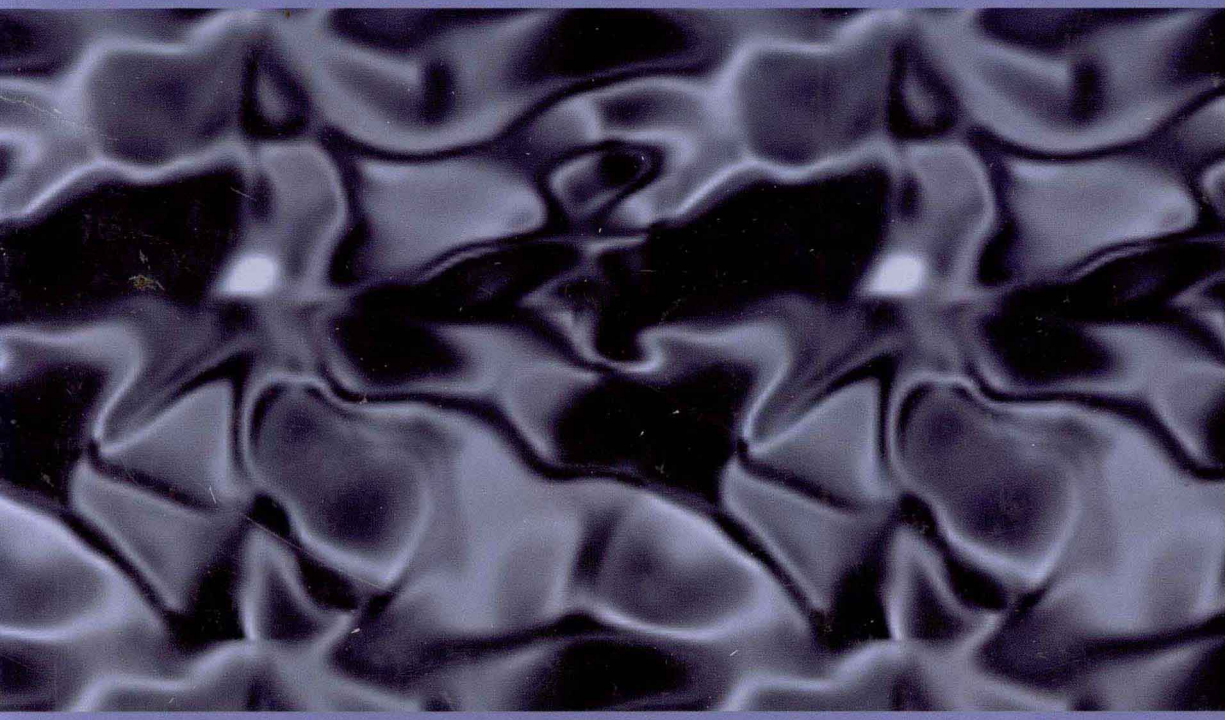
Economics of Evidence, Procedure and Litigation

VOLUME I

Edited by **Chris William Sanchirico**



ECONOMIC APPROACHES TO LAW 13

Economics of Evidence, Procedure and Litigation Volume I

Edited by

Chris William Sanchirico

Professor of Law, Business and Public Policy,
University of Pennsylvania Law School
and The Wharton School, USA

ECONOMIC APPROACHES TO LAW

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Introduction to Volume I

Chris William Sanchirico

This volume and Volume II anthologize the economic analysis of legal disputes. The object of both volumes is to provide the reader with a sense of the basic landscape of economic thinking regarding this central social institution. The expository premise is that this objective is best accomplished by identifying and organizing the articles that form the major features of that landscape and then letting the articles speak for themselves.

The division of articles across these two volumes is driven primarily by modeling structure and is only roughly in line with divisions in the legal curriculum. Although Volume I corresponds vaguely to Procedure, and Volume II to Evidence, the precise dimension along which the articles are sorted is the level of detail with which they treat the process of trying cases. Articles in Volume I model trial in 'reduced form'. Most dramatically, in many of these articles, trial process is summarized by a single fixed number: the probability of plaintiff victory. The focus in these articles is on events that surround and are influenced by trial rather than on trial itself. Such events include, most notably, the decision to sue, the settlement of disputes out of court and 'primary activity' behavior, such as contractual performance, product design or precaution in hazardous activities. Articles in Volume II delve into the workings of trial process itself. The objective of these articles is both to understand trial process on its own terms and to investigate the interaction between the actual mechanics of trial, on the one hand, and filing, settlement, and primary activity behavior on the other hand.

The papers in Volume I are further subdivided according to how fully they account for parties' litigation spending decisions. Models examined in the first half of this volume include only the plaintiff's decision whether to file suit and the parties' joint decision whether to settle. These models do not include parties' decisions concerning how much to spend on filed suits that remain unsettled. Topics covered by the papers in Part I include settlement negotiations, fee allocation rules, negative expected value suits, discovery and the role of litigation in setting primary activity incentives. Part II of Volume I considers models in which the parties choose not just whether to sue and settle, but also how much to spend litigating filed and as yet unsettled suits. Adding this decision variable to the model increases its complexity. But endogeneity in litigation spending appears to be an empirically important determinant of overall litigation costs and, as the papers included in this part show, adding such endogeneity to the analysis can significantly alter key results.

The remainder of this Introduction attempts to connect and contextualize the articles included in this volume. Reference is made to the larger scholarly literatures in which these articles reside, as well as to the real legal phenomena that these articles strive to address. Like the volume itself, the Introduction is crafted for a dual audience: economists interested in legal issues and legal scholars interested in the economic approach. Each may wish to make allowances for attempts to reach the other.

Part I: Models with Exogenous Litigation Spending

A. Settlement and Plea Bargaining: Cooperative Game Theory Approach

Most legal disputes settle out of court.[1] Correspondingly, much, if not most, of the economic literature on legal disputes concerns settlement. Two approaches dominate the field.

The first approach has much in common with 'cooperative game theory', a branch of game theory concerned more with the existence of mutually beneficial arrangements than with the process by which such arrangements are made.[2] In the most basic version of this approach, two risk-neutral disputants come to the bargaining table, each with expectations of how well they would fare if negotiations broke down. The plaintiff's walk away payoff, her 'threat point', is the expected value of her uncertain winnings at trial less the litigation costs she expects to incur in obtaining those winnings.[3] The defendant's threat point is the expected value of how much he would lose at trial plus the cost of his defense.[4] These 'threat points' are common knowledge, but they may be based on differing probabilistic beliefs over litigation outcomes.[5]

The questions typically asked of this model are two: will the parties settle? And for how much will they settle? The question whether the parties will settle is generally answered with a 'no' if the most that the defendant would be willing to pay the plaintiff to drop the suit falls short of the least that the plaintiff would be willing to accept to drop the suit – i.e. if the defendant's threat point is less than the plaintiff's. The amount, if any, by which the defendant's threat point *exceeds* the plaintiff's is generally referred to as the 'settlement surplus'. The existence of a settlement surplus is thus a necessary condition for settlement.[6]

Assuming that a settlement surplus exists and that a deal is struck, how much will the defendant end up paying the plaintiff? The 'settlement range' is the interval above the plaintiff's threat point and below the defendant's. (To say there is a settlement surplus, therefore, is to say that the settlement range is non-empty.) The model predicts that the settlement amount will lie somewhere in the settlement range, but it says little about its precise location. Nevertheless, it is sometimes assumed – occasionally invoking cooperative game theory's 'Nash bargaining solution'[7] – that the parties 'split the surplus evenly', which is to say that the settlement payment lies at the midpoint of the settlement range. In this case, the parties' payoffs from settlement exceed their respective threat points by the same absolute amount.

This approach enters the literature on litigation in Gould (1973; Chapter 2), portions of Landes (1971; Chapter 3),[8] and portions of Posner (1973; Chapter 1).[9] Posner lays out the structure just presented and identifies the factors that determine whether a surplus exists and where the settlement range is located. This analysis appears as well in Gould, who additionally describes the interesting implications of risk aversion and risk preference. Landes studies the problem of plea bargaining.

B. Settlement and Plea Bargaining: Asymmetric Information Models

The cooperative game theoretic approach to settlement bargaining has much to recommend it, including its explication of the role of threat points and its relative simplicity. But it is lacking in certain important respects. Most significantly, perhaps, it does not capture the role of hidden information. It seems clear that each party enters into settlement negotiations with only limited

information about her opponent's threat point, just as employers and potential employees enter into salary negotiations with only some sense of the others' outside options. This creates important dynamics in the process of settlement. Two such dynamics, in particular, have been extensively studied.

The first dynamic focuses on the guesswork involved in making a settlement offer not knowing what the other side is willing to accept. A fundamental tradeoff arises in determining how much to offer. On the one hand, the offeror generally wants to obtain as much of the surplus for herself as possible. This desire leads her to propose an offer that is less favorable to her opponent. On the other hand, this offer may be the last chance to reach a deal, and the offeror does not want to spoil the chance of garnering any of the surplus at all by holding out for too much. The offeror, therefore, finds herself facing a tradeoff similar to that faced by a monopolist, who, in deciding whether to raise her price, balances a higher price for each unit still sold against the possibility of selling fewer units. The result of the tradeoff is also similar: just as there is too little production under monopoly, there are too few settlements under incomplete information.

Bebchuk (1984; Chapter 4)[10] studies this tradeoff in the context of settlement. In his model, the defendant possesses private information about the likely trial outcome. The uninformed plaintiff makes a 'take it or leave it offer' to the defendant. If the defendant rejects the offer, negotiations end and the case goes to trial.

Spier (1992; Chapter 5) extends the model in Bebchuk to allow the plaintiff to repeatedly return with a revised offer should the defendant reject earlier offers. Under certain parametric assumptions, settlement in her model tends to occur either at the start of negotiations or immediately prior to the trial date, a finding that resonates with actual practice.

The second important informational aspect of settlement negotiations is the possibility that offers signal private information.[11] Parties might hope to signal the strength of their position by making an offer that is unfavorable to the other side. Of course, their bargaining counterparts might anticipate this 'strategy' and reject the offer. Reinganum and Wilde (1986; Chapter 6) sort out some of the strategic logic implicated by this dynamic. In their model, the plaintiff is privately informed about the level of her damages and makes a take-it-or-leave-it settlement demand to an uninformed defendant. In one equilibrium, plaintiffs who have suffered greater harm make higher settlement demands, and the defendant rejects higher settlement demands with higher probability. The defendant's strategy produces for the plaintiff a monopoly-like decision problem similar to that in Bebchuk: raising the settlement demand yields higher payoffs when the defendant accepts, but also lowers the chance of acceptance. The equilibrium 'separation' of plaintiffs according to the harm they have suffered is made possible by the fact that more severely harmed plaintiffs, who would win more in court, care less about the possibility that their demand will be rejected, which is the downside of raising the settlement demand.

Asymmetric information settlement models are admirable for their mathematical sophistication and for their insistence on explicitly modeling the information dynamics of settlement bargaining. Whether they are more appropriate than cooperative game theoretic models, however, probably depends on the application. Neither dominates the other. While the older model ignores hidden information dynamics, the newer model remedies this omission only for certain special configurations of hidden information and at the expense of adopting bargaining structures that seem implausibly rigid.

C. The Selection of Disputes for Litigation

What can be deduced about the larger set of disputes from the characteristics of the smaller set of cases that are actually tried? The question is important because information regarding tried cases is relatively abundant, and one might wish to make use of this information in judging how legal rules affect out of court behavior.

As noted, many claims are settled before trial. The process of settlement thus acts as a filter along the flow of disputes from primary activity to trial.[12] In order to make deductions about the characteristics of disputes based on the characteristics of tried cases, therefore, one must understand the properties of this filter. In particular, only if the set of disputes that pass through settlement and onto trial is effectively a random selection of filed suits will averages and rates calculated for the set of tried cases be unbiased estimates of the same averages and rates for the full set of filed cases.[13] The percentage of plaintiffs who win at trial, for instance, will reflect the percentage of filed cases that the plaintiff would win were they tried, only if the set of unsettled cases is a random sample of the set of filed cases.

Priest and Klein (1984; Chapter 7)[14] point out, however, that the process of settlement is such that the set of tried cases will not generally constitute a random sample of the set of filed cases. They dramatize the point with two stark results. First, whatever the composition of filed cases, most tried cases will be close calls. The level of defendant's 'fault' discovered by the court, for example, will tend to lie close to the threshold level of fault for assigning liability. Second, whatever the composition of filed cases, as parties' own estimates of the defendant's fault level become more accurate, the frequency with which plaintiffs win in tried cases will approach 50%.

Priest and Klein's 50% win-rate result has garnered much attention. It is important to note, however, that even within the confines of the Priest and Klein model, the 50% win rate result applies only in the limit as parties' estimates of the defendant's fault level become more and more accurate. Outside of this limit, the Priest-Klein model does not generate a 50% plaintiff win rate at trial, as Priest and Klein are careful to note. Indeed, allowing the shape of the distribution of defendant's fault level and/or the legal standard to vary, the Priest-Klein model is consistent with any plaintiff win rate at trial.

A number of papers have emphasized the fragility of the 50% win rate result. Often these papers defeat the result by adding additional features to the Priest-Klein model rather than removing its assumptions. Wittman (1988) emphasizes the role of the plaintiff's filing decision. Hylton (1993) emphasizes the role of the plaintiff's decision whether to continue to prosecute his case following a breakdown in settlement negotiations.

Shavell (1996; Chapter 8) also examines the dearth of theoretical prediction regarding plaintiff win rates outside Priest-Klein's limiting case. He does so in the context of an asymmetric information settlement model, as discussed in Section B, above. Shavell emphasizes that not only does theory predict no particular plaintiff win rate at trial, but it also predicts no particular plaintiff win rate at trial *given* the plaintiff win rate among all filed cases.[15] In addition, Shavell's article contains several useful footnotes fleshing out the formal structure of the Priest-Klein model.

Waldfogel (1995; Chapter 9) submits the Priest-Klein model to empirical testing. He finds that a revised Priest-Klein model is supported by the data. Most importantly, he demonstrates that although deductions about the full set of filed cases should generally not be made from

tried cases *as if the latter were a random sample*, it is in fact possible to make such deductions properly given enough data on the properties of the settlement filter.

D. The Allocation of Legal Costs

In the United States, each party generally bears the bulk of her own litigation costs whether or not she prevails. Other countries, such as the United Kingdom, have generally adopted a 'loser-pays' rule,[16] whereby the losing party pays both parties' costs. Cataloguing the plusses and minuses of each cost allocation rule has been one of the chief occupations of the economic analysis of evidence and procedure.

Posner (1973; Chapter 1) discusses the effect on the settlement surplus (defined above) of shifting from a pay-your-own rule to a loser-pays rule. He shows that when parties' probabilistic beliefs about trial are identical, the settlement surplus is equal to the sum of the parties' litigation costs (net of settlement costs) under both rules. Thus, in this special case, the cost allocation rule has no effect on the likelihood of settlement.[17] He also briefly describes the effect of a loser-pays rule on settlement when parties are risk averse.

Shavell (1982; Chapter 10) expands on Posner's analysis to include the plaintiff's decision to file suit and the impact on settlement when the parties disagree about the probabilities of litigation outcomes. He finds that, contrary to intuition, shifting to a loser-pays rule would not necessarily reduce the number of filed suits. The extreme case is easiest to see. Under a regime in which parties pay their own costs, a plaintiff who is certain that she will win at trial might still not bring suit if the award that she would obtain is lower than her costs. Such a plaintiff would, however, file under a loser-pays rule, which from her confident perspective is in effect a defendant-pays rule.

Shavell further explains why a loser-pays rule would not necessarily encourage settlement. To take the extreme case again, imagine that the plaintiff and defendant are both sure they will win at trial. Then, under a pay-your-own rule, the defendant's threat point is merely his costs, while the plaintiff's threat point is the award she is sure she will win less her costs. A mutually beneficial settlement could still exist because the defendant's litigation costs might well exceed the award less plaintiff's litigation costs.[18] Under a loser-pays rule, however, the defendant, expecting both to win *and* to have his costs reimbursed, would offer nothing to the plaintiff: his threat point would be zero. The plaintiff, on the other hand, also expecting to win and have her costs reimbursed would accept nothing less than the award. No mutually beneficial deal would exist.

Bebchuk (1984; Chapter 4) also considers fee allocation rules in the context of his uninformed-offeror model of settlement bargaining. He finds that settlement is more likely under a pay-your-own rule. Less turns on the outcome of the suit under a pay-your-own rule, and when this is the case, the adverse selection problem preventing efficient settlement is less severe. Reinganum and Wilde (1986; Chapter 6) also consider fee allocation rules in the context of their informed-offeror model. They find that the probability of settlement is unaffected by choice of fee allocation rules.

The effect of cost allocation rules is also significantly altered by the introduction of endogenous litigation expenditure. We take up this point below in Part II, Section B, concerning endogenous litigation spending models.

In principle (and practice), there is no reason why fee allocation rules must be keyed exclusively to the outcome of the lawsuit.[19] Miller (1986; Chapter 11) analyzes 'offer of settlement' rules, under which cost allocation following trial depends not just on who wins, but also on how parties behave during settlement negotiations. He focuses, in particular, on the American FED. R. CIV. P. 68, under which a plaintiff who refuses a defendant's settlement offer and then wins less than this offer at trial must pay the defendant's post-offer costs. Miller explains that such rules do not necessarily increase the likelihood of settlement, as one might imagine. It is true that, facing any given settlement offer from the defendant, the plaintiff is more likely to accept it given the potential penalty imposed by the rule if she does not. But it is reasonable to expect defendants to respond to the rule by presenting plaintiffs with less favorable offers. The net result on the likelihood of plaintiff's acceptance is unclear.

E. Negative Expected Value Suits

A perennial policy issue regarding litigation is the extent to which the system encourages or discourages 'frivolous' lawsuits. 'Frivolous' is a controversial term with many potential definitions. The economic analysis has focused on the possibly overlapping category of Negative Expected Value (NEV) suits. These are suits that would cost the plaintiff more to prosecute than she expects to win.

The literature has been concerned with explaining the dual puzzle – inspired by empirical observation – that plaintiffs file NEV suits and that defendants settle them. This is a puzzle because a rational defendant would never agree to make any settlement payment to an NEV plaintiff, given that such a plaintiff would never actually choose to prosecute the case should negotiations fail. An NEV plaintiff would thus never find it worthwhile to pay the (albeit minor) cost of filing such a suit in the first place.

Bebchuk (1988; Chapter 12) locates the rationality of filing NEV suits in information asymmetries. The defendant may propose a positive settlement offer to an NEV plaintiff if the defendant is not sure whether the plaintiff has an NEV suit or not. Knowing this, an NEV plaintiff may well file.

An alternative rationale is offered in Bebchuk (1996; Chapter 13). This paper considers the effect of the fact that litigation costs are not typically paid all at once, but rather in piecemeal fashion. The plaintiff, expecting to win \$90, at a litigation cost of \$100 would not go forward with the suit if the \$100 had to be paid all at once. But suppose the \$100 was paid in two installments of \$50, one on Monday morning and one on Tuesday morning. Then in settlement negotiations on Monday afternoon, assuming the plaintiff had paid the first \$50 that morning, the plaintiff's threat to go forward on Tuesday would be credible: she would win \$90 at a cost of \$50. Therefore, a settlement might be reached. In this settlement, the plaintiff's threat point would be \$40, and potentially she might negotiate for more, depending on the defendant's costs and her negotiating skills. If she expected to obtain \$60, say, then in settlement negotiations on Sunday afternoon, her threat to pay the \$50 on Monday morning would be credible. Paying the \$50 on Monday morning would enable her to obtain her \$60 in negotiations on Monday afternoon. Therefore, she would indeed file suit on Sunday morning, rationally expecting to settle the case that afternoon for at least \$10.

F. Discovery

Discovery is the formal state-enforced process by which parties share information prior to trial. Certain information must be automatically disclosed to the other side. Potential trial witnesses may be interrogated (deposed) under oath in real time and on record. And parties may force their opponents to provide documents and tangible evidence for inspection. In many cases, the bulk of which are small stakes suits, there is little discovery. In large stakes cases, however, discovery plays a major role and is a significant portion of overall litigation expenses.[20]

Cooter and Rubinfeld (1994; Chapter 14) discuss the effects of discovery on the likelihood of settlement. They identify two countervailing forces. First, because discovery organizes and facilitates the exchange of information prior to trial, it encourages settlements. The cooperative game theoretic approach to settlement implies that parties are more likely to settle when their views about trial are aligned. Discovery aligns their views. Second, mandatory discovery may induce a party to reveal information that corrects her opponent's mistaken pessimism about his chance of winning at trial. In this way, discovery may discourage settlement.

Hay (1994; Chapter 16) questions Cooter and Rubinfeld's assertion that, absent mandatory discovery, a party could prevent the other side from learning unfavorable information. Hay argues that a failure to disclose may lead the other side to make an adverse inference that is worse for the suppressing party than the adverse inference that would result from disclosure. Hay also argues for placing more weight than do Cooter and Rubinfeld on the accuracy-enhancing effects of discovery. Mandatory discovery generates more information for trial than would be available were parties unable to compel their opponents to turn over unfavorable information.

Farber and White's (1991; Chapter 15) empirical findings regarding discovery seem roughly in line with the theoretical papers just discussed. In a study of malpractice claims, they find that the plaintiffs in their sample generally file suit with little information about the value of their cases, hoping to learn more through discovery. Discovery does in fact provide valuable information, leading either to voluntary dismissal or settlement. If discovery indicates that the plaintiff's claim is not valuable, the plaintiff typically drops the suit. If discovery indicates that the suit has value, then the parties typically settle.

G. Litigation and Primary Activity Incentives

The papers considered so far have been for the most part positive rather than normative. Settlement models, for example, answer the questions whether settlement will occur and at what amount, without considering whether this is good or bad, at least not explicitly. The literature on NEV suits is directed at the puzzle of why such suits might be filed, without considering whether they should be. The literature on cost allocation considers what effect different allocation rules have on filing and settlement, not explicitly which rule is best. The articles in the current section, by contrast, although still reduced form models of litigation, take up the explicitly normative question: what *should* litigation look like?

Shavell (1982; Chapter 17) identifies two external effects from the plaintiff's decision to file suit, one positive and one negative. In deciding whether to file, the plaintiff weighs her own litigation expenses but not the defendant's. The defendant's litigation expenses are part

of the social cost of litigation, and the plaintiff's failure to account for them means that, to this extent, the private incentive to file suit is excessive from a societal viewpoint. On the other hand, the plaintiff also fails to take into account that her readiness to file suit helps to create socially valuable primary activity incentives for defendants. The plaintiff is, to this extent, doing society's work without remuneration. This positive externality points in the direction of insufficient filing from a social standpoint.

Following Shavell, Menell (1983) argues that the first externality identified in Shavell, plaintiffs' failure to account for defendants' legal expenses, would be mitigated by defendants' ability to avoid suit in the first place by ensuring that the damages they cause do not exceed plaintiffs' costs of suit. In broader terms, Menell argues that Shavell's two externalities are not disconnected. Kaplow (1986) replies that the litigation cost externality still exists despite Menell's argument.

Rose-Ackerman and Geistfeld (1987; Chapter 18) help sort out the confusion by placing Shavell, Menell (1983) and Kaplow (1986) in a general framework. In addition, Rose-Ackerman and Geistfeld go beyond the mere diagnosis of externalities, and, at least in one special case, offer a cure. They show that under certain conditions, including the absence of legal uncertainty, a negligence standard coupled with a loser-pays system of allocating legal costs produces the social optimum.

Polinsky and Rubinfeld (1988; Chapter 19) step in where Rose-Ackerman and Geistfeld leave off, continuing the literature's foray into optimal litigation design. How, they ask, should litigation be structured if the object is to maximize social welfare taking into account both externalities in primary activity choices and the social cost of litigation? More specifically, how should the damage level under strict liability be adjusted relative to compensatory damages? As is perhaps clearest from their appendix,[21] Polinsky and Rubinfeld identify a number of conflicting effects. Raising damages above a precisely compensatory level has positive primary activity effects because it increases defendants' level of precaution.[22] Raising damages also lowers litigation costs because the responsive increase in defendants' level of precaution leads to fewer accidents with lower harm, and so fewer suits. On the other hand, given that an accident causing a given level of harm has occurred, suit is more likely when damages are increased because plaintiffs stand to win more. Thus, the social costs of litigation are to this extent greater. As Polinsky and Rubinfeld note, it is not possible to determine the net impact of these conflicting forces.

Polinsky and Che (1991; Chapter 20) continue in the same vein, but take the novel step of proposing that defendant's liability need not equal plaintiffs' recovery. Thus, they avoid the source of the unhappy tradeoff in Polinsky and Rubinfeld, namely that increasing deterrence means suffering more costly suits. Polinsky and Che argue that whenever the plaintiff's recovery equals the defendant's damages, the same level of deterrence can be produced with lower social cost by simultaneously lowering the plaintiff's 'recovery' and raising the defendant's 'damages', thus 'decoupling' the two transfers. Lowering recovery reduces the number of cases filed, thus reducing both deterrence and the social costs of litigation. Raising damages alone by an appropriate amount restores deterrence. But because plaintiffs do not receive the increase, filings remain at their new lower level. Thus, deterrence is restored without also restoring litigation costs.

Part II: Models with Endogenous Litigation Expenditure

A. The Litigation Expenditure Game

The foregoing articles say less about the actual business of trial in order to say more about the referent events of filing and settlement. One is left wondering, however, whether a more detailed account of trial process would leave the findings of these articles intact.

In delving into the innards of litigation, the natural first step is to replace the assumption that the probability of plaintiff (or prosecutor) victory is exogenously determined with the less reductive assumption that such probability is an exogenous *function* of how much each party spends on litigation. This adds to the model parties' decisions about how much to spend litigating filed suits that remain unsettled. Such decisions appear to be an important determinant of the overall cost of litigation.[23]

One of the chief challenges and rewards of accounting for endogenous litigation spending is the requisite modeling of two kinds of interactive effects. The probability of plaintiff victory depends on *both* parties' expenditure choices. The joint determination of plaintiff victory produces, in turn, an interdependence in parties' litigation payoffs. In general, the more each party spends, the worse the prospect of litigation for the other. Payoff interdependence has a number of interesting implications. It casts a shadow back onto pre-trial process and the primary activity. In deciding whether to accept or provide a settlement offer, for instance, a party must predict what her opponent would spend in litigation in order to calculate her own threat point.

A more complicated interdependence – one implying, but not implied by, the payoff interdependence just discussed – might be called 'best response interdependence'. While payoff interdependence requires only that the *level* of one's payoffs is sensitive to one's opponent's litigation expenditure, best response interdependence arises when such sensitivity extends to the *marginal* impact on payoffs of one's own litigation expenditure. Changes in the marginal impact of a party's litigation expenditure on her own payoffs induce her to change how much she spends on litigation. Thus, not only does a party *fare* differently in litigation by virtue of her opponent's choices, she also *acts* differently. Such shifts are often called 'cross-effects'.

Cross-effects implicate what might be regarded as the fundamental problem of game theory, as initially noted by Cournot (1838) in his model of duopoly, namely the circularity and consequent indeterminacy of strategic interaction. Each party's best choice depends on what the other chooses, but what the other chooses, her best choice, depends on the choice of the first, etc. Game theory's standard 'solution' to this problem, however unsatisfying, is to assume that parties choose their strategies in Nash equilibrium (Nash, 1950), which is to say that parties jointly choose a strategy pair with the characteristic that each party's strategy is a best response to the other's.

Though it has subsequently received relatively little attention in the economic literature on litigation, the problem of endogenous litigation expenditure was recognized from the start. The three seminal papers included in Part I of this volume deal with the issue. Landes (1971; Chapter 3) models the expenditure of prosecutors and defendants (though he puts aside the problem of cross-effects[24]). Gould (1973; Chapter 2) does not explicitly consider litigation effort, but does note that doing so would raise the kind of circularity problems just discussed.

Posner (1973; Chapter 21) specifically casts the litigation expenditure game as a Cournot duopoly problem, adopting a particular function form for the probability of plaintiff victory as a function of joint expenditures. In an appendix,[25] he identifies the Nash equilibrium of the game and describes the effect on the likelihood of settlement. In the main body of his article, he explores the effect of various procedural rules in the context of this game.

Katz (1988; Chapter 22) delves deeper into the specific properties of the litigation expenditure game, conducting comparative statics and, perhaps most importantly, uncovering a fundamental property of the litigation expenditure game, what might be called 'strategic reciprocality'.[26] An increase in opponent expenditures might increase the marginal productivity of one's own expenditures, or it might reduce it. That is, litigating parties might advance or retreat in the face of an opponent's advance. Katz points out that, in the litigation expenditure game, as opposed to many other settings studied by economists, the two parties cannot share the same reactive impulse. One party will retreat; the other will counter-punch.

Shepherd (1999; Chapter 23) explores cross-effects in his empirical analysis of discovery. He finds that parties counter-respond with a distinct pattern and that this pattern is consistent with strategic reciprocality. Defendants counter-punch in response to aggression by plaintiffs, while plaintiffs tend to retreat in response to additional expenditure by defendants.[27]

B. How Results Change

Braeutigam, Owen and Panzar (1984; Chapter 24) add litigation expenditure to the picture painted by Shavell (1982; Chapter 17).[28] They find that shifting from a pay-your-own rule to a loser-pays rule increases the litigation expenditure of at least one of the parties and, under certain assumptions, increases the sum of the parties' expenditures. Thus, even if adopting a loser-pays rule reduces the number of filings and increases the number of settlements, it might also increase the cost of each unsettled suit, and thus might still increase the social cost of litigation. The argument that the loser-pays rule increases litigation costs is complex and tied up in vagaries of Nash equilibrium comparative statics. *Holding fixed opponent expenditure*, moving to a loser-pays rule: (1) increases the marginal benefit of additional litigation expenditure by increasing the stakes, and (2) decreases the marginal cost of expenditure by creating the possibility that such expenditure will be reimbursed. Both of these effects act to increase parties' litigation expenditures. But one of the parties will generally react to an increase in her opponent's expenditure by reducing her own.[29] This responsive reduction may well dominate not only in determining the change in this party's individual expenditure, but also in determining the change in total expenditure across the parties. Braeutigam, Owen and Panzar's assumptions,[30] which are difficult to interpret, rule out a reduction in the sum of expenditures.[31]

Choi and Sanchirico (2004; Chapter 25) show that Polinsky and Che's (1994; Chapter 20) decoupling maneuver, as discussed above, may no longer improve social welfare when defendants respond to higher stakes by exerting greater litigation effort. The key to the social optimality of Polinsky and Che's maneuver is that raising what defendants must pay in damages, without also raising what plaintiffs recover, increases deterrence without increasing the cost of litigation. But Polinsky and Che assume that defendants' litigation spending is fixed. Raising what defendants must pay in damages raises the marginal benefit to the defendant of litigation spending and so generally encourages the defendant to spend more.

Therefore, raising only what defendants must pay in damages, while it may increase deterrence, also increases litigation costs.

Notes

1. For example, in 1992, 73% of tort cases in large US counties were resolved by agreed settlement; see Smith *et al.* (1995).
2. The settlement range is the 'core' of the litigation game in cooperative game theory terms.
3. This discussion assumes that the plaintiff's suit is profitable. Negative expected value suits are analyzed in a separate literature, which is considered in Section E, below.
4. Technically, this is the additive inverse of the defendant's threat point.
5. Some commentators, presumably following Aumann (1976), have found troubling the assumption that different beliefs about the same event are common knowledge between two agents. A contradiction arises if the agents who started with (essentially) the same priors end up with different beliefs due only to the differing information that they subsequently received. This is clearest when each party's beliefs perfectly indicate to the other what information she received. But the contradiction evaporates if the agents do not start with the same prior beliefs and there seems to be no good reason to make this assumption, see e.g. Gilboa (1992).
6. Some authors assume that the existence of a surplus is also sufficient for settlement. Others leave open the possibility that a mutually beneficial deal might not be struck due to disagreements about how to 'split the surplus', which is to say disagreements about precisely how much the defendant should pay to plaintiff.
7. See Nash (1950a).
8. The first section of Landes models how litigants choose litigation expenditures, a topic discussed in Volume II. The first section of the article is included here because it defines variables used later in the paper.
9. A portion of this article's Appendix that is relevant to settlement (pp. 455–6) is reproduced elsewhere in this volume. For ease of publication it was necessary to reproduce the Appendix intact, and it was believed that it was more important to the portion of this volume where it currently appears.
10. Bebchuk also considers the effect of various fee allocation rules; see Section D, below.
11. This possibility is ruled out in Bebchuk because the offering party is uninformed.
12. The potential plaintiff's decision whether to file suit also acts as a filter, one positioned upstream from settlement.
13. The condition is not strictly necessary. For instance, the biases of the two filters could perfectly counteract each other.
14. The Priest-Klein model also applies to parties' error in estimating how facts translate into legal assessments.
15. This stronger result perhaps also holds in the Priest-Klein model, so long as we may vary both the shape of the distribution of cases (admitting e.g. bimodal distributions) and the position of the legal standard.
16. This 'English Rule' is used in the United States in certain limited circumstances. Under 42 U.S.C. §1983 and §1988, for example, losing defendants must pay plaintiffs' attorney's fees in certain civil rights actions (but not vice versa). Furthermore, costs other than attorney fees are also routinely shifted under rules such as Fed. R. Civ. Pro. 54(d)(1). Attorney fees, however, typically constitute the bulk of parties' litigation expenses.
17. This assumes that the likelihood of a settlement is a function only of the existence and size of the settlement surplus.
18. This result is obtained if and only if joint litigation costs exceed the award.
19. The literature described above also considers fee shifting rules that turn on the identity of the parties, such as a 'plaintiff-pays-all' rule.
20. See Willging *et al.* (1998).

21. The reader should note that this appendix is missing an assumption on the sign of cross derivatives.
22. Moreover, the level of precaution will be too low when damages are perfectly compensatory because not all harmed plaintiffs will sue given the cost of doing so.
23. See e.g. Katz (1987) and Kakalik *et al.* (1998) ('higher stakes are associated with significantly higher total lawyer work hours, significantly higher lawyer work hours on discovery, and significantly longer time to disposition'); Id. at 648 (Table 2.8) ('median total lawyer work hours were more than two and a half times larger for cases with monetary stakes over $500,000 than for cases with monetary stakes of $500,000 or less, while mean total lawyer work hours were almost four times larger'). See also Willging *et al.* (1998) ('the size of the monetary stakes in the case had the strongest relationship to total litigation costs of any of the case characteristics we studied'; Id. at 533 ('the stakes in the litigation were positively correlated with the length of the case: the higher the stakes, the longer the case lasted').
24. See Landes 64 n.3 and 65 n.7 (1971; Chapter 3).
25. The relevant portion of the appendix begins on p. 456. The full appendix was included in this volume for ease of publication.
26. This property appears earlier without verbal comment in appendix equations in Braeutigam, Owen and Panzar (1984; Chapter 24).
27. See also Sanchirico (2005). Noting that cross-effects are in part a matter of litigation design, Sanchirico (2005) extends the analysis of cross-effects in a normative direction. He asks whether the plaintiff should be the retreater and the defendant the counter-puncher, as Shepherd finds to be the case. His answer also rephrases the question: the party whose primary activity incentives are the target of the evidentiary contest, whether that be plaintiff or defendant, should generally be the party induced to counter-punch. Sanchirico (2006) applies these results to the question of which party should bear the burden of proof.
28. On the same issue, see also Katz (1987). Braeutigam, Owen and Panzar credit as well an unpublished manuscript, 'Incentives and the Allocation of Legal Costs: Products Liability' by Marilyn J. Simon (1982).
29. Implicit in Braeutigam, Owen and Panzar (1984; Chapter 24) (see p. 185 proof of Proposition 4, noting typo) is the finding that it is the strategic complementer who increases her expenditure in response to adoption of the English Rule, while the strategic substitutor's response is ambiguous. This finding is easy to see in reaction curve diagrams.
30. See in Braeutigam, Owen and Panzar (1984; Chapter 24) on pp. 184–5, the use of (A5) in the proof of Proposition 2 and, by reference, the proof of Proposition 4.
31. Other notable work on cost allocations rules includes Miller (1986); Katz (1987); Hylton (1993b, 2002); Polinsky and Rubinfeld (1998).

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