Information, Litigation, and Common Law Evolution
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INFORMATION, LITIGATION, AND COMMON LAW EVOLUTION

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Abstract: It is common in the legal academy to describe trends in judicial decisions leading to new common law rules as the result of conscious judicial effort. Evolutionary models of litigation, in contrast, treat common law as resulting from pressure applied by litigants. One apparent difficulty in the theory of litigation is explaining how trends in judicial decisions favoring one litigant, and biasing the legal standard, could occur. This paper presents a model in which an apparent bias in the legal standard can occur in the absence of any effort toward this end on the part of judges. Trends can develop favoring the better informed litigant whose case is also meritorious. Although the model does not suggest an unambiguous trend toward efficient legal rules, it does show how private information from litigants becomes embodied in common law, an important part of the theory of efficient legal rules.

I. Introduction

It is common in the legal academy to describe trends in judicial decisions, both those favoring plaintiffs and those favoring defendants, as the result of conscious judicial effort. For example, Horwitz (1977) argued that the formulation of the negligence standard over the early nineteenth century occurred because judges wanted to subsidize the emerging railroad industry.

Evolutionary models of litigation, in contrast, treat common law rules as resulting from pressure applied by litigants. Judges play a passive role in this view. If the law moves in a direction favoring a group of defendants – say, railroads – that is merely a byproduct of the types of cases litigated to judgment, not any conscious effort on the part of judges to subsidize any particular type of potential defendant.

One apparent difficulty in the theory of litigation is explaining how long-term trends in judicial decisions favoring one litigant, and biasing the legal standard, could occur. Under the prevailing theory of litigation, that of Priest and Klein (1984),[1] litigation is driven largely by uncertainty, so that litigated cases are as unpredictable as coin tosses. It would seem unlikely under this model for long-term trends favoring any particular class of litigant to occur. To return to Horwitz's argument, under the uncertainty model of Priest and Klein, it seems unlikely that a large body of negligence law, providing several special rules favorable to railroad defendants, would have emerged from a process in which decisions favoring defendants were just as likely as those favoring plaintiffs. Indeed, some have argued that courts were corrupted by powerful interest groups such as the railroads during the early nineteenth century (Glaeser and Shleifer, 2003).

This paper presents a model, which includes Priest-Klein as a special case, in which an apparent bias in the legal standard can occur in the absence of any effort toward this end on the part of judges. Trends can develop favoring the better informed litigant (i.e., the litigant who knows whether the defendant violated the legal standard) whose

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[1] Perhaps I should describe Priest-Klein as the prevailing *positive* theory, since it aims to explain observed patterns of litigation, and has been treated in empirical papers as the prevailing theory, see Waldfogel (1998). Other theories of litigation stress informational asymmetry (Bebchuk, 1984), and over-optimism (Shavell, 1982).

case is also meritorious. To return to the Horwitz argument, uninformed plaintiffs might sue railroads, unsure given the size and complexity of such organizations whether the railroad acted negligently. Informed railroads that are innocent of violating the legal standard tend to stay in court all they way to judgment and win. As a result, they have a disproportionate influence on the developing legal standard. This gives rise to an appearance that courts favor railroads.

Because this paper's model includes Priest-Klein as a special case, the sort of unbiased short-run rule evolution suggested by Priest-Klein is also suggested in this model. Apparently unbiased rule evolution occurs when neither plaintiff nor defendant has a significant informational advantage in litigation. In contrast, apparently biased rule evolution occurs under informational asymmetry.

The model presented here has implications for the literature on the evolution of efficient legal rules. The key analysis in the modern literature is that of Rubin (1977), which argues that common law rules tend toward efficiency over time. This paper's model does not suggest an unambiguous movement toward economically efficient legal rules. However, it does show how private information becomes embodied in legal rules. This is an important part of an older theory of efficient legal rules that can be traced to Hume (1737, 484-501), Hayek (1963, 35-54), and Leoni (1961). Hayek, in particular, stressed the importance of the common law process as a method of discovering private information on efficient norms.

Part II of this paper describes the literature on the economics of common law evolution. Part III presents the model. In Part IV, I summarize the empirical support for the model, and in Part V I discuss its implications for common law evolution.

II. Literature Review

The economic literature on legal evolution begins with Rubin (1977) (followed immediately by Priest (1977)). Rubin argued that common law tends toward efficient legal rules. The reason for this tendency is that inefficient legal rules create deadweight losses. The gains to the parties who benefit as a result of a switch from an inefficient to an efficient rule exceed the losses of parties who prefer the inefficient rule. Given this, a

party with a long-term stake in the efficiency of the rule has a relatively large incentive to litigate, until the inefficient rule is reversed.[2]

Rubin's theory can be framed in terms of litigants' stakes. Asymmetric stakes cause parties to litigate at different rates over the long term. Since potential beneficiaries of the efficient rule have greater stakes than non-beneficiaries, they have stronger incentives to challenge inefficient rules.[3]

More recent papers have offered a "bidding theory" in place of Rubin's efficiency theory.[4] Under the bidding model, common law moves in a direction that favors the parties that are best able to devote resources to litigate in favor of their preferred rules. Thus, even if Rule A is inefficient, courts may be driven to adopt it if its beneficiaries have an advantage relative to others in organizing and devoting resources to litigation.

Both the efficiency theory of Rubin and the bidding theory of more recent articles focus on litigation stakes. If no one has a long-term interest in the formulation of the legal rule – e.g., in a world without repeat players in litigation – then there would be no evolutionary pressure on legal rules under either theory.

An alternative approach to legal evolution focuses on the information content of court decisions. Priest (1980) provided the first and only paper so far to approach legal evolution from this perspective. Priest questions the likelihood of efficient rules emerging from the litigation process. Working with the core insights of the later-formalized Priest-Klein model (1984), Priest argued that the disputes most likely to go all the way to judgment (rather than settle early) were those in which the outcome is most uncertain – like coin tosses. Given the high uncertainty associated with fully litigated cases, the short-run evolutionary push provided by new cases is unpredictable.

A clearer sense of Priest's argument might be conveyed by considering a vague legal standard, stated in general terms, such as the negligence standard. A particular

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[2] Goodman (1979) presents an alternative version of this argument in which the party with a long-term interest in the efficient rule spends more in litigation. The party that spends more increases its chance of success in litigation. For empirical evidence on the common law efficiency hypothesis, see Mahoney (2001).

[3] An alternative long-run efficiency story recently advanced in Zywicki (2003) focuses on the "supply side" of the law. During much of the formative period of the common law, English courts competed to attract litigants, since their revenues depended on court filings. Competition, in turn, led courts to adopt efficient law.

[4] See Hirshleifer (1982); Bailey and Rubin (1994); Rubin, Curran, and Curran (2001). For a related model, see Fon and Parisi (2003). For a review of these theories, see Rubin (2003).

practice is challenged as negligent. The challenge is most likely to go to judgment, according to Priest, if the standard's application to the particular practice is highly uncertain – in the sense that the plaintiff and the defendant appear equally likely to win. Uncertainty gets resolved in favor of plaintiffs just as often as it gets resolved in favor of defendants, so there appears to be no biasing of the standard over time.

The model in this paper builds on and formalizes the approach of Priest (1980) by reexamining the extent to which general standards are biased by the new information from court decisions. The appearance of information biasing does occur in this model. Under certain conditions, uncertainty tends to get resolved in favor of defendants, and under other conditions in favor of plaintiffs. To observers, the cloud of uncertainty appears to shift in favor of one of the parties.

The key difference between this paper's model and that of Priest is that this one allows for asymmetric information among litigants.[5] Information biasing of the legal standard occurs in favor of the party who is both informed (i.e., has a superior prediction of the case outcome) and meritorious. The reason is that informed and non-meritorious parties (e.g., guilty defendants) tend to settle, which leaves a relatively large share of the informed and meritorious litigants in the pool of cases litigated all the way to judgment. As a result, the information content of legal rules shifts in favor of the informed and meritorious party.

One can think of the model here as one of "micro" or "short-run" evolution because it focuses on short run changes in the information content of the legal standard. The stakes models, in contrast, focus on long-term evolutionary pressures. While the implications for efficiency are not straightforward, it should be clear that the information

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[5] Other papers that examine the influence of asymmetric information on litigation outcomes are Bebchuk (1984), Hylton (1993), Shavell (1996), and Hylton (2002). The last three are especially relevant because they examine implications for trial outcome statistics, such as frequency of plaintiff victory. One may well ask what this paper contributes to those. First, unlike the earlier papers, this one provides a simple general model that incorporates asymmetric information models, the model of Priest (1980) and of Priest and Klein (1984), and that of Rubin (1977). The key results of these models are easily derived within this paper's framework. Unlike the asymmetric information models in Bebchuk (1984), Shavell (1996), and Hylton (2002), this one dispenses with modeling strategic behavior, which greatly simplifies the analysis. Second, unlike the earlier papers, this one establishes general results that have clear implications for the development of case law – e.g., the development of efficient or inefficient legal rules (Part VI.B). By incorporating the models of Priest (1980) and Rubin (1977), this paper provides an integrated model of short- and long-run legal evolution.

biasing identified in this paper's model could improve the efficiency of legal rules over time.[6]

III. Model

A. Basic Components

The model below focuses on the determinants of the frequency of litigation. Following Priest (1980), I will treat the mathematical relationship between those determinants and the frequency of litigation as a forcing function that determines the content of the law produced by courts. The model consists of four basic components.

The first basic component of this model is the Landes-Posner-Gould (LPG) condition for litigation. Under the LPG model, parties choose to litigate rather than settle a dispute if

$$(P_p - P_d)J > C \tag{1}$$

where C = the sum of the plaintiff's litigation cost (C_p) and the defendant's litigation cost (C_d), J = the dollar value of the judgment, P_p = plaintiff's estimate of the probability of a verdict in his favor, P_d = defendant's estimate of the probability of a verdict in plaintiff's favor.[7] I assume that the settlement cost is zero (i.e., the bargaining costs to reach settlement are zero). If the LPG condition (1) holds, the set of mutually beneficial settlement agreements is empty, so the parties choose to litigate.[8]

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[6] One can think of the stakes models as describing one selection process or mechanism under which cases are funneled into litigation. The information model presents an alternative selection process which operates generally, even on those cases that are driven by stakes pressure. The information biasing described here continues to operate even when stakes are asymmetric (see Part IV *infra*).

[7] This model, in which differences in probability estimates drive litigation, differs from the model of Rubin (1977), in which differences in stakes drive litigation. See Part IV of this paper.

[8] Recent literature has made advances on the LPG model by introducing other influences on the decision to settle, such as the rate of compliance with the law, credibility of the plaintiff's threat to sue, and informational asymmetry, see, e.g., Hylton (2002). By relying on the LPG framework, I am assuming that the nonexistence of a mutually beneficial settlement is the main determinant of litigation. This assumption would be restrictive in some contexts, but not in this one. The LPG model is appropriate here because it captures the influence of differential perceptions in a direct and concise manner.

The second basic component of this model is the assumption that each party's predictions can be modeled as the sum of a rational estimate and an idiosyncratic error term

$$P_p = P'_p + \varepsilon_p \tag{2}$$

$$P_d = P'_d + \varepsilon_d \tag{3}$$

If Ω_p represents the information set of the plaintiff, and Ω_d represents the information set of the defendant, then $P'_p = E(P_p|\Omega_p)$, $P'_d = E(P_d|\Omega_d)$, $E(\varepsilon_p|\Omega_p) = 0$, $E(\varepsilon_d|\Omega_d) = 0$.

The third basic component of the model is a specification of the plaintiff's and the defendant's rational estimates of the probability of a verdict in favor of the plaintiff. Let W = probability that the defendant in a legal dispute violated the legal standard. Let Q_1 = probability that a defendant who has violated the legal standard will be found innocent (type-1 judicial error). Let Q_2 = probability that a defendant who has not violated the legal standard will be found guilty (type-2 judicial error). So that courts are at least as accurate as coin tosses, I will assume that $1-Q_1 > Q_2$. The plaintiff's rational estimate of a verdict in the plaintiff's favor can be expressed as a function of the compliance and judicial-error probabilities:

$$P'_p = W_p(1-Q_{1p}) + (1-W_p)Q_{2p}, \tag{4}$$

where $W_p = E(W|\Omega_p)$, $Q_{1p} = E(Q_1|\Omega_p)$, $Q_{2p} = E(Q_2|\Omega_p)$. Similarly, $P'_d = W_d(1-Q_{1d}) + (1-W_d)Q_{2d.}$

I will focus on two types of information set immediately below. One is the case in which the litigant has minimal case-specific information and forms a rational estimate of the likelihood of a verdict on the plaintiff's side using that minimal information. This is the case of the uninformed litigant. The other is the case in which a litigant has private information and knows whether the defendant complied with the legal standard.

For example, an uninformed malpractice plaintiff will know that he has been injured, but will not know whether the injury is due to the defendant's negligence. An

informed malpractice defendant will know not only that he has injured the patient, but also whether or not he was negligent.

In the case of the uninformed litigant, I will assume that his rational predictions are accurate and equal to the true case-specific probabilities of compliance and of error (given minimal case-specific information). Thus, if the plaintiff is uninformed, his prediction is the objective probability of a verdict in favor of the plaintiff, i.e., $P'_p = W(1-Q_1) + (1-W)Q_2$. Similarly, if the defendant is uninformed $P'_d = W(1-Q_1) + (1-W)Q_2$. To simplify, let us label the objective probability of a verdict in the plaintiff's favor

$$v = W(1-Q_1) + (1-W)Q_2 \qquad (5)$$

If one of the parties has private information on compliance, his estimate of W is equal to 1 in the case of non-compliance, or 0 in the case of compliance. Thus, to take one example, if the defendant is informed and innocent, $P_d = P'_d = Q_2$.

The fourth basic component is a *heteroscedasticity assumption* regarding the error variances of the predictions. From the perspective of a litigant, the outcome of a dispute is most uncertain when the rational component of the litigants' prediction is equal to ½. This is the case in which the outcome of the dispute is viewed by the litigant as a coin toss; the litigant may have a great deal of information on the case, but the sum total of his information leads him to believe that a finding of guilt (or liability) is just as likely as a finding of innocence (non-liability). Consistent with Priest and Klein (1984), I will therefore assume that the variance of the prediction error term is a function of the rational component of the litigant's prediction, and that the variance reaches a maximum when the rational component is ½ and with minima at 0 and 1 (see Figure 1 below).
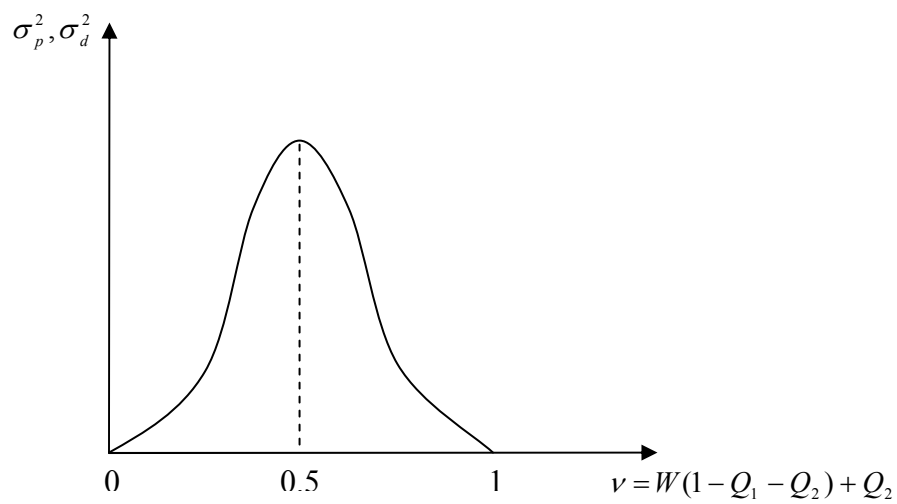
Figure 1

B. Frequency of Litigation

The probability of litigation is

$$f = prob((P_p - P_d)J > C)$$ (6)

which, given (2) and (3), is

$$f = prob\left(\varepsilon_p - \varepsilon_d > \frac{C}{J} - (P'_p - P'_d)\right).$$ (7)

Assume ε_p and ε_d are generated by a normal distribution with variances σ^2_p and σ^2_d respectively, and covariance ρ. The frequency of litigation is given by

$$f = 1 - \Phi\left(\frac{\frac{C}{J} - (P'_p - P'_d)}{\sqrt{\sigma^2_p + \sigma^2_d - 2\rho}}\right)$$ (8)

where Φ is the cumulative distribution for the standard normal variable. The frequency of litigation falls as the numerator inside Φ increases and the frequency of litigation increases as the denominator inside Φ increases.

The heteroscedasticity assumption implies that as the degree of uncertainty concerning the judgment increases (as reflected in the variance terms in the denominator), the probability of litigation rises (Priest and Klein, 1984). Given this, I will assume that the relationship between the prediction-error variances and v is such that f forms a probability density over v.[9]

The frequency of litigation function combines features from several models of the litigation process. Note that as the cost of litigation rises, other things equal, the

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[9] To be precise, $f(v) = 1 - \Phi\left(\frac{\frac{C}{J} - (P'_p - P'_d)}{\sqrt{\sigma^2_p(v) + \sigma^2_d(v) - 2\rho}}\right)$, where $\int_0^1 f(v)dv = 1$.

probability of litigation falls, a prediction of the Landes-Posner-Gould framework. The Priest-Klein model is also incorporated by the assumption of heteroscedastic prediction-error variances.

Over-optimism appears as a factor that generates litigation (Shavell, 1982). Over-optimism is captured by the negative correlation between prediction errors, $\rho < 0$. When the correlation between the parties' prediction errors is negative, plaintiffs overestimate the size of the judgment while defendants underestimate the size of the judgment.

1. *Priest-Klein Case*

Under the Priest-Klein model, litigation is driven by uncertainty and the plaintiff win rate equals 50 percent. The reason is that only disputes that are as uncertain as coin tosses make it all the way to judgment.

The frequency of litigation function is consistent with the implications of Priest-Klein when the rational predictions of the plaintiff and the defendant are the same ($P'_p = P'_d$). In this case, the key "push factor" leading to litigation is uncertainty, as reflected in the error variances in the denominator of (8). The Priest-Klein model assumes uncertainty regarding trial-outcome predictions increases as the defendant's conduct comes closer to the legal standard, which implies that the rational component of the trial-outcome prediction is 50 percent ($P'_p = P'_d = \frac{1}{2}$).

A more precise description of the Priest-Klein theorem can be achieved by examining the plaintiff's win rate in this model. For any given v, the plaintiff win rate is

$$\pi = \frac{(1-W)f(v)Q_2 + Wf(v)(1-Q_1)}{(1-W)f(v) + Wf(v)} = v \qquad (9)$$

where $f(v) = 1 - \Phi\left(\frac{\frac{c}{J}}{\sqrt{\sigma_p^2(v) + \sigma_d^2(v) - 2\rho}}\right)$. The average plaintiff win rate takes into account the frequency of litigation, so that

$$\bar{\pi} = \int_0^1 vf(v)dv \tag{10}$$

Given the assumptions on the error variances (reflected in Figure 1), f is symmetric around $v = \frac{1}{2}$. It follows that $\bar{\pi} = \frac{1}{2}$.[10]

The essence of the Priest-Klein model is captured by assuming heteroscedastic error variances; in particular, the assumption that prediction error variances reach a maximum when the rational prediction components equal fifty percent ($P'_p = P'_d = \frac{1}{2}$). Since the pool of litigated cases will be dominated by those in which the rational component of the litigants' predictions is equal to fifty percent, the average plaintiff win rate will be fifty percent.

The Priest-Klein analysis falls out of this model easily in the special case of Bernoulli predictions. Suppose

$$P_P = \begin{cases} 1 \ prob & P'_P \\ 0 \ prob & 1 - P'_P \end{cases} \tag{11}$$

$$P_d = \begin{cases} 1 \ prob & P'_d \\ 0 \ prob & 1 - P'_d \end{cases} \tag{12}$$

The probability of litigation is simply $P'_p(1-P'_d)$, which reaches its maximum at $P'_p = P'_d = \frac{1}{2}$. The most uncertain cases, in which the rational trial outcome prediction is fifty percent, dominate the landscape of disputes. Average trial win rates approximate fifty percent.

2. *Asymmetric Information Case*

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[10] The formal argument that $\bar{\pi} = \frac{1}{2}$ is in the appendix. Although the Priest-Klein proposition is generally accepted, the original article does not contain a formal proof. The proof in the appendix of this paper, which shows that the Priest-Klein result follows straightforwardly from the assumption that f is symmetric about $v = \frac{1}{2}$, is the only simple proof of the theorem of which I am aware.

There are two asymmetric information cases to consider: where the defendant has the informational advantage and where the plaintiff has the informational advantage.

When the defendant has the informational advantage, the frequency of litigation will depend on the defendant's type. If the defendant is innocent, $P'_p = W(1-Q_I) + (1-W)Q_2$, $P'_d = Q_2$, and the frequency of litigation is

$$ f_I = 1 - \Phi\left(\frac{\frac{C}{J} - W(1 - Q_1 - Q_2)}{\sqrt{\sigma_p^2 + \sigma_d^2 - 2\rho}} \right). \tag{13} $$

If the defendant is guilty, $P'_p = W(1-Q_I) + (1-W)Q_2$, $P'_d = 1-Q_I$, and the frequency of litigation is

$$ f_G = 1 - \Phi\left(\frac{\frac{C}{J} + (1 - W)(1 - Q_1 - Q_2)}{\sqrt{\sigma_p^2 + \sigma_d^2 - 2\rho}} \right). \tag{14} $$

When defendants have the informational advantage, the frequency of litigation is larger for cases involving innocent defendants, i.e., $f_I > f_G$. This is because guilty defendants settle their cases at a higher rate than the innocent. As a result, the plaintiff win rate is pushed downward from the fifty percent level.

For any given noncompliance probability W, the overall frequency of litigation is $Wf_G + (1-W)f_I$, and the plaintiff's win rate at trial is

$$ \pi = \frac{W f_G (1 - Q_1) + (1 - W) f_I Q_2}{W f_G + (1 - W) f_I} \tag{15} $$

The average win rate is

$$\bar{\pi}_2 = \int_0^1 \left[W f_G (1-Q_1) + (1-W) f_I Q_2 \right] dv \tag{16}$$

The influence of innocent defendants relative to guilty defendants on the content of law produced by courts can be described by the ratio of the litigation frequency functions f_I/f_G. The win rate formula implies that instead of a tendency toward 50 percent, the average win rate will tend toward some level less than 50 percent, i.e., $\bar{\pi}_2 < \bar{\pi}$.[11]

Now suppose the plaintiff has the informational advantage. There are two cases to consider: when the plaintiff deserves to win (*meritorious* plaintiff), and when the plaintiff deserves to lose (*non-meritorious* plaintiff). In the non-meritorious case, the plaintiff brings a claim that deserves to be called frivolous. The plaintiff brings it because he knows that with probability Q_2 he will be awarded damages by the court.

In the meritorious plaintiff case, the probability of litigation is given by

$$f_I = 1 - \Phi \left(\frac{\frac{C}{J} - (1-W)(1-Q_1-Q_2)}{\sqrt{\sigma_p^2 + \sigma_d^2 - 2\rho}} \right). \tag{17}$$

In the non-meritorious case the probability of litigation is

$$f_G = 1 - \Phi \left(\frac{\frac{C}{J} + W(1-Q_1-Q_2)}{\sqrt{\sigma_p^2 + \sigma_d^2 - 2\rho}} \right). \tag{18}$$

The "innocent" plaintiff's (i.e., the pairing between the uninformed defendant and the informed and meritorious plaintiff) likelihood of litigation is larger than that of the "guilty" (frivolous) plaintiff. The reason is that the guilty plaintiff tends to settle his claim. This leads to high win rates, exceeding fifty percent.

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[11] See appendix for proof.

IV. Extension to Stakes

The "core" model just presented focuses on uncertainty and information as the key push factors behind litigation. The model can be extended easily to incorporate the stakes factor originally formalized in Rubin (1977). Both the common law efficiency hypothesis and the more recent bidding model (which holds that common laws moves in the direction favored by the party with the greatest resources to devote to litigation) are special cases of Rubin's stakes model.

Differential stakes can be incorporated in this model by letting the value of the judgment depend on type, so that the difference in expected awards is $P_pJ_p - P_dJ_d$. In addition, let $J_p = J + T_p$, $J_d = J + T_d$, where J is the damage award and T_d (T_p) represents the present value of the defendant's (plaintiff's) interest in the litigation (Rubin, 1977). The LPG condition, (1), implies that litigation occurs when $(P_p - P_d)J_p + P_d(J_p - J_d) > C$.

In this more general formulation, the frequency of litigation is

$$
f = 1 - \Phi\left(\frac{\dfrac{C}{J_p} - \left(P'_p - P'_d\right) - \beta P'_d}{\sqrt{\sigma_p^2 + (1-\beta)^2\,\sigma_d^2 - 2(1-\beta)\rho}} \right), \tag{19}
$$

where $\beta = \frac{T_p - T_d}{D + T_p}$. If the plaintiff has greater stakes, $0 < \beta < 1$, and if the defendant has greater stakes $\beta < 0$. Clearly, if the plaintiff and the defendant have symmetric stakes ($T_p = T_d$), this reduces to the information model of the previous section. Introducing stakes adds new results to the model of the previous section only when stakes are asymmetric.

The results can be summarized as follows. In the Priest-Klein case, the plaintiff win rate exceeds (is less than) fifty percent when the plaintiff (defendant) has the greater stakes, which is a well-known result of the Priest-Klein model.[12] In the asymmetric information case, we have instances in which the stakes-based and information-based push factors work at cross purposes. For example, when the defendant has the

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[12] The proof is in the appendix. Although this is a well known result, I am not aware of a neat proof of it – other than the one in the appendix of this paper.

informational advantage, the plaintiff, motivated by his greater stakes, will litigate more frequently against guilty defendants than in the case of symmetric stakes. Still, the results of the asymmetric information model survive: $f_I/f_G > 1$ even in the presence of the stakes incentive.[13]

V. Empirical Support

As a general matter, the predictions of this model are borne out in the data on plaintiff win rates (Hylton, 1993). Observed win rates frequently differ from the fifty percent level predicted by the Priest-Klein model when stakes are symmetric. Only two theories exist to explain these deviations from fifty percent: asymmetric stakes and asymmetric information. The asymmetric information theory seems to be more consistent with the data.

For example, win rates for contract actions tend to be greater than those for tort actions (Eisenberg, 1990, p.357). This makes sense under the asymmetric information theory. Tort actions often involve defendants with private information on their own compliance with the legal standard. Contract actions, in comparison, generally look at the conduct of both parties in relation to objective rules governing offer and acceptance. Since defendant-side informational advantage is more common in the tort setting, lower plaintiff win rates are predicted under the informational asymmetry model. The asymmetric stakes theory, on the other hand, could explain this pattern only if plaintiffs generally have greater stakes in contract than in tort actions.

Areas of law in which defendants are likely to have a substantial informational advantage over plaintiffs report plaintiff win rates well below fifty percent. Two areas in which such a disparity is observed are products liability and medical malpractice tort actions. Products liability is governed largely by the "risk-utility" standard, which is a type of negligence test that focuses on the incremental risk and incremental utility presented by the defendant's design in comparison with a safer alternative. The standard gives the defendant an informational advantage over the plaintiff. Similarly, the negligence standard for medical malpractice, which is based on the doctor's compliance

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[13] See appendix.

with medical custom, gives the doctor an informational advantage over the plaintiff. In both products liability and medical malpractice, plaintiff win rates are consistently below fifty percent (e.g., Eisenberg, 1990).

Even within the products liability category, win rate patterns are more consistent with the asymmetric information theory than with the asymmetric stakes theory. When the plaintiffs bring products liability claims based on contract – e.g., a claim that the product failed to perform as warranted – plaintiff win rates tend to be greater than fifty percent.[14] What explains the difference between plaintiff win rates for product-liability tort actions (low) and product-liability contract actions (high)?

The asymmetric information model suggests that the key difference between product-liability contract and product-liability tort actions is that the defendant does not have an informational advantage under the legal standard used in the contract actions. Those standards come in essentially two varieties: express and implied warranty rules. Express warranties are simply the terms of the contract, and there is no reason to believe that either party has an informational advantage in reading the contract. However, contract law doctrines generally favor the consumer in these cases. Since state courts are rather idiosyncratic in this regard, it is quite possible that lawyers on the plaintiff's side, who are more likely than the product seller's lawyers to be familiar with the law and the behavior of juries in their jurisdiction, generally have the best prediction of the effective legal standard. In the case of implied warranties, the court's determination of a contract breach will often depend on the type of use to which the consumer put the product. In these cases, the plaintiff-consumer is again likely to have an informational advantage.

In contrast to the asymmetric information theory, the stakes theory fails to explain the pattern of win rates observed within the products liability category. If defendants have greater stakes in these cases, as the stakes theory posits, they should tend to win more often than plaintiffs both in product-liability tort actions and in product-liability contract actions. But we see the opposite in the case of product-liability contract actions.

VI. Implications for Common Law Evolution

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[14] Eisenberg (1990) reports .57 in the case of contract-based actions, .25 for tort-based actions.

The implications of this model for legal evolution are straightforward. The direction of the law is influenced by the "litigation likelihood ratio" of innocent to guilty litigants, f_I/f_G. This is so even when stakes are asymmetric.

In the Priest-Klein case in which the rational components of the litigant's predictions are the same, the litigation likelihood ratio is equal to one. The results are those explained by Priest (1980) (assuming stakes are symmetric). Law does not evolve in a direction that favors any party – the guilty or the innocent. One might describe this type of evolution as a random walk, in the sense that the law is equally likely to move in a direction favoring plaintiffs as it is to move in a direction favoring defendants.

The more interesting cases are the two involving asymmetric information, where the defendant has the informational advantage and where the plaintiff has the informational advantage. In each case, the model shows that the relative frequency of litigation favors the party who is both informed and has the strongest case, i.e., $f_I/f_G > 1$. Informed defendants that are innocent, and informed plaintiffs that have meritorious claims, are most likely to litigate to judgment and to win their cases. In this process, the law should come over time to embody the information that those plaintiffs have with respect to their types of case.

So far, this model tells a story about "micro-evolution" in which existing legal rules are shaped, in the asymmetric information setting, by the information provided by "innocent" litigants in court. To take a concrete example, suppose we are considering a medical malpractice claim. The legal standard is negligence. Suppose the plaintiff is uninformed as to the doctor's potential compliance with the standard, while the doctor is far better informed.

This model implies that the negligence standard in medical malpractice is infused, over time, disproportionately by the information provided by innocent doctors. The negligence standard is somewhat ambiguous a priori. Litigation gives the standard a definite form, in the sense that certain types of conduct are deemed to be non-negligent and other types negligent. The case law will be "informationally biased" in the sense that it tends largely to identify specific types of non-negligent conduct under the standard.

This informational bias could also lead to "rule evolution" over time, as the information embodied in legal rules alters the nature of the rule itself. Consider the

medical malpractice example again. Negligence determinations today are made chiefly by referring to the custom of the profession. The emergence and resilience of the custom rule in medical malpractice may be in large part because the case law, defining so many specific types of conduct deemed to be non-negligent, has in effect generated the custom rule to supplant the relatively ambiguous negligence test.

A. Evolution of Efficient Legal Rules

That the law comes to favor the informed and meritorious party in asymmetric information settings seems consistent with the common-law efficiency hypothesis. Legal rules in many contexts are ambiguous, depending on terms such as "reasonableness." Where the rules are not ambiguous, they may need to be updated over time to reflect changes in tastes or technology. The litigation process described in this model permits that to occur in a manner that could enhance the efficiency of legal rules. The party in a legal dispute who is likely to be in the best position to improve the efficiency of a legal rule is the party that is both informed and meritorious.

Consider the negligence rule of tort law. In early judicial opinions, the negligence rule is described as requiring reasonable conduct on the part of the defendant. In modern opinions, the rule is sometimes described as a cost-benefit test, under which courts compare the incremental losses that could be avoided by additional care with the cost of that care. Judge Learned Hand described the test as a comparison between, on one hand, the burden of additional precaution and, on the other hand, the probability of harm multiplied by the severity of the harm.[15] Richard Posner has described the test as an economically efficient legal rule:

> When the cost of accidents is less than the cost of prevention, a rational
> profit-maximizing enterprise will pay tort judgments to accident victims
> rather than incur the larger cost of avoiding liability. Furthermore, overall
> economic value or welfare would be diminished rather than increased by
> incurring a higher accident-prevention cost in order to avoid a lower
> accident cost. (Posner, 1972)

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[15] United States v. Carroll Towing Co., 159 F.2d 169 (2d Cir. 1947).

Anyone who has become involved even peripherally in litigation knows that the social desirability of the negligence standard depends on how it is implemented. If a court fails to measure the burden of precaution or the expected marginal losses with acceptable accuracy, the negligence test will result in inefficient outcomes, no matter how the test is framed verbally. The litigation process, as described by this model, has the desirable feature of maximizing the likelihood that the negligence test will be applied in a manner that is economically efficient.

The custom rule in medical malpractice serves as an example of a highly-specific negligence rule that is probably efficient. Leaving it up to the individual court to determine negligence under a general cost-benefit test would be administratively expensive and could easily generate too much uncertainty to provide guidance to physicians. Moreover, market pressures already encourage physicians to adopt methods that are efficient in the sense of minimizing the sum of the costs of accidental injuries and accident avoidance.

B. Evolution of Inefficient Rules

The information biasing that occurs in this model could have an undesirable influence on the law. Suppose the parties agree on the merits (facts and law) and disagree on their estimates of the likelihood of judicial error. The difference in their predictions can be expressed as

$$P_p - P_d = W(Q_{1d} - Q_{1p}) + (1-W)(Q_{2p} - Q_{2d}) + \varepsilon_p - \varepsilon_d \ , \tag{20}$$

which implies that uncertainty pushing parties to litigate can be decomposed into white noise and differences in estimates of the judicial error probabilities. Since I am not assuming informational asymmetry with respect to the merits of a lawsuit, the Priest-Klein analysis applies to this case. I will treat the Priest-Klein case as the benchmark against which this case is compared. As a preliminary matter, note that if the judge's prejudices were well known, the litigants' judicial-error predictions would be the same

($Q_{1p} = Q_{1d}$, $Q_{2p} = Q_{2d}$) and white noise would drive the litigation process, as in the Priest-Klein model.[16]

Suppose the plaintiff is both relatively optimistic as to the likelihood of an erroneous finding of liability against an innocent defendant ($Q_{2p} > Q_{2d}$) and relatively pessimistic as to the likelihood of an error favoring a guilty defendant ($Q_{1d} > Q_{1p}$). This is the case of *plaintiff relative optimism* with respect to judicial errors. The probability of litigation is

$$f = 1 - \Phi\left(\frac{\dfrac{C}{J} - [W(Q_{1d} - Q_{1p}) + (1 - W)(Q_{2p} - Q_{2d})]}{\sqrt{\sigma_p^2 + \sigma_d^2 - 2\rho}}\right) \tag{21}$$

Since the difference between the litigants' rational predictions (the second term in the numerator) is positive, the probability of litigation is greater than in the Priest-Klein (white noise) case.

Implications for the evolution of legal standards depend on whether relatively optimistic plaintiffs have valid beliefs. Suppose the plaintiff's relative optimism is valid – e.g., plaintiff has private information on the judge's prejudices that is not available to defendant. Since the defendant's prediction of the plaintiff's probability of success is always too low relative to the best prediction, the error variance distribution for the defendant is to the right of that for the plaintiff, as shown in Figure 2. The sum of the error variances reaches a maximum between 50 percent (maximum variance estimate for plaintiff) and the maximum variance estimate of the defendant. The plaintiff win rate, determined by the point at which the sum of prediction-error variances reaches a maximum (point A, figure 2), exceeds 50 percent.[17]

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[16]The other case in which prejudices would not influence litigation is when the prejudice-induced optimism of the non-frivolous plaintiff (overestimating his chance that prejudicial error advantages him) is perfectly offset by the prejudice-induced pessimism (underestimating his chance that prejudicial error advantages him) of the innocent defendant ($W(Q_{1d} - Q_{1p}) + (1-W)(Q_{2p} - Q_{2d}) = 0$), again leaving white noise as the sole uncertainty component leading to litigation.

[17] The intuitive story here is that the defendant is relatively pessimistic from the plaintiff's perspective and relatively optimistic from his own. He refuses to settle cases that a better-informed defendant would settle, and as a result loses more frequently.
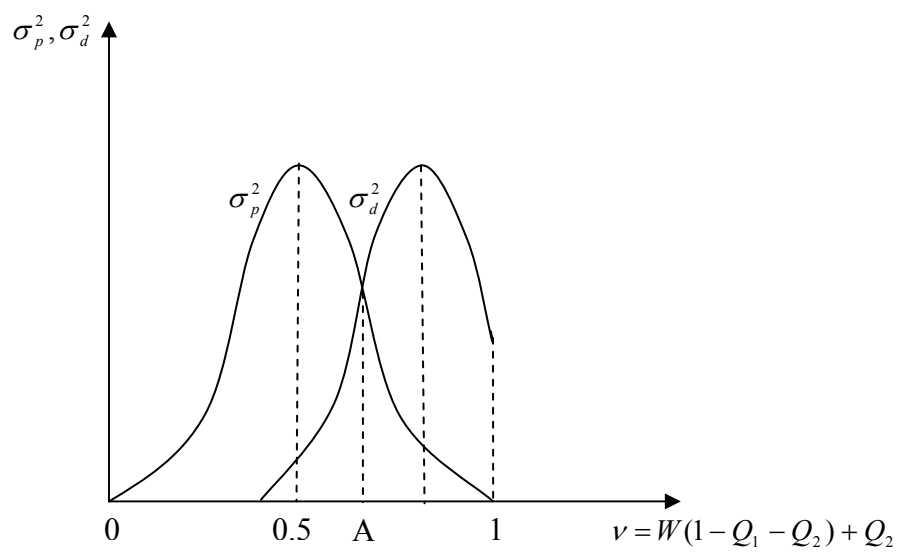
Figure 2

Information biasing that occurs because of the plaintiff's superior knowledge regarding judicial prejudices should be a fragile, short-run phenomenon. If defendants consistently do worse then they expected in court, they will adjust their expectations downward, until the 50 percent win rate is re-established.[18] If the assumptions are reversed, so that the defendant is relatively optimistic and has the information advantage in predicting judicial error, the short run result would be a plaintiff win rate less than 50 percent, and this would hold until plaintiffs adjusted their expectations.[19]

Holding to the assumption that the plaintiff has private information on the likelihood of judicial error and is relatively optimistic in the sense defined above, what does this model imply for the evolution of legal standards? Since the plaintiff win rate exceeds 50 percent in the short run, the legal standard will appear to be biased in favor of the plaintiff and will be modified in the short run to incorporate judicial biases favoring the plaintiff.

One can think of this case as a failure of the *rule of law*. Insiders gain knowledge of the prejudices of judges, or perhaps influence those prejudices, and legal rules are distorted in their favor as a result. The law becomes less predictable to those unaware of the judges' biases. Since rules are modified in the short run to incorporate judicial biases, inefficient legal rules are likely to result.

C. Rule Evolution Generally (Three processes)

In the general case in which the litigants' perceptions of the merits and the likelihood of judicial error differ, the difference in the litigants' predictions of the probability of plaintiff success can be expressed as

$$P_p - P_d = (W_p - W_d)(1 - Q_{1d} - Q_{2d})$$

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[18] An exception might be observed in the case where one side is a one-shot player and the other a repeat player. Consider, again, the example of local product liability lawyers going against an out-of-state seller. The one-shot player (out-of-state seller) may not gain sufficient experience to adjust its expectations on the likelihood of prejudice-induced error.

[19] Obviously, there are other cases that to consider, where the results follow easily from this argument: where the plaintiff has the information advantage and is relatively pessimistic (regarding plaintiff's likelihood of success), where the defendant has the information advantage and is relatively pessimistic (regarding plaintiff's likelihood of success).

$$+ W(Q_{1d} - Q_{1p}) + (1-W)(Q_{2p} - Q_{2d}) + \varepsilon_p - \varepsilon_d \tag{22}$$

Thus, the uncertainty that pushes parties into litigation can be decomposed into parts reflecting differential information with respect to the merits (facts and law), differential information with respect to the likelihood of judicial error (e.g., insider knowledge of judicial biases), and white noise.

In this model of short run evolution, there are three evolutionary processes suggested: *asymmetric information*, favoring the party that is both informed and meritorious; *asymmetric access*, favoring the party with better knowledge of judicial prejudices; and *white noise*, favoring neither party and exhibiting high short-run indeterminacy. All three processes may be at work at any time.

These three processes connect to long-standing arguments in the law literature. Oliver Wendell Holmes argued that legal standards become more certain or predictable over time, as a consequence of litigation.[20] The asymmetric-information and white-noise process are consistent with this view. Bentham, on the other hand, argued that common law was inherently uncertain and unpredictable, and always subject to official discretion (Postema, 1986). The asymmetric-access process generates short run evolution consistent with Bentham's view of the litigation process.

The common law efficiency hypothesis is a relatively recent development in the legal evolution literature. The dominant theory, due to Rubin, is one of long-run evolutionary pressure, driven by differences in litigants' stakes rather than information. Inefficient legal rules are challenged more frequently than efficient legal rules, and, as a result, are more likely to be overturned. The model in this paper is easily reconcilable with Rubin's. The three short run processes identified in this model could co-exist with long run pressure toward efficiency. Indeed, this model's finding that the content of common law is disproportionately influenced by informed and meritorious litigants provides more support to the efficiency thesis.[21]

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[20] Holmes (1881), 111-29.

[21] Of the three short-run processes identified here, the asymmetric-access process has potentially troubling implications for the efficiency thesis. If common law rules are under constant short-term pressure to be distorted to favor insiders, then it is difficult to see how an efficient rule could last long. On the other hand, the asymmetric-access process, as noted earlier, is the most fragile of the three identified in this model –

More recent literature has replaced the common law efficiency hypothesis with a bidding model in which common law is under pressure to favor the parties with both a long-term stake in a specific legal rule and the resources to litigate in their interests. The result of this pressure could be an efficient or inefficient rule. For present purposes, the key thing to note about the bidding model is that it is simply a version of the stakes model.

The information-based model presented here has implications that modify those of the bidding model. The most interesting is suggested by the combination of the bidding model (as a description of long run evolution) and the asymmetric-information process as a description of short-term pressure. The short-term biasing in favor of informed and meritorious litigants that occurs under the asymmetric-information process provides a countervailing force against the long-term pressure toward an inefficient rule under the bidding model. As Part IV of this paper shows, even in the case of asymmetric stakes, the case law's information content continues to be biased in favor of the informed and meritorious litigant. Because of this information biasing, the common law process has an inbuilt brake on the degree to which interest groups can use it to establish inefficient rules.

D. Pace of Legal Change

J. Robert S. Prichard (1988) argued that the rules governing the allocation of legal expenses affect the pace of legal change. Prichard suggested that British law is more rule-based and predictable because the British rule for allocating legal costs (loser pays) acts as a subsidy for litigation. Litigation, because it occurs more frequently, leads to a more steady pace of rule clarification, a process in which legal change appears to be marginal and conservative in comparison to the American legal system.

It is straightforward to show in this model that the British rule on legal expenses generates a higher frequency of litigation. The more interesting question is how this affects the three evolutionary processes identified here.

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because outsiders (e.g., those who don't have information on judicial prejudices) will adjust their expectations until the white noise process emerges.

Consider, first, the white noise (Priest-Klein) process. More frequent and cheaper litigation implies that the degree of uncertainty necessary to generate litigation falls. Although the resulting law appears to move with equal likelihood in a pro-plaintiff or pro-defendant direction, the shifts are more frequent and of smaller magnitude. Rule clarification occurs in a smoother, more continuous way, as Prichard claimed. Similarly, under the asymmetric-information process, the law's apparent shift in favor of the informed and meritorious party would occur in a more continuous fashion. Under the asymmetric-access process, rules are distorted more consistently by official discretion.

Georgakapoulos (1999) presents a model of legal evolution in which common law generates smoother, more continuous change in legal rules than statute law. Assuming risk aversion and switching costs, he argues that common law is preferable to statute law, given the necessity for law to keep up with changes in tastes and technology. The argument formalizes that of Leoni (1961, pp.59-96). The same argument can be applied to this analysis of legal change. Assuming risk aversion or costs to conforming to changes in the law, the British rule is preferable to the American rule.

VI. Conclusion

Theories of legal evolution fall into two categories: judicial-effort and evolutionary theories. Evolutionary models, in turn, are either ones describing long-run evolutionary pressure, most of them building on the seminal paper of Rubin (1977), or short-run evolutionary analyses such as that of Priest (1980). This paper has advanced the short-run evolutionary analysis by presenting a model that includes both Priest-Klein and asymmetric information models as special cases.

The short-run evolutionary model of this paper does not suggest a clear trend toward efficient rules, as was first argued by Rubin in his discussion of long-run pressures. However, the model does show how private information becomes embodied in legal rules over time, which is a key part of the efficiency theories of common law dating back to Hume, and more recently, Hayek.

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Appendix

Proof that $\overline{\pi} = \dfrac{1}{2}$:

$$\overline{\pi} = \int_0^1 vf(v)dv \qquad \text{(A1)}$$

where $v = W(1 - Q_1) + (1 - W)Q_2$. Integrating by parts,

$$\overline{\pi} = F(1) - \int_0^1 F(v)dv \qquad \text{(A2)}$$

Since f is symmetric around $v = \frac{1}{2}$, the cumulative distribution can be graphed as follows:
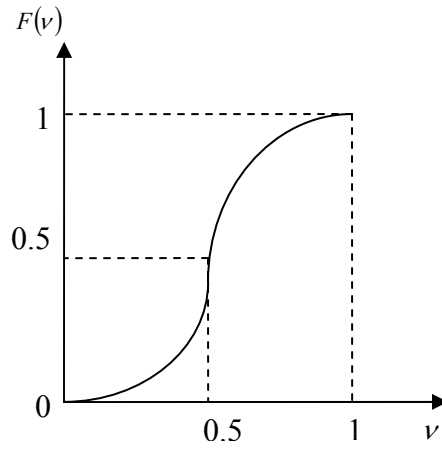

Figure A1

Using this graph, it follows that $F(1) = 1$ and $\int_0^1 F(v)dv = \dfrac{1}{2}$. Thus, $\overline{\pi} = \dfrac{1}{2}$. Alternatively,

using a well-known formula for expected value (in conjunction with figure A1),

$$\overline{\pi} = \int_0^1 (1 - F(v))dv = \frac{1}{2} \quad \blacksquare$$

Proof that $\overline{\pi} < \overline{\pi}_2$:

The suggested inequality holds if:

$$\int_0^1 vf(v)dv > \int_0^1 [Q_2(1-W)f_I + (1-Q_1)W f_G]dv \ . \tag{A3}$$

Recall that $v = W(1-Q_1) + (1-W)Q_2$. Thus, (A3) holds if

$$\frac{1-Q_1}{Q_2} > \frac{\int (1-W)(f_I - f)dv}{\int W(f - f_G)dv} \quad . \tag{A4}$$

Moreover, it is sufficient, for (A4) to hold, that

$$\int W(f - f_G)dv > \int (1-W)(f_I - f)dv \tag{A6}$$

or, equivalently,

$$- \int W f_G dv > \int f_I dv - \int W f_I dv - \int f dv \tag{A7}$$

Since the first and third terms on the right cancel, we have

$$\int W(f_I - f_G)dv > 0 , \tag{A8}$$

which holds, because $f_I > f_G$ for $0 < v < 1$.■

Stakes Model

Priest-Klein case:

The following argument shows that the plaintiff win rate exceeds (is less than) fifty percent if plaintiff (defendant) has greater stakes. Under Priest-Klein assumptions $P'_p = P'_d = \frac{1}{2}$, and the probability of litigation function is

$$f(v) = 1 - \Phi\left(\frac{\dfrac{C}{J_p} - \beta v}{\sqrt{\sigma_p^2(v) + (1-\beta)^2\, \sigma_d^2(v) - 2(1-\beta)\rho}}\right), \tag{A9}$$

where the variance terms reach a maximum at $v = \frac{1}{2}$. Taking the derivative of f and evaluating at $v = \frac{1}{2}$, the sign of the derivative is simply the sign of β. Thus, if the plaintiff has greater stakes, $\beta > 0$, and the frequency of litigation is maximized at some $v > \frac{1}{2}$. Similarly, if the defendant has greater stakes, $\beta < 0$, and the frequency of litigation reaches a maximum at $v < \frac{1}{2}$.■

Asymmetric Information case:

The following argument shows that the implications of the asymmetric information continue to hold in the asymmetric information scenario. Suppose the defendant has the informational advantage. If the defendant is innocent, litigation occurs when

$$\varepsilon_p - (1-\beta)\varepsilon_d > \frac{C}{J_p} - W(1 - Q_1 - Q_2) - \beta Q_2 \tag{A10}$$

If the defendant is guilty, litigation occurs when

$$\varepsilon_p - (1-\beta)\varepsilon_d > \frac{C}{J_p} - (1-W)(1 - Q_1 - Q_2) - \beta(1 - Q_1) \tag{A11}$$

The frequency of litigation is greater when the defendant is innocent if $W(1-Q_1-Q_2) - \beta Q_2 > (W-1)(1-Q_1-Q_2) + \beta(1-Q_1)$, which holds, given that $\beta < 1$. It follows that in the case in which stakes are asymmetric and the defendant has the informational advantage, $f_I/f_G > 1$.

Now suppose the plaintiff has the informational advantage. When the plaintiff's case is meritorious, litigation occurs when

$$\varepsilon_p - (1-\beta)\varepsilon_d > \frac{C}{J_p} - (1-W)(1-Q_1-Q_2) - \beta[W(1-Q_1)+(1-W)Q_2]. \qquad \text{(A12)}$$

When the plaintiff's case is not meritorious, litigation occurs when

$$\varepsilon_p - (1-\beta)\varepsilon_d > \frac{C}{J_p} + W(1-Q_1-Q_2) - \beta[W(1-Q_1)+(1-W)Q_2]. \qquad \text{(A13)}$$

Clearly, litigation is more likely to occur when the plaintiff's case is meritorious, and this is so whatever the value of β. Hence, when stakes are asymmetric and the plaintiff has the informational advantage, $f_I/f_G > 1$.∎