by considering the consequences of pooling information.

A. Probability of Settlement

The first purpose of discovery is to increase the probability of settlement. This purpose is achieved by enabling the parties in a dispute to pool information so as to predict the outcomes of a trial more accurately. We will describe this phenomenon precisely by developing some theorems based on Figure 1.

In Figure 1, the parties who go through discovery subsequently settle at time 2 or go to trial at time 3. Settlement bargaining is conducted in light of the parties' expectations about the trial judgment which they hold at time 2. Assume risk neutrality. Denote the parties' expected monetary judgments (the probability multiplied by the magnitude) at time 2 by $x_\pi(2)$ and $x_\Delta(2)$, respectively. In settlement bargaining at time 2, the plaintiff will not settle for less than his subjective expected trial judgment, $x_\pi(2)$, minus his trial costs, denoted $c_{i\pi}$. Similarly, the defendant will not settle for more than his subjective expected judgment $x_\Delta(2)$, plus his trial costs $c_{i\Delta}$. These are the subjective threat points of the parties at time 2.

A trial resulting in a judgment transfers a sum of money from defendant to plaintiff that could also have been agreed to in settlement bargaining. Bargaining to a settlement at time 2 costs plaintiff and defendant $c_{s\pi}(2)$ and $c_{s\Delta}(2)$, respectively. Consequently, any trial judgment x can be reproduced by a settlement $s(2) = x$ at time 2 that creates a savings equal to the difference between trial costs $c_t = (c_{i\pi} + c_{i\Delta})$ and settlement costs $c_s(2) = c_{s\pi}(2) + c_{s\Delta}(2)$.⁴ Optimism about trial will reduce the advantage that the parties perceive in settling. *Relative optimism* about trial exists when the judgment expected by the plaintiff exceeds the judgment ex-

⁴ We assume implicitly that the trial has no future consequences (for example, no reputation or precedential effects), so the parties only care about the judgment's money value.

pected by the defendant, or $x_{\pi}(2) > x_{\Delta}(2)$. In order for settlement to be possible, the savings in costs to the parties must exceed their relative optimism about trial:

$$\underbrace{c_t - c_s(2)}_{\text{transaction costs saved}} > \underbrace{x_{\pi}(2) - x_{\Delta}(2)}_{\text{relative optimism}}. \quad (1)$$

The oldest and simplest model of trials in the economic theory of litigation assumes that the existence of a surplus as given by condition (1) is both necessary and sufficient for settlement.⁵ Subsequent to this simple theory, many bargaining models have been applied to litigation. All have in common the assumption that the existence of a putative surplus as given by condition (1) is necessary for a settlement. However, this condition is not sufficient for a settlement in the more sophisticated theories which encompass strategic interaction. To avoid technical issues that are tangential to the article, we will adopt the simplest model of settlement bargaining and assume that the preceding necessary condition for settlement is also sufficient. In other words, settlement occurs if and only if the parties perceive a surplus from settlement over trial.

Let us continue to focus on time 2, when the parties decide to bargain to a settlement or go to trial. Notice that settlement condition (1) is most likely to be satisfied when relative optimism is small. Conversely, trials occur when plaintiff expects a large trial judgment, $x_{\pi}(2)$, and defendant expects a relatively small trial judgment, $x_{\Delta}(2)$. This fact can be formulated precisely. Suppose the plaintiff draws his subjective expected trial outcome at time 2 from the probability density function $f_{\pi}(x_{\pi}(2))$. Similarly, the defendant draws his subjective expected trial outcome from the probability density function $f_{\Delta}(x_{\Delta}(2))$. By assumption, a trial occurs when plaintiff draws an $x_{\pi}(2)$ whose value exceeds the defendant's draw of $x_{\Delta}(2)$ by at least $c_t - c_s(2)$. The probability of this occurring for any value $x_{\pi}(2)$, which is illustrated by the shaded zone in Figure 2, can be written

$$F_{\Delta}(x_{\pi}(2) - c_t + c_s(2)) = \int_0^{(x_{\pi}(2) - c_t + c_s(2))} f_{\Delta}(x_{\Delta}(2)) dx_{\Delta}(2).$$

This value is the probability of a trial conditional on plaintiff's expectation being $x_{\pi}(2)$. The unconditional probability of a trial must take ac-

⁵ Equivalently, the settlement gap, $(x_{\Delta}(2) - x_{\pi}(2)) + (c_t - c_s(2))$, which is the difference between the expected loss of defendant and the expected net gain of plaintiff, must be positive.

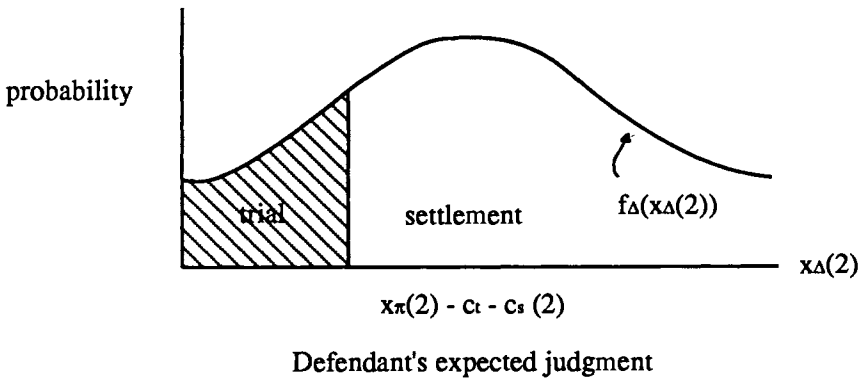


FIGURE 2.—The probability of trial conditional on the plaintiff's expectation $x_{\pi}(2)$

count of the probability of the plaintiff drawing expectation $x_{\pi}(2)$. Hence the unconditional probability at time 2 of a trial at time 3 is given by

$$\int f_{\pi}(x_{\pi}(2)) F_{\Delta}(x_{\pi}(2) - c_t + c_s(2)) dx_{\pi}(2). \quad (2)$$

This probability can be affected by discovery. Discovery pools information and thus changes the probability distributions $f_{\pi}(\cdot)$ and $f_{\Delta}(\cdot)$ relative to what they would be otherwise. Typically, we would expect discovery to move the discovering party's expectation closer to the full information trial outcome, while at the same time reducing the variance of the distribution of subjective expected values.⁶ It is analytically convenient, therefore, to distinguish between changes in the mean and the variance of the distributions. Discovery that decreases the mean of $f_{\pi}(\cdot)$ makes plaintiffs more pessimistic on average. Discovery that increases the mean of $f_{\Delta}(\cdot)$ makes defendants more pessimistic on average. Pessimism about trial by either party results in more settlements, as is formulated in the following proposition (which is proved in the Appendix).

PROPOSITION 1. Discovery that makes plaintiffs or defendants more pessimistic about trials on average (decreases the mean of $f_{\pi}(\cdot)$ or increases the mean of $f_{\Delta}(\cdot)$) increases the probability of settlements. Conversely, discovery that makes the parties more optimistic about trials on average increases the probability of trials.⁷

⁶ Other effects of discovery are forcing the discovered party to look closely at the facts and informing the discovered party about how much of its case the discovery party knows.

⁷ In a major survey of lawyers in federal cases, William Glaser, *Pretrial Discovery and the Adversary System* (1968), confirms our result that discovery can increase the likelihood of trial in several cases. However, the author neither provides a model of the discovery process nor tests any hypotheses explicitly.

Discovery not only affects the parties' average optimism and pessimism about trial, it also affects the variance in their expectations. A trial occurs in the small number of cases where the parties' expectations are drawn from the tails of the distribution representing extreme optimism about trial. As a result, a reduction in variance caused by the pooling of information can result in fewer trials. These intuitions are the basis for the following two-part proposition, which is proved in the Appendix.

PROPOSITION 2. (i) If $f(\cdot) = f_\pi(\cdot) = f_\Delta(\cdot)$ is unimodal, then discovery which leads to a mean-preserving reduction in the variance $f(\cdot)$ will increase the probability of settlement.⁸ (ii) If the mean of $f_\pi(\cdot)$ does not exceed the mean of $f_\Delta(\cdot)$ by more than c_i , and the difference between the distributions is unimodal, discovery which reduces the variance of either distribution will increase the probability of settlement.

Propositions 1 and 2 are based on a simple bargaining model that predicts when settlement will occur, but not its terms. The terms of an agreement divide the surplus from cooperation. There is no consensus among bargaining theories concerning the division of the surplus. One of the oldest and simplest theories assumes that, when the parties are symmetrically situated, a settlement gives each his threat value plus an equal share of the surplus—the “Nash bargaining solution.” Conversely, a common feature of bargaining models is that unequal divisions of the surplus arise from asymmetry in the positions of the parties. Depending on the model, an advantage goes to the player who moves first, or commits first, or moves last, or has better information, or is less averse to risk, or bears lower bargaining costs, or has a lower time discount rate.

To simplify the analysis, we will apply the Nash bargaining solution. Thus, in our model a dispute is settled at time period 2 by the defendant paying the plaintiff $s(2)$, which is given by the equation⁹

$$s(2) = \{(c_{i\Delta} - c_{i\pi}) + [c_{s\pi}(2) - c_{s\Delta}(2)] + [x_\pi(2) + x_\Delta(2)]\}/2. \quad (3)$$

Each party pays his own bargaining costs $c_{s\pi}$ and $c_{s\Delta}$. Note that the settlement increases if the relative cost of trial goes up for the defendant,

⁸ It is also relatively straightforward to show that, if $x_\pi(2)$ is given, a reduction in the variance of $f(x_\Delta(2))$ will increase the probability of settlement, and vice versa. More generally, the settlement probability is increased whenever the variance of the difference between the plaintiff's and the defendant's probability distributions is decreased.

⁹ The plaintiff's threat value is $x_\pi(2) - c_{i\pi}$, and the defendant's threat value is $-x_\Delta(2) - c_{i\Delta}$. The cooperative value of the game is $-c_i(2) = -c_{i\pi}(2) - c_{i\Delta}(2)$. The surplus is the cooperative value less the sum of the threat values, which equals $(c_i - c_s(2) - (x_\pi(2) - x_\Delta(2)))$. The Nash bargaining solution gives each his threat value plus half the surplus. This can be achieved by settling for $s(2)$ as given in equation (3) and having each party pay his own bargaining costs.

or the relative cost of settlement goes up for the plaintiff, or the plaintiff becomes more optimistic about trial, or the defendant becomes less optimistic about trial.

It is a relatively straightforward exercise to see how our results change if the bargaining strength of the parties is unequal. Suppose that the bargaining strength of the plaintiff is given by a parameter $0 \leq \beta \leq 1$. When $\beta = 0$, the plaintiff gets his threat value and none of the bargaining surplus, and when $\beta = 1$, the entire surplus goes to the plaintiff. Then, the settlement amount in (3) would be

$$s(2) = \{[\beta c_{i\Delta} - (1 - \beta)c_{i\pi}] + [(1 - \beta)c_{s\pi}(2) - \beta c_{s\Delta}(2)] \\ + [(1 - \beta)x_{\pi}(2) + \beta x_{\Delta}(2)]\}.$$

This formula has significant implications for the settlement bargaining process. According to (3), an increase in either the plaintiff's or the defendant's expectations about the trial judgment causes an increase in the settlement's value. Consequently, the plaintiff who anticipates a settlement will voluntarily disclose any information that causes the defendant to expect that a trial would result in a higher judgment (a larger $x_{\Delta}(2)$).¹⁰ This analysis assumes that the bargaining advantage is worth more than the gain from holding back information that would help the other side prepare for trial. Conversely, the plaintiff who anticipates a settlement will conceal any information that causes the defendant to expect that a trial would result in a lower judgment (a smaller $x_{\Delta}(2)$). Equivalently, the defendant who anticipates a settlement will voluntarily disclose any information that causes the plaintiff to expect a lower trial judgment (a smaller $x_{\pi}(2)$) and resist disclosing any information that causes the plaintiff to expect a higher trial judgment (a larger $x_{\pi}(2)$).

Sometimes economic actors tell all by saying nothing. For example, if one car manufacturer asserts that its car gets fifty miles to a gallon of gas, and a competing manufacturer says nothing about gas mileage, the rational consumer assumes that the alternative car gets less than fifty miles per gallon.¹¹ The equivalent phenomenon in pretrial bargaining is

¹⁰ If the parties anticipate a trial, they may not disclose some information that would have given them an advantage in settlement bargaining. Steven Shavell, *supra* note 3, at 183, suggests several reasons why plaintiffs may choose not to reveal private information: (i) it may be difficult to convince the defendant that private information is valid, and (ii) the surprise revelation of private information at trial may be more valuable than revelation during the normal course of discovery.

¹¹ See Paul R. Milgrom, Good News and Bad News: Representation Theorems and Applications, 12 Bell J. Econ. 380 (1981).

to infer the most optimistic conclusion from the other side's silence. In other words, if the other side explicitly corrects all my false optimism, I should assume the best until corrected. Insofar as this mechanism works, compulsory discovery is unnecessary.

There are, however, impediments to the effectiveness of such a mechanism. One impediment is that the two sides may not know how to dimensionalize all the private information. In other words, I may not have in mind all the kinds of information that the other side possesses, so I cannot infer from their silence that my optimism is justified. Another impediment is that you may not wish to reveal your pessimism to me for fear of alerting me to an advantage that I possess. In any case, this hypothetical mechanism must work imperfectly in fact, or else compulsory discovery would be more unusual than it actually is.

We have just explained why the parties have an incentive to voluntarily disclose information that makes the other party more pessimistic about trial and resist disclosing information that makes the other party more optimistic about trial. This argument can be combined with proposition 1 to reach a further conclusion about the effect of discovery on settlements. Proposition 1 asserts that the disclosure of information that makes its average recipient more pessimistic increases the probability of settlement, and the disclosure of information that makes its average recipient more optimistic decreases the probability of settlement. Combining these results gives this proposition:

PROPOSITION 3. Discovery that organizes the voluntary pooling of information increases the probability of settlement, and discovery that compels the involuntary pooling of information increases the probability of trials.

Sometimes discovery uncovers facts unknown to either party. The parties cannot predict in advance which side will be advantaged by such chance discoveries. Consequently, the parties do not know whether to obstruct or facilitate chance discoveries of facts unknown to either of them. They can know, however, that chance discoveries reduce variance, which, by proposition 2, increases the probability of settlement.

PROPOSITION 4. Facts found by chance in discovery, which reduce the variance of the distribution of subjective expected values, increase the probability of settlement.

B. Accuracy of Settlement

Earlier we distinguished between private and public information. A third concept is complete information, which includes everything that the parties would know if information were costless. We say that a court has

complete information when it possesses full knowledge of the law and all the facts that are relevant to the case. Complete information results in an accurate judgment, conditional on existing law, denoted x^* . The resolution of a dispute is both fair and accurate relative to existing law if the defendant pays x^* to the plaintiff as a settlement or trial judgment.

We will use the Nash bargaining solution to analyze whether discovery actually achieves accurate dispute resolutions.¹² Recall that the Nash bargaining solution requires the defendant to settle at time 2 by paying the plaintiff

$$s(2) = \{(c_{i\Delta} - c_{i\pi}) + [c_{s\pi}(2) - c_{s\Delta}(2)] + [x_{\pi}(2) + x_{\Delta}(2)]\}/2. \quad (3)$$

We will show very restrictive conditions under which equation (3) reduces to $s(2) = x^*$, as required for an accurate settlement. Assume that process costs in this case are symmetrical ($c_{i\pi} = c_{i\Delta}$ and $c_{s\pi}(2) = c_{s\Delta}(2)$), in which case the equation becomes $s(2) = (x_{\pi}(2) + x_{\Delta}(2))/2$. If the court's information is incomplete, but its errors are *unbiased*, the objectively expected trial judgment is accurate ($E(x) = x^*$). The "preponderance of the evidence" standard in civil disputes presumably promotes "unbiased errors" in this sense of the phrase. Assume that both parties expect the errors at trial to be unbiased ($x_{\pi}(2) = x_{\Delta}(2) = E(x) = x^*$). Under these assumptions, the Nash bargaining settlement as given by equation (3) reduces to the accurate judgment $s(2) = x^*$.

PROPOSITION 5. Assume that trials are unbiased ($E(x) = x^*$), as are the expectations of the parties about trial ($x_{\Delta}(2) = x_{\pi}(2) = x^*$). Also assume that the transaction costs of dispute resolution (the costs of settlement and trial) are symmetrical for the two parties ($c_{i\pi} = c_{i\Delta}$ and $c_{s\pi}(2) = c_{s\Delta}(2)$). Then the expected resolution of the dispute corresponds to the complete information trial judgment as required for accuracy ($E(x) = x^* = s(2)$).

From proposition 5 we can see how discovery contributes to the accurate resolution of disputes. Discovery affects the perceived merits of the case by helping to eliminate biased beliefs about trial. Aligning the subjective expectations of the parties with the merits of the case makes the rational settlement correspond to the complete information judgment.

To illustrate, suppose the plaintiff's expectations about the trial judgment at time 1 are unbiased, ($x^* = x_{\pi}(2)$) but the defendant is falsely pessimistic ($x^* < x_{\Delta}(2)$). The defendant's subjective threat position is weaker than the objective situation warrants, so it is rational for him to settle for more than x^* . However, if discovery corrected the defendant's

¹² If the bargaining power were unequally divided, the analysis would differ for obvious reasons.

false pessimism, the settlement would be restored to x^* , as required for accuracy. The same conclusion would be reached if we reverse the example and make the plaintiff falsely pessimistic; it would also hold in the converse case in which one of the parties is falsely optimistic. These results are formalized in the following proposition.

PROPOSITION 6. Assume that court errors are unbiased ($E(x) = x^*$) and transaction costs are symmetrical ($c_{i\pi} = c_{i\Delta}$ and $c_{s\pi}(2) = c_{s\Delta}(2)$). If the expectations of one party are falsely pessimistic at time 1 ($x^* < x_{\Delta}(1)$ or $x^* > x_{\pi}(1)$), then discovery which corrects false pessimism increases the accuracy of settlements $s(2) \rightarrow x^*$. If the expectations of one party are falsely optimistic ($x^* < x_{\pi}(2)$ or $x^* > x_{\Delta}(2)$), then discovery which corrects false optimism increases the accuracy of settlements $s(2) \rightarrow x^*$.

C. Accuracy of Trials

The third goal of discovery is to increase the accuracy of trials by improving the information available to the court. The court's information is allegedly improved by eliminating surprises, which provides time for deliberation and investigation of the opposing side's claims. As a result, discovery can lead to more thoughtful, considered arguments in court.

This claim can be restated more formally. The court observes x^* with error ϵ . The court's observation is *biased* if $E(\epsilon) \neq 0$. The court's observation is *erratic* if the variance of ϵ is large. An increase in the court's information makes its observations less biased and erratic. Discovery pools information *before* trial, which improves legal arguments and thus typically increases the court's information *after* trial.¹³ In other words, the proponents of discovery assert that the court's information after trial is typically better if information is pooled before trial rather than during it. To illustrate, the information from lengthy depositions and detailed documents may be available by discovery and unavailable at trial as a practical matter.

The claim that discovery increases the information available after trial is often true, but sometimes it is false. Discovery increases deliberation by facilitating lengthy interrogations and allowing time to reflect on the answers. Discovery, however, reduces spontaneity. Spontaneous answers are sometimes more candid and revealing than considered answers. ("When desperate, tell the truth.") The full justification of discovery requires a demonstration that deliberation is more likely than spontaneity to reveal the essential facts. A complete economic theory of discovery would thus model the trade-off between deliberation and spontaneity in revealing the truth.

¹³ It also reduces risk to the parties in the dispute.

D. Filtering Complaints

A rational plaintiff files a complaint and pursues it when the cost of doing so is less than the expected value of the claim. To analyze this issue fully, we drop our earlier assumption that the parties are risk-neutral, and, instead, we allow explicitly for risk aversion. Then the expected value of the claim at time 1 is the net payoff that settlement or trial yields to the plaintiff, adjusted for the probability of each, less the cost of bearing risk. The risk-bearing term is important because the reduction in risk caused by discovery makes risk-averse parties less willing to settle.

In our notation, the expected value of plaintiff's complaint at time 2, denoted $\pi(2)$, is given by

$$\pi(2) = p_{s2}(s(2) - c_{s\pi}(2)) + (1 - p_{s2})(x_{\pi}(2) - c_{t\pi}) - \sigma_{\pi}(2), \quad (4)$$

where p_{s2} is the probability that the case will settle at time 2 and $\sigma_{\pi}(2)$ is the plaintiff's risk-bearing cost at time 2. At time 1, the value of the claim, denoted $\pi(1)$, is given by

$$\pi(1) = p_{s1}(s(1) - c_{s\pi}(1)) + (1 - p_{s1})(\pi(2) - d_{\pi}) - \sigma_{\pi}(1), \quad (5)$$

where p_{s1} is the probability that the case will settle at time 1, and d_{π} is the cost of discovery to the plaintiff (see Figure 3).¹⁴

In general, the effect of discovery on filing and pursuing complaints can be analyzed by determining how discovery changes the expected value of a complaint as given by equation (5). When discovery provides information that increases the pessimism of the defendant ($x_{\Delta}(2)$ increases), other things being the same, the rational settlement $s(2)$ increases (by equation [3]). The same is true of $s(1)$, although we have not represented it explicitly. Consequently, the expected value of a claim $\pi(1)$ increases (by equation [5]). Similarly, an increase in the defendant's pessimism increases the probability of a settlement (by proposition 1), which presumably causes an increase in the expected value of a claim (by equation [5]).¹⁵ When the value of a claim $\pi(1)$ increases, more claims will be filed. Thus discovery which provides information that increases the pessimism of defendants increases the number of claims filed.

The same conclusion is reached more cautiously when discovery increases the plaintiff's optimism. When discovery provides information that increases the optimism of the plaintiff (x_{π} increases), the expected settlement (either $s(1)$ or $s(2)$) increases, which causes an increase in the expected value of a claim (by equation [5]). However, an increase in the

¹⁴ A similar expression holds for the defendant.

¹⁵ It is assumed that settlements are more advantageous than trials to both parties.

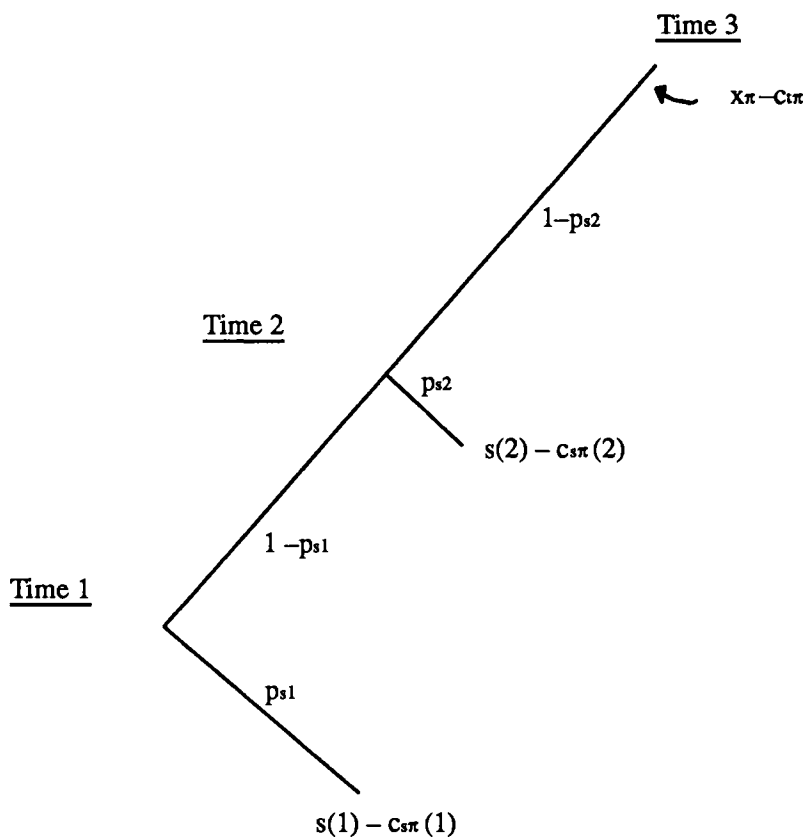


FIGURE 3.—Valuing plaintiff's claim

plaintiff's optimism also increases the probability of a trial (by proposition 1), which presumably causes a decrease in the expected value of a claim (by equation [5]). Consequently, pure theory is ambiguous about whether the number of filed claims will increase or decrease. Theory aside, it seems likely that the former effect will outweigh the latter, so that discovery that increases the optimism of plaintiff will increase the value of a claim $\pi(1)$ and, thus, cause more claims to be filed. These arguments can be summarized as follows:

PROPOSITION 7. Discovery that increases (decreases) the pessimism of defendants causes more (fewer) complaints to be filed. Discovery that increases the optimism (pessimism) of plaintiffs causes more (fewer) complaints to be filed, assuming that the probability of disputes ending in trials does not increase.

Now we remark on the effect of discovery on claims with little merit. On the one hand, discovery may cause plaintiffs to drop claims motivated by false optimism. For example, an injured plaintiff who mistakenly suspects that the harm was caused by the defendant's negligence will file a general complaint, discover that the facts disconfirm his suspicion, and drop the claim. On the other hand, discovery can exacerbate asymmetries in process costs that create an incentive to pursue unmeritorious claims solely to extract a settlement, as we explain later.

E. The Transaction Costs of Resolving Disputes

The transaction costs of the legal process are primarily bargaining costs, discovery costs, and litigation costs. We will consider the effect of additional discovery on the expected transaction costs which follow it. Discovery shifts the pooling of information from trial at time 3 to the litigation-settlement decision at time 2. Thus an increase in discovery costs " d " usually causes a fall in trial costs c_t , and possibly a change in bargaining costs $c_s(2)$ as well. These are the direct effects of discovery on transaction costs.

In addition, discovery changes the probability that the parties will bargain to a settlement at time 2, rather than proceeding to trial. The change in the probability of a settlement causes a change in expected transaction costs, which we call the indirect effect of discovery on transaction costs.

Letting " Δ " denote a change in a variable, the two effects of discovery on transaction costs can be written in our notation as follows:

$$\underbrace{\Delta d + (1 - p_{s2})\Delta c_t + p_{s2}\Delta c_s(2)}_{\text{direct effect}} + \underbrace{(\Delta p_{s2})(c_s(2) - c_t)}_{\text{indirect effect}}. \quad (6)$$

Insofar as additional discovery increases the probability of a settlement ($\Delta p_{s2} > 0$), the indirect effect results in lower transaction costs ($c_s(2) - c_t < 0$). The direct effect, however, probably goes in the opposite direction and increases transaction costs. To see why, consider that private facts can become public in discovery or trial. Discovery of an additional fact has the certain cost Δd , whereas postponing the uncovering of the additional fact until trial has the probability-discounted cost of $(1 - p_{s2})\Delta c_t$. Thus discovery substitutes a certain cost for a possible cost. The expected cost of uncovering a fact at trial is unlikely to be as high as the certain cost of discovering the additional fact.

Empirical evidence indicates that over 90 percent of cases filed are

settled out of court,¹⁶ so that $1 - p_{s2}$ is approximately equal to .1. Thus the cost of finding a fact by discovery must be around 10 percent of the cost of finding it through a trial in order for discovery to save transaction costs directly. However, the saving is probably not of the order of 90 percent that would be needed to offset the increase in certainty of the expenditure.¹⁷ We conclude that any reduction in transaction costs caused by discovery must result from the indirect effect of reducing the frequency of trials, not the direct effect of pooling information before, rather than during, trials.

II. DISCOVERY ABUSE AND FAIR RESOLUTION OF DISPUTES

A. *The Concept of Abuse*

This article has focused on the supply of information. We now turn more briefly to the demand for information. We want to define discovery misuse and abuse in a way that clarifies current law and practice. From this perspective, misuse or abuse occurs when the gain to the requesting party is out of proportion relative to the cost of compliance. In general, we can define discovery misuse as discovery whose compliance costs more than the expected increase in value to the requesting party's claim. Discovery abuse is defined as a knowing misuse.¹⁸ We will show that discovery misuse and abuse by rational parties can be eliminated by shifting the reasonable cost of compliance to the party making the request. Since cost shifting eliminates both misuse and abuse, the distinction is not so important to this article and we do not dwell on it.

For purposes of exposition, assume that the defendant alone has private information, and therefore the plaintiff is the discovering party. Additional discovery benefits the plaintiff by increasing the expected value of his legal claim. Recall that $\pi(2)$, the expected value of the plaintiff's legal claim at time 2, is given by equation (4):

$$\pi(2) = p_{s2}(s(2) - c_{s\pi}(2)) + (1 - p_{s2})(x_{\pi}(2) - c_{i\pi}) - \sigma_{\pi}(2).$$

The change in $\pi(2)$ caused by additional discovery is denoted $\Delta\pi(2)$.

¹⁶ We define settlement broadly to include suits that are dropped after filing. See Perloff & Rubinfeld, *supra* note 3, for one example of a broad definition of settlements.

¹⁷ To illustrate, obtaining facts by deposition may be less expensive than by cross-examining a witness in the course of a trial. A deposition can be taken in a law office or hotel room with the witness, two lawyers, and a stenographer. In contrast, cross-examination must occur before the full court. Thus discovery lowers transaction costs by shifting information gathering from an expensive to an inexpensive forum. These cost savings, however, are unlikely to be of the order of 90 percent. Also note that discovery is paid by the parties to the dispute, but some court costs are borne by the state.

¹⁸ We are grateful to Ed Cooper for distinguishing abuse and misuse. See his Comment on Discovery Cost Allocation, in this volume.

Discovery imposes costs on the plaintiff who makes the requests and the defendant who complies with them; these costs are denoted d_π and d_Δ , respectively. Similarly, the costs of additional discovery, relative to an arbitrary baseline, are Δd_π and Δd_Δ , respectively. Using the definition above, additional discovery is misused by the plaintiff if the change in his expected benefit is less than the additional cost to him and to the defendant:

$$\underbrace{\Delta \pi(2)}_{\pi\text{'s benefit}} < (\underbrace{\Delta d_\pi}_{\pi\text{'s cost}} + \underbrace{\Delta d_\Delta}_{\Delta\text{'s cost}}) \rightarrow \text{discovery misuse.} \quad (7)$$

Misuse is abuse if the objective expectation $\pi(2)$ is also the requesting parties' subjective expectation.

In practice, the Federal Rules of Civil Procedure impose a two-pronged test for discovery abuse. First, a party must answer questions reasonably calculated to have material bearing on the case.¹⁹ Second, answering the question must not impose an undue burden or expense.²⁰ This two-pronged test is applied *ex ante* when a judge decides whether a party must comply with a discovery request, and also *ex post* under Rule 11 when a judge must decide whether discovery abuse has already occurred and compensation is due.²¹ Often the general rules are implemented through local practices, such as automatically allowing thirty interrogatories and requiring justification for more.

Our definition of discovery abuse in equation (7) provides an interpretation of the two-pronged test in cases where the plaintiff seeks damages from the defendant. The first prong of the test requires discovery to increase the expected value of the requesting party's legal claim. In other words, we interpret "material bearing" to mean "change in expected value of the claim." The critical phrase in the test, which appears in the

¹⁹ Thus, Rule 26(b)(1) states in part, "Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the pending action."

²⁰ According to Rule 26(b)(1), "[D]iscovery . . . shall be limited . . . if . . . (iii) the discovery is unduly burdensome or expensive, taking into account the needs of the case, the amount in controversy, limitations on the parties' resources, and the importance of the issues at stake in the litigation."

²¹ As revised in 1983, Rule 11 imposes an objective test of reasonableness, not a good-faith subjective test. Thus the rule states, "[T]o the best of the signer's knowledge, information, and belief formed after reasonable inquiry it is well grounded in fact and is warranted by existing law or a good faith argument for the extension modification, or reversal of existing law, and that it is not interposed for any improper purpose, such as to harass or to cause unnecessary delay or needless increase in the cost of litigation."

second prong, is “undue burden.” We use the balancing test of equation (7) to interpret this phrase. Thus (abstracting from risk-bearing costs), the second prong requires the increase in the value of the requesting party’s claim to exceed compliance costs. In other words, discovery is abused if the expected value of the information to the requesting party is less than the cost of compliance.

To clarify current law and practice, we have defined discovery misuse and abuse by reference to private interests of the parties in civil disputes. Consequently, our definition does not build “social welfare” or “social efficiency” into it. Later we will discuss social welfare.

B. Eliminating Abuse by Shifting Costs

Why does discovery misuse or abuse occur? Under current U.S. law, the plaintiff pays most of the cost of making an additional discovery request, and the defendant pays much of the cost of complying with it. Assume that the plaintiff and defendant cannot cooperate together and reach a mutual agreement to constrain discovery. In the absence of such an agreement, the rational plaintiff will conduct additional discovery as long as the resulting increase in the value of his legal claim exceeds the cost to him of making the request. When the sign reverses and the cost to him exceeds the benefit, the rational plaintiff will stop conducting additional discovery:

$$\Delta\pi(2) < \Delta d_{\pi} \rightarrow \text{stop discovery.} \quad (8)$$

By comparing expressions (7) and (8), it is easy to see that the rational plaintiff will not stop conducting discovery until he has gone beyond the point where it becomes abusive:²²

PROPOSITION 8. Assume that $\pi(2)$ is a concave function of d_{π} . If the parties act noncooperatively and each bears his own cost of complying with discovery requests, then the plaintiff will conduct discovery whose incremental cost exceeds the expected increase in the value of the legal claim (abusive discovery).

Suppose the current law were changed so that the reasonable cost of complying with a discovery request were shifted to the party who made it. Now the rational plaintiff will conduct additional discovery until the resulting increase in the value of his legal claim equals the cost of making the request and complying with it. As a result, he stops short of abuse:

$$\Delta\pi(2) \leq (\Delta d_{\pi} + \Delta d_{\Delta}) \rightarrow \text{stop discovery.} \quad (9)$$

²² A similar proposition holds for the defendant.

The correspondence between (7) and (9) leads to the following proposition:

PROPOSITION 9. Assume that $\pi(2)$ is a concave function of d_π . If the parties act noncooperatively and compliance costs of discovery are shifted to the requesting party, then the plaintiff (defendant) will conduct discovery until the incremental cost equals or exceeds the expected increase (decrease) in the value of the legal claim (nonabusive discovery).

So far we have discussed requests for facts whose expected value to the requesting party is less than the transaction costs of producing them. This can be called “informational abuse.” In contrast, “impositional abuse” is a request for facts in order to impose compliance costs on the other party. The threat of impositional abuse is used solely to extract a settlement. Under a cost-shifting rule, however, the requesting party can only threaten to impose costs on himself. Thus a cost-shifting rule completely eliminates impositional abuse.

This argument can be explained using our model. The threat to impose additional discovery costs must be made at time 1 in our model, prior to discovery. It is not hard to see that a credible threat by the plaintiff to impose discovery costs on the defendant will increase the rational settlement value, denoted $s(1)$.²³ The increase in $s(1)$ in turn causes the value of the plaintiff’s claim to increase. To illustrate this, the value of the plaintiff’s claim at time 1, denoted $\pi(1)$, can be read off Figure 3 as follows:

$$\pi(1) = p_{s1}(s(1) - c_{s\pi}(1)) + (1 - p_{s1})(\pi(2) - d_\pi) - \sigma_\pi(1). \quad (10)$$

A credible threat of impositional discovery abuse increases $\pi(1)$ by increasing $s(1)$.²⁴ However, a cost-shifting rule prevents the plaintiff from imposing discovery costs on the defendant, so $s(1)$ does not increase when the plaintiff credibly threatens more discovery.

We note in passing the possibility of another novel abuse that might arise if U.S. law were revised in order to shift discovery costs but not trial costs. Under these rules, a party requesting information during discovery must pay the cost of producing it. If, however, a party postpones the request until trial, the other party must bear the cost of producing it.

²³ The Nash bargaining solution can be written $s(1) = p_{s2}Es(2) + (1 - p_{s2})(x_\pi(1) + x_\Delta(1))/2 + \{(d_\Delta - d_\pi) + (1 - p_{s2})(c_{t\Delta} - c_{t\pi}) + p_{s2}(c_{s\pi}(2) - c_{s\Delta}(2)) + (c_{s\pi}(1) - c_{s\Delta}(1))/2\}$, where $Es(2)$ indicates the expected value of the rational settlement at time 2. An increase of \$1 in d_Δ causes $s(1)$ to increase by \$1/2, ceteris paribus. Note that this result holds whatever the division of bargaining power between the two parties.

²⁴ Note that to make a credible threat of excessive discovery, the plaintiff must be able to commit to conducting excessive discovery. Or else the plaintiff must play the game repeatedly and value her reputation for toughness.

By postponing requests for information until the trial begins, the cost of producing them will be born by the complying party rather than the requesting party. Consequently, discovery might be deficient.

While possible in theory, the likelihood of this abuse seems remote in practice. Judges will not allow trial time to be devoted to hunting for evidence. If this kind of abuse should prove to be problematic, it could be dampened by modifying the cost-shifting rule. Instead of shifting the full cost of complying with incremental discovery requests, the amount shifted could be discounted by the expected reduction in trial costs. To illustrate, assume that complying with a discovery request by the plaintiff costs the defendant Δd_Δ and producing the same facts at trial would have cost the defendant $\Delta c_{i\Delta}$. Under the revised rule, the amount of cost shifted to the plaintiff would equal $\Delta d_\Delta - (1 - p_{s2})\Delta c_{i\Delta}$. Then, the plaintiff has little incentive to postpone finding facts until trial.²⁵

Finally, another novel form of abuse could arise from cost shifting. Under current law, parties sometimes discourage discovery by resisting it. With a cost-shifting rule, a party might discourage discovery requests by inflating the costs of complying with them. For example, the defendant who is subject to discovery might hire a more expensive lawyer or waste time gathering documents. This kind of abuse is dampened by the fact that the court only shifts "reasonable" costs of compliance.

One might object to marginal cost shifting on the grounds that wealth constraints limit the ability of plaintiffs to file and pursue meritorious suits. The willingness of attorneys to take cases on contingent fees should substantially mitigate this concern. (In effect, the contingent fee system is like a perfect capital market.) In addition, this concern is further mitigated by limiting cost shifting to the costs of complying with marginal requests, as explained in the next section.

C. *Accurate Resolution of Disputes*

Earlier we defined accuracy as the resolution of a dispute on terms corresponding to the complete information judgment. In this section, we explain how the allocation of discovery costs affects the accurate resolution of disputes.

As proved in proposition 5, the expected resolution of disputes corresponds to the complete information trial judgment as required for accuracy, assuming (i) a Nash bargaining solution (equal bargaining strength) exists, (ii) the parties correctly expect unbiased trials, and (iii) their trans-

²⁵ From the expression for $s(1)$ in note 23 *supra*, it is easy to see that an increase in Δd_Δ and an equal increase in $(1 - p_{s2})\Delta c_{i\Delta}$ leaves $s(1)$ unchanged, *ceteris paribus*.

action costs are symmetrical.²⁶ When applied to discovery, this proposition yields the following generalization:

PROPOSITION 5'. Assume symmetry in settlement and court costs for the two parties. Also assume that trials are unbiased, that the parties have equal bargaining strength, and that discovery eliminates bias in expectations about trial by the parties. If the law allocates an equal share of the cost of reasonable discovery to the two parties, the dispute will be resolved on terms corresponding to the complete information trial judgment.

The accurate resolution of disputes relative to existing law is a goal that seems attractive for legal policy. Its pursuit requires achieving symmetry in the transaction costs of dispute resolution, which requires rethinking all the rules of legal procedure. We do not advocate using discovery rules to correct asymmetrical transaction costs in particular cases. However, we do advocate the more modest goal of equalizing the burden of discovery by inframarginal cost shifting. (The next section suggests how one might do this in practice.) In that way, discovery will not introduce any additional inaccuracy into dispute resolution.²⁷

D. Toward a "Best" Discovery Rule

Now we can suggest how a two-part rule might eliminate discovery abuse and also promote the accurate resolution of disputes.²⁸ According to this rule, the responding party bears the cost of discovery compliance up to a specified level, and the requesting party bears the reasonable cost of complying with additional requests. The switching point is computed to preserve symmetry in discovery costs.

To illustrate, suppose the plaintiff has much to discover and little to reveal. (Perhaps the plaintiff is the passive victim of monopoly practices, or perhaps this is a class action in which the defendant only wants information on the representative nature of the class.) The two-part rule would require the defendant to bear the costs of reasonable compliance up to a level deemed appropriate for this class of cases, beyond which the rea-

²⁶ Proposition 5 proved that $s(2) = x^*$. If we also assume symmetrical discovery costs ($d_\pi = d_\Delta$), then it is easy to show that $s(1) = x^*$.

²⁷ Note that the condition for "no abuse" given by equation (9) has no necessary connection to symmetry in the transaction costs of dispute resolution. Equation (9) is a marginal condition created by internalizing the cost of discovery requests. Symmetry is an inframarginal condition in which the parties face equal costs of discovery, settlement, and trial.

²⁸ This rule presumes equal-bargaining power. Such a rule would need to be modified if it were known that the parties had unequal bargaining power.

sonable costs of complying with further discovery requests would shift to the plaintiff.²⁹

Under the preceding assumptions, it is not hard to see why a two-part rule is more advantageous than the simple alternatives. A discovery rule of "each pays his own costs" encourages discovery abuse by the plaintiff. Alternatively, a rule that shifts all discovery costs (both marginal and inframarginal) will impose much larger costs on the plaintiff than the defendant. Consequently, the rational settlement will be less than the expected judgment, thus favoring the defendant. So the simple rules ("each bears his own costs" or "all cost shifted") result in discovery abuse or inaccuracy. In contrast, the two-part cost-shifting rule can achieve both objectives. The two-part rule can make the requesting party bear the cost of marginal discovery, which eliminates the incentive for abuse, and the two-part rule can make the defendant bear enough of his compliance costs to achieve symmetry in transaction costs, which results in an accurate settlement.

As stated above, the two-part cost-shifting rule requires compliance costs to be shifted after they reach the "switching point." We will illustrate the computation of the switching point, which we denote α . Assume as before that the plaintiff is making a discovery request. The defendant bears his own reasonable compliance costs up to α , after which they are shifted to the plaintiff. Thus the discovery cost allocation rule for requesting and responding parties is

$$\text{requesting party (plaintiff) bears:} \quad \begin{array}{ll} d_{\pi} & \text{for } d_{\Delta} < \alpha, \\ d_{\pi} + d_{\Delta} - \alpha & \text{for } d_{\Delta} \geq \alpha, \end{array}$$

and

$$\text{responding party (defendant) bears:} \quad \begin{array}{ll} d_{\Delta} & \text{for } d_{\Delta} < \alpha, \\ \alpha & \text{for } d_{\Delta} \geq \alpha. \end{array}$$

The cost-shifting point α can ideally be selected to achieve symmetry in discovery costs. Specifically, α is chosen so that after the parties have chosen discovery levels d_{π}^* and d_{Δ}^* ,

$$\alpha = (d_{\pi}^* + d_{\Delta}^*)/2. \quad (11)$$

²⁹ The Advisory Committee on Civil Rules advocates an explicit cost-benefit test to limit discovery. The proposal would amend Rule 26(b)(1)(a)(iii) to read as follows: a court shall limit discovery where "the burden or expense of the proposed discovery outweighs its likely benefit, taking into account the needs of the case, the amount in controversy, the parties' resources, the importance of the issues at stake in the litigation, and the importance of the proposed discovery in resolving the issues." See Ralph K. Winter, In Defense of Discovery Reform, 58 Brooklyn L. Rev. 263 (1992), at 265.

As long as the defendant's cost of responding to plaintiff's discovery request is at least α , the marginal cost of \$1 of discovery to the requesting party will be \$1, which will cause the requesting party to internalize the cost of marginal discovery.

To illustrate, suppose that a plaintiff's reasonable discovery requests cause a defendant to expend \$2,000 in order to comply, while the defendant's reasonable requests impose compliance costs of \$1,000 on the plaintiff, and transactions costs are otherwise symmetrical. Then the appropriate value of α would be \$1,500. Plaintiff would then pay \$1,000 responding to defendant's request, plus \$500 of the defendant's compliance costs, for a total of \$1,500. The defendant would pay the \$2,000 cost of responding to the plaintiff's requests and receive \$500 from the plaintiff. Thus the net expenditures on discovery would be \$1,500 for each party as required for accuracy, and each party would internalize the marginal cost of discovery as required to eliminate abuse.

To avoid strategic behavior it is important that α be independent of the actual discovery costs in the case. In other words, the parties must regard α as determined exogenously, not as determined by their actual discovery. Otherwise, each party would not internalize the cost of its marginal discovery. One way to achieve this objective is to have the courts calculate α based on average values for similar cases in the past.

III. CONCLUSION: REMARKS ON POLICY

Among animals like elk or mountain sheep, the males often strut and display before fighting, and the probable loser often concedes without a fight. If animals had discovery, their combat rituals would include exchanging exact information on height and weight. Like animal rituals, discovery ideally reproduces the expected results of conflict at lower costs.

Trials often occur because one side in the dispute underestimates the strength of the opposing case. People willingly reveal advantageous facts that correct their opponent's false optimism. Discovery rules merely facilitate disclosure of advantageous facts. In some countries, discovery does not go much beyond facilitating voluntary exchanges.³⁰ However, in the United States, discovery also compels disclosure of disadvantageous facts, which do not increase the probability of settlement but, rather, align its terms with the merits of the case. Compulsory discovery invites

³⁰ In Belgium, involuntary disclosure in civil disputes requires a request to a judge to order production of particular materials, which lawyers are reluctant to do. See Code Judiciaire de Belgique, Articles 870–82. We are grateful to Vincent Horsmans for this information.

misuse and abuse.³¹ To encourage nonabusive discovery and to promote settlements on the merits, courts should consider applying a two-part discovery rule, where the responding party bears the cost of discovery compliance up to a specified level and the requesting party bears the reasonable cost of complying with additional requests.

We clarify current law and practice by defining "misuse" as a discovery request whose expected value to the requesting parties is less than the cost of complying with it. Discovery abuse can be eliminated by shifting the reasonable cost of compliance to the party making the request. This reform seems desirable in terms of principles imbedded in current U.S. law, specifically the principle that each party should bear his own legal costs and the principle that discovery abuse should be suppressed.

Besides this principled advantage, cost shifting is desirable for practical reasons. Under current law, the judge must identify discovery abuse by estimating the expected value of the information to the party making the request. The judge is poorly placed for making such computations. Indeed, this task is so difficult that Wayne Brazil and others propose large changes in practice to depart from the adversarial method and have the judge manage the case.³² Cost shifting is a much simpler solution. To shift costs, the judge must determine whether the cost of compliance as stated by one of the parties is reasonable. Nothing more is required of the judge. This task is commensurate with the information a judge actually possesses or can obtain.

Looking toward a higher goal, the switch to a cost-shifting rule will also increase social welfare. As defined, discovery abuse occurs when the cost of compliance with a discovery request exceeds the *private* value of the information to the requesting party. The private value includes a large element of redistribution, as the two sides vie to win the stakes. Redistribution has little or no social value. Consequently, discovery that is excessive relative to the requesting parties' private value must be even more excessive relative to social value. It follows that replacing current

³¹ Practitioners have told us that abuse usually involves excessive interrogatories and document production. Abusive depositions are less common. The scholarly literature listed uniformly concurs with the conclusion that discovery abuse is a significant problem. See Charles B. Renfrew, *Discovery Sanctions: A Judicial Perspective*, 67 Calif. L. Rev. 264 (1979); and works listed in note 2 *supra*.

³² Wayne D. Brazil, *The Adversary Character of Civil Discovery: A Critique and Proposals for Change*, 31 Vand. L. Rev. 1295 (1978); and Wayne D. Brazil, *Improving Judicial Controls over the Pretrial Development of Civil Actions: Model Rules for Case Management and Sanctions*, Am. B. Found. Res. J., 1981, at 873.

law with a cost-shifting rule, which dampens discovery abuse, must increase social welfare.

By informing the parties concerning the facts, discovery encourages settlements of disputes on the merits. Settlement on the merits is encouraged by symmetry in transaction costs, as well as information. Symmetry in discovery costs can be achieved by "marginal cost shifting," in which each party bears the cost of compliance up to a specified level and additional compliance costs are shifted to the requesting party. This refinement on cost shifting increases the accuracy of settlements at the cost of creating practical problems of administration. However, restricting cost shifting to marginal discovery might diminish political resistance to legal reform, which is practically important, even though the ultimate goal should be to make dispute resolution more accurate and efficient, not to equalize the impact of reforms.

APPENDIX

PROOFS OF SELECTED PROPOSITIONS

The order of the proofs of the first two propositions has been reversed in order to simplify the presentation.

PROPOSITION 2. Let $f(x)$ represent the probability density function of possible expected trial outcomes x . (i) If $f(\cdot) = f_\pi(\cdot) = f_\Delta(\cdot)$ is unimodal (single-peaked), then discovery which leads to a mean-preserving reduction in the variance $f(\cdot)$ will increase the probability of settlement. (ii) If the mean of $f_\pi(\cdot)$ does not exceed the mean of $f_\Delta(\cdot)$ by more than c_t , and the difference between the distributions is unimodal, discovery which reduces the variance of either distribution will increase the probability of settlement.

Proof. i) Let p_s = probability of settlement. Also, let $y = x_\pi - x_\Delta$. To simplify the notation, we omit the reference to the fact that the postdiscovery settlement decision comes at time 2. We presume that a case settles when $y < c_t - c_s$. Therefore,

$$p_s = \text{prob}(x_\pi - x_\Delta < c_t - c_s).$$

Alternatively,

$$p_s = G(c_t) = \int \text{prob}(x_\pi < x_\Delta + c_t - c_s | x_\Delta) f(x_\Delta) dx_\Delta,$$

or

$$p_s = \int F(x_\Delta + c_t - c_s) f(x_\Delta) dx_\Delta. \quad (\text{A1})$$

The function $G(\cdot)$ represents the cumulative distribution function associated with the density function representing the difference between the identical densities $f_\pi(x_\pi)$ and $f_\Delta(x_\Delta)$. The proof follows from the properties of the $G(\cdot)$ function. Specifically,

$$g(c_t) = \int f(x_\Delta + c_t - c_s) f(x_\Delta) dx_\Delta. \quad (\text{A2})$$

It can be shown that $g(\cdot)$ is unimodal and symmetric with mean zero. In addition, the variance of $g(\cdot)$ falls in response to a decrease in the variance of $f(\cdot)$.

Note also that $g(0)$, the maximum density of $g(\cdot) = \int f(x_\Delta)^2 dx_\Delta$. It follows that a mean-preserving decrease in the variance of $f(\cdot)$ causes $g(0)$ to increase (since $f(0)$ increases as the density function of $f(\cdot)$ becomes less dispersed). Since the variance of $g(\cdot)$ has also declined, it follows that $p_s = G(c_t - c_s)$ must increase (the tail of the distribution of $g(\cdot)$ that lies above $c_t - c_s$ has diminished in magnitude).

ii) Because the mean of $f_\pi(\cdot)$ is not greater than the mean of $f_\Delta(\cdot)$ by $c_t - c_s$, and discovery that reduces the variance of either $f_\pi(\cdot)$ or $f_\Delta(\cdot)$ reduces the variance of $g(\cdot)$, which is unimodal, it follows that $p_s = G(c_t - c_s) < 1/2$ with $g'(c_t - c_s) > 0$. Then, discovery that reduces the variance of either $f_\pi(\cdot)$ or $f_\Delta(\cdot)$ reduces the variance of $g(\cdot)$. This in turn causes the maximum density of $g(\cdot)$, $g(0)$, to increase. As in the proof of part i, it follows immediately that p_s must increase.

PROPOSITION 1. Discovery which makes plaintiffs or defendants more pessimistic about trials on average (that is, decreases the mean of $f_\pi(\cdot)$ or increases the mean of $f_\Delta(\cdot)$) increases the probability of settlements. Conversely, discovery which makes the parties more optimistic about trials on average increases the probability of trials.

Proof. Generalizing from (1) above to the case in which the plaintiff's and defendant's expectations differ, we find that

$$\begin{aligned} p_s &= \text{prob}(x_\pi - x_\Delta < c_t - c_s) \\ &= G(c_t - c_s) \\ &= \int F_\Delta(x_\pi + c_t - c_s) f_\pi(x_\pi) dx_\pi. \end{aligned} \tag{A3}$$

Let $\Pi = (x_\pi - x)$ represent plaintiff's optimism. False optimism is reduced when $\Pi > 0$ falls to $\Pi - \delta$. Now p_s becomes $\text{prob}(x_\pi - x_\Delta < c_t - c_s + \delta) = G(c_t - c_s + \delta)$. But recall that since G is a cumulative distribution function, $G(\cdot)$ is increasing in its argument. Consequently, the probability of settlement will increase.

PROPOSITION 5. Assume that trials are unbiased ($E(x) = x^*$), as are the expectations of the parties about trial ($x_\Delta(2) = x_\pi(2) = x^*$). Also assume that the transaction costs of dispute resolution (the costs of settlement and trial) are symmetrical for the two parties ($c_{t\pi} = c_{t\Delta}$ and $c_{s\pi}(2) = c_{s\Delta}(2)$). Then the expected resolution of the dispute corresponds to the full information trial judgment as required for fairness ($E(x) = x^* = s(2)$).

Proof. The proposition follows directly from equation (3) in the text. With symmetry, $s(2) = (x_\pi(2) + x_\Delta(2))/2$. In addition, both parties perceive the trial to be unbiased, so that $x_\pi(2) = x_\Delta(2) = x^*$. It follows that $s(2) = x^*$.

PROPOSITION 6. Assume that court errors are unbiased ($E(x) = x^*$) and transaction costs are symmetrical ($c_{t\pi} = c_{t\Delta}$ and $c_{s\pi}(2) = c_{s\Delta}(2)$). If the expectations of one party are falsely pessimistic at time 1 ($x^* < x_\Delta(1)$ or $x^* > x_\pi(1)$), then discovery which corrects false pessimism increases the accuracy of settlements ($s(2) \rightarrow x^*$). If the expectations of one party are falsely optimistic ($x^* < x_\pi(2)$ or $x^* > x_\Delta(2)$), then discovery which corrects false optimism increases the accuracy of settlements ($s(2) \rightarrow x^*$).

Proof. Suppose that the settlement process leads to the Nash bargaining solution, in which the parties divide up the surplus from cooperation. Since $E(x) = x^*$, the plaintiff's putative threat value, the plaintiff's expected value if the case is not settled, is given by

$$x^* + x_\pi(1) - c_{t\pi} - c_{s\pi}(2). \tag{A4}$$

Likewise, defendant's putative threat value is

$$-x^* + x_{\Delta}(1) - c_{t\Delta} - c_{s\Delta}(2). \quad (\text{A5})$$

Since the noncooperative value of the game is ((A4) + (A5)), and the cooperative value of the game is zero, the putative surplus obtained by settling is given by $-(\text{A4}) - (\text{A5})$, or

$$-(x_{\Delta}(1) + x_{\pi}(1)) + (c_{s\pi}(2) + c_{s\Delta}(2)) + (c_{t\pi} + c_{t\Delta}). \quad (\text{A6})$$

It follows that the plaintiff's expected settlement is given by (A4) + (1/2)(A6), or

$$x^* + \{(1/2)(x_{\pi}(1) - x_{\Delta}(1)) + (1/2)[(c_{s\Delta}(2) - c_{s\pi}(2)) + (c_{t\Delta} - c_{t\pi})]\} \\ = x^* + B. \quad (\text{A7})$$

An accurate settlement occurs when the expected settlement amount $= x^*$. Hence a decrease in the absolute value of B brings settlement closer to the merits. It follows that, for $c_{t\pi} = c_{t\Delta}$ and $c_{s\pi}(2) = c_{s\Delta}(2)$, any policy which reduces the optimism of the plaintiff will decrease the absolute value of B if the false optimism of the plaintiff is greater than defendant's false optimism. More generally, any policy which reduces the optimism of the plaintiff will improve the accuracy of a settlement if the false optimism of the plaintiff is greater than the sum of defendant's false optimism and the difference between defendant's and plaintiff's trial costs.

PROPOSITION 8. Assume that $\pi(2)$ is a concave function of d_{π} . If the parties act noncooperatively and each bears his own cost of complying with discovery requests, then the plaintiff will conduct discovery whose incremental cost exceeds the expected increase in the value of the legal claim (abusive discovery).

Proof. The concavity assumption insures that if the plaintiff increases d_{π} up to the point at which $\Delta\pi(2) = d_{\pi}$, that a global maximum point (rather than minimum or local maximum) will have been reached.

PROPOSITION 9. Assume that $\pi(2)$ is a concave function of d_{π} . If the parties act noncooperatively and compliance costs of discovery are shifted to the requesting party, then the plaintiff will conduct discovery until the incremental cost equals or exceeds the expected increase in the value of the legal claim (nonabusive discovery).

Proof. The concavity assumption insures that a global maximum is obtained.

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