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Litigant Resources and the Evolution of Legal Precedent

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Abstract

This paper develops an informational model of litigation in which court decisions are a function of legal representation. In this model, resource constraints determine how much parties expend on legal representation. The allocation of resources across parties influences court decisions in two important ways. First, in individual cases the party with greater resources can produce more information, thereby increasing her probability of a favorable decision by the court. Second, as the cost of litigation increases relative to parties' resources, courts have less information upon which to make decisions. We model the evolution of precedent as a dynamic externality under stare decisis. These factors determine the evolution of legal precedent. In areas of law in which parties on a particular side have persistently greater resources, the law is likely to evolve in a direction that favors that side. The extent of information provided determines the variability of outcomes.

Introduction

Most economic models of litigation ignore limitations on parties' ability to pay the costs of legal representation. This article explores the role that parties' resources have on legal outcomes when one side has more resources than the other or litigation costs are relatively high. In particular, this article examines how the allocation of resources and costs between parties affects outcomes in individual cases and, over time, legal precedent.

While largely overlooked in the economic literature, resource constraints are a common issue facing litigants. Defendants typically have fewer resources than prosecutors in criminal cases (Luban, 1993). In civil cases, individual litigants generally have fewer resources to litigate

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than corporations (Hadfield, 2000). At the extreme, resource constraints may force parties to forego lawyers and represent themselves in litigation. This phenomenon is not restricted to the poor, but extends to the middle class as well (Gibbs 2008), often for complex legal matters (Glater, 2009).

Richard Posner (1973) has famously argued that the common law is efficient, whereby the market for litigation accepts efficient rules and challenges inefficient ones. Over time, legal precedent converges towards greater efficiency, allowing parties to resolve disputes by bargaining in the shadow of the law (Mnookin and Kornhauser 1979).

Given the infrequency of trials (Galanter 1994; Eaton et al 2005), the primary focus of economic models of litigation has understandably been on settlement. Early scholarship on settlement (Landes 1971; Gould 1973) highlighted parties' incentive to settle in order to avoid the costs of trial and the delay in resolution. This work led to seminal formal models of litigation (Shavell 1982a, 1982b) as a choice between settlement and trial. Subsequent scholarship built on this early work by introducing asymmetric information and the factors that influence the likelihood (P'ng 1983) and terms of settlement (Bebchuk 1984). Subsequent scholarship offered important refinements by modeling different types of private information and their effect on settlement outcomes (Reinganum and Wilde 1986; Schweizer 1989; Daughety and Reinganum 1994; Spier 1994a, 1994b). Common to these models is a framework where settlement outcomes are a function of parties' expectations at trial with respect to both outcome and litigation costs. By backward induction, most litigants settle.

Litigation can be thought of a competition in which parties commit effort or resources to prevail in a given case. There is a rich literature on contests (Tulloch 1980, 1985; Dixit 1987), including how legal presumptions affect whether and how parties engage in litigation (Bernardo, Talley & Welch 2000).

Because their focus was on understanding settlement, these models largely ignore the costs of legal representation.¹ Litigation costs, while included in these models, are exogenously assigned to the parties. More significantly, these models assume that parties have the resources to pay these legal fees. Subsequent attempts to explain the dynamic decision-making of litigation expenditures relax the first condition but retain the second (Katz 1988). In effect,

¹ In addition, most models assume lumpy litigation costs (Spier, 2002), incurred mostly at trial, although more recent models allow for litigation costs to be divisible over time.

parties in these models are making a discrete determination whether to incur litigation costs, not a continuous determination regarding the amount.

The focus of this article departs from the previous models in three important ways. First, while other models describe settlement, this model describes court decisions. Second, this model seeks to explain legal precedent, not optimization of the parties themselves. Third, parties' decisions in this model are influenced not by their preferences, but by their constraints.

Why our interest in the development of legal precedent? In a common law system, legal rules in several areas of the law are created through court decisions. Over a series of decisions, the courts develop legal rules that affect not simply parties to these decisions, but prospective litigants as well. Our model is a partial equilibrium model in that we abstract away from the decision as to whether to litigate at the appellate level. Even though it is well established that parties "bargain in the shadow of the law" (Mnookin and Kornhauser, 1979), courts nonetheless continue to hear many trials and appeals. In 2008, the federal appeals courts alone rendered nearly 30,000 opinions on cases decided on the merits. More than 5,000 of these cases resulted in published opinions expounding on how the law applied to the given facts (2008 Judicial Business of the U.S. Courts, 2009). Court decisions in this respect are generally viewed as a public good, in part because they apply to everyone, regardless of their participation in the actual cases.

What is often overlooked, however, is that the production function of court decisions consists in large part of private expenditures by the parties themselves. Recent scholarship provides support that parties' quality of lawyer have a significant effect on case outcomes (Abrams and Yoon, 2007). Not surprisingly, parties often expend significant resources to hire lawyers to present their claims to the court (Hadfield, 2000). But resources for litigation are finite and heterogeneously distributed across parties, many of whom are unable to spend the same resources as the opposing party. This model examines how parties' resource constraints influence case outcomes and, through a series of decisions, the evolution of legal precedent itself.

The paper proceeds as follows: Part 2 develops a model in which the parties' resources determine their expenditures for legal representation. In turn, each party's expenditures, in conjunction with the given facts of the case and existing law, determine the probability that the court will rule in her favor. The more that a party spends on legal representation – all things equal – the greater the probability of a favorable outcome. The parties' limits on expenditures

may generate decisions that differ from how the court would decide if parties did not face these resource constraints. The greater the costs of litigation relative to the parties' resources, the greater the variability of the court's decisions. This allocation of resources and costs potentially play an important role in development of legal precedent.

Part 3 illustrates through simulations how the constraint and cost parameters influence the development of legal precedent. Part 4 evaluates how the model in light of actual litigation, relaxing some of the model's assumptions. Part 5 summarizes the results and discusses broader implications of the model on litigation. Part 6 concludes.

Part 2: Model

Framework: The following is a model of legal precedent. Although legal precedent can emerge at the trial level, this model focuses primarily on outcomes at the appellate level, where decisions are more likely to be published and therefore where most precedent is established (Pershbacher & Bassett, 2004). It looks only at disputes resolved by formal adjudication by the court, for which the court issues a published opinion.² A case involves a dispute between two parties, a plaintiff (P) and a defendant (D), each of whom retains a lawyer³ to represent her during litigation. Each party has the same objective: a favorable decision by the court. For the sake of simplicity, we assume the court is a unitary actor.

Each case involves a set of facts, F . The model assumes that, while the court decides cases that collectively span several areas of law, each F pertains to a particular and single area of law, L .⁴ L is represented by a single-dimensional space, where $L \in [0,1]$. Each F is located at a point along L and therefore $F \in [0,1]$. For both L and F , the range represents a normalized distribution of facts that can be ordered along a single dimensional space.

The position of F along L is determined by the case during the trial phase, and hence is exogenous to the appellate process. At trial, the parties argue questions of fact as well as law;

² Although this is a model of court decisions, it does not assume or require that all disputes require formal adjudication by the courts. It recognizes that parties often settle, but – as discussed below – assumes that they do so only when the case presents facts previously resolved by the court. We relax these assumptions in Part 4.

³ Legal representation includes all work conducted by the lawyers, including but not limited to gathering of facts, depositions, selection and preparation of witnesses.

⁴ The model assumes that cases raise only one area or doctrine of law. As we discuss in Part 4, we recognize that in actual litigation, cases often involve multiple areas or doctrine of law.

on appeal, the model assumes that the court accepts the facts as established below.⁵ Accordingly, the parties on appeal are not arguing where *F* is situated along *L*, but rather the legal determination of the lower court, given *F*. We also assume that the court shows no deference to the lower court's findings of law and reviews these questions *de novo*. In other words, the model assumes that appellate cases before the court involve only questions of law, rather than questions of fact.⁶

Parties in this model litigate cases under the adversarial system - existing most notably in the United States and England - where each party is responsible for presenting arguments before the court. The court plays a largely passive role in the production of these arguments: it may raise procedural (e.g., jurisdiction) issues *sua sponte*, but are generally loath to do so for substantive issues. Judicial discretion occurs primarily in evidentiary issues regarding admissibility (Cheng and Yoon, 2005). In so doing, the court follows the judicial norm of "active parties and an inactive court." (Note, 1966).

Before the court, the lawyers for *P* and *D* produce arguments that depict *F* in a light most favorable to their respective clients. After the presentation of arguments, the court issues a decision, which identifies the prevailing party and the decision, given *F*. In so doing, the model captures court decisions as a discrete outcome (e.g., prevailing party; legality of *F*), not a continuous one (e.g., magnitude of remedy; degree of culpability).

The model assumes that the interests of the parties and the court are narrowly defined by the present case. The parties argue about a particular outcome only as it relates to *F* and not another set of facts. Similarly, consistent with principles of judicial restraint (Merrill, 2005; Schaurer, 2006), the court decides only *F*, and does not attempt in its decision to rule on a different or broader set of facts.

Judicial Decisions and the Development of Legal Precedent: At common law, judicial opinions serve individual and social objectives. Regarding the former, the court provides formal adjudication for the parties to the case. As for the latter, the court provides guidance through

⁵ This comports with the practices of most jurisdictions, in which appellate courts review show deference to lower courts' findings of fact, typically under an *arbitrariness or abuse of discretion* standard (Miles and Sunstein, 2008).

⁶ In actual litigation, lawyers argue questions of fact as well as law. But in appellate matters, courts are highly deferential to lower courts' determination of facts (e.g., review questions of fact for abuse of discretion) and focus on questions of law. This focus on law, not facts, typically occurs at the appellate level, although in some instances it happens at trial (i.e., summary judgment).

its decisions to prospective parties involved in similar disputes, serving as productive capital stock (Landes & Posner, 1976). The focus of this model is on the social objective.

Each decision by the court establishes judicial precedent. The model assumes a strong form of *stare decisis*. Unlike a legislature, the court in each decision is required to be internally consistent with prior decisions. Accordingly, subsequent cases involving the same F must adhere to the court's earlier determination.⁷ Parties cannot ask the court to reach an outcome that is contrary to earlier decisions. In our model, *stare decisis* actually precludes repetition of cases with identical facts: once an appellate court makes a decision regarding a given set of facts, it does not reconsider it, either on additional appeal or in a subsequent case.

Legal precedent places an additional restriction: a court's decision for a given F may also dictate the court's decisions involving other facts that the court may not have even heard, and therefore obviate the need for the court to hear such subsequent cases. We elaborate on this point shortly.

It is worth repeating that our model differs from most economic models of litigation. In most models, a plaintiff will bring suit if her expected gross return exceeds the costs of taking the case to trial; and parties will forego trial if their expected returns from settling exceed those of going to trial (Spier, 2007). Priest and Klein (1984) famously hypothesized that trials reflect cases of mutual uncertainty, where the probability of either party winning is 50 percent.⁸ Common throughout these models is that parties make litigation decisions based on personal utility. In our model, we take the decision to litigate to be exogenous.

At time $t=0$, the court has yet to provide precedent for L . All of L is unsettled at $t=0$: for any set of facts, parties do not know how the court would decide. But with each decision, the court establishes a precedent that reduces the *unsettled* space of L , which has lower bound \underline{L} and upper bound, \bar{L} .⁹ At any time t , the unsettled space (between \underline{L}_t and \bar{L}_t) involves facts that

⁷ This assumption is of course does not reflect the subtleties of appellate litigation. Most appellate courts have mandatory rather than discretionary dockets, meaning parties have the right to appeal. As a result, appellate courts may hear cases that raise no new issues of fact, law, or either. At the same time, however, appellate courts at both the state and federal level have a practice of *unpublished* opinions – written opinions that are issued for the exclusive benefit of the interested parties – which do not carry precedential significance for subsequent parties (Weisgerber, 2009).

⁸ Several scholars have theoretically and empirically explored the Priest-Klein hypothesis. For an excellent summary, see Waldfogel (1998).

⁹ At time $t=0$, $\underline{L} = 0$ and $\bar{L} = 1$.

the court has not yet decided. By contrast, the *settled* space (below \underline{L}_t and above \bar{L}_t) involves facts that the court has already decided, either directly or by implication through a prior case.

Whether the court hears a case depends on the location of F_t relative to \underline{L}_t and \bar{L}_t . If F_t falls within the settled space, such that $F_t < \underline{L}_t$, or $F_t > \bar{L}_t$, then by definition, legal precedent has determined the legal outcome for F_t , and *stare decisis* applies. When this occurs, the parties look to the court's prior decisions and settle the case. In other words, parties bargain in the shadow of the law (Mnookin and Kornhauser, 1979), settling when the case raises no new issues of fact and law.

If F_t falls within the unsettled space, $\underline{L}_t < F_t < \bar{L}_t$, then the parties proceed to trial, after which the court decides in favor of P or D . Each decision reduces the unsettled space of L by moving either \underline{L} or \bar{L} to F_t , depending on the prevailing party. In the model, we arbitrarily choose that the court ruling in favor of P shifts \underline{L}_t upward, and a ruling in favor of D shifts \bar{L}_t downward. Accordingly, the decision sets a new precedent such that if P wins, the new bounds are $[\underline{L}_{t+1}=F_t, \bar{L}_{t+1} = \bar{L}_t]$; and if D wins the new bounds are $[\underline{L}_{t+1}=\underline{L}_t, \bar{L}_{t+1} = F_t]$. The court does not decide cases involving facts in the settled space, even if it has not explicitly heard the specific facts. By implication, the court through its earlier decisions has already determined how the court would decide cases within the settled space. If one or both of the parties is dissatisfied with the decision, they appeal. The highest decision from which a decision is published establishes precedent.¹⁰

In addition to being exogenous to the model, the selection of each given F is randomly determined. The sequence by which cases appear before the court and how the court decides them, however, has a potentially dramatic effect on legal precedent. Drawing from initial model, suppose for the first case involving L , $F=0.95$. If the court rules in favor of D , then \bar{L}_t shifts downward to 0.95. Most of L remains unsettled $[\underline{L}=0, \bar{L}=0.95]$. If, however, the court rules in favor of P , then \underline{L} shifts upward to 0.95. Now, most of L is settled, with the unsettled space only $[\underline{L}=0.95, \bar{L}=1]$.

As the number of precedents increase in L , the unsettled space between \underline{L}_t and \bar{L}_t grows smaller, converging to zero. The court continues to hear cases involving new facts until

¹⁰ We recognize the strong assumptions regarding case selection for appeal, which are both under and over-inclusive in light of actual appellate litigation. In Part 4 we discuss the implications of relaxing these assumptions.

$\underline{L}_t - \bar{L}_t \approx 0$. In the process, these precedents converge towards a legal rule, $S \in [0,1]$ – such that $[\underline{L}_t=S, \bar{L}_t=S]$. S serves as a cut-point where legal precedent dictates that all $F < S$ will be decided in favor of P , and all $F > S$ will be decided in favor of D . Because of *stare decisis*, over time \underline{L} is monotonically increasing, \bar{L} is monotonically decreasing, and the unsettled space between \underline{L} and \bar{L} is converging towards zero.

The Influence of Resources and Costs on Decisions: Case outcomes are a function of the facts of the given case and existing legal precedent (Posner, 1973). Parties expend resources to litigate, typically through retaining lawyers. Implicit in our model is the belief that the quality of legal representation matters. Robert Frost artfully captured the significance of legal representation when he remarked, “A jury consists of twelve persons chosen to decide who has the better lawyer” (Gillers, 2002). Our model extends the existing models of litigation by having court decisions depend on parties’ expenditures on legal representation.

The model distinguishes S from S^* . We stated earlier that S is the convergence point of legal precedent in L over a series of decisions, given the allocation of resources and costs between parties. By contrast, S^* is the convergence point in L , assuming both an equal allocation of resources between parties and sufficiently low costs of litigation. Under these conditions, precedents converge to a point where $[\underline{L}_t=S^*, \bar{L}_t=S^*]$. While it is possible that $S=S^*$, our model does not assume it. Our central interest are the factors which likely cause S to diverge from S^* .

Intuitively, one can think of S^* as a gravitational point. The strength of its attraction depends on several factors, including existing social and political norms, as well as legal precedent in other areas of the law. For example, societal beliefs about due process and equal protection may influence how the court decides cases across several areas of law. Three important caveats: First, the model does not make any normative or efficiency claims about S^* . Second, S^* is not the objective of any of the actors in the model. The parties’ interests are to prevail on appeal, given F , and these interests may be indirect conflict with S^* ; the court’s interest is to decide F , and only F . Third, the model does not assume that the parties or the court is even aware of S^* with any precision.

Stated formally: at time t , case outcomes are a function of five factors: 1) F ; 2) \underline{L} and \bar{L} ; 3) S^* ; 4) R^P and R^D , the resources available to each party for legal representation; and 5) E^P and E^D ,

the effort of resources spent in litigation. We now describe the relationships among these parameters.

The effort in litigating a case for P and D – E^P and E^D , respectively – depends on the particular facts of the case and its relationship to the settled part of L (\underline{L} ; \bar{L}) and S^* :

$$E^P = \frac{c_m(F - \underline{L})}{(|\underline{L} - S^*|)^w}, \quad E^D = \frac{c_m(\bar{L} - F)}{(|\bar{L} - S^*|)^w} \quad (1)$$

Equation 1 captures the relationship between the given facts of the case and the arguments that increase the probability that a party prevails. For P , the expression $(F - \underline{L})$ in the numerator signifies that the closer F is to \underline{L} , the less effort required by P to persuade the court to decide in its favor. The intuition here is the influence of legal precedent: P has a greater probability of prevailing when she can show that the current facts closely relate to a prior case in which that plaintiff also prevailed. Accordingly, the smaller is $(F - \underline{L})$, the lower is P 's costs.

The expression $|\underline{L} - S^*|$ in the denominator signifies that P will find it less costly to persuade the court to rule in its favor the farther \underline{L} is from S^* . As the distance between \underline{L} and S^* increases, E^P decreases. The non-case-related factors that affect the evolution of the law increase the gravitational pull of S^* the further it is away from \underline{L} . The intuition here is that P finds it more challenging – and hence more costly – to persuade the court to reach decisions contrary to S^* . It is worth noting that S^* influences litigation costs, even if legal precedent has evolved such it precludes the legal rule converging to S^* itself. The functional form assures that the “gravitational pull” is relatively greater at whichever boundary of the law is farther from S^* , as well as keeping E positive. We describe in greater detail the construction of S^* in the appendix.

The cost parameter is determined by two additional positive parameters, c_m and w . The first, c_m , is the marginal cost of litigation given existing precedent.¹¹ For P , as c_m increases, so too does E^P . The second, w , captures the strength of the gravitational pull. As w increases, E^P also increases. More importantly, if w is sufficiently large, then E falls rapidly the further L is from S^* , increasing the gravitational pull towards S^* . Holding the other parameters constant, an increase in either c_m or w – or both – increases the parties' litigation costs.

¹¹ For example, the cost of litigating a complex torts case (e.g., carcinogenic products) will likely be more expensive than litigating an ordinary personal injury tort.

The ability of parties to pay the costs of legal representation depends on their resources allocated to the case, R^P and R^D . Standard economic theory suggests that parties will spend on litigation up until the point that their marginal return of doing so is zero. The model, however, is agnostic about the mechanism that determines the resources devoted to litigation: R^P and R^D simply reflect what the parties have allocated to spend, which may or may not be the same as what they would prefer to spend. A gap between the parties' actual and preferred allocation depends on a range of factors, including risk-aversion, expenditures by the opposing party, and resource constraints.

Together with E^P and E^D , R^P and R^D determine the ability of the parties to make legal arguments before the court.

$$Q^P = \frac{R^P}{E^P}, Q^D = \frac{R^D}{E^D} \quad (2)$$

In Equation 2, Q represents an index of the quality and quantity of legal arguments. We assume that the court cares primarily about the quality of arguments raised by the parties. All things equal, however, the court benefits from a greater number of arguments. It is important to note that the unit cost of argument is not necessarily the same for each party: E^P and E^D weights the arguments that the parties are trying to make for F relative to \underline{L} or \bar{L} , and S^* . This weighting comports with the intuition that when the facts and legal precedent weigh heavily against the position a party is seeking, her lawyer's task is more challenging, and therefore more costly.

The arguments that P and D present determine their probability of prevailing before the court:

$$p(P) = \frac{e^{(Q^P - Q^D)}}{1 + e^{(Q^P - Q^D)}}, p(D) = 1 - p(P) \quad (3)$$

The party that produces more Q has a greater probability of prevailing. We have structured the outcome to be probabilistic, not deterministic, to allow for random factors (e.g., court misinterpretation of argument; judicial ideology) to influence the outcome. When $Q^P = Q^D$,

each party has an equal probability of a favorable opinion from the court. If the parties have the same level of resources, $Q^P = Q^D$ occurs only when $F=S^*$.

Before proceeding, we note why S^* is the convergence point when resources are equal. Consider the value $Q^P - Q^D$ if the parties have equal resources. Substituting from equations (1), equation (3) can be rewritten as follows:

$$Q^P - Q^D = \frac{R}{c_m} \left(\frac{|\underline{L} - S^*|^w}{(F - \underline{L})} - \frac{|\bar{L} - S^*|^w}{(\bar{L} - F)} \right) \quad (4)$$

As $w \rightarrow \infty$, whichever numerator term is larger becomes infinitely more important, so that party wins. This forces the decision to go toward S^* . This convergence towards S^* occurs not in a single step, but over time. That is why S^* is also the gravitational point.

By contrast, if parties have sufficiently unequal level of resources and low costs of litigation, $Q^P = Q^D$ could potentially occur anywhere $F \in [0,1]$. This possibility reflects the assumption in the model that parties enjoy positive returns expenditures on legal representation, at least in expectation. Lastly, as the costs of litigation approaches ∞ , $Q^P \approx Q^D$, signifying that when costs of litigation are prohibitively high relative to the parties' resources, they dwarf any disparity in resources between the parties.

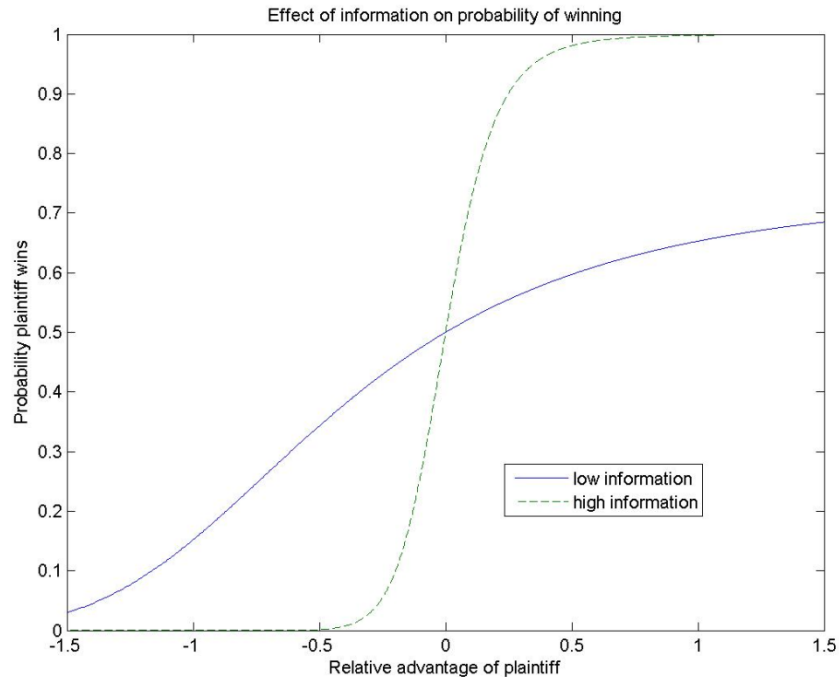
This model, while a simplification of the appellate process, captures important constraints of the adversarial legal system, discussed above. P and D are constrained by F and existing precedent (\underline{L} and \bar{L}). The parties cannot modify F or its location along L on appeal; they can only present it in a light most favorable to their client.¹² The court, in turn, is constrained by Q^P and Q^D . It must base its decision solely on the information presented by P and D 's lawyers: the outcome is a function of the merits of the case, but conditioned on the parties resources.

While focusing on resources and costs, the model highlights the role of information in judicial adjudication. Legal advocacy, particularly at the appellate level, is a competition of ideas. All things equal, the party that can produce stronger arguments to the court has a higher probability of prevailing. But the production of arguments is costly. With heterogeneity of resources, wealthier parties are at a competitive advantage over their opponents, which advantages them before the court, and in the development of legal precedent.

¹² Under the canons of legal ethics, lawyers are prohibited from presenting facts they know to be false.

Figure 1 illustrates, from the perspective of the plaintiff, the effect that information has on case decisions.

Figure 1



Notes: The horizontal axis is the $\log(Q^P - Q^D)$. In the high information line Q is 10 times as large as in the low information line.

Figure 1 incorporates the central ideas – resource constraints and the gravitational pull of S^* – built into the model. When both parties produce high levels of information, $Q^P - Q^D$ is dispositive for the court in most cases, and legal precedent converges towards S^* (illustrated by the dotted line). Only in a narrow class of close cases does the plaintiff's chances of prevailing (or losing) diverge from 0 or 1. By contrast, when parties produce low levels of information, the resulting differences in Q between the parties are less dispositive (illustrated by the smooth line). Compared to the plaintiff in the high-information world, the plaintiff in the low-information world has a non-trivial probability of prevailing when F favors the defendant, and a non-trivial probability of losing when F favors her. As a result, legal precedent in the low-information world is less likely to converge to S^* .

Part 3: Simulation Results

In Part 2, we described a model of legal precedent where courts make decisions based on the facts of the given case (F) and existing precedent (\underline{L} ; \bar{L}), but also the costs of litigating (E^P ; E^D) and resources (R^P ; R^D) of the parties. The decisions produce legal precedent, which over time converge towards a rule (S). Given these parameters, how does legal precedent evolve? How closely does S comport with S^* ? How does the allocation of resources relative to the costs of litigation influence legal precedent? In this section, we illustrate through simulations how different allocation resource and cost parameters influence legal precedent.

Convergence of Legal Precedent: In the following simulations, we arbitrarily assign $S^* = 0.5$, meaning that under conditions of equal resources and sufficiently low litigation costs, legal precedent would converge towards $S=0.5$.

Each simulation involves a two-stage process. In the first stage, we run a series of trials. For each trial, F is randomly chosen between $[0,1]$. If $F \leq \underline{L}$ or $F \geq \bar{L}$, then it is deemed to fall within existing precedent – therefore obviating the need for adjudication by the court – and a new F is chosen. If $\underline{L} \leq F \leq \bar{L}$, the parties proceed, producing units of argument, Q^P and Q^D respectively, determined by the aforementioned parameters.

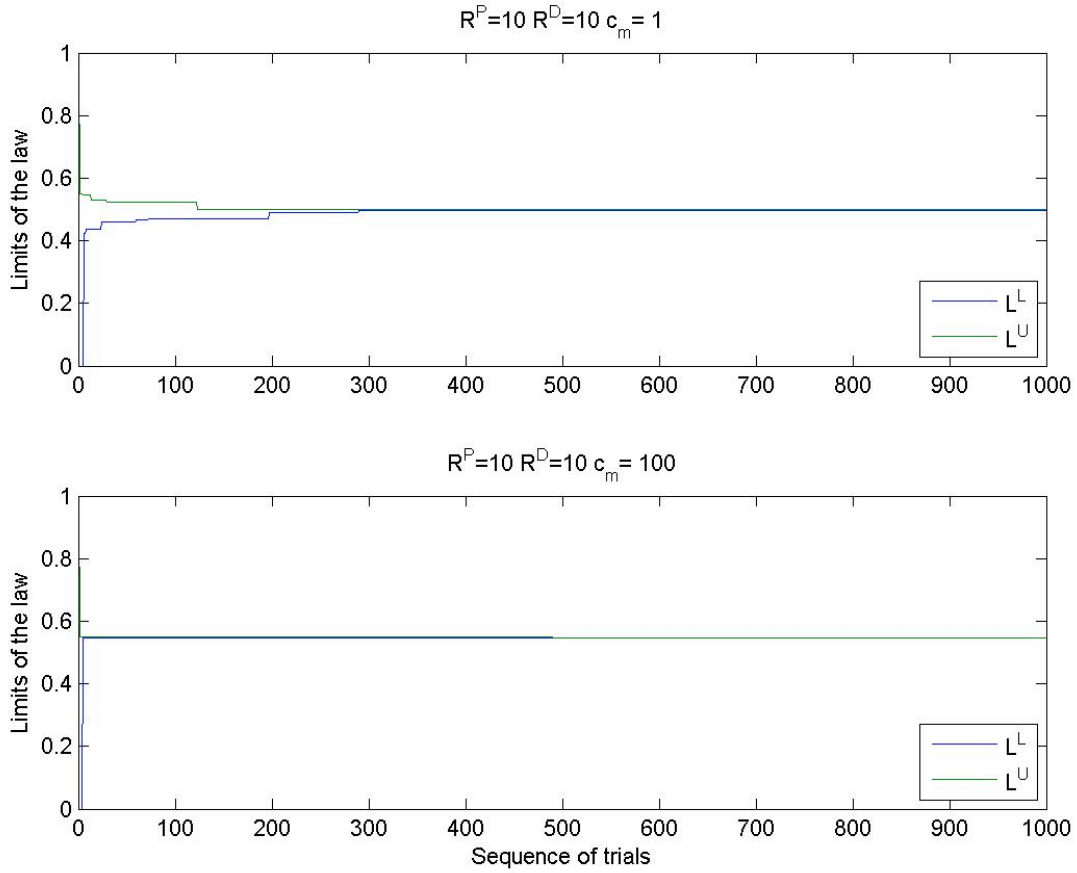
We then compute $p(P)$ from Equation 5 and “toss a coin” with $p(P)$ of P winning. If P wins, \underline{L}_t shifts upward to F ; if P loses, \bar{L}_t shifts downward to F . We repeat this process for 1000 trials, during which $[\underline{L}_t = S, \bar{L}_t = S]$. We choose this number because it provides ample iterations for precedent to converge.

Figure 2 shows two sample convergences towards S .¹³ It shows that convergence occurs after relatively few trials. In each panel, the parties have equal resources: in the first panel, the litigation costs are relatively low; in the second panel, the litigation costs are relatively high.¹⁴ As one might expect, legal precedent has a higher probability of converging to S^* when resources are equal and costs are low. When resources are low relative to costs, however, legal precedent is less likely to converge towards S^* .

¹³ In the Figure 2, we truncate the iterations after 1000 iterations to better show the convergence that occurs during the first 200 iterations.

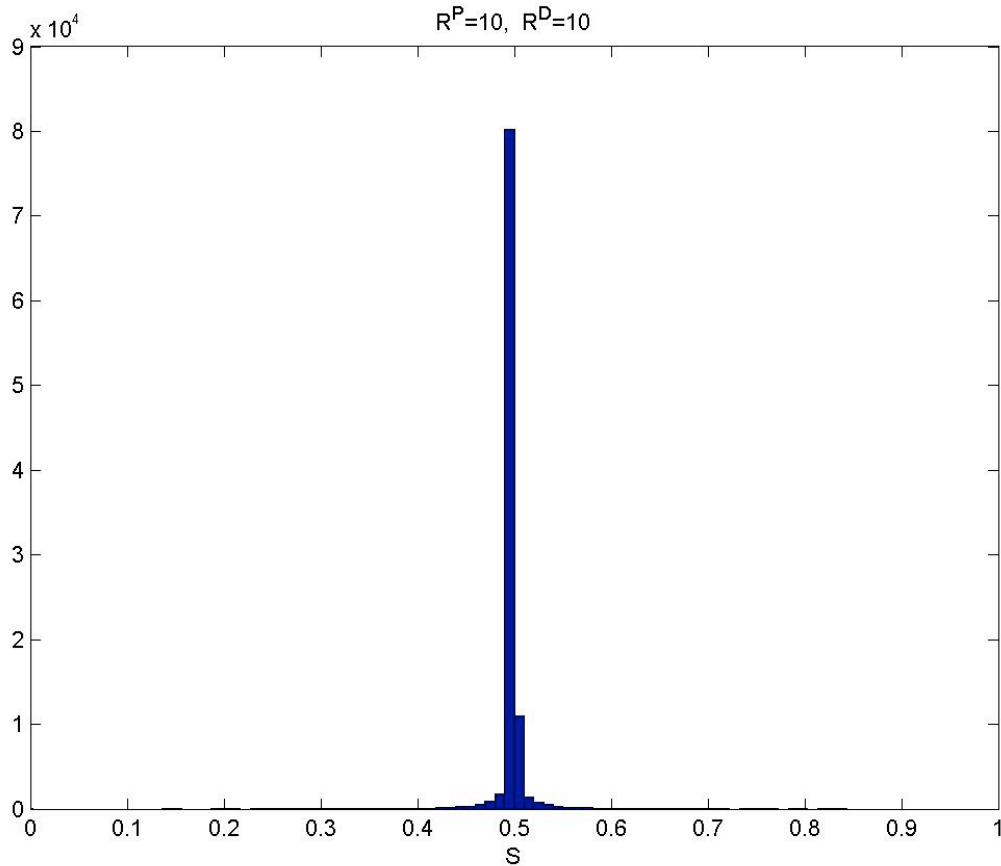
¹⁴ In Figure 2 and subsequent figures, we adjust litigation costs through c_m . As discussed in Part 2, increasing either c_m or w increases a party’s litigation costs, C .

Figure 2
Convergence Towards S with Different Allocation of Resources and Costs



In the second step, we repeat the 1000-trial process 10,000 times. Given the restrictive conditions of *stare decisis* and the probabilistic feature of case decisions we assume in the model, this repetition allows us to observe how, if at all, the distribution of 10,000 trials sets differs from what we observe in a single set. In Figure 3, we show the asymptotic distribution of S under unequal allocation of resources and low costs of litigation ($R^P = 10$; $R^D = 10$; $c_m = 1$; $w = 1$), using the initial parameter values, based on 10,000 draws of sequences of 1,000 trials.

Figure 3
Equal Allocation of Resources, Low Costs of Litigation



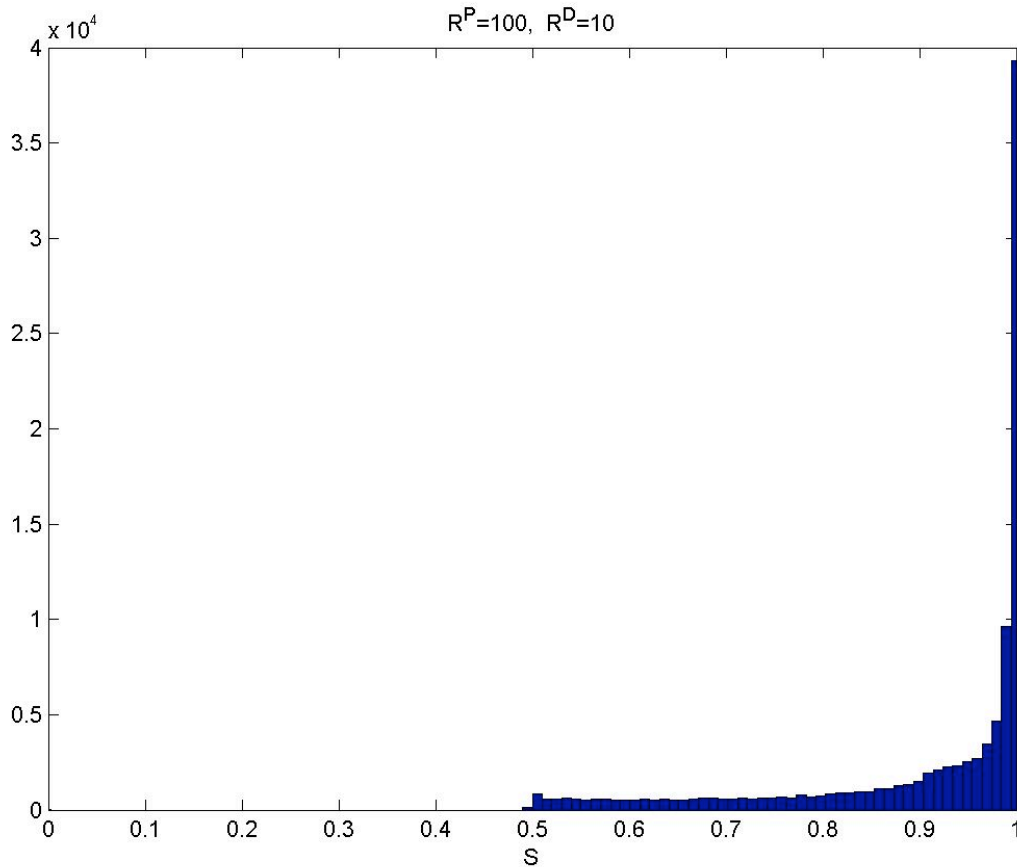
Of course, the fact that legal precedent converges to S^* on average when parties have equal resources is not at all the same as saying that a given area of the law comes out “right,” i.e. close to S^* . Due to *stare decisis*, the outcomes depend on the stochastic path of case decisions. In other words, a wrong step in the initial stages of legal precedent can have permanent consequences. But the more information the court has – in other words, the more resources parties spend or the lower the cost of information – the more likely it is that a particular path converges close to S^* . In Figure 2, most – but not all – cases end up very close to S^* .

The next simulation illustrates the central point of the paper: the effect of equal versus unequal resources on the evolution of legal precedent.

Case 1: P has systematically greater resources than D: In some areas of the law, the allocation of resources may differ between opposing litigants. For example: in criminal cases,

the prosecution (government) in most instances has greater resources than defendants (Bright, 1996); similarly, in housing litigation, landlords usually have greater resources than tenants (Scherer, 2003). Figure 4 reports the asymptotic distribution of S under unequal allocation of resources and low costs of litigation ($R^P = 100$; $R^D = 10$; $c_m = 1$; $w = 1$).

Figure 4
Unequal Allocation of Resources, Low Costs of Litigation

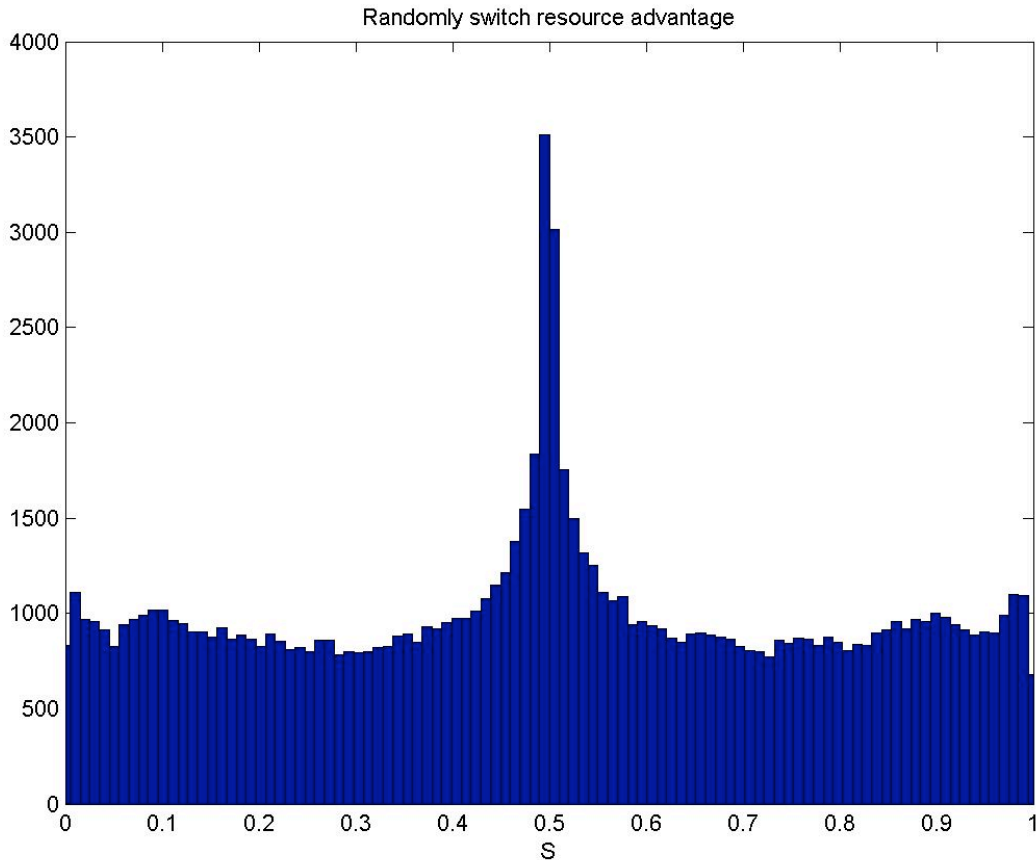


P 's significant resource advantage over D dramatically alters the evolution of legal precedent. In each case, P is able to exploit its resource advantage to provide a higher index of information to the court, thereby increasing her probability of prevailing. Given the magnitude of her resource advantage (100 to 10), P is able to prevail in most cases, irrespective of where the facts fall along L . In most iterations, legal precedent diverges significantly from S^* . Generally, the greater P 's resource advantages over D , the greater the convergence of S towards 1.

Case 2: P and D have randomized unequal resources: In many areas of the law, the plaintiff (defendant) may not have a systematic resource advantage over the defendant (plaintiff). We now consider an alternative scenario in which the allocation of resources is identical across the population of opposing parties but always unequal in litigation. In this allocation, the resources of P are equal with D on average in the population of plaintiffs and defendants in L , but unequal in the pairing of parties in each case.

Figure 5 replicates the unequal resource setup of Figure 4, with the exception that before each trial we figuratively toss a fair coin to decide whether it's the plaintiff or defendant who has the resource advantage. Figure 4 runs a simulation where the two resource levels are $[10, 100]$, and the cost parameters - $c_m = 1$; $w = 1$ - are the same as in Figure 2: low relative to the resources of both parties.

Figure 5
Random Allocation of Resources, Low Costs of Litigation

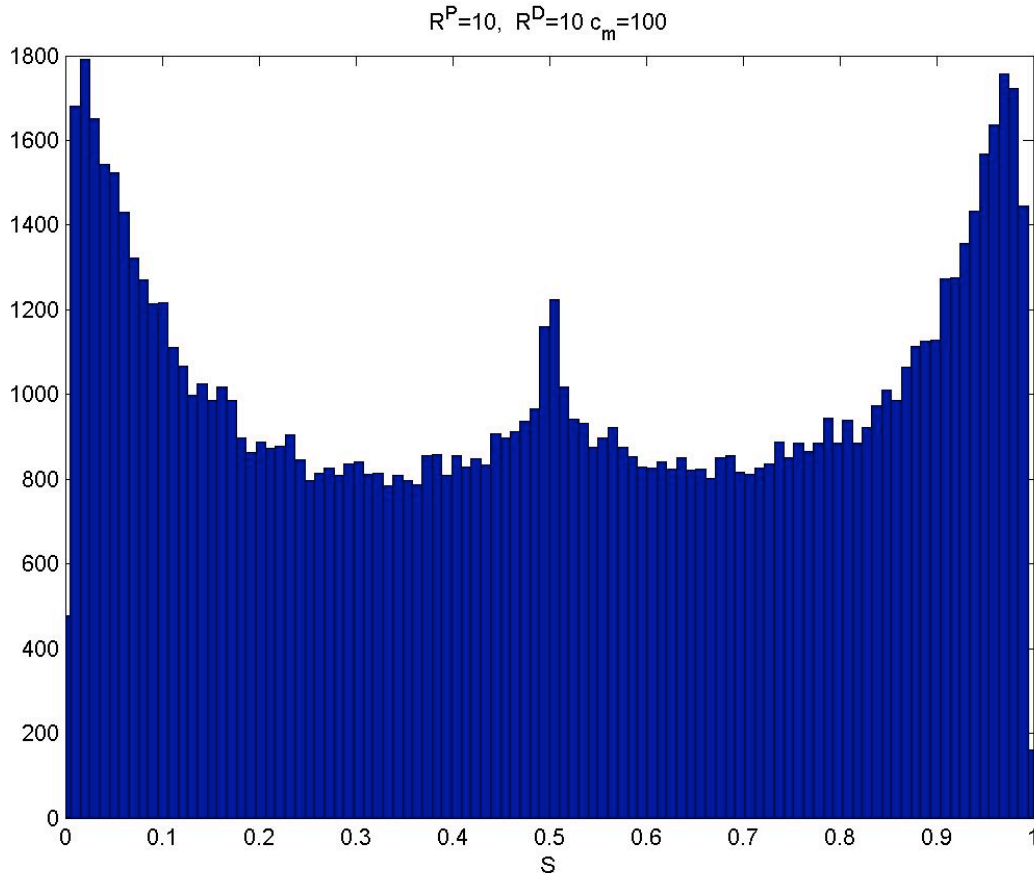


The result in Figure 5 comports with our intuition that, with no systematic resource advantage enjoyed by either P or D , legal precedent will still converge around $S=0.5$. In this respect it is similar to the convergence where parties have equal resources (Figure 2). The difference is that distribution of convergence in Figure 5 is flatter and more uniform than in Figure 2, reflecting more iterations of trials where S converges away from S^* . *Ex ante*, the disparity in resources deviations does not systematically favor one party over the other. But in many iterations, S ends up favoring P or D . Thus, even in the absence of a systematic disparity in resources between parties, disparities in individual cases may still produce legal rules that diverge from S^* , in some instances significantly (e.g., $S \approx 1$; $S \approx 0$).

Case 3: P and D have equal resources (and high litigation costs): We began Part 3 with a simulation where P and D have equal resources and low costs (Figure 3). For completeness, we include in Figure 6 a simulation where parties' resources, while equal, are low relative to the costs of litigation.¹⁵

¹⁵ As discussed in Part 3, the convergence towards S depends not simply on the resource allocation between the parties, but also the costs of litigation. C depends on the particular facts of the case (F) and existing precedent (\underline{E} , \overline{F}), but also marginal cost of litigation (c_m) and the gravitational pull of S^* (w). Since an increase in either c_m or w increases C , in Figure 4 we increase just c_m .

Figure 6
Equal Allocation of Resources, High Costs of Litigation



When litigation costs are high relative to parties' (equal) resources, the distribution of S around 0.5 flattens. The average and median value of S remains ≈ 0.5 , but the variance is considerably greater. The intuition behind Figure 6 is that if litigation costs are sufficiently high relative to what the parties can afford, then the court will produce legal rules that in the aggregate are unbiased but in many iterations will not converge to S^* .

The effect of litigation costs, if sufficiently high, holds irrespective of the allocation of resources between P and D . Even if P enjoys a significant resource advantage over D , this resource advantage is largely negated with high costs. Similarly, if the resource disparities is randomly assigned between P and D , high costs of litigation reduce the probability that legal precedent converges to S^* . At litigation costs exceed parties' resources and approach ∞ ,

$E(S)=S^*$, regardless of the allocation of resources. Legal rules, however, appear increasingly stochastic along L .

Table 1 provides a summary table of the mean, median and variances of each of the figures in this section:

Table 1
Mean, Median, and Variance of S

Case	Mean	Median	Variance
Equal resources, low litigation costs (Figure 3)	0.50	0.50	2.53×10^{-4}
Resources favor plaintiff, low litigation costs (Figure 4)	0.91	0.98	1.80×10^{-2}
Randomly fluctuating resources, low litigation costs (Figure 5)	0.50	0.50	7.80×10^{-2}
Equal resources, high litigation costs (Figure 6)	0.50	0.50	9.83×10^{-2}

When one party has a significant resource advantage, legal precedent diverges far from S^* . Moreover, if the advantage is sufficient, as in Figure 4, the variance in outcomes is low. Conversely, for the remaining three simulations, the median and mean convergence of S is 0.5. The average legal precedent converges towards S^* , provided that either 1) parties have equal resources; 2) the allocation of resources across opposing parties is unequal but random; or 3) litigation costs are high relative the parties resources. However, the variance differs considerably across these three states: variance is low when resources are equal and litigation costs are low, but (relatively) high when resource disparity is randomly unequal or litigation costs are high. In other words, with random inequality of resources or high litigation costs, legal precedent on average does *not* converge to 0.5.

Part 4: The Model in Light of Actual Litigation

The model presented in Part 2 is a simplified version of legal precedent. Some of these assumptions are decidedly stronger than what we observe in actual litigation, and it is worth discussing the predictions of the model when we relax these assumptions.

Contrary to the model, the court is not a unitary actor. Litigation occurs across multiple jurisdictions – both state and federal – each of which has its own set of courts. Within each jurisdiction is a hierarchical structure of trial and appellate courts. If jurisdictions are heterogeneous with respect to litigants, courts, community, it is possible that several parameters in the model – resources, costs, S^* – may vary across jurisdictions. Accordingly, one would expect legal rules to vary across jurisdictions as well, which often forms the basis for petitions for *certiorari* before the highest appellate court, at either the state or federal level.

In contrast to the model, *stare decisis* in real litigation imposes lesser constraints on both courts and parties. Most appellate courts have mandatory, not discretionary dockets. Parties have the right to appeal even if the case raises no new issues of fact or law. Accordingly, it is entirely possible that appellate decisions involve similar or identical facts that, even if the court does not expressly acknowledge, appear incongruent. More significantly, for the highest appellate courts, *stare decisis* is more of a norm, albeit a strong one, than a rule (Kim, 2007). Appellate courts, most notably the U.S. Supreme Court, overturn legal precedent on occasion. In some instances, the Supreme Court overturns its own precedent (e.g., it abolished the death penalty for juveniles in *Roper v. Simmons* (1991), reversing its earlier decision in *Stanford v. Kentucky* (1989), which allowed the death penalty for any child at least 16 years of age).

Judicial review mitigates the harsh consequences of legal precedent by allowing courts to revisit prior decisions. A reversal in precedent may reflect error by an earlier court (e.g., misunderstanding the arguments) or – consistent with the informational component of the model – novel or stronger legal arguments made possible by greater resources by one or both of the parties. For example, historians credit the involvement of the NAACP, led by Thurgood Marshall, in civil rights litigation leading to the *Brown v. Board of Education* (1954), overturning the “separate but equal” doctrine established in *Plessy v. Ferguson* (1896) (Klarman, 2004).

For the purpose of tractability, we assume in the model that cases involve facts pertaining to a single area of law. Actual litigation often involves several areas of the law (e.g., many civil claims involve both matters of tort and contract), or different doctrines within an area of law (e.g., due process, equal protection). In some instances the court may be able to resolve the

issue along a single dimension, or at least address each dimension discretely. But in other instances, the court's decision necessarily involves several areas or doctrines of law. This multidimensionality complicates the evolution of legal precedent. Decisions that draw upon more than one area of law may lead to apparent inconsistencies in legal precedent if one looks at a single area of law.

It is worth noting that the number of dimensions of law may be endogenous to expenditures on legal representation. It is often said that effective lawyers develop multiple arguments to enable their client a greater probability of prevailing. They typically produce arguments in the alternative, providing the court more than one ground to find for their client.

Lastly, our model is agnostic about the mechanism by which parties determine their expenditures on legal representation. The relationship between the amount that parties spend on legal representation and the amount they actually have available is an empirical question, but likely unanswerable, given that parties are not typically not required to report their financial wealth. Given heterogeneity in resources, it is likely that parties vary in their willingness to spend their available resources.

The larger question is whether parties with unequal resources, given the opportunity to choose whether to litigate, would settle rather than proceed to trial. As we discuss more fully in Part 5, we suspect that litigation decisions likely reflect beliefs about resources as well as merits of the case. A complete answer to this question lies outside of our model, but we make the following observations. First, our model suggests that disparity of resources between parties may in some instances actually encourage trial rather than settlement. For example, a case in which $Q^P - Q^D$ clearly favors P if both parties had equal resources may suddenly be less certain if D has greater resources than P . Second, as an empirical matter, parties of unequal resources nonetheless litigate against one another. A recent survey of federal judges suggests that in certain areas of the law (e.g., criminal, immigration, civil rights), opposing litigants vary dramatically in their quality of legal representation (Posner-Yoon, 2009).

Part 5: Discussion

Based on the simulations in Part 3, it is worth noting that only under particular conditions does the distribution of legal precedent converge closely around S^* : when parties have equal

resources and relatively low litigation costs. Under any other allocation of resources and costs, there is a non-trivial possibility that legal rules diverge from S^* , in many instances significantly.

An equal allocation of resources does not assure that legal rules converge to S^* , if resources are low relative to the costs of litigation. In repeated iterations, the convergence centers around S^* , but the distribution is dispersed. The higher the litigation costs relative to resources, the wider and flatter the distribution, irrespective of the allocation of resources. Even when resources systematically favor one side (e.g., plaintiff) over another (e.g., defendant), legal rules are more likely to favor the party with more resources. But the degree of divergence from S^* depends again on the relative cost of litigation.

There are two ways to describe divergence of legal precedent away from S^* . One divergence is variance, which can occur in one of two forms. The first form, as illustrated Figure 6 and Figure 1 (solid line), is when parties provide little information to the court.¹⁶ When this happens, information is not dispositive for the court, and its decisions appear more stochastic. The second, as illustrated by Figure 5, is with randomly fluctuating resources between parties. The resource disparity inherent in each case increases the probability in each case that the court reaches a decision that diverges from S^* .

The second divergence is skew, which, as illustrated by Figure 4, which occurs when one party has systematically higher resources than the other. When parties have systematically unequal resources, the expected outcome is no longer S^* , but skewed above or below it depending on whether the allocation favors plaintiffs or defendants. The greater the resource advantage, the greater is the skew away from S^* .

Because our model is one of constraints and not utility, we are agnostic about the normative implications raised by variance and skew. But it is worth a brief discussion of the concerns they might raise. It is reasonable to believe that, to the extent that society prefers that legal precedent converges to S^* , it would like to this occur not only for a single area of law, but across all areas. Accordingly, if society benefits when legal precedent converges at S^* and is harmed when it diverges from S^* , then there is potentially a qualitative difference between $S=S^*$ and $E(S)=S^*$. The former does not generate harm, while the latter does whenever $S \neq S^*$. The degree of harm depends on the amount of variance. This view of variance comports with our

¹⁶ At the limit, if neither party provided information to the court, the $Q^P-Q^D=0$, and $p(P)=p(D)$. In practice this would not happen, of course, since the plaintiff (in both criminal and civil cases) is required to provide a basis for bringing suit.

intuition that our society prefers a legal system where courts get it “right” all (or nearly all) of the time over a legal system that is just as likely to get it right as it is to get it wrong.

Since skew is systematic divergence from S^* , it similarly generates disutility. With respect to the tradeoff between variance and skew, one can imagine that society might be willing to accept small amounts of skew to avoid large variance in S across areas of law. This statement, however, is merely suggestive, as it is outside of our model.

Although this paper focuses on appellate decisions, it is worth considering two broader effects of the allocation of resources beyond legal precedent. First, the allocation of resources and costs may affect decisions at trial as well as on appeal. At trial, parties generally argue questions of fact as well as law. The allocation of resources and costs central to the appeals process also matter for trials. Constructing and arguing facts is costly (e.g., identifying and preparing witnesses, conducting discovery, etc.). If we allow the location of F along L to be endogenous at the trial stage, determined in part by the allocation of resources across parties, then the party with more resources is more likely to have a favorable positioning of F along L . As with the appellate process, the institutional design of the trial system, while facially neutral, can produce legal precedent that favors parties with greater resources. Mechanisms such as judicial review may mitigate, but do not negate, wealth effects, particularly given the deference appeals courts give to trial courts on questions of fact.

Second, an unequal allocation of resources may deter disadvantaged parties from resolving their dispute through the courts, even when their case presents a new issue of law. A party may decide that, despite the strength of her case on the merits, her relative lack of resources make it unlikely she will produce the arguments to prevail. Instead, she settles, quite possibly on terms reflecting this resource disparity. Or, even more drastic, she decides against bringing suit at all. If so, cases brought to trial may reflect selection based on perceived merits (Priest & Klein, 1984), but conditioned on available resources. This selection effect, depending on the allocation of resources across parties, may actually impede the development of legal precedent. In terms of the model, it means that parts of L may remain unsettled and legal precedent does not converge towards S , let alone S^* .

Ultimately, the ability of this model to tell us something about actual precedent depends what on what we believe is the actual allocation of resources and cost among parties. If parties possess sufficient resources to litigate their case and litigation costs are sufficiently low, we have reason to believe that legal precedent converges in ways that may be characterized as socially

optimal. This may be true in some areas such as law, such as corporate, where opposing parties both possess considerable resources to litigate. Other areas, however, strongly suggest a systematically unequal allocation of resources, both in civil (Scherer, 2003; Abel, 2007) and criminal (Abrams and Yoon, 2007) cases.

Part 6: Concluding Remarks

The development of legal precedent is fundamentally a competition of ideas between opposing parties, with the court as the arbiter. The contribution of this paper is our view that legal precedent is a production function not simply of the court, but of the parties themselves. In this respect, the current legal system is a de facto public-private venture. The public finances the courts (e.g., courts, judges, administrative staff); private parties finance their cases before the courts. While there has been considerable attention given to the importance of public funding of the judicial system (Breyer, 2003), by comparison there is relatively little attention to the funding of litigation itself. Although outside this paper, we believe litigation costs are worth closer examination. Parties, through their lawyers, produce these ideas. The cost of production is non-trivial, however, and in many instances, substantial. Unfortunately, parties vary – often dramatically – in resources, which affect their ability to produce arguments.

One potential implication of this paper is a critique of the current system of legal representation. In both the criminal and civil context, parties are largely responsible for financing their own legal representation. The U.S. Constitution qualifies this norm in the criminal system by providing free legal representation for indigent defendants. This provision, however, mitigates but does not eliminate issues of resource allocation and costs: it is widely believed that prosecutors have more legal resources than public defenders or court-appointed counsel. In the civil context, no such constitutional protections exist for indigent parties, let alone those of moderate means.

If we believe that parties' resources influence how courts make decisions, and that resources vary among litigants – often in significant and systematic ways – then it logically follows that the allocation of resources influences the development of legal precedent. This statement is the essence of our model. The efficacy of parties' self-financing their legal costs depends in large part on their possessing the resources to effectively present their arguments. This reliance seems at odds with what we often observe with actual litigation. A recurring

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criticism of the legal system is that it consistent favors wealthy parties (Meeker & Dombrink, 1993). This paper shows how legal precedent, without any bias or prejudice by the court, may nonetheless favor wealthier parties.

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Appendix

The parameter w is the strength of the gravitational pull of S^* , where cost is inversely proportional to the distance of the existing law to S^* .

$$E \propto \frac{1}{|\underline{L} - S^*|^w} = |\underline{L} - S^*|^{-w} \quad (1)$$

Since $w > 0$, the further \underline{L} is from S^* , the lower the cost and the greater the attraction towards S^* . Formally:

$$\frac{\partial |\underline{L} - S^*|^{-w}}{\partial |\underline{L} - S^*|} = -w |\underline{L} - S^*|^{-w-1} < 0 \quad (2)$$

What do different levels of w do? Formally:

$$\frac{\partial |\underline{L} - S^*|^{-w}}{\partial w} = -\ln |\underline{L} - S^*| \times |\underline{L} - S^*|^{-w} > 0 \quad (3)$$

(Note that $\ln |\underline{L} - S^*| < 0$ for $|\underline{L} - S^*| < 1$).

As $w \rightarrow 0$, the denominator goes to 1, and the gravity effect disappears. As $w \rightarrow \infty$, the change in the denominator gets larger the further the law is from S^* . Formally,

$$\frac{\partial^2 |\underline{L} - S^*|^{-w}}{\partial |\underline{L} - S^*| \partial w} = -|\underline{L} - S^*|^{-w-1} [1 - w \ln |\underline{L} - S^*|] < 0 \quad (4)$$

As written, w means high costs. More importantly, it means that gravity is important: if w is large, then costs fall rapidly the further the law is from S^* . As a result, the pull towards S^* is greater.