LITIGATION v. SETTLEMENT:

A THEORY OF THE SELECTION OF TRIED DISPUTES

by

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A THEORY OF THE SELECTION OF DISPUTES FOR LITIGATION

I. Introduction: The Nature of the Problem and Some Earlier Attempted Solutions

This is a working paper setting forth a basic theory (and some early empirical results) which will be developed and tested in a future, more extensive empirical analysis now in preparation (described below). The subject of the paper is the relationship between litigated disputes--those which are tried to a verdict--and settled disputes--those which are resolved by the parties in a manner that avoids a trial or appellate verdict.

The definition of the relationship between these two classes of disputes is important for the analysis of the influence of the legal system on behavior within the society. Virtually all of our knowledge of the legal system derives from studies of litigated cases and, in particular, of appellate cases. Appellate cases, of course, provide the most direct view of doctrinal developments in the law. Very few legal scholars today, however, are content to study doctrinal developments alone without regard to the broader influence of legal rules on social life. And the outlook provided by appellate cases of the influence of legal rules on behavior is very obscure.

If all disputes which occurred in the society, or even a random sample of these disputes, were tried to judgment and then appealed, one would have a picture of the range of behavior governed by legal rules. One, then, could study trial and appellate cases to determine how different legal rules, or changes in legal rules, influence behavior. It is well-known, however, that a very small fraction of disputes comes to trial and an even smaller fraction of these disputes is appealed. H. Laurence Ross in a study of insurance company claim files reports that, of his sample, 4.2 percent of claims ultimately reached trial and only .2 percent of claims were appealed.[1] Alfred Conrad, et al., in a more comprehensive study of all police automobile accident reports found that .5 percent of accident victims pressed their claims to trial and only .09 percent of victims appealed trial verdicts.[2] It is very difficult to infer specific characteristics from observations of .2 percent or less of a population, especially where there is no reason to believe that the observations (the disputes selected for litigation) were selected randomly.

Some legal scholars have expressed concern about the peculiar sample of cases that reach trial and appeal, but none has developed an accepted means of adjusting analysis in response to the problem. Karl Llewellyn, for example, regarded litigated cases as "pathological": bearing the same relation to the broader set of disputes "as does homicidal mania or sleeping sickness, to our normal life."[3] Llewellyn attempted to obtain greater representativeness in his studies of appellate decisions by disregarding leading decisions and sampling in a manner that approaches randomness. Llewellyn studied "the cases in sequence as they stand in the reports" (that is, for example, the first 194 pages of New York reports from 1842)[4] or decisions rendered by a court on a "single opinion-day" (that is, for example, the decisions of the Pennsylvania Supreme Court of March 20, 1944).[5]

These decisions represented to Llewellyn "the mine-run stuff as it comes unselected from the mine."[6] More recently, Professor Whitford in a study of the impact of the strict liability standard on automobile manufacturers and consumers, disregarded leading cases and studied all reported decisions in the period 1960-67 in which auto defects were involved (including cases where the issues were procedural).[6a] Whitford, however, despaired of the representativeness of even a census of decisions,[7] and turned to interviews with consumers, dealer and manufacturer employees and attorneys involved in auto litigation.[8]

Most legal scholars, however, either ignore the problem of the representativeness of appellate decisions or presume representativeness. The most common presumption is that the facts of disputes that reach trial or, more commonly, appeal, resemble the facts of disputes that are settled. Professor Posner, for example, infers the efficiency of 19th century negligence law from the observation that there were no cases within his large appellate sample in which parties with a contractual relationship agreed to a standard of liability different from the legal standard.[9] Professor Posner's conclusion requires the presumption that there are no cases involving alternative liability standards which were settled prior to appeal.[10] As another example, in a separate paper, one of us concluded that case-law interpreting the Uniform Commercial Code is consistent with an efficiency standard from the observation that the rate of plaintiff's victories on appeal is higher in cases where it was relatively more difficult for plaintiffs to discover product defects.[11] Similarly, it is very common for legal scholars to infer the predilection of judges or juries towards plaintiffs or defendants by observing the rate of plaintiff verdicts.[12] As we shall see, however, the proportion of plaintiff victories will be invariant, over a wide range, to the substantive standard of law as well as to the predispositions of judges and juries, so that these inferences too cannot be supported.

This paper presents a model of the litigation process which attempts to relate the substantive standard of decision of a legal dispute with the likelihood that the dispute will go to trial and the eventual outcome of the trial. The most important theoretical assumption of the model is that potential litigants form rational estimates of the likely decision at trial employing all available information relating to the outcome, including, most significantly, information relating to the standard of decision such as applicable legal precedent or judicial or jury bias. From this basic proposition, the model implies that the likelihood of success in litigation of plaintiffs and defendants will be, generally, invariant to the standard of decision itself.[13] Furthermore, from general assumptions about the distribution of asymmetric information, it will be shown that, again regardless of the legal standard, plaintiffs are likely to be successful at trial approximately 50 percent of the time. Thus, plaintiff victories will tend toward 50 percent whether the legal standard is strict liability or negligence, whether judges or juries are hostile or sympathetic. Part II of the paper presents the model and derives the 50 percent implication. Part III presents some evidence of trial verdicts in various contexts which tests the implication.

Part IV of the paper relaxes some assumptions of the basic model. The most important consideration of Part IV is the set of cases in which the stakes of the case are different for the parties, such as where a single driver sues an insurance company whose future practices will be implicated by the decision. Part IV shows how the rate of plaintiff victories will differ as the relative stakes of the parties differ. Part V then presents data testing these further implications. Finally, Part VI returns to the central subject of the paper and attempts to show how the basic model of litigation can be employed to describe the relationship between litigated and settled disputes.

II. The Basic Model

A. Some Preliminary Definitions

We define a "dispute" as any occasion in which a plaintiff asserts a claim of injury against a defendant.[14] A dispute may be resolved either by a verdict after trial or by a settlement at any time prior to a verdict. Thus, in this terminology, a dispute is "litigated" only if a verdict is rendered; all terminations of the dispute short of a verdict are regarded as "settlements."[15] All trial verdicts constitute the relevant set of disputes for appeal. The decision of the parties to press an initial dispute to a trial verdict, however, is otherwise indistinguishable in theory from the decision to press a trial verdict to an appellate decision.

If the verdict is announced in favor of the plaintiff, the defendant (who receives a "guilty" verdict) is made to pay an amount called the judgment. We initially assume that the plaintiff receives the judgment in entirety (the assumption is relaxed later). In addition, at this point, we ignore any other gains to the plaintiff or losses to the defendant from the verdict besides the judgment. If, on the other hand, the defendant prevails at trial (a verdict of "not guilty"), he pays nothing to the plaintiff.

If both parties possess identical information, the expected judgment levied against the defendant will equal the expected judgment garnered by the plaintiff. If parties must pay litigation costs,[16] however, they both can be made better off by settling the dispute. Finally, we assume that the distribution of initial disputes is given and that the parties engage in the litigation process in a non-strategic way. By non-strategic, we mean that the parties act as if their actions have no effect on current or future actions of the other party. The model, then, may be best viewed as a one-period model of competitive dispute resolution.

B. The Process of Decision at Trial or Appeal

An important objective of the paper is to determine how the standard of decision at trial or appeal influences the decision to litigate a dispute. For this purpose, we will presume that coherent standards exist for resolving disputes, and that judges or juries will apply some specific standard consistently in disputes of one type or another. It is not necessary to assume any particular basis for decision standards; that is, a standard may be based on precedent or, say, the personal bias (for example, racial prejudice) of a judge or jury. Every decision standard, however, must relate in some way to the circumstances of the disputes to which the standard is applied. Thus, the trial or appellate verdict can be described as,

(1) $G = G(X)$, where $G = 0$, if the verdict is for the plaintiff (guilty), and

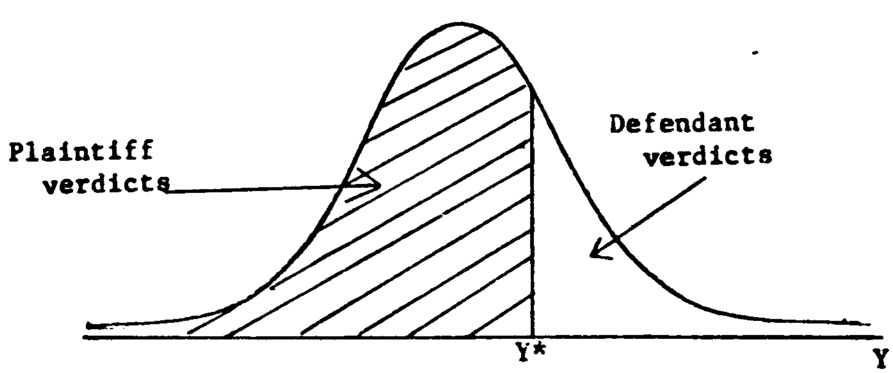
$G = 1$, if the verdict is for the defendant (not guilty),

where X is the vector of circumstances or characteristics of a particular type of dispute and G(X) is the function that summarizes the application of the standard by the judge or jury to the set of characteristics. Again, it is not necessary to assume that the function G(X) is constant across judges or juries, or is independent of factors such as the individual qualities of the parties or of the judge or jury.

To elaborate our assumption of the consistent application of the decision standard, let us array a set of disputes according to a scalar measure Y that describes the relationship between the relevant characteristics of the dispute and the decision standard. Figure 1 presents a distribution of litigated disputes according to this scalar measure. Thus, $Y = H(X)$, where X refers to specific facts or characteristics of disputes and H(X) represents the interpretation function of these facts in relation to the particular decision standard. The distribution of disputes is divided into two parts at some particular value, Y*. The shaded part, to the left of Y*, consists of disputes in which a verdict for the plaintiff (guilty) is returned; the unshaded part, to the right of Y*, consists of disputes in which a defendant verdict (not guilty) is returned. That is, $G = 0$ if $Y \leq Y^*$, and $G = 1$ if $Y > Y^*$.

FIGURE 1

Distribution of Litigated Disputes



The measure Y, thus, can be interpreted as representing the propensity of a plaintiff verdict, and Y* as the value of the set of relevant characteristics of the disputes just sufficient to lead a judge or jury to render a decision for the plaintiff. Figure 1 shows the distribution of the propensity of a plaintiff verdict across the set of disputes given the values of the relevant characteristics within the set and the interpretation function H(X). If Y is assumed to be a linear function of the relevant characteristics of disputes, then we can write $Y = H(X) = B_L \cdot X$. Each element of the B_L vector is the weight or load placed upon each relevant characteristic by the interpretation function. Therefore, each coefficient incorporated within B_L indicates the marginal effect of each of the corresponding characteristics on the propensity of a plaintiff verdict.

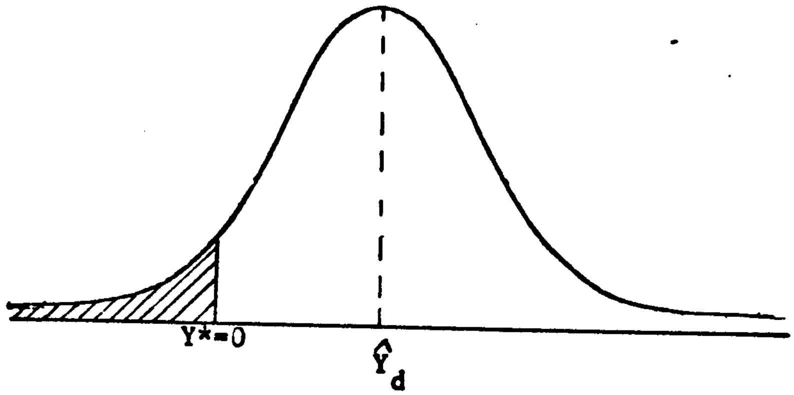
C. The Formation of the Parties' Expectations

We assume that each party to a particular dispute forms an estimate of Y, the propensity of a plaintiff verdict according to a linear specification such as that above. We assume that no party can determine with certainty whether the plaintiff or defendant will prevail. First, some of the facts or circumstances of the case may not be available to one or another of the parties, or may be developed in a different manner at trail. In addition, the parties may not be able to appreciate fully how the decision standard will be applied to the dispute. Thus, the coefficients of the B_L vector are not likely to be calculable with precision. The value of each coefficient of the vector (corresponding to specific characteristics of the dispute) will be estimated by the parties based upon evidence of past decisions. But each party may evaluate the similarities between past and current disputes differently. Thus, in general, each party's estimate of the propensity of a plaintiff verdict is likely to differ both from the estimate of the opposing party and from the true Y value of the dispute. Each party, therefore, will form an estimate of Y with the understanding that there is likely to be error attending the estimate.

These assumptions are described in Figure 2. Figure 2 represents the estimate of one of the parties (here, the defendant) of the relationship between his dispute and the decision standard. Y_d indicates the mean value of the defendant's estimate of Y. The distribution around Y_d reflects the defendant's error in predicting Y for the dispute and, thus, his uncertainty as to the value of the true Y. For ease of exposition, we assume that Y*, the value just sufficient for a plaintiff verdict, is zero. (The problem is clearly invariant to such a normalization. It merely shifts the density of Y* until Y* = 0.) The shaded area in Figure 2 represents that portion of the distribution of the defendant's estimate of Y that corresponds to the chance of a plaintiff verdict ($Y \leq Y^*$). In Figure 2, although $Y_d > Y^*$, that is, although the defendant's best estimate is that <u>he</u>, not the plaintiff, will prevail, the <u>probability</u> that the true Y of the dispute will be less than Y* corresponds to the probability that the defendant's error in estimating Y is sufficiently large that the true $Y \leq Y^*$ (zero). Thus, the defendant's expectation of a verdict against him is represented by the shaded area of the distribution to the left of Y*. The probability of a plaintiff verdict (P_d for the defendant and P_p for the plaintiff) is represented by the ratio of the area shaded ($Y \leq Y^*$) to the cumulative distribution. Of course, a distribution similar in nature could be described for the plaintiff's expectation of the verdict.

FIGURE 2

Defendant's Estimate of Probability of Plaintiff Verdict



For the model, we assume that

(2a) $\hat{Y}_p = Y + \varepsilon_p$ and

(2b) $\hat{Y}_D = Y + \varepsilon_d$

where ε_p and ε_d are independent random variables with zero expectation.[17]

By this formulation, we presume that each party forms an independent, unbiased estimate of Y. We may rewrite these statements such that,

(3a) $P_d = P(Y<0) = P(\varepsilon_d > \hat{Y}_d)$

(3b) $P_p = P(Y<0) = P(\varepsilon_p > \hat{Y}_p)$.

Hence,

(4a) $P_d = 1 - F_d(\hat{Y}_D)$

(4b) $P_p = 1 - F_p(\hat{Y}_p)$

where F_d and F_p are the cumulative distribution functions of ε_d and ε_p respectively.

C. Settlement Negotiation between the Parties

We shall adopt a very simple formulation of the economic model of litigation and settlement.[18] According to this model, litigation occurs where the parties fail to negotiate a settlement. The plaintiff's minimum settlement demand (ask) and the defendant's maximum settlement offer may be represented as follows:

(5a) $A = P_p \cdot J - C_p + S_p$, and

(5b) $O = P_d \cdot J + C_d - S_d$,

where J is the expected judgment should a plaintiff (guilty) verdict be returned (we assume J to be fixed and known for an individual dispute); C_p and C_d are the respective litigation costs;[19] and S_p and S_d are the respective settlement costs.

A sufficient condition for litigation is that the plaintiff's minimum demand (A) exceed the defendant's maximum offer (O) which may be rewritten from equations (5a) and (5b) as

(6) $P_p - P_d > \frac{C-S}{J}$,

where $C = C_d + C_p$ and $S = S_d + S_p$. From this formulation it is clear that the allocation of court costs and settlement costs between the parties will not affect the probability of litigation. Furthermore, because court costs, as a general matter, are higher than settlement costs, $\frac{C-S}{J}$ will be greater than zero.[20] If, however, $\frac{C-S}{J}$ is greater than 1 (that is, if the difference between litigation and settlement costs is greater than the expected judgment), the dispute will never be litigated because $P_p - P_d$ can never exceed 1. We let $D = \frac{C-S}{J}$ and adopt the (reasonable) assumption that $0 < D < 1$ in what follows.

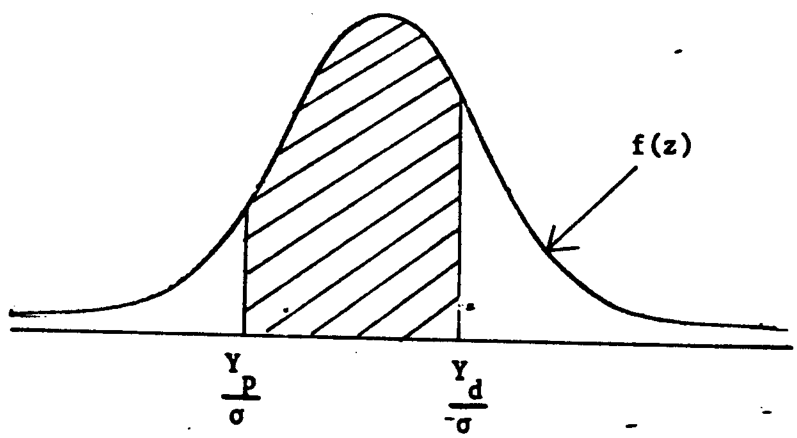
If both parties can predict Y with equal precision (that is, equal error variance), although subject to independent errors, then $P_p - P_d = F_d\left(\frac{\hat{Y}_d}{\sigma}\right) - F_p\left(\frac{\hat{Y}_p}{\sigma}\right)$ where the F's are the standardized cumulative distributions of the two errors. This is to say that the difference between the plaintiff's and defendant's estimates of the likelihood of a plaintiff victory relates to the difference between the error terms of their estimates of Y. If ε_d and ε_p have the same density then

$$(7) \qquad P_p - P_d = \int_{\left(\frac{\hat{Y}_p}{\sigma}\right)}^{\left(\frac{\hat{Y}_d}{\sigma}\right)} f(z)dz$$

where F(z) is the standardized density of $\frac{\varepsilon_d}{\sigma}, \frac{\varepsilon_p}{\sigma}$. Graphically, this corresponds to the shaded region in Figure 3. The shaded area represents the difference between the parties' estimates of the propensity of a plaintiff verdict. The propensity consists, according to the defendant, of the entire area under the distribution to the left of $\hat{Y}_d$; and, according to the plaintiff, of the (unshaded) area to the left of $\hat{Y}_p$. The difference between these estimates, then, is the area shaded. Substituting for $\hat{Y}_p$ and $\hat{Y}_d$ and replacing $\frac{\varepsilon_d}{\sigma}$ and $\frac{\varepsilon_p}{\sigma}$ by the standardized variables Z_d and Z_p yields,

$$(8) \qquad P_d - P_p = \int_{\frac{Y}{\sigma} + Z_p}^{\frac{Y}{\sigma} + Z_d} f(Z)\, dz$$

FIGURE 3



Therefore, the probability that a given dispute will go to court is equal to the probability that this integral is greater than $D = (C-S)/J$. If $f(z)$ is symmetric then Z_p, $-Z_p$, Z_d and $-Z_d$ will be identically distributed. This coupled with the fact that

$$\int_{-a}^{-b} f(z)dz = \int_{b}^{a} f(z)dz$$

for a symmetric distribution yields that the probability that a dispute will go to court given $Y = a$ is the same as the probability of a dispute going to court when $Y = -a$.[21] In fact, any error structure which yields this symmetry in Y will lead to the following results. Intuitively, this is saying that disputes that are equally close to the decision rule--regardless of which side of the decision rule (i.e., plaintiff's or defendant's) they are on--are equally prone to measurement errors sufficient to generate litigation.

The distribution of litigated disputes is proportional to the product of the distribution of the population of disputes and the probability of litigation for each Y. Note that the probability that $\{P_p - P_d > D\}$ is less than the probability that $\{P_p > D\}$ and the probability that $\{P_d < 1 - D\}$ since both of these must be true for the first condition to hold. But for Y/σ far from zero, one of these probabilities is very small. That is, where Y large (far from the decision rule) and positive, $P(P_p > D)$ is very small. When Y is large, Y_p will generally be large and P_p will be small. (Very little of the density will lie to the left of the decision rule.) Similarly, in disputes in which Y is large and negative, $P(P_d<1-D)$ is small, and the probability that a case will go to court is very small. Put more simply, the greater the distance that the true Y lies from the decision standard, the lower the difference between the parties' probability estimates of a plaintiff verdict is likely to be. On the other hand, where Y lies close to the decision standard, it is more likely that the estimates of the parties of the outcome will differ and that litigation will occur.

Figures 4(a) and 4(b) illustrate the point. In the figures, the error of the parties in estimating Y is equivalent. The figures differ, however, in the distance between the true Y of the dispute (the true probability of a plaintiff victory) and the decision standard, Y*. In Figure 4(a), the true Y lies far from the decision rule; and in Figure 4(b), the true Y is very close to the decision rule. The difference in the probability estimates of the parties of a plaintiff victory is represented by the relative area of the probability distribution of each party to the left of the decision rule. In Figure 4(a), where the true Y is far from the decision rule, the difference in the probability estimates of the parties is small. In Figure 4(b), however, where the true Y of the dispute lies close to the decision rule, the difference between the parties' probability estimates is much larger. Thus, the likelihood that the parties will litigate rather than settle the case is much larger.

FIGURE 4(a)

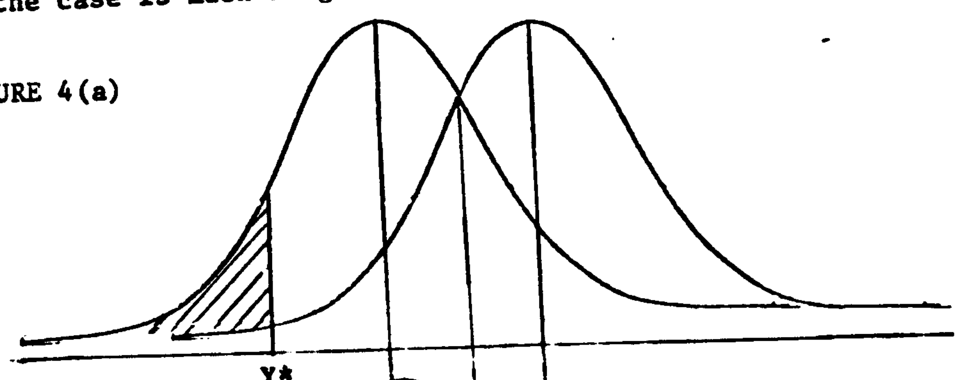
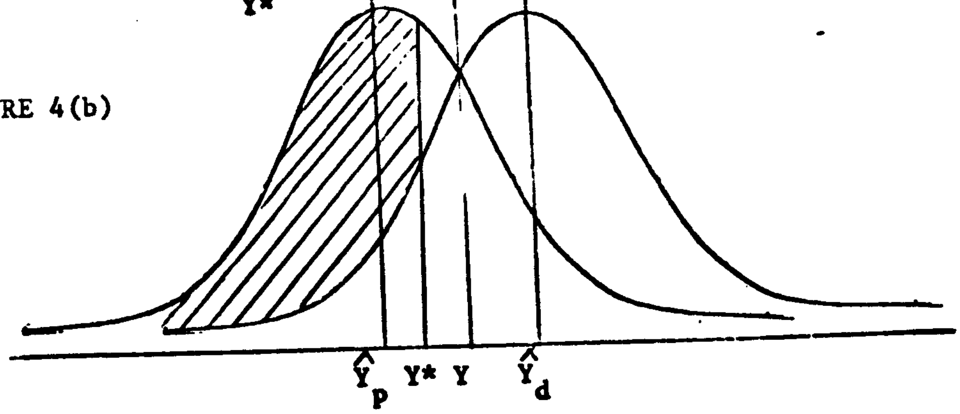


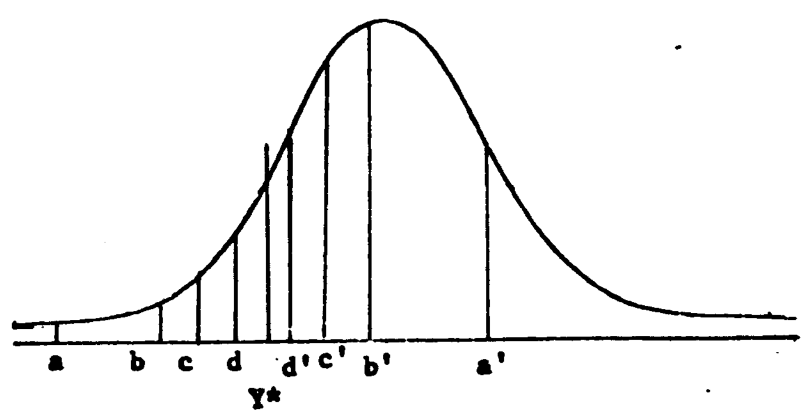
FIGURE 4(b)



By applying Cheby-Chevs inequality to $P(P_d>D)$ and $P(P_p<1-D)$ it can be shown mathematically that under our assumptions $P(P_p-P_d>D) \to 0$ as $|Y| \to +\infty$ or, equivalently, (since P_p and P_d depend only on Y/σ and not on Y alone), $P(P_p-P_d>D) \to 0$ as $\sigma \to 0$ for all $Y \neq 0$. Hence the vast majority of disputes that are litigated will lie "close" to the decision rule as Figures 4(a) and 4(b) imply. (How close depends on σ.)

If the distribution of Y is continuous at zero, the distribution of litigated cases will be approximately symmetric and approximately 50% of the cases will be on each side of the decision rule, yielding at litigation a proportion of defendant victories and hence plaintiff victories that approaches .5. For example, in Figure 5, if all the cases between a and a' were litigated, there would be many more defendant victories than plaintiff victories; whereas if only those cases between d and d' were litigated, the observed frequency of plaintiff verdicts would be much closer to .5. In fact, if Figure 5 corresponded to a normal density with mean and standard deviation 1 and (a,a'), (b,b'), (c,c') and (d,d') corresponded to intervals of length 3, 2, .5, and .2 respectively, then the corresponding probabilities of plaintiff verdicts would be .22, .29, .33, and .47.

FIGURE 5



It is important to note that the observed frequency of victories for plaintiffs in litigated cases does not, in general,[22] depend on the substantive content of the decision rule (in terms of Figure 5, the location of the decision rule relative to the set of all potentially litigible disputes). That is, whether the decision rule makes recovery by a plaintiff difficult or automatic, there will be a tendency for plaintiffs to prevail at litigation, in general, about 50 percent of the time. In Figure 5, for example, if all of the disputes represented by the distribution were litigated, plaintiffs would win less than 20 percent. As the Figure illustrates, however, the process of negotiating a settlement reduces the number of disputes that actually reach the courts. Disputes of which the true Y is far from the decision rule tend to be settled rather than litigated. Thus, the more critical determinant of litigation and of the rate of success of one party or another is the error of the parties in predicting Y. This formulation also suggests that as litigation proceeds over time and as more information about the decision function G(X) is made available to parties, there will occur a convergence toward 50 percent plaintiff victories. That is, as more information is collected, the error terms of the parties' estimates of Y diminish (for example, from the interval a, a' to b, b' in Figure 5). As a consequence, the rate of disputes litigated to a verdict declines and the proportion of victories for plaintiffs approaches 50 percent.

Put simply, the requirements for the probability of victory to be close to .5 are that the error variance in predicting Y be small and approximately equal for the two parties. This condition is likely to be met if the plaintiff and defendant possess information that is on average of equal precision, and if the application of legal standards, on the whole, is coherent and predictable. The intuition can be made more precise in the following proposition:

PROPOSITION 1: If both the defendant and plaintiff predict Y as $\hat{Y}_p = Y + \varepsilon_p$ and $\hat{Y}_d = Y_d + \varepsilon_d$ where ε_d and ε_p are identically, independently, and symmetrically distributed with mean zero and finite variance ε_σ^2 and the dispute distribution has a well defined limit at zero which does not equal zero, then in the limit as $\sigma_u^2 \to 0$ the proportion of litigated cases approaches zero and the observed frequency of plaintiff victories approaches 1/2.[23]

D. A Refinement of the Theory's Implications

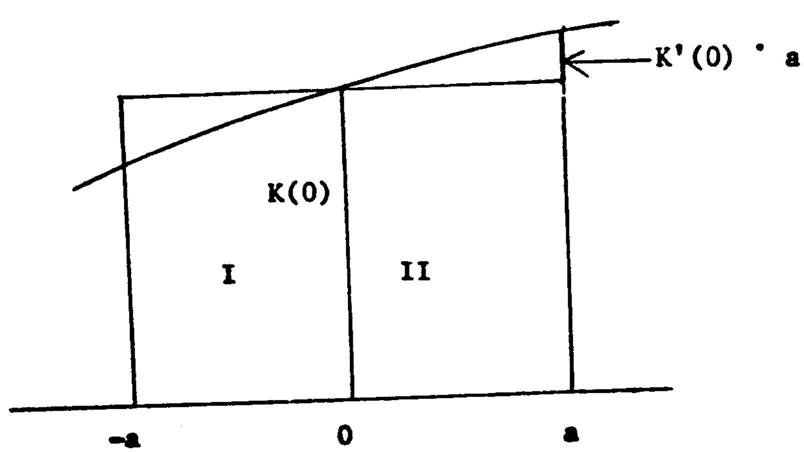
As we have shown, the tendency of the rate of success at litigation to approach 50 percent is essentially independent of the position of the decision rule relative to the distribution of all potentially litigible disputes. The shape of the underlying distribution of disputes, however, can affect the proportion of victories at litigation and the speed of convergence toward 50 percent in a more specific way. According to the model, given some error in the parties' estimates of Y, an interval will exist around the decision rule consisting of the set of litigated disputes (see Figure 5). The range of the interval, of course, will be defined by the parties' errors in predicting Y. The probability of success at litigation, however, is defined by the area of the interval lying on each side of the decision rule (again, see the various interval estimates at Figure 5). The exact value of this probability depends upon the ratio of the areas on the opposite sides of the decision rule. The probability of victory at litigation will equal exactly .5 only when these areas are symmetric.

Figure 6 illustrates how the position of the decision rule at the distribution of underlying disputes affects the rate of success and the speed of convergence to .5. The interval-a, a is determined by the errors of the parties' estimates of Y and describes the disputes that will be litigated. Area I represents those disputes in which the plaintiff will prevail $(Y \leq Y^*)$; Area II, those in which the defendant will prevail. K(0) is the height of the distribution and K'(0), the slope (which for convenience we approximate as constant over the interval). The ratio of plaintiff to defendant victories at litigation is determined by the ratios of Areas I and II. In Figure 6, Area I = a · K(0) - 1/2 a · K'(0)a, and Area II = a · K(0) + 1/2a · K'(0)a. The ratio of Area II to Area I converges to 1 (and thus to 50 percent victories) as

$$\text{(9)} \qquad \frac{II}{I} = \frac{a \cdot K(0) + 1/2a \cdot K'(0)a}{a \cdot K(0) - 1/2a \cdot K'(0)a}$$

$$\text{(10)} \qquad = \frac{\frac{K(0)}{K'(0)} + \frac{a}{2}}{\frac{K(0)}{K'(0)} - \frac{a}{2}}, \quad \text{converges to 1.}$$

FIGURE 6



It may be readily observed with respect to equation (10) that for a given a, the greater the height of the distribution (K(0)) relative to the slope (K'(0)), the closer this ratio will be to 1 and the closer the proportion of plaintiff victories will be to .5. Put another way, as K(0)/K'(0) increases, the slope will appear relatively flatter for a given height. As a consequence, the ratio of victories will approach 1 without a reduction in the interval a which derives from the error of the parties' estimates. Of course, as shown before, as a diminishes, regardless of the height or slope, equation (10) will approach 1.

Thus, the position of the decision standard relative to the distribution of disputes will have some affect on the rate of victories at litigation. But the effect will not be that assumed by most legal scholars. It is commonly concluded, for example, that a legal standard or, say, a particular judge or jury is relatively more favorable to plaintiffs than defendants if the proportion of plaintiff verdicts under the standard or by the judge is relatively greater.[24] This conclusion, however, cannot be supported. The proportion of victories for a party under a decision standard will be determined by the shape of the distribution of disputes at the error interval and the ratio between the height and slope of the distribution.

E. The Model Illustrated

Finally, we report simulations of the model that illustrate its selection and convergence properties. Table I presents simulations conducted with a normal distribution for Y, ε_p and ε_d. In each set, we progressively diminish the parties' error in estimating Y from a standard deviation of 1 to .5, .25 and .1 (see row 4). The three sets of simulations differ in the expected value of Y, E(Y), the position of the decision rule with respect to the distribution of disputes. The simulations in Set 1 (columns 1-4) assume a decision standard at 0, the median of the distribution; in Set 2 (columns 5-8), at a standard deviation of .5 (at this standard, plaintiffs would win 27-28 percent of the time if every dispute were litigated); and in Set 3 (columns 9-12), at a standard deviation of .3 (at this standard, plaintiffs would win 35-37 percent of the time if every dispute were litigated).

Row 10 shows the convergence toward 50 percent victories at litigation. In Set 2, for example, the proportion of plaintiff victories in the underlying population of disputes is roughly 27.5 percent. As the error of the parties' estimates of Y diminishes from a standard deviation of 1 to .25 (columns 5 and 7), the proportion of plaintiff victories at litigation increases from 33 to 49 percent. A comparison of rows 10 and 11 for each set indicates the relationship between the proportion of disputes that are pressed to a verdict and the proportion of plaintiff victories. At the point (roughly) that no more than 6 percent of disputes are litigated, the proportion of plaintiff and defendant victories is about equal, no matter what the initial position of the decision standard. (Compare in row 10, the entries in columns 3, 7, and 11.) The greatest deviation from the 50 percent prediction occurs where E(Y) is .5 and the standard deviation of the parties' estimates is 1. Under these conditions, plaintiffs prevail at litigation only 33 percent of the time. But 20.4 percent of disputes are litigated, a proportion far higher than the rate of typical civil and criminal litigation.[25]

TABLE I: Simulations of the Basic Model, Normal Distribution

	Set 1				Set 2				Set 3			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) N	4000	4000	4000	4000	4000	4000	4000	4000	2000	2000	2000	2000
(2) E(Y)	0	0	0	0	.5	.5	.5	.5	.3	.3	.3	.3
(3) σ_Y	1	1	1	1	1	1	1	1	1	1	1	1
(4) σ_ε	1	.5	.25	.1	1	.5	.25	.1	1	.5	.25	.1
(5) $\frac{C-S}{J}$	.3	.3	.3	.3	.25	.25	.25	.25	.25	.25	.25	.25
(6) # of Victories in Population*	1956	2022	1967	2017	1100	1120	1080	1080	725	712	702	738
(7) # of Cases Litigated	735	499	267	124	816	488	252	92	408	268	148	80
(8) # of Victories in Court	355	243	134	66	269	185	123	49	173	117	71	42
(9) % of Victories in Population	48.9	50.6	49.1	50.4	27.5	28	27	.27	37.6	35.6	35.1	36.9
(10) % of Victories in Court	48.3	48.7	50.2	53.2	33.0	38	49	53	42.5	43.8	47.7	52.3
(11) % Litigated	18.4	12.5	6.67	3.1	20.4	12.2	6.3	2.3	20.4	13.4	7.4	4.0

*All victories refer to plaintiffs.

In each of the three sets of Table I, we assume a normal distribution of disputes (is there a more attractive alternative?). We may illustrate our analysis of the influence of the shape of the distribution on the proportion of plaintiff victories at litigation, however, by changing the assumption. Where the distribution of disputes is uniform (that is, flat over the entire range of the distribution), convergence to plaintiff verdicts of 50 percent is more rapid. For example, we conducted simulations with a uniform distribution of range 5 and with the decision standard set so that if all disputes were litigated, plaintiffs would win only 20 percent of the time. Under these conditions, where the standard deviation of the parties' error in estimation is 1, .5, .25, and .1, the proportion of plaintiff victories at litigation is 42, 46, 53 and 52 percent, respectively. In these simulations, the proportion of plaintiff victories in the underlying population of disputes is lower than in Sets 2 and 3 of Table I (.2 compared to .27 (Set 2) and .35 (Set 3)). Yet the relative flatness of the uniform to the normal distribution leads to a much more rapid convergence to the 50 percent range.

III. An Empirical Examination of the Theory

This section presents some initial evidence bearing on the implication of the basic model that the proportion of plaintiff verdicts in litigated cases will approach .5, regardless of the standard of decision.

A. Civil Jury Verdicts, 1961-79, by Subject

Table II reports the proportion of verdicts for plaintiffs in all cases tried to juries over a 19-year period, 1961-79, in the civil courts of Cook County, Illinois. The cases are arrayed in rows according to the nature of the incident giving rise to the dispute: -traffic collisions (row 1), auto-pedestrian collisions (row 2), jobsite injuries (row 5), etc. Although there are many more categories of cases, we report those traffic and non-traffic categories generating the greatest volume of verdicts for the period. The Table displays the results for each of six years chosen randomly, as well as totals for the 19-year period (column 7). The numerals in parentheses under each proportion show the total number of litigated cases for the category.[26]

One would imagine that each of the different legal subject categories describes a different distribution of disputes. Furthermore, it is not implaus ble that the decision standards of the various categories of disputes are loc ted in different positions relative to the respective underlying distributions of disputes. Certainly, the decision standards of various of the categories are different in substance. For example, in Illinois, the liability standard for automobile collisions (row 1) is ordinary negligence; for injuries to passengers of common carriers (row 3) is "the highest degree of care";[27] and for injuries from product defects (row 8) is ordinary negligence prior to 1965, and strict liability from 1965-79.[28]

That decision standards are different in substance, however, does not establish that their positions relative to the underlying distributions of disputes are different. The relationship between the types of disputes that occur and a decision standard is likely to be determined most significantly by the costs to the parties of avoiding disputes (i.e., preventing the manufacture of defective products). Again, although no a priori conclusion may be drawn, it would seem the most remote coincidence for any two of the distributions of these categories of disputes to be closely similar. One may more confidently presume a difference between decision standards and the distribution of disputes where a legal standard is shifted within a given category, such as the shift in Illinois in 1965 from negligence to strict liability for product defect cases. (Product defect cases themselves, however, are analyzed more carefully, infra, Part V.)

The results of Table II seem generally consistent with the hypothesis. The subject category with the largest number of litigated cases (auto collisions, row 1), provides strong support. In the six randomly selected years, the proportion of plaintiff verdicts in auto collision cases deviated no more than five percent from the .50 prediction.[29] Except for Dramshop Act cases, the proportions of plaintiff verdicts in the other subject categories are more varied. Some of the variation, however, may reflect

Table II: Plaintiff Jury Verdicts by Subject of Dispute, Cook County, Illinois, 1961-79.

	(1) 1961 % (total cases)	(2) 1962 % (total cases)	(3) 1967 % (total cases)	(4) 1973 % (total cases)	(5) 1977 % (total cases)	(6) 1978 % (total cases)	(7) All years* 1961-79 % (total cases)
Traffic							
(1) Auto Collision	48 (272)	49 (361)	49 (590)	45 (672)	46 (478)	45 (473)	46.6 (4225)
(2) Pedestrian	49 (57)	43 (42)	51 (100)	36 (103)	32 (65)	38 (75)	42.0 (1453)
(3) Common Carriers	44 (51)	42 (61)	51 (74)	43 (37)	68 (36)	39 (19)	49.8 (896)
Non-Traffic							
(4) Work Injuries	50 (20)	50 (29)	53 (52)	65 (81)	66 (31)	60 (31)	60.2 (5585)
(5) Injuries on Property	36 (46)	43 (51)	34 (81)	47 (64)	37 (46)	48 (43)	42.0 (949)
(6) Falls in Street	83 (12)	26 (21)	29 (43)	54 (25)	41 (16)	64 (25)	51.1 (416)
(7) Dramshop	39 (18)	47 (17)	46 (27)	44 (9)	47 (19)	50 (14)	50.0 (356)
(8) Product Liability	55 (11)	40 (22)	42 (26)	35 (43)	32 (73)	37 (71)	37.0 (691)
(9) Contracts, Bus.Torts	70 (5)	51 (14)	47 (15)	55 (49)	70 (74)	62 (86)	59.0 (741)
(10) Total Traffic*	48.0 (384)	47.5 (469)	49.2 (768)	44.1 (772)	45.9 (583)	44.2 (573)	47.7 (11,998)
(11) Total Non Traffic*	49.4 (162)	44.9 (217)	42.1 (323)	48.4 (377)	47.2 (361)	51.4 (399)	48.5 (5610)
(12) Composite Total*	48.4 (546)	46.7 (686)	47.1 (1091)	45.5 (1149)	46.4 (944)	47.1 (972)	47.1 (17,296)

Source: Derived from Indices. Cook County Jury Verdict Reporter. 1961-79.

NB: Deadlocked verdicts are counted as 1/2 for plaintiff.

... totals because of sampling.

the small number of observations in each subject area. For example, in 1978 plaintiffs prevailed in 64 percent of cases involving falls in streets (row 6). In that year, however, only 25 street-fall cases were litigated. If the decision in three cases had been different, plaintiffs would have won 13 cases and lost 12.

The summary of the traffic and non-traffic categories (rows 11 and 12) resolves the problem of small numbers. While these summaries, of course, tend to suppress differences between subject areas, we know of no alternative theories that would suggest suppression towards a .5 result.[30] The summaries also support the hypothesis. With the exception of non-traffic cases in 1967, there are no observations in which the difference from .5 is greater than 6 percent. And the totals of all traffic and non-traffic cases for the 19-year period (column 7) are very close to .5.

The 19-year subject area summaries (column 7), however, reveal what appear to be significant differences from .5 in some specific subject categories, in particular: product liability, 37 percent; injuries on property (invitee, licensee cases), 42 percent; workplace injuries, 60 percent; and contracts-business tort cases, 59 percent. We discuss some potential sources of these differences in Part IV. These differences, however, are not clearly related to what one would imagine to be the predisposition of juries toward plaintiffs in these various areas. For example, one would imagine juries to be more sympathetic to victims than manufacturers in cases involving injuries from product defects. In fact, over 19 years victims prevail on average only 37 percent of the time. There appears to be no greater rate of recovery in the years following the adoption of a strict liability standard in 1965 (see columns 3, 4, 5, and 6). We will discuss the product liability data more carefully, however, in Part V.

B. Civil Jury Verdicts, 1960-79, by Court

Table III presents the jury verdict results from the vantage of the court in which the trial was conducted. It shows the proportion of plaintiff verdicts from 1960-79 (although some year's results were unavailable) in the Municipal, Circuit and U.S. District Courts of Cook County, Illinois. Although these are verdicts by juries rather than by judges, there is no reason to believe that the proportion of success of plaintiffs will be similar. The subject matters of the cases are different, the pool of jurors is different and the judges directing the conduct of the trials are different for the respective courts.

The results of Table III also support the hypothesis. With respect to the Municipal Courts, in 10 of 17 years, the proportion of plaintiff verdicts was within 5 percent and in 15 of 17, within 7 percent of .5. With respect to the Circuit Courts, in which more jury cases are tried and the jurisdictional limit is higher, the results are stronger. There is no year in which the proportion of plaintiff verdicts differs from .5 by more than 3.4 percent. Furthermore, in 12 of 17 years the proportion in the Superior Courts differs from .5 by less than 2 percent. There is some greater variation in the results with respect to the U.S. District Courts, although the number of jury verdicts in any single year is quite small. The total for the 17 reported years for the U.S. District Courts is within 4 percent of .5.

C. Verdicts by Individual Judges, 1960-80

The data presented above consist solely of verdicts by juries. It might be believed that jury verdicts appear even-handed because individual biases are suppressed where a 12-person jury must agree on a verdict,[31] or because a lay jury is likely to decide cases in a roughly random manner.

Table III: Plaintiff Jury Verdicts by Court of Disposition, Cook County, Illinois, 1961-79.

Year	Municipal Courts % (total cases)	Circuit Courts % (total cases)	U.S. District Courts % (total cases)
1960	39.1 (184)	49.7 (332)	46.9 (48)
1961	43.9 (245)	48.3 (324)	54.1 (61)
1962	50.0 (244)	47.2 (534)	61.8 (55)
1963	51.3 (237)	49.4 (639)	63.3 (45)
1964	55.6 (189)	49.8 (623)	56.5 (61)
1965	52.3 (288)	52.7 (684)	45.1 (61)
1966	49.0 (353)	48.3 (736)	56.0 (50)
1967	47.9 (431)	48.5 (695)	65.3 (36)
1968	44.5 (420)	51.8 (707)	63.2 (38)
1969	46.0 (210)	51.2 (655)	42.0 (38)
1970	48.3* (121)	49.1 (612)	48.4 (31)
1971	43.1 (320)	51.8 (600)	48.7 (38)
1972	41.4 (349)	51.5 (616)	54.5 (56)
1974	43.4 (309)	53.0 (466)	55.4 (37)
1976	46.2 (198)	50.3 (522)	52.4 (21)
1978	49.4 (238)	53.4 (535)	46.4 (56)
1979	48.7 (224)	52.6 (495)	49.1 (57)
TOTAL	46.8 (4560)	50.5 (9575)	53.4 (789)

Source: Derived from Cook County Jury Verdict Reporter, 1961-79.

NB: Deadlocked verdicts are counted as 1/2 for plaintiff.

*Suburban counties' magistrates excluded after 1969.

This subpart examines the rate of plaintiff verdicts in cases tried without juries, that is, in decisions rendered by judges. Of course, it is widely believed that the decisions of any judge reflect the judge's individual viewpoints.[32] Indeed, important to the acceptance of this view by the Realists and others was the famous empirical demonstration of Jerome Frank in Law and the Modern Mind of significant differences between individual judges of the New York City Magistrate's Courts in criminal conviction and sentencing practices.[33]

It is very difficult to obtain information on the decisions of individual judges with respect to specific legal categories. Table IV presents results of a (small) sample of decisions by U.S. District Court judges in negligence and contract breach cases from 1960-80, derived from Lexis. The selection of the five individual judges was not entirely random. Many District Court decisions are rendered without a formal opinion and, although there is some specialization within the federal courts, it was difficult to find individual judges who, even over a long period, had decided (and reported) large numbers of general negligence cases. The five judges were selected randomly from the set of U.S. District Judges who had decided more than 8 negligence cases in the period. The sample was later extended to consider verdicts in contract-breach cases by these same judges. The five judges are Andrew A. Caffrey (D.Mass.), Roszel C. Thomsen (D.Md.), Edward Weinfeld (S.D.N.Y.), Joseph S. Lord, III (E.D.Pa.), and Frank A. Kaufman (D.Md.). We have no specific historical, political, or psychological information about any of the judges, although we imagine that there are differences between them in some dimension.

Table IV: Plaintiff-Defendant Verdicts by U.S. District Judge, 1960-80.

Judge	Negligence Cases			Contract Cases		
	Total Negl.	For Plaintiff	For Defendant	Total Contract	For Plaintiff	For Defendant
Caffrey	23	9	14	12	5	7
Thomsen	15	9	6	17	9	8
Weinfeld	18	10	8	8	4	4
Lord	16	8	8	7	4	3
Kaufman	8	3	5	3	2	1
Total all judges	80	39	41	47	24	23

Source: Lexis, Federal Supplement 1960-80.

The results of Table IV again confirm the hypothesis. The largest difference from the .5 range appears in the negligence decisions of Judge Caffrey, although the difference may result from the small number of decisions; a shift of 2 of Caffrey's decisions would make 11 plaintiff and 12 defendant verdicts. No other judge (nor Caffrey with respect to contract breach cases) differed from the .5 prediction by more than one decision. Furthermore, the totals for the 5 judges are striking.

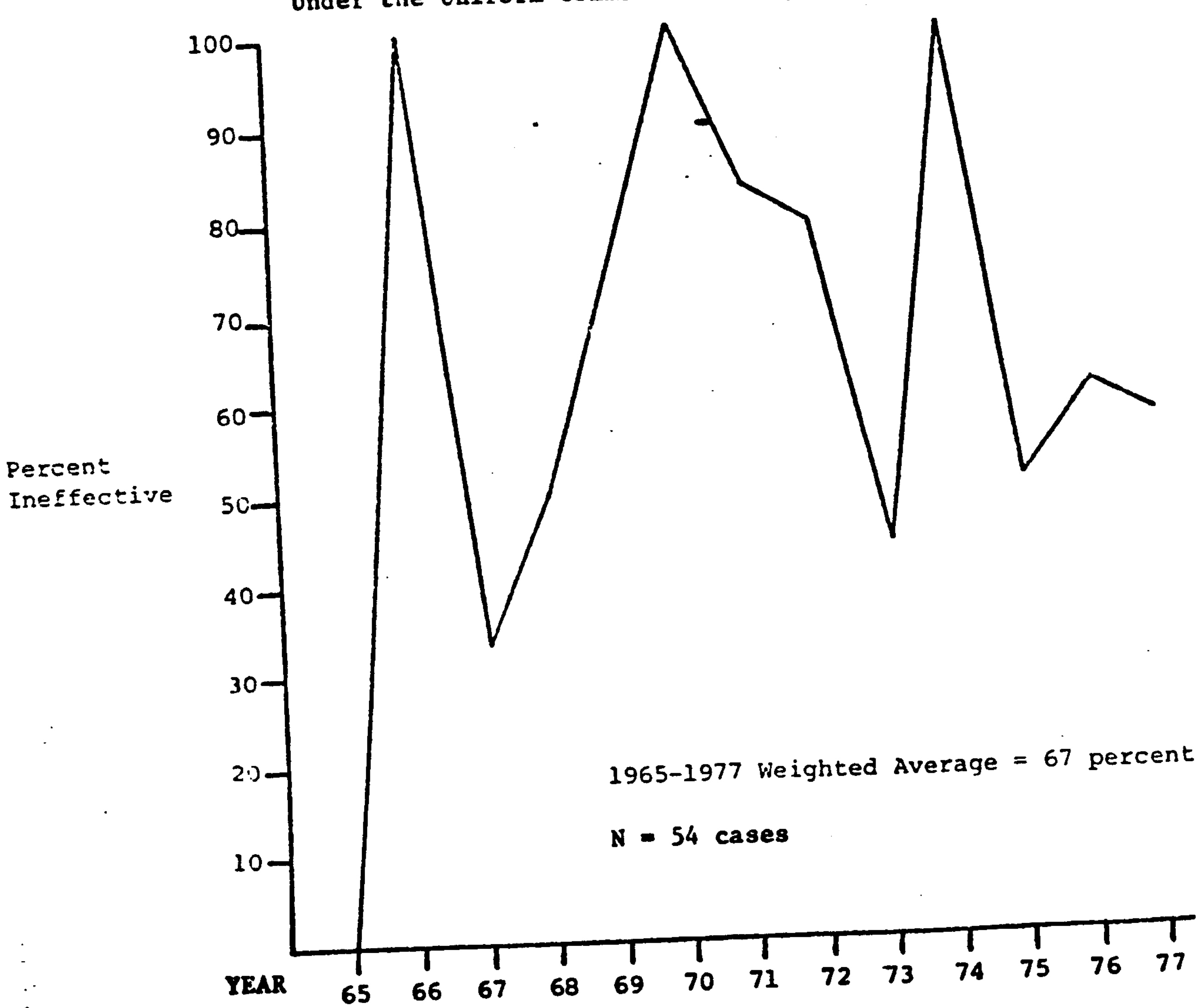
It might be thought that an alternative hypothesis consistent with the findings of Table IV is that these five judges are distinguished among judges by their exceptional fair-mindedness. It is, in fact, <u>because</u> of their unusually equitable dispositions that plaintiffs and defendants together were willing to waive juries with greater frequency before these judges than before others on the federal bench. This hypothesis, however, is identical to that of the paper. According to the theory, litigation is more likely to occur where there are relatively greater differences between the parties' expectations of the outcome. Outcomes will be hardest to predict in close cases before fair-minded judges, in the same way that it is most difficult to predict the outcome of a flip of a perfectly unbiased coin.

D. <u>Some Partial Evidence of Convergence</u>

Finally, we present some eivdence bearing on the prediction of the theory of convergence toward .5 as information available about the decision standard increases. Figure 7 describes the proportion of all appellate decisions in which disclaimers of the implied warranties were held ineffective under the Uniform Commercial Code from the adoption of the Code to 1977. The Uniform Commercial Code implies a warranty of merchantability which requires all goods to meet a standard of "fair, average quality."[34] The Code provides, however, that a manufacturer may disclaim this warranty (thus limiting consumers to rights and remedies offered expressly in the written warranty) as long as certain technical requirements are met.[35] The Code's technical requirements for an effective disclaimer are not exacting, but many courts, hostile to disclaimers, have held them ineffective by increasingly stringent interpretations.[36]

Figure 7 illustrates--we believe--how parties to warranty disputes have responded to the growing awareness of judicial hostility to warranty disclaimers. The convergence toward .5 is apparent.

Figure 7. Proportion of Decisions in Which Disclaimers of Implied Warranties in Consumer Sale Contracts Held Ineffective Under the Uniform Commercial Code, 1954-1977.



Source: Uniform Commercial Code Reporting Service

IV. Extensions and Complications

Although the assumptions of the basic model are not overly restrictive, the implications that follow from relaxing some of them may indicate the factors that are creating the discrepancies in the plaintiff-defendant victory proportions observed above. In this Part we relax our assumptions that the judgment is fixed and known, and that the stakes to the parties are identical. We continue to limit discussion, however, to non-strategic behavior of the parties.

A. Imperfectly known judgments

Where judgments are not known by the parties with certainty but must be estimated, we may describe the respective estimates as

$$\hat{J}_p = J + u_p \tag{11a}$$

$$\hat{J}_d = J + u_d \tag{11b}$$

where J is the true judgment, $\hat{J}_p$ and $\hat{J}_d$ are the plaintiff's and defendant's estimates of J, and u_p and u_d are their corresponding measurement errors.

Error in measurement will increase the proportion of plaintiff victories because even if error variances are small, cases in which a plaintiff faces a high probability of winning are more likely to go to court. For example, where it is known with certainty that the plaintiff will lose, the dispute will never be litigated because any disagreement over the judgment is irrelevant. On the other hand, where the plaintiff is certain to win (i.e., $P_p = P_d = 1$) the dispute will be litigated if $\hat{J}_p - \hat{J}_d > C - S$.

When judgments are not known with certainty, disputes may be litigated for two reasons: 1) the defendant and plaintiff may differ in their estimates of the probability that a guilty verdict will be returned, which as shown in Part II, is symmetric across Y and -Y. 2) the plaintiff and defendant may disagree on the anticipated judgment (plaintiff's estimate is greater than the defendant's). The second set of conditions leads to asymmetric outcomes because the effect of measurement errors is proportional to P_d and P_p. This effect will be more important (more likely to lead to litigation) for large values of P_d and P_p.

B. Different Stakes to the Parties

Although in cases involving legal rather than equitable remedies, the amount the loser pays is the amount the winner gains, there are many situations in which the resolution of the dispute implicates the activities or practices of one of the parties but not the other. Examples are where the loss of a case:

1) damages the defendant's public reputation (or a victory restores a reputation, such as the John Connally bribery case);

2) influences future sales of the defendant (such as Ford's defense of the Pinto cases);

3) requires the defendant to change an existing practice at an increase in costs, such as where a marketing technique is held to violate the antitrust laws.[37]

To consider differential stakes, we may describe the difference between the plaintiff's settlement demand (ask) and the defendant's offer as

$$(12)\quad A - O = P_p \cdot J_p - P_d \cdot J_d + S - C .$$

The selectivity equation becomes:

$$(13)\quad P_p J_p - P_d \cdot J_d > C - S.$$

Letting $\bar{J} = \frac{J_p + J_d}{2}$ and $\Delta J = J_d - J_p$, this can be rewritten as:

$$(14)\quad P_p - P_d > \frac{C-S}{\bar{J}} + \bar{P}\,\frac{\Delta J}{\bar{J}}$$

where $\bar{P} = \frac{P_p + P_d}{2}$.

It is clear that when $\Delta J = 0$ we have $J_d = J_p = \bar{J}$ and the selectivity equation reduces to its form in the basic model. When ΔJ is positive, that is, when the stakes are greater to the defendant than to the plaintiff, the right side is smallest where $\bar{P}$ is small. Hence, relatively more disputes will be litigated in which the plaintiff has a small probability of winning. On the other hand, when ΔJ is negative, and the stakes are greater to the plaintiff than to the defendant, the right side of the selectivity equation is smallest where $\bar{P}$ is large (i.e., close to 1). Hence, more disputes will be litigated in which the plaintiff has a high probability of winning.

The implications of the analysis are that where the stakes are greater for the defendant than the plaintiff, fewer disputes will be litigated in general (because the right term of equation 14 is positive). More importantly, however, of the disputes that are litigated, more are likely to be decided in favor of the defendant. On the other hand, where the stakes are greater for the plaintiff than the defendant, the opposite consequences will follow: more disputes will be litigated and more are likely to be decided in favor of the plaintiff.

We present in Table V Monte Carlo simulations illustrating the importance of differential stakes to the parties with respect to the rate of litigation and the frequency of plaintiff verdicts. The simulations were conducted with litigation costs of 15, Y at 0 (the median of the normal distribution), a standard deviation of the distribution of 1, and a standard deviation of both parties' estimates of .5.

The simulations illustrate extraordinary changes in outcomes as differences in the stakes to the parties are shifted. Column 2 shows that where the stakes are heavily weighted in favor of the defendant, only 3.9 percent of disputes are litigated of which plaintiff s win 30 percent. If all disputes had been litigated, or if the stakes to the parties had been equal (see Set 1, Table I, supra), plaintiffs would have won 50 percent. Column 3, however, presents results where the stakes are weighted oppositely in favor of the plaintiff. Now 68 percent of disputes are litigated of which plaintiffs win 67.6 percent. Of course, it should be noted that for illustrative purposes, we have exaggerated the difference in stakes between the parties. It is not the normal case in which one party stands to gain or lose four times the amount of his opponent. Furthermore, for these simulations, the litigation cost assumption is unrealistically low (at .08 or .1 compared to .3 for the simulations reported in Table I). It is this

Table V: Simulations with Differential Stakes, Normal Distribution.

Assumptions	(1)	(2)	(3)	(4)
$\hat{J}_p$	50	50	200	100
$\hat{J}_d$	100	200	50	50
Results				
(1) N	4000	4000	4000	4000
(2) # of Victories in Population*	2030	2008	1963	1953
(3) # of Cases Litigated	244	156	2720	2204
(4) # of Victories in Court	82	48	1840	1658
(5) % Litigated	6.1	3.9	68	55.1
(6) % Victories in Population	50.8	50.2	49	48.8
(7) % Victories in Court	33.6	30.8	67.6	75.3

*All victories refer to plaintiffs.

assumption that generated the unrealistically high rates of litigation where the stakes to the plaintiff were higher.

V. Some Exceptions Considered

This Part briefly reviews evidence relating to the prediction of greater plaintiff and defendant verdicts as the stakes to the parties differ.

A. Product Liability Cases, 1959-75

Table II showed that in litigated disputes involving injuries from product defects, plaintiffs systematically lost more often than they won. Table VI again reviews recoveries in product liability cases in jury verdicts rendered in the courts of Cook County, Illinois between 1959-75. We have studied the reports of these cases more carefully and have uncovered many more product liability cases than indicated in the sources of Table II.

There again is evidence of a systematic difference in the rate of plaintiffs' recoveries from the .5 prediction of the basic model (although a less substantial difference than reported earlier). The yearly data also confirm that the shift in the standard of liability in 1965 from negligence to strict liability had little effect on the rate of recovery. Of cases decided under the negligence standard, plaintiffs won 42.6 percent; under the strict liability standard, 41.5 percent. These figures again confirm the implication of the invariance of the rate of recovery to the decision rule. Because of the substantial trial queue in Illinois, however, we may test the hypothesis more carefully. There were many cases filed when the

Table VI: Plaintiff Verdicts in Product

Defect Cases, Cook County, Illinois, 1959-75.

Year	Proportion Victory %	Total Cases
1959	38	13
1960	50	32
1961	39	51
1962	56	39
1963	40	52
1964	37	54
1965	40	58
1966	41	58
1967	42	43
1968	41	46
1969	33	48
1970	42	31
1971	26	34
1972	48	56
1973	43	47
1974	40	63
1975	52	56
TOTAL 1959-75	781	41.9

Source: Cook County Jury Verdict Reporter, 1959-75.

standard of liability was negligence but tried when the standard was strict liability. Of these cases, plaintiffs won 40.78 percent. There appears to have been a very rapid convergence of the parties' estimates of recovery.

How might we explain the systematic deviation from 50 percent recoveries? Although we have no data on which to base a judgment, it is not implausible that the stakes in product liability actions are greater, in general, to manufacturer-defendants than to victim-plaintiffs. A product-liability judgment, of course, may lead to an appeal establishing an adverse precedent. A trial court judgment may serve to support an estoppel. An adverse judgment might inform other injured parties that a case is worth bringing or increase their estimates of success and thus their settlement demands. Further, it is often alleged that firms such as insurance companies which deal over time with a substantial number of claimants invest to establish and preserve a reputation for tough bargaining to reduce further settlement demands. These are suppositions. The evidence does seem to suggest, however, that the determinant of the rate of success at trial is structural in nature, invariant over time and over changes in the standard of liability.

B. Resale Price Maintenance Actions, 1936-75

This subpart discusses cases in which we would expect the stakes to be higher to the plaintiff than to the defendant. Table VII presents the outcomes of all reported private actions seeking to enforce resale price maintenance agreements from 1934-75, the period during which such agreements were exempt from the antitrust laws. Typically, these actions were brought by manufacturers against retailers who had violated agreements by selling at a price below that established by the manufacturer. They are all equit-

TABLE VII: Resale Price Maintenance Private Actions, 1934-75.

Period	Injunction Granted % (total cases)	Contempt Order % (total cases)
1934-40	71.4 (28)	
1941-45	52.6 (19)	
1946-50	68.5 (92)	
1951-55	52.3 (193)	75.0 (8)
1956-60	57.6 (238)	61.0 (41)
1961-65	53.8 (143)	78.9 (19)
1966-70	60.6 (71)	100.0 (12)
1971-75	63.5 (63)	84.2 (19)
TOTAL	60.2 (425)	72.9 (70)

Source: Derived from CCH Trade Cases 1934-75.

able actions seeking injunctions prohibiting further violations and, in the case of second offenders, contempt orders for violations of injunctions.

The objective of these actions was general daterrence of violations. The ootcome at trial was publicized in trade journals and often--it is reported--by circulars from manufacturers to the set of retailers obligated under agreements. The stakes of such actions to the manufacturer-plaintiff, thus, were likely to be substantially greater than the difference in sales to a retailer-defendant if the injunction were denied. Actions for contempt, of course, are more drastic. The relative infrequency of such actions over the period may suggest that they were brought where maintenance of prices on especially important marketing technique of the manufacturer.

Table VII shows that the proportion of plaintiff victories was systematically greater than .5 for the period. The rate of success in contempt actions was greater yet. Contempt is often regarded as following automatically from the violation of an injunction. We see, however, that over the period contempt orders were denied in 27 percent of cases. An explanation for the result is that the rate of success at trial reflects the differential stakes to the parties.

For the Workshop:

VI. Conclusion: Future Uses of the Model

The model of the paper offers some success in explaining rates of recovery in various legal contexts. The more important aim of the project, however, is to create a way to determine the effect of legal standards more generally--that is, to infer the population of disputes--from observations of litigated cases. We believe the model can be developed to approach that objective.

The most critical assumptions of the model are of the distributions both of the population of disputes and of the measurement errors of the parties. The similarity of the simulation results under assumptions of a normal and uniform distribution are illustrative. Furthermore, various combinations of the mean of the population of disputes and of the standard error of the parties' measurements can yield the proportions of victories that we have observed. As a consequence, without a more firm theoretical grounding of the assumptions, the theory lacks power.

We are at work, however, at the resolution of some of these ambiguities. Two sources of data are available to us[38] from which we may observe directly the distribution of the population of disputes: first, a census of claims filed against several individual insurance companies in various classes of disputes during various recent years; second, reports of all product liability and malpractice suits filed in the Cook County, Illinois civil courts of which the litigated disputes described earlier are a subset.

In addition, it is possible to infer the distribution of the parties' measurement errors from several sources. The Cook County, Illinois records include descriptions of settled disputes (including the terms of settlement) in some limited classes of cases. Furthermore, the reports of litigated cases in the Cook County courts comprise information of the final settlement offers of the parties prior to the verdict. By comparing these offers to the eventual verdicts, we can estimate the range of error of the parties as well as the position of the decision rule relative to specific characteristics of the cases themselves. We should observe sharp differences in these offers (although not in the proportion of plaintiff verdicts), for example, over periods in which decision standards are changed. The reliability of these inferences, of course, remains to be determined.

We describe here--admittedly--projects that are not carefully worked out employing data that have not yet been carefully analyzed. As a consequence, even the objectives of the study are highly tentative. It is our view, however, that a precondition for conclusions about the effects of the law from studies of decisions is a theory of case selection. As legal scholarship becomes more empirical and statistical in nature, inferences based upon presumptions of selection will be increasingly central to findings and to our understanding of the legal system.

APPENDIX

We have previously shown that the probability that a case will go to court for a given Y is

$$P \left\{ \int_{\frac{Y}{\sigma} + z_1}^{-\frac{Y}{\sigma} + z_2} f(z)dz > D \right\} \qquad 0 < D < 1$$

where z_1 and z_2 are standardized random variables with common density $f(z)$. Since

$$\int_{\frac{Y}{\sigma} + z_1}^{-\frac{Y}{\sigma} + z_2} f(z)dz = \int_{\frac{Y}{\sigma} - z_2}^{\frac{Y}{\sigma} - z_1} f(z)dz$$

and z_1, z_2, $-z_1$; and $-z_2$ are identically distributed, we have:

$$P(P_p - P_d > D|Y) = P(P_p - P_d > D|-Y)$$

Hence, the function $P(Y)$: $Y \rightarrow [0,1]$, which assigns to each Y the probability of going to court, is symmetric about zero. Further,

$$P(P_p - P_d > D) \leq P(P_p > D)$$
$$P(P_p - P_d > D) \leq P(P_d < 1-D)$$

If we choose $\bar{Y}$ such that

$$(1-D) = \int_{-\infty}^{\bar{Y}} f(z)dz$$

Then by Cheby Chevs inequality, letting $Y = \max(0,\bar{Y})$ we have

$$P(P_p - P_d > D|Y) \le \frac{\sigma^2}{(Y-\bar{Y})^2} \qquad Y > \bar{Y}$$

$$P(P_p - P_d > D|Y) \le \frac{\sigma^2}{(Y-\bar{Y})^2} \qquad Y < -\bar{Y}$$

Hence

$$\int_{-\infty}^{\infty} |P(Y)|dm < \infty$$

which implies $P(Y) \in L'(M)$. Hence letting $K(\sigma) = \int_{-\infty}^{\infty} P(Y)dm$ we can find an interval $(-Y_0, Y_0)$ such that

$$\frac{\int_{-Y_0}^{Y_0} P(Y)dm}{K(\sigma)} < 1 - \varepsilon \quad \text{for any } \varepsilon > 0$$

and an interval $(-Y_1, Y_1)$ such that for $|Y| > Y_1$ $\frac{P(Y)}{K(\sigma)} < \varepsilon$ for any $\varepsilon > 0$. Letting $Y^* = \max(Y_1, Y_2)$ we have an interval with both of these properties. Further since $P(Y)$ depends only on $\frac{Y}{\sigma}$ we can make this interval as small as desired by choosing sigma small. That is for any $\varepsilon > 0$ and $a > 0$ $\exists\sigma$ such that

$$\frac{\int_{-a}^{a} P(Y)dm}{\int_{-\infty}^{\infty} P(Y)dm} < 1 - \varepsilon$$

Letting $G(Y)$ = distribution of litigated cases

$H(Y)$ = distribution of all cases

we have,

$$g(Y) \simeq h(Y)\cdot P(Y)$$

Hence

$$\frac{\int_{-\infty}^{0} g(Y)}{\int_{0}^{\infty} g(Y)} = \frac{\int_{-\infty}^{0} h(Y)\,\frac{P(Y)}{K(\sigma)}}{\int_{0}^{\infty} h(Y)\,\frac{P(Y)}{K(\sigma)}}$$

If $h(Y)$ is continuous at zero then for any $\varepsilon > 0$ there exists a δ such that for $|Y| < \delta$, $|h(Y) - h(0)| < \varepsilon'$. If $h(0) \neq 0$ then

$$\int_{-\infty}^{0} h(Y)\,\frac{P(Y)}{K(\sigma)} = \int_{\infty}^{-\delta} h(Y)\,\frac{P(Y)}{K(\sigma)} + \int_{-\delta}^{0} h(Y)\,\frac{P(Y)}{K(\sigma)}$$

Let $B(Y) = 1$ for $|Y| < Y^*$, $B(Y) = \frac{\sigma^2}{(Y-\bar{Y})^2}$. For $|Y| > \bar{Y}$ this implies

$$\int_{-\infty}^{0} h(Y)\,\frac{P(Y)}{K(\sigma)} \leq B(-\delta)P + (\varepsilon' + h(0)) \int_{-\infty}^{0} \frac{P(Y)}{K(\sigma)}$$

where $P = \int_{-\infty}^{0} h(Y)dm$.

Taking limits as $\sigma \to 0$ we see

$$\lim_{\sigma \to 0} \int_{-\infty}^{0} h(y)\,\frac{P(Y)}{K(\sigma)} \leq \frac{h(0) + \varepsilon'}{2}$$

Similarly,

$$\lim_{\sigma \to 0} \int_{0}^{\infty} h(y)\,\frac{P(Y)}{K(\sigma)} \geq \frac{h(0) - \varepsilon'}{2}$$

$$\Rightarrow \lim_{\sigma\to 0} \frac{\int_{-\infty}^{0} g(Y)dm}{\int_{0}^{\infty} g(Y)dm} < \frac{h(0) + \varepsilon'}{h(0) - \varepsilon'}$$

since ε' was arbitrary this will hold for $\varepsilon' = \frac{\varepsilon}{\varepsilon + 2} h(0)$ if $h(0) \neq 0$

This yields

$$\lim_{\sigma\to 0} \frac{\int_{-\infty}^{0} g(Y)dm}{\int_{0}^{\infty} g(Y)dm} < 1 + \varepsilon$$

Since ε was arbitrary this implies

$$\lim_{\sigma\to 0} \left[\frac{\int_{-\infty}^{0} g(Y)dm}{\int_{0}^{\infty} g(Y)dm} \right] \leq 1$$

But by reversing the roles of $\int_{0}^{\infty} g(Y)dm$ and $\int_{-\infty}^{0} g(Y)dm$ in the above proof we get

$$\left[\frac{\int_{0}^{\infty} g(Y)dm}{\int_{-\infty}^{0} g(Y)dm} \right] \leq 1$$

$$\Rightarrow \lim_{\sigma\to 0} \left[\int_{-\infty}^{0} g(Y)dm - \int_{0}^{\infty} g(Y)dm \right] = 0$$

since

$$\int_{-\infty}^{0} g(Y)dm + \int_{0}^{\infty} g(Y)dm = 1 \Rightarrow \int_{-\infty}^{0} g(Y)dm = \int_{0}^{\infty} g(Y)dm = \frac{1}{2}.$$

REFERENCES

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[1] H. Laurence Ross, Settled Out of Court at 216 (1970).

[2] Alfred Conard, et al., Automobile Accident Costs and Payments (derived from) 155, 241 (1964).

[3] Karl N. Llewellyn, The Bramble Bush 53 (1960).

[4] K. N. Llewellyn, The Common Law Tradition--Deciding Appeals 6, 64-63 (1960).

[5] *Id.* at 92-96.

[6] *Id.* at 6.

[6a] William C. Whitford, "Strict Products Liability and the Automobile Industry: Much Ado About Nothing," 1963 *Wisc. L. Rev.* 83, 102-03. For other surveys of a universe of appellate decisions, *see* Richard A. Posner, *infra*, n. 9, and G. L. Priest, *infra*, n. 11.

[7] *Id.* at 103-04.

[8] *Id.*

[9] Richard A. Posner, "A Theory of Negligence," 1 *J. Leg. Stud.* 29, 74 (1972).

[10] There may have been no litigated cases because it was clear to the parties that courts would give effect to voluntary agreements, because the standards drafted by the parties were unambiguous, or because no party found appeal of a trial court decision involving such an agreement worthwhile.

[11] George L. Priest, "Breach and Remedy for the Tender of Nonconforming Goods under the Uniform Commercial Code: An Economic Approach," 91 *Harv. L. Rev.* 960, 997-98 (1978).

[12] *See* Jerome Frank, *Law and the Modern Mind* 112 (1931); Harry Kalven, Jr. & Hans Zeisel, *The American Jury*, *passim* (1960); Richard A. Posner, *supra* n. 9, at 92.

[13] This paper builds on the earlier work of one of the authors, although it presents a more careful and precise definition of the model and its implications. See George L. Priest, "Selective Characteristics of Litigation," 9 J. Leg. Stud. 399 (1980).

[14] We cannot address here the interesting question of the relationship of the decision standard to an individual's initial assertion of a claim.

[15] Largely for empirical reasons. See infra, Parts III, V. The model, of course, could be expanded to consider settlement at intermediate points.

[16] See n. 19, infra.

[17] This assumption is similar to the usual errors in variables assumption in the observation of Y (the propensity). The conclusions of the paper, however, hold if $Y = \hat{Y}_p + \varepsilon_p$; $Y = \hat{Y}_d + \varepsilon_d$ which is the standard regression model assumption. The structure of our model lends itself to easier exposition and proof.

[18] Taken from William M. Landes, "An Economic Analysis of the Courts," 14 J. Law & Econ. 61 (1971).

[19] Court costs are assumed to be exogenously set at "optimal" levels for the defendant and the plaintiff. We have modeled the determination of these expenditures and the effect they have on the outcome of a case. However, an effect of court costs on the propensity of a victory does not affect the results of our basic model, although we have not included a demonstration

of this point. $\hat{Y}_p$ and $\hat{Y}_d$ should be viewed as estimates made by the plaintiff and defendant each taking into account anticipated court expenditures made by both parties.

[20]If $C - S < 0$, then it would be cheaper to litigate than to settle and, hence, even if the plaintiff and defendant had identical estimates, they would litigate the dispute. Our assumption can be justified empirically because if $C - S \leq 0$, over 50% of disputes would be litigated. Typically, as mentioned, TAN 1-2, supra, less than 5% of civil disputes are litigated.

[21]See Appendix.

[22]But see infra, Part IV.

[23]See Appendix.

[24]See sources cited, supra n. 12.

[25]See TAN 1-2, supra.

[26]We treat deadlocked verdicts as one-half for plaintiff. This measure, however, understates the marginal character of deadlocked disputes.

[27]Uebelein v. Chicago Transit Authority, 86 Ill. App.2d 395, 230 N.E.2d 33 (1967).

[28]Suvada v. White Motor Co., 32 Ill.2d 612, 210 N.E.2d 182 (1965).

[29]We have omitted from the tally cases in which liability was admitted or directed, since the disputed issue in such cases is the level of damages. Of course, many other apparent plaintiff verdicts may represent disputes over the level of damages actually won by the defendant.

[30]Friedrich Kessler and Grant Gilmore have articulated a theory according to which the common law consists of sets offsetting rules and counter-rules. There are no specific empirical implications of the theory and it is not addressed to plaintiffs or defendants but rather to social categories such as buyers and sellers. *See* Kessler & Gilmore, *Contracts: Cases and Materials*, *passim* (2d ed. 1970).

[31]Most would imagine, however, that lay juries are more heterogenous and that their verdicts are likely to be inconsistent over time.

[32]*See*, for example, Glendon A. Schubert, *Judicial Policy Making* (1974).

[33]Jerome Frank, *Law and the Modern Mind* at 112 (1930).

[34]Uniform Commercial Code § 2-314.

[35]*Id.*, § 2-316.

[36]These cases are described in George L. Priest, "The Structure and Operation of the Magnuson-Moss Warranty Act," forthcoming in *Economic Regulation and Consumer Welfare: The Federal Trade Commission in the 1970s* (Clarkson & Muris, eds., 1981).

[37]Differential stakes to the parties may also arise in cases of differential risk aversion or where one of the parties is motivated by spite.

[38]All data described in this Part have been collected by the Institute for Civil Justice, The Rand Corporation.