# EVOLUTION OF THE COMMON LAW AND THE EMERGENCE OF COMPROMISE

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Abstract

In a system of judge-made law, each judge who decides a case in a particular area of law may, in principle, choose to depart from precedent in favor of another rule. This paper examines the question of whether such a system will produce constant oscillation among different legal rules or will instead produce a single rule that potential litigants can rely upon when choosing their behavior. Using a model of the legal process that treats judges as self-interested agents maximizing their private and reputation-based utility, this article derives conditions under which the common-law process will produce convergence on a single rule rather than oscillation between rules. The article also examines the circumstances in which the introduction of a compromise rule can resolve a problem of oscillation between rules.

> Precedent, *n*. In Law, a previous decision, rule or practice which, in the absence of a definite statute, has whatever force and authority a Judge may choose to give it, thereby greatly simplifying his task of doing as he pleases. As there are precedents for everything, he has only to ignore those that make against his interest and accentuate those in the line of his desire.
>
> Lawful, *adj*. Compatible with the will of a judge having jurisdiction. [Ambrose Bierce, *The Devil's Dictionary*]

Under what circumstances will a common-law process yield legal rules that people can reliably assume judges will follow? In a system of judge-made law, judges are nominally bound to follow precedent whenever deciding cases, but in actual fact judges do depart from precedent from time to time. Sometimes the new rule pronounced by a judge who parts from precedent will be upheld and become the new precedent, while other times the new rule will be repudiated by other judges in subsequent cases. If such departures from precedent were never allowed, the law could never evolve over time to deal with new problems and circumstances; but if such depar-

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tures are allowed, the constancy and reliability of the common law seem to be in jeopardy. In a system where any given judge can in principle depart from an existing rule, why (and when) does it make sense for people to rely on any particular legal rule in making their plans and decisions about how to act?

The answer to this question has a number of serious implications for the legitimacy of the legal system. The ideal of the rule of law depends upon the principle that people should know in advance when they will and when they will not be punished for their actions—or, at least, they should be able to make reasonably reliable predictions. The rule of law also depends on the principle that like cases should be decided in a like manner, so that the citizens who live under the law will be treated equitably, not discriminatorily. But if judges cannot be counted on to pronounce the same rules in similar cases, at least most of the time, these principles cannot be upheld, and the ideal of the rule of law suffers as a result.[1]

The indeterminacy problem also bears upon the issue of the efficiency of the common law. A number of economists analyzing the law have argued that the common law tends to evolve, over time, toward efficient (that is, wealth-maximizing) rules. In general, the models that support this conclusion assume that, when a given rule is the precedent, agents will adjust their behavior to fit the precedent. A prominent example is the model of George Priest,[2] in which inefficient rules cause agents to behave in a manner that produces more cases with higher stakes, so that inefficient rules get relitigated and overturned more often than efficient rules.[3] But what if agents have no expectation that an inefficient (or efficient) precedent will actually be upheld in their own case? If there is a substantial possibility that a rule other than the current precedent will be pronounced, then the characteristics of the current rule may be irrelevant to the agents' choices.

This paper addresses the question of reliability in the legal system via a model of self-interested judicial behavior. The legal process is treated as a sequence of cases, each of which is decided by a single judge randomly

[1] For more on the indeterminacy problem as it relates to the rule of law, see Jason Scott Johnston, Uncertainty, Chaos, and the Torts Process: An Economic Analysis of Legal Form, 76 Cornell L. Rev. 341 (1991); and Christopher L. Kutz, Just Disagreement: Indeterminacy and Rationality in the Rule of Law, 103 Yale L. J. 997 (1994).

[2] George L. Priest, The Common Law and the Selection of Efficient Rules, 6 J. Legal Stud. 65 (1977).

[3] Other models of legal evolution include Paul H. Rubin, Why Is the Common Law Efficient? 6 J. Legal Stud. 51 (1977); John C. Goodman, An Economic Theory of the Evolution of the Common Law, 7 J. Legal Stud. 393 (1978); and William M. Landes & Richard A. Posner, Adjudication as a Private Good, 18 J. Legal Stud. 235 (1979), which will be addressed in Section III.

selected from the judge pool. Each time a judge faces a case, she must decide whether to follow precedent or instead announce an alternative rule. In doing so, she will have to consider both reputational concerns and her personal preferences over rules in order to make the optimal choice. The interaction of all judges' choices determines whether or not the process will ultimately lead to convergence on a single legal rule.

In Section I, I outline the paper's basic model. I then derive implications for legal reliability, under the assumption of two rules competing for the attention of judges. Specifically, I conclude that if division of opinion among judges is low relative to the strength of judges' activist tendencies, then the system will converge on a single rule. This is because even activist judges who disagree with whichever rule is the precedent will follow precedent anyway, for fear of having their opinions rejected by subsequent judges. On the other hand, if division of opinion among judges is high, oscillation between the two rules will take place, thereby depriving potential litigants of the ability to predict what rule will be pronounced in their cases.

In Section II, I revise the model by adding a third rule into the mix. This third rule will be a potential compromise, in that no judge considers it the best rule but all judges consider it better than the alternative. I then derive conditions under which convergence on the compromise rule can occur. It turns out that a compromise is most likely to be viable when division of opinion among judges is highest—in other words, just when oscillation would be most common in the absence of a compromise rule.

In Section III, I consider the relationship between this and other models of the evolution of the common law, discuss two real-world illustrations of the model's conclusions, and make some concluding remarks.

## I. Two Competing Rules

### *A. The Two-Rule Model*

What is the mechanism through which the doctrine of stare decisis[4] operates? Suppose that a judge faces a precedent with which she disagrees. On the one hand, she may choose to follow precedent, and most likely her peers will not blame her for doing so, since following precedent is supposed to be the norm. But in sticking with precedent, she must affirm a rule that offends her in some way, perhaps for ideological reasons, or perhaps because the precedent just does not seem right in this particular case. She will experience some amount of cognitive dissonance, or to use a term coined

[4] ''To stand on a decision,'' that is, the legal doctrine that precedents ought to be followed.

by Timur Kuran, ‘‘preference falsification.’’[5] On the other hand, she may break with precedent and pronounce a rule she finds more acceptable. By doing so, she experiences ‘‘preference satisfaction’’ (the converse of preference falsification) from making what she considers the right decision, and she also takes part in a kind of gamble. If subsequent judges uphold her decision, then she will experience the gain in reputation associated with pioneering a successful new rule. But if subsequent judges return to the precedent she rejected, a corresponding loss in reputation will result. A judge who cares about the esteem of her peers in the legal community, as well as the possibility of promotion to higher benches, will surely wish to avoid having her decisions repudiated.

These factors, preferences over rules and reputational utility, provide the basis for the following model of self-interested decision making by judges. The model's basic framework, which I have borrowed in large part from the model of Thomas J. Miceli and Metin M. Cosgel,[6] is as follows: Imagine there exists a well-defined area of law. Within this area of law, an endless line of cases arise in sequence. Each time a new case occurs, a judge is selected randomly from a pool of judges to decide the case. This judge will take the rule announced by the last judge to decide such a case as the relevant precedent. In deciding the case, the judge announces a legal rule—possibly the precedent announced by the last judge, possibly an alternative. Whichever rule she chooses will constitute the precedent faced by the next judge.

I will assume (for now) that there are only two rules competing for the attention of judges, designated rule 1 and rule 2. Let $\gamma$ equal the proportion of judges who favor rule 1 and $(1 - \gamma)$ the proportion who favor rule 2. I will refer to judges in the first group as 1-preferrers and judges in the second group as 2-preferrers. The parameter $\gamma$ will sometimes be used as a measure of division of opinion among judges in the judge pool. When $\gamma$ is close to zero or one, a substantial majority of judges favor one rule over the other, so division of opinion is low. On the other hand, when $\gamma$ is close to one-half, there is greater division of opinion, because the two rules command approximately equal support among judges.

[5] Timur Kuran, Private and Public Preferences, 6 Econ. & Phil. 1 (1990); cited in Thomas J. Miceli & Metin M. Cosgel, Reputation and Judicial Decision-Making, 23 J. Econ. Behav. & Org. 31 (1994).

[6] Miceli & Cosgel, *supra* note 5. The most important difference between this paper's model and Miceli and Cosgel's is that Miceli and Cosgel assume a judge will never face a precedent she agrees with. The upshot of this assumption is that Miceli and Cosgel's model produces a single probability value that represents the chance that any judge will break from any precedent, rather than the two probability values produced by this paper's model. It is not clear why Miceli and Cosgel assume judges always disagree with precedents they face. It appears to have been a provisional assumption, but the assumption is never dropped later.

If a judge chooses to break from precedent, she takes a risk with her reputation, because it matters to her whether subsequent judges affirm or reject her judgments. For the sake of simplicity, in this model only the very next judge's decision will make a difference in this regard. If a judge announces a new precedent and the next judge affirms it, the current judge will reap a reputational gain of $u$. If, on the other hand, the next judge rejects the new precedent, the current judge will suffer a reputational loss of $d$. (Both of these quantities are utility valued, constant, time invariant, and identical for all judges.) Again, these factors come into play only when a judge breaks from precedent; a judge who follows precedent is perceived as the norm.

When a judge chooses to follow precedent, she will feel neither a positive nor a negative impact on her reputation. She will, however, fail to experience the satisfaction associated with announcing a rule she agrees with. Let $V_i(x)$ denote a judge's private utility from pronouncing rule $x$. Let $x_i^p$ denote the judge's preferred legal rule, and let $x_i^n$ denote the judge's nonpreferred rule. If the judge pronounces her nonpreferred rule instead of her preferred rule, she will experience the following loss in utility:

$$v_i = V_i(x_i^p) - V_i(x_i^n). \tag{1}$$

This is the cost of reaffirming a precedent that one disagrees with—or, alternatively, it is the guaranteed benefit (aside from any reputational effect) of breaking from precedent and asserting one's preferred rule instead. I will call $v_i$ the judge's preference satisfaction value.[7] As implied by the $i$ subscript, this term need not be the same for all judges; some judges may care more about announcing their preferred rules than others.

A judge's $v_i$ value can be interpreted as a measure of her propensity toward activism, since judges with higher $v_i$ values are more concerned with implementing their own preferences over rules, and such judges will (other things equal) be more inclined to break from precedent than judges with lower $v_i$ values. (I should point out that this is a functional definition of activism that may differ from others' use of the term.) I assume there is some known distribution of $v_i$ values in the judge pool. I also assume that judges' preference satisfaction values are bounded below by $\underline{v}$ and above by $\bar{v} < d$. The purpose of this last assumption is to guarantee that there are no judges who will break from a precedent they disagree with *no matter what;* clearly, if a judge's gain from pronouncing her preferred rule outweighs the worst possible loss from doing so, this judge will always pro-

[7] Miceli and Cosgel, *id.*, call this the judge's preference falsification value. I have adopted the term preference satisfaction to emphasize that it is not just the relative loss from making a ''bad'' decision, but also the relative gain from making a ''good'' decision.

nounce her preferred rule. The significance of this assumption will become apparent later.

All judges are taken to be expected utility maximizers. In deciding whether to follow precedent or break from it, a judge will compare the expected sum of private and reputational utility from each course of action and pick the action with the higher expected total. Suppose that a judge faces precedent $x_i^n$, and if she breaks from precedent in favor of rule $x_i^p$, she believes there is a probability $p$ that the next judge will reject the rule and announce $x_i^n$ and a corresponding probability $(1 - p)$ that the next judge will affirm the new precedent. The current judge therefore faces an expected utility of

$$V_i(x_i^p) + (1 - p)u - pd \quad \text{or} \quad V_i(x_i^p) + u - p(u + d) \tag{2}$$

from pronouncing her preferred rule, which she will compare to a guaranteed utility of $V_i(x_i^n)$ from following precedent. She will break from precedent if

$$V_i(x_i^p) + u - p(u + d) > V_i(x_i^n) \tag{3}$$

or, after rearranging terms and applying the definition of $v_i$,

$$p < \frac{v_i + u}{u + d}. \tag{4}$$

In other words, if she believes the probability of the next judge rejecting a new precedent is sufficiently low, then the current judge will go ahead and pronounce her preferred rule. But if the probability of rejection is too high (if the inequality above is reversed), she will stick with precedent.[8]

Of course, the value of $p$ will depend on what rule is pronounced. It could be that rule 1 is more likely than rule 2 to be rejected by the next judge, or vice versa. I will therefore let $p$ equal the probability that the next judge, given a precedent of rule 2, will reject it in favor of rule 1. In addition, let $q$ equal the probability that the next judge, given a precedent of rule 1, will reject it in favor of rule 2. Given these definitions, inequality (4) actually represents the condition for 2-preferrers to depart from a precedent of rule 1 in favor of rule 2, since $p$ is the chance that the next judge will reject the new precedent of rule 2. The equivalent condition for 1-preferrers to depart from a precedent of rule 2 in favor of rule 1 is

[8] If $p = (v_i + u)/(u + d)$, the judge will be indifferent between following and breaking precedent. An indifferent judge could take either action, or even adopt a mixed strategy (randomizing between following and breaking). This is true of all the other decision rules (yet to come) as well.

$$q < \frac{v_i + u}{u + d}, \tag{5}$$

which is identical to (4), except that $p$ has been replaced by $q$.

For the remainder of the paper, I will employ the following shorthand notation,

$$y_i \equiv \frac{v_i + u}{u + d},$$

and similarly for other expressions of the general form $(v + u)/(u + d)$. (For example, $\bar{y}$ corresponds to $y_i$ when $v_i = \bar{v}$.) This expression appears often and has an intuitive explanation: it is the ratio of the greatest potential gain from breaking precedent $(v_i + u)$ to the total utility at stake in the gamble that results from doing so $(u + d)$. Like $v_i$, $y_i$ can be treated as a measure of the strength of a judge's activist impulses: The larger is $y_i$, the more likely is the judge to break precedent. We can think of $v_i$ as a judge's *absolute* propensity to be activist and $y_i$ as a judge's *relative* propensity to be activist.

The analysis so far has implicitly assumed that only a judge who disagrees with the current precedent will break from it. It is conceivable, however, that a judge might depart from precedent purely for reputational purposes. Specifically, a 1-preferring judge who faces a precedent of rule 1 will break precedent in favor of rule 2 if

$$V_i(x_i^n) + u - p(u + d) > V_i(x_i^p), \tag{6}$$

which reduces to

$$p < \frac{u - v_i}{u + d}. \tag{7}$$

And similarly, a 2-preferring judge who faces a precedent of rule 2 will break precedent in favor of rule 1 if

$$q < \frac{u - v_i}{u + d}. \tag{8}$$

Clearly, these conditions will always fail if we assume $u < v_i$ for all judges. This assumption means that the reputational gain from pronouncing a successful new rule is always less than the loss due to pronouncing a rule one dislikes. This assumption will be made later for simplicity, but it is not crucial to the analysis.

In each of the four breaking conditions just stated, observe that a judge thinking of departing from precedent needs to consider the probability that the next judge will depart from the new precedent she has just announced. This probability has two components: first, the probability that the next judge will *disagree* with the new rule and subsequently break from it and, second, the probability that the next judge will *agree* with the new rule and subsequently break from it. The sum of these two components is the total probability of a new rule being overturned by the next judge.

Let us consider the case of a current judge who is considering breaking from a precedent of rule 1 in favor of rule 2. The probability that the next judge will disagree with the new precedent and break from it (that is, the first component described above) is equal to the probability that the next judge will disagree, multiplied by the probability that this judge's appropriate condition for breaking precedent is satisfied. The first part—the probability the next judge will disagree—is simply equal to $\gamma$, the fraction of judges in the judge pool who disagree with rule 2. The second part—the probability that this judge's condition (5) will be satisfied—is determined by the distribution of $v_i$ values. Hence,

$$\text{Pr(next judge disagrees and breaks)} = \gamma \, \Pr\left(q < \frac{v_i + u}{u + d}\right). \qquad (9)$$

Similar reasoning applied to the probability of the next judge *agreeing* with the new precedent and nonetheless breaking from it (that is, the second component described above) will show that if the current judge breaks from a precedent of rule 1 in favor of rule 2, then

$$\text{Pr(next judge agrees and breaks)} = (1 - \gamma) \, \Pr\left(q < \frac{u - v_i}{u + d}\right). \qquad (10)$$

The sum of these two expressions is the total probability that the next judge, randomly chosen from the judge pool, will break from a precedent of rule 2:

$$p(q) = \gamma \, \Pr\left(q < \frac{v_i + u}{u + d}\right) + (1 - \gamma) \, \Pr\left(q < \frac{u - v_i}{u + d}\right). \qquad (11)$$

Here we have an expression for *p*, the probability of a random judge breaking from a precedent of rule 2, in terms of *q*, the probability of a random judge breaking from a precedent of rule 1. Why the interdependence? The reason is that whether the next judge will decide to go back to rule 1 will depend on the likelihood *q* of the next judge *plus one* going back to rule 2 again.

By analogous reasoning, we can derive a similar expression for *q* in terms of *p:*

$$q(p) = (1 - \gamma)\,\Pr\left(p < \frac{v_i + u}{u + d}\right) + \gamma\,\Pr\left(p < \frac{u - v_i}{u + d}\right). \tag{12}$$

The two equations (11) and (12) are very much like reaction functions: Given the probability $q$ of a precedent of 1 being replaced by 2, judges who face a precedent of 1 will react by breaking from a precedent of 2 (in favor of 1) some fraction $p$ of the time. Likewise, given the probability $p$ of a precedent of 2 being replaced by 1, judges who face a precedent of 2 will react by breaking from a precedent of 1 some fraction $q$ of the time.[9]

An equilibrium (specifically, a stationary perfect Bayesian equilibrium) of this system occurs when there exists a pair of values $p^*$ and $q^*$ that satisfy both equations (11) and (12). Any such equilibrium is self-reinforcing, in the sense that $p^*$ will induce judges to take actions that lead to $q^*$, and vice versa. At least one equilibrium is guaranteed to exist for any $\gamma$ (between zero and one) and any distribution of $v_i$ values satisfying the assumptions above.[10]

In what follows, I will make the simplifying assumption that $u < v_i$ for all judges. When this is the case, no judge will depart from a precedent she agrees with. The reaction functions (11) and (12) become

$$p(q) = \gamma\,\Pr(q < y_i) \tag{13}$$

and

$$q(p) = (1 - \gamma)\,\Pr(p < y_i), \tag{14}$$

respectively. Adopting this assumption simplifies the analysis but does not change any qualitative conclusions.[11]

[9] In writing these ‘‘reaction functions,’’ I have assumed for ease of exposition that the distribution of $v_i$ values is continuous, so that the functions are in fact functions rather than correspondences. (This assumption is not crucial, and it is dropped in the proof of the existence of equilibrium.) If noncontinuous distributions—particularly distributions with mass points—are allowed, then a positive mass of judges may be indifferent between following and breaking precedent at some values of $p$ and $q$. Indifferent judges may take either action, or even adopt a mixed strategy. For any $q$ such that some judges are indifferent, $p(q)$ can take on two values—one equal to the proportion of judges who break precedent if all indifferent judges choose to break, and one equal to the proportion of judges who break if all indifferent judges choose to follow. In addition, since indifferent judges can adopt mixed strategies (randomizing over whether to break or follow), $p(q)$ can also take on all values in between these extremes.

[10] A proof of the existence of an equilibrium is available from the author upon request. The key element of the proof is a fixed-point theorem (along with a demonstration of the upper hemicontinuity of the reaction functions) used to show that the ‘‘reaction functions’’ must cross at least once.

[11] A proof of the following results that does not employ the assumption $u < v_i$ is available from the author upon request.

### *B. Implications*

The equilibrium probabilities $p^*$ and $q^*$ will determine the evolution of the area of law in question. Each represents the probability of transition from one rule to another rule in a single case. Suppose, for instance, that the current precedent is rule 2. Then there is a $(1 - p^*)$ probability that rule 2 will remain the precedent for at least one more case and a $p^*$ probability that it will be replaced as precedent by rule 1 in the next case. Likewise, if the current precedent is rule 1, then there is a $(1 - q^*)$ chance that rule 1 will remain the precedent for at least one more case and a $q^*$ probability that it will be replaced by rule 2 in the next case.

How the legal system will evolve depends on the relative sizes of the transition probabilities $p^*$ and $q^*$. Robert Cooter and Lewis Kornhauser[12] examine the properties of a legal system in which they are always positive. In their approach, the transition probabilities are taken as exogenous, rather than derived from a model of judicial behavior as in this paper. They conclude, among other things, that such a system will not converge on any particular rule; instead, the system will oscillate among the rules, with each rule spending a certain percentage of the time as precedent.[13] Specifically, rule 1 will in the long run spend $p^*/(p^* + q^*)$ of the time as precedent, while rule 2 will spend $q^*/(p^* + q^*)$ of the time as precedent.[14] Hence, the relative sizes of the transition probabilities affect how often each rule is on top, but they will not cause the system to pick one rule and stick with it. But what if the transition probabilities are not strictly positive? If one probability is equal to zero, then the system will converge on a single rule. Suppose, for instance, that $p^* = 0$ and $q^* > 0$. Then if rule 2 is ever announced as precedent, it will forever remain as precedent, because the chance of a judge rejecting a precedent of rule 2 in favor of rule 1 is nil. And since the probability of a precedent of rule 1 being rejected in favor of rule 2 is positive, it is certain that rule 2 will eventually be announced as precedent. Therefore, the system will converge on rule 2.

[12] Robert Cooter & Lewis Kornhauser, Can Litigation Improve the Law without the Help of Judges? 9 J. Legal Stud. 139 (1980).

[13] Actually, Cooter and Kornhauser's results are broader: they show that the system will oscillate among all rules that can be reached with positive probability. It is not necessary that every 1-period transition probability be positive, so long as there is a positive chance of each rule being reached eventually. For instance, if there were a 50 percent chance of transition from A to B and a 20 percent chance of transition from B to C, then C could be reached in 2 periods with positive probability even if the chance of transition from A to C in 1 period were zero. Obviously, this possibility is irrelevant when there are only two rules.

[14] These fractions are derived by finding the limiting distribution (over rule 1 and rule 2) that results from iterating the stochastic process indefinitely.

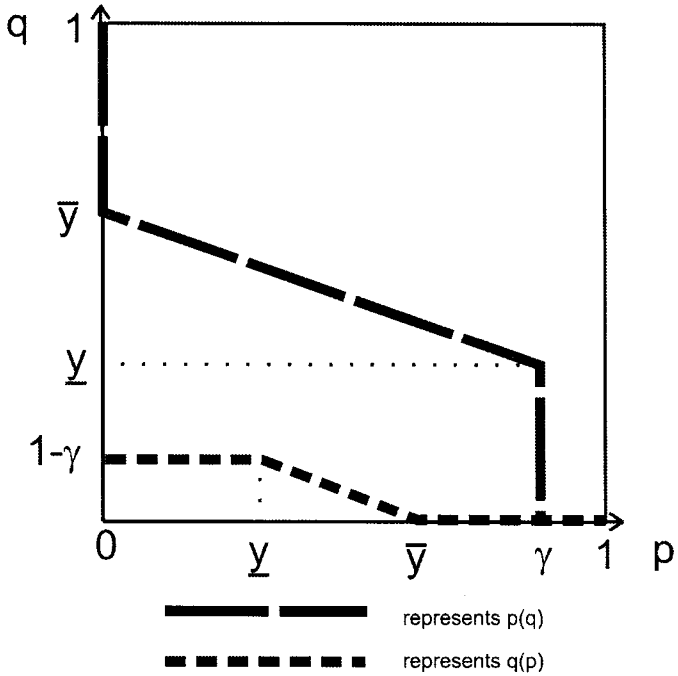


FIGURE 1.—A convergent equilibrium. Equilibrium is $p^* = \gamma$ and $q^* = 0$. Parameter values used are $\gamma = .875$, $\underline{y} = .3125$, $\bar{y} = .625$, with a uniform distribution.

A necessary condition for the system to converge on a single rule is as follows:

$$\gamma < (1 - \bar{y}) \quad \text{or} \quad \gamma > \bar{y}. \tag{15}$$

As long as this condition holds, there exists an equilibrium in which one of the transition probabilities is equal to zero

For instance, suppose $\gamma > \bar{y}$ and $p = \gamma$, so that $p > \bar{y}$. Consequently, no 2-preferring judge would ever depart from a precedent of 1. According to equation (14), it must be the case that $q = 0$. And when $q = 0$, we can see from equation (13) that $p = \gamma$. Thus, $q^* = 0$ and $p^* = \gamma$ are mutually reinforcing and constitute an equilibrium of the system. This equilibrium would lead to convergence on rule 1.[15] Similar reasoning shows that if $\gamma < (1 - \bar{y})$, then $q^* = (1 - \gamma)$ and $p^* = 0$ constitute an equilibrium that leads to convergence on rule 2. Figure 1 shows a convergent equilibrium, under the

[15] As we will see below, however, this is not necessarily the only equilibrium.

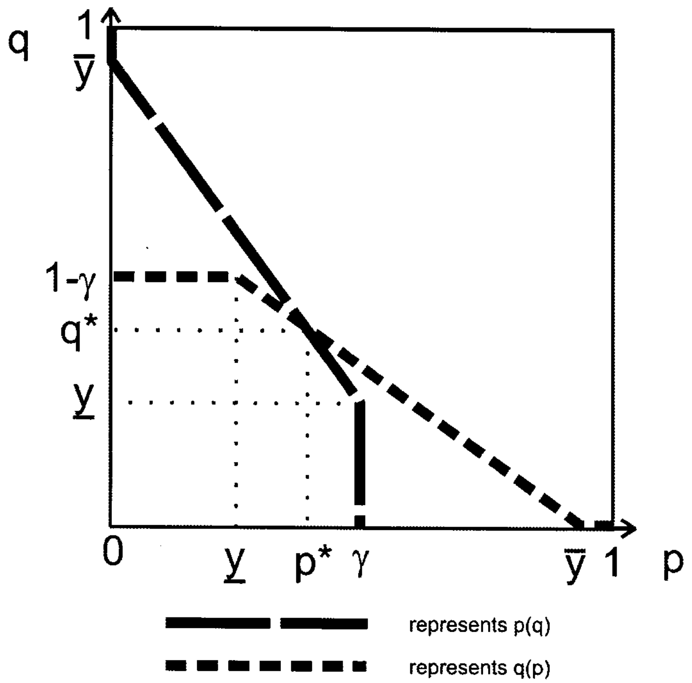


FIGURE 2.—An oscillating equilibrium. Equilibrium is $p^* = q^* = .3947$. Parameter values used are $\gamma = .5$, $\underline{y} = .25$, $\bar{y} = .9$, with a uniform distribution.

assumption that $v_i$ is uniformly distributed over the interval $[\underline{v}, \bar{v}]$. (This distribution is only an example, and it is not necessary for the general result.)

If condition (15) does not hold, both transition probabilities will be positive and oscillation between rules will result. Figure 2 shows an oscillating equilibrium, again under the (unnecessary) assumption of a uniform distribution. In short, we can see from condition (15) that whether or not convergence is possible depends on the *most* activist judge's propensity toward activism, $\bar{y}$. This is because there must be enough supporters of a rule to deter even the most activist advocate of the other rule from breaking precedent.

There is more to the story, however, because even if a convergent equilibrium is possible, other equilibria may be possible as well. Figure 3 shows an example (again using a uniform distribution of preference satisfaction values) of a situation in which there is more than one equilibrium that could occur. In this type of situation, the parameters of the situation—the fraction of judges who support each rule, the degree of activism among judges, and

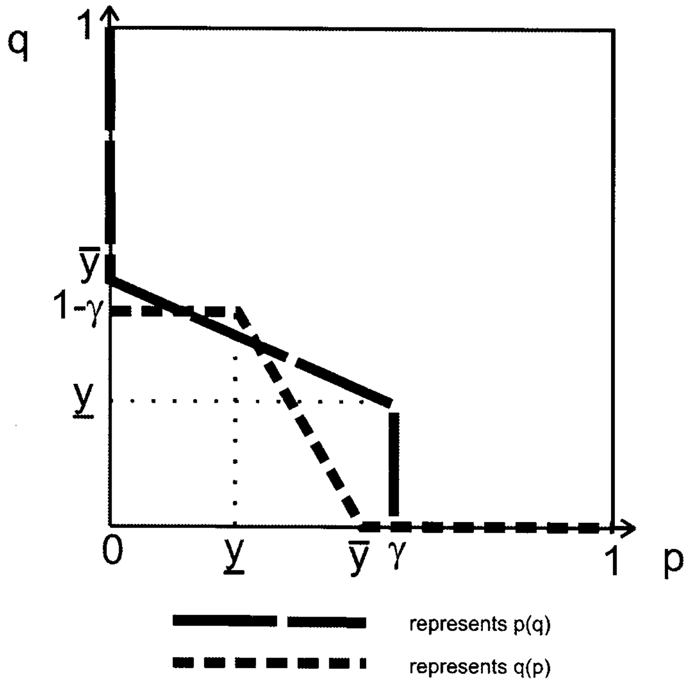


FIGURE 3.—A convergent equilibrium. Equilibria occur at $p^* = \gamma$, $q^* = 0$; $p^* = .2872$, $q^* = .3724$; and $p^* = .1406$, $q^* = 1 - \gamma$. Parameter values used are $\gamma = .55$, $\underline{y} = .25$, $\bar{y} = .5$, with a uniform distribution.

so on—do not uniquely determine the outcome of the system. Which equilibrium actually occurs depends crucially upon the expectations of judges and the history of the system. Convergence on a single rule is possible, but not guaranteed.

To eliminate any chance of oscillation, we need the following *sufficient* condition for convergence on a single rule:

$$\gamma < \underline{y} \quad \text{or} \quad \gamma > (1 - \underline{y}). \tag{16}$$

This condition (jointly with the necessary condition (15)) assures that any equilibrium *must* be convergent. Suppose, for example, that $\gamma > (1 - \underline{y})$. Since $q$ cannot be larger than $(1 - \gamma)$, we have $q < \underline{y}$, and thus equation (13) reveals that $p^* = \gamma$. In other words, 1-preferring judges will break from a precedent of rule 2 in favor of rule 1, even if they know that *all* 2-preferring judges will go right back to 2. And then, since $p^* = \gamma$ and the necessary condition holds, $q^* = 0$. Similar reasoning shows that if $\gamma < \underline{y}$ (and the necessary condition holds), then the equilibrium is $p^* = 0$, $q^* =$

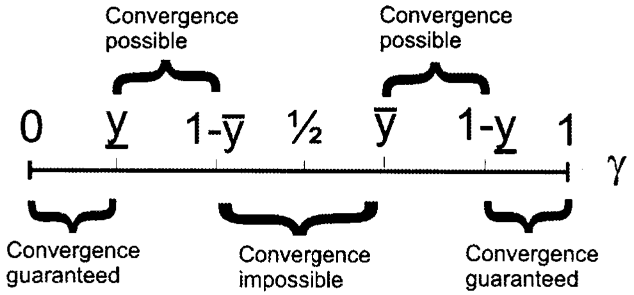


FIGURE 4.—Necessary and sufficient conditions for convergence

$(1 - \gamma)$. In other words, whether or not convergence is guaranteed depends on the *least* activist judge's propensity toward activism, $\underline{y}$. This is because there must be few enough supporters of one rule that even the least zealous advocate of the other rule is willing to break precedent.

The foregoing results imply a picture like Figure 4. This figure displays a unit interval representing all possible values of $\gamma$. As the figure shows, for high division of opinion (in the center of the interval), convergence is impossible; for medium division of opinion, convergence is possible but not guaranteed; and for low division of opinion (near the endpoints of the interval), convergence on a single rule is guaranteed.[16] In summary, convergence on one rule is most likely when division of opinion among judges is low and least likely when division of opinion among judges is high. Conversely, oscillation between rules is *least* likely when division of opinion is low and *most* likely when division of opinion is high. This fact will take on added importance in Section II, once we have discovered the circumstances under which convergence on a third, ''compromise'' rule is most likely to occur: when division of opinion is high.

## II. Appearance of a Third Rule

### A. *The Three-Rule Model*

Despite the existence of circumstances in which the legal system can be expected to converge on a single rule within an area of law, there remain many other circumstances in which that is not the case. In these circum-

[16] In some cases, incidentally, the medium range will not occur. This happens when $\bar{y} > 1 - \underline{y}$, so that satisfaction of the necessary condition for convergence immediately implies satisfaction of the sufficient condition for convergence. In such circumstances, convergence is either impossible or guaranteed. Also, the range wherein convergence is impossible fails to exist when $\bar{y} < 1/2$, since either $\gamma > \bar{y}$ or $(1 - \gamma) > \bar{y}$ (or both) must hold.

stances, the system will instead oscillate between the two competing legal rules. Such oscillation robs potential litigants of the ability to anticipate the actions of the courts and adjust their behavior accordingly. Short of widespread changes in the preferences and beliefs of judges, is there anything that can obviate these unfortunate results?

In this section, I will argue that the answer is yes, at least sometimes. One solution to the dilemma emerges when we include a third rule—a potential compromise—among the alternatives available to judges. If this third rule has certain properties (to be discussed shortly), it can act as an ''attractor'' from which a judge is less willing to depart than her nonpreferred rule, even though she would rather announce her preferred rule. As a result, the third rule may emerge as the dominant rule in the system, from which no judge will deviate. This can even occur if no judge thinks the third rule is the best!

Where would this third rule come from? This question lies outside the model presented here, which treats the appearance of a third alternative as exogenous. In the real world, the conception of a new rule could result from a creative act on the part of a judge or legal scholar. The new rule might be introduced into the legal process by a judge who disagrees with the current precedent but who does not wish to take the risk of rejecting it entirely. She might therefore introduce a compromise, knowing (or suspecting) that it will be sufficiently agreeable to other judges that it will stick as the new precedent and thereby augment her reputation. Alternately, there might be a single judge who introduces the compromise rule because she actually considers it *better* than both existing rules. (This is, of course, contrary to the assumption above that the new rule is no one's first choice. But admitting judges who like the new rule best would only strengthen the model's conclusions, which hold even if no one actually prefers the new rule.)

The structure of the model duplicates the one used in Section I, with no changes but a few additions. As before, $\gamma$ represents the fraction of judges who favor rule 1, $(1 - \gamma)$ the fraction who favor rule 2. There is now a third rule, rule 3, available to judges, but no judge considers it inherently the best, so there are still only two major factions of judges.

Rule 3 does have a special feature, however: it is every judge's *second* preference. This assumption is operationalized by letting the amount of preference satisfaction from announcing rule 3 be less than the amount of preference satisfaction from announcing one's preferred rule. Or, from the perspective of a judge announcing a precedent she disagrees with, it is less ''painful'' to announce the compromise rule than to announce the rule she disagrees with most. To be more precise, let

$$v_i' = V_i(3) - V_i(x_i^n) \tag{17}$$

and

$$v_i'' = V_i(x_i^p) - V_i(3), \tag{18}$$

where, as before, $x_i^p$ is the judge's preferred rule and $x_i^n$ her nonpreferred rule, and 3 is the compromise rule. The value $v_i'$ represents the preference satisfaction from picking the compromise rule rather than one's least preferred rule. The value $v_i''$ represents the preference satisfaction from picking one's preferred rule rather than the compromise rule. The sum of $v_i'$ and $v_i''$ is $v_i$. As before, I assume there exists a known distribution of preference satisfaction values in the judge pool and that the range of possible values is bounded above and below (that is, $v_i'$ has a maximum of $\bar{v}'$ and a minimum of $\underline{v}'$, and $v_i''$ has a maximum of $\bar{v}''$ and a minimum of $\underline{v}''$). Since there are now three rules, any equilibrium must consist of six transition probabilities. Specifically, let

$p$ = probability of transition from rule 2 to rule 1,
$q$ = probability of transition from rule 1 to rule 2,
$p_c$ = probability of transition from rule 2 to rule 3,
$q_c$ = probability of transition from rule 1 to rule 3,
$p_b$ = probability of transition from rule 3 to rule 1, and
$q_b$ = probability of transition from rule 3 to rule 2.

In the two-rule world, I assumed for simplicity that $v_i > u$, which assured that judges would not depart to their nonpreferred rules purely for reputational purposes. I will make two equivalent assumptions here: first, $v_i' > u$, which assures that judges will not depart from the compromise rule to their nonpreferred rules; second, $v_i'' > u$, which assures that judges will not depart from their preferred rules to the compromise rule. Together, these three assumptions guarantee that whenever a judge breaks from precedent, she always moves to a rule she prefers to the precedent, though not necessarily to her most preferred rule. Again, these assumptions are made for simplicity.[17]

Under these assumptions, it turns out that $p$, $p_c$, and $p_b$ represent the actions of 1-preferrers (since none of them involves a transition away from rule 1 or toward rule 2), while $q$, $q_c$, and $q_b$ represent the actions of 2-preferrers (since none of them involves a transition away from rule 2 or toward rule 1).

The next task is to derive the judges' conditions for breaking precedent. In order for a judge to depart from a precedent to another rule, two conditions must be satisfied: first, defecting to that rule must be better than following precedent; second, defecting to that rule must be better than de-

[17] A proof of the following results that does not rely on the assumptions just stated is available from the author upon request.

fecting to a different rule. For example, consider a 1-preferring judge. If she faces a precedent of rule 2, she can depart to either rule 1 or 3. In order for her to depart to rule 1, doing so must be better than following precedent and better than departing to rule 3. In all of what follows, I will use the word ''willingness'' to indicate that a judge considers departing to a given rule better than following precedent, without necessarily implying that it is better than departing to the other possible rule. I will use the word ''superiority'' to indicate that defecting to a given rule is better than defecting to the other rule. Thus, in order for a judge to defect to a particular rule, both the ''willingness condition'' and the ''superiority condition'' must be satisfied.

Take the case of a 2-preferrer facing a precedent of rule 1. In order for this judge to be willing to defect to rule 2 (that is, for defecting to rule 2 to be better than following precedent), it must be the true that

$$V_i(x_i^p) + u - (p + p_c)(u + d) > V_i(x_i^n). \tag{19}$$

Notice that this inequality is almost identical to condition (3), which was the condition for a 1-preferring judge to defect from rule 1 to rule 2 in the two-rule model. The only difference is that now the chance of the next judge repudiating the new precedent is not just $p$, but $(p + p_c)$, since the next judge may go to rule 1 (with probability $p$) or to rule 3 (with probability $p_c$). The above condition reduces to

$$(p + p_c) < \frac{v_i + u}{u + d}. \tag{20}$$

This is the willingness condition for 2-preferrers to defect from rule 1 to rule 2. By analogous reasoning, the willingness condition for 1-preferrers to defect from rule 2 to rule 1 is

$$(q + q_c) < \frac{v_i + u}{u + d}. \tag{21}$$

The satisfaction of condition (20) or (21) does not indicate that a judge will, in fact, defect to her preferred rule from her nonpreferred rule, because we have yet to consider the possibility of her defecting to rule 3 instead.

In order for any judge to be willing to defect from her nonpreferred rule to rule 3, it must be true that

$$V_i(3) + u - (q_b + p_b)(u + d) > V_i(x_i^n), \tag{22}$$

which follows from the fact that $(q_b + p_b)$ is the probability that the next judge will depart from a precedent of rule 3. This condition reduces to

$$(q_b + p_b) < \frac{v_i' + u}{u + d}. \tag{23}$$

This condition for willingness to defect to rule 3 is the same for both 1-preferrers and 2-preferrers, because both groups face the same probability that the next judge will depart from rule 3.

All of the conditions stated so far are willingness, not superiority, conditions. Suppose that both conditions (20) and (23) hold for some judge; then this 2-preferrer considers defection to either rule 2 or 3 to be preferable to following a precedent of rule 1. But to which will she actually choose to defect? In order for a 2-preferring judge to depart from a precedent of rule 1 to 2 rather than to rule 3, it must be true that

$$V_i(x_i^p) + u - (p + p_c)(u + d) > V_i(3) + u - (q_b + p_b)(u + d), \quad (24)$$

which reduces to

$$v_i'' > (p + p_c - q_b - p_b)(u + d). \quad (25)$$

This condition has a natural interpretation. Since departing to one's preferred rule and departing to the compromise rule both involve breaking from precedent, both create potential reputational effects. What matters, then, is the *difference* between the probability of one's preferred rule being left by the next judge, $(p + p_c)$, and the probability of the compromise rule being left by the next judge, $(q_b + p_b)$. The cost of defecting to one's preferred rule rather than to the compromise rule is the expected difference in reputational utility attributable to the compromise rule being less likely to be left by the next judge, $(p + p_c - q_b - p_b)(u + d)$. The benefit of defecting to one's preferred rule rather than the compromise is avoiding a preference falsification loss of $v_i''$. A comparison of the two determines which course of action is preferable.

The equivalent condition for a 1-preferrer to depart to rule 1 rather than rule 3 is

$$v_i'' > (q + q_c - q_b - p_b)(u + d). \quad (26)$$

The interpretation is exactly the same as condition (25), except the probability of the next judge leaving one's preferred rule is $(q + q_c)$ instead of $(p + p_c)$.

Finally, we need conditions for judges to leave rule 3 in favor of another rule. In order for a 2-preferring judge to leave rule 3 in favor of rule 2, it must be that

$$(p + p_c) < \frac{v_i'' + u}{u + d}. \quad (27)$$

And in order for a 1-preferring judge to leave rule 3 in favor of rule 1, it must be that

$$(q + q_c) < \frac{v_i'' + u}{u + d}. \quad (28)$$

(These conditions are derived via the same logic as the previous willingness conditions; no superiority conditions are necessary, since I have assured that no judge will depart from the compromise in favor of her nonpreferred rule.)

The seven conditions just derived—(20), (21), (23), (25), (26), (27), and (28)—define the three-rule legal system. They can be combined into six equations or ‘‘reaction functions,’’ each of which states one of the six transition probabilities as a function of the other five. These six equations would define the three-rule system in the same manner that equations (13) and (14) define the two-rule system: specifically, any ($p^*$, $q^*$, $p_c^*$, $q_c^*$, $p_b^*$, $q_b^*$) sextuplet that satisfies all six equations constitutes an equilibrium. I will omit the statement of the six equations, since they will not be necessary in what follows, and instead I will simply note that, once again, at least one equilibrium of the system is guaranteed to exist.[18]

### *B. Implications*

Within this framework, there are many kinds of conceivable equilibria, and exploring them all would be beyond the scope of this paper. Instead, I will focus on the equilibrium that produces convergence on the compromise rule, since only this type of equilibrium can obviate a situation of oscillation that would occur in the absence of a compromise rule. But first I will make a few brief comments about the other equilibria. Not surprisingly, the appearance of a ‘‘compromise’’ rule does not always guarantee a compromise will actually occur. As we will see, a rule must possess some very specific properties for it to be a viable compromise. If a third rule is introduced that does not have these properties, the outcome could be very different. Some equilibria, for instance, involve oscillation among all three rules; thus, the compromise may not only fail to produce convergence on a single rule, but in fact add an additional source of uncertainty.[19] In other equilibria, there ends up being oscillation between the third rule and one of the other rules, leaving either rule 1 or rule 2 out in the cold. And in still other equilibria, the third rule ends up being completely irrelevant, because there is convergence on one of the original two rules, or oscillation between the original two rules that excludes the third rule.

Under what circumstances, then, will there be an equilibrium that involves convergence on the compromise rule? Clearly, such equilibrium

[18] Proof is available from the author upon request.

[19] One factor that mitigates this possibility is the fact that, as suggested earlier, a judge would be most inclined to introduce a third rule if she thought the system would converge on it. Otherwise, she could suffer a reputational loss for even introducing it. There is, however, no guarantee that a judge will not introduce a rule that does not lead to convergence.

must have $q_b = 0$ and $p_b = 0$; otherwise, there would be a positive probability of the compromise rule being left, and hence no convergence. This fact has a couple of implications. First, since $q_b + p_b = 0$, condition (23) is automatically satisfied, meaning that every judge is willing to depart from her nonpreferred rule in favor of the compromise rule. Thus, every judge who faces her nonpreferred rule as a precedent will depart to something, either her preferred rule or the compromise rule (as we will see in a moment, it will definitely be the compromise). Therefore, $p + p_c = \gamma$, since all 1-preferrers depart from a precedent of rule 2, and $q + q_c = (1 - \gamma)$, since all 2-preferrers depart from a precedent of 1.

A second implication follows from this conclusion. To justify $q_b = 0$ and $p_b = 0$, all judges must be deterred from leaving the compromise rule in favor of their preferred rules; that is, conditions (27) and (28) must fail to hold for all judges. So we need to have $(p + p_c) > \bar{y}''$ and $(q + q_c) > \bar{y}''$. And we already know that $(p + p_c) = \gamma$ and $(q + q_c) = (1- \gamma)$, so we have

$$\gamma > \bar{y}'' \quad \text{and} \quad (1 - \gamma) > \bar{y}''. \tag{29}$$

(In keeping with the previously adopted shorthand, $\bar{y}'' = (\bar{v}'' + u)/(u + d)$.) This condition has a natural interpretation: the proportion of judges who oppose any judge's preferred rule must be large enough to deter her from leaving the compromise in favor of that rule.

It turns out that any judge who is unwilling to defect from the compromise would, when facing her nonpreferred rule as precedent, rather depart to the compromise than depart to her preferred rule. Suppose, on the contrary, that a judge preferred to depart to her preferred rule rather than to the compromise rule; then condition (25) or (26), whichever is appropriate to the judge's type, must hold. Since $q_b + p_b = 0$, $(p + p_c) = \gamma$, and $(q + q_c) = (1 - \gamma)$, for condition (25) or (26) to hold we need

$$v_i'' > \gamma(u + d) \quad \text{or} \quad v_i'' > (1 - \gamma)(u + d). \tag{30}$$

But these conditions imply

$$\frac{v_i''}{(u + d)} > \gamma \quad \text{or} \quad \frac{v_i''}{u + d} > (1 - \gamma). \tag{31}$$

Since $y_i'' = (v_i'' + u)/(u + d) > v_i'' /(u + d)$, we can conclude that $y_i'' > \gamma$ or $y_i'' > (1 - \gamma)$. But either of these statements would contradict condition (29); therefore, in order for an equilibrium to involve convergence on the compromise rule, every judge must choose to depart to the compromise rather than her preferred rule. Hence, $p = 0$, $q = 0$, $p_c = \gamma$, and $q_c = (1 - \gamma)$. Intuitively, this is true because any judge who is unwilling to leave the compromise for her own preferred rule would also depart to the compromise rather than to her preferred rule. This conclusion follows from the fact that, when no one will leave the compromise, anyone who goes to the compromise is guaranteed a reputational gain.[20]

There is therefore only one possible equilibrium that involves convergence on the compromise rule: $p^* = 0$, $q^* = 0$, $p_c^* = \gamma$, $q_c^* = (1 - \gamma)$, $p_b^* = 0$, $q_b^* = 0$. This equilibrium corresponds to a single overarching condition, (29), that must be satisfied in order for an equilibrium that involves convergence on the compromise rule to occur.[21]

This condition has an intriguing implication: *a compromise should be easier to find when there is greater division of opinion among judges.* This becomes evident if we rewrite condition (29) as $\bar{y}'' < \min\{\gamma, 1 - \gamma\}$. Since $\gamma$ and $(1 - \gamma)$ always lie on opposite sides of and equidistant from one-half, lower division of opinion—that is, $\gamma$ closer to zero or one—pushes down the ceiling on viable values of $\bar{y}''$. The smallness of $\bar{y}''$ can be thought of as a measure of how ''good'' the compromise is; the smaller it is, the less preference falsification judges experience from adopting the compromise. A less satisfactory compromise (one with high $\bar{y}''$) requires greater division of opinion for it to work, while a better compromise (one with low $\bar{y}''$) can succeed when division of opinion is not as severe.

To some extent, this result is an artifact of the model's construction. It might seem implausible to assume that a potential compromise rule always produces the same amount of preference satisfaction ($v_i''$) for preferrers of both of the original rules. It is perhaps more plausible to think that a compromise would tend to ''lean'' toward either rule 1 or rule 2, so that members of one group will be more satisfied with the compromise and members of the other group less satisfied. In effect, the assumption of a single preference satisfaction value restricts the analysis to compromise rules that exactly ''split the difference'' between the two original rules, in some sense. To correct this problem, it would be necessary to allow there to be two different values of $\bar{v}''$ for 1-preferrers and 2-preferrers. This would complicate the analysis but not substantially change the conclusions. Suppose that $\bar{v}''$ takes on the value $\bar{v}_1''$ for 1-preferrers and $\bar{v}_2''$ for 2-preferrers. Presumably,

[20] To be more specific: when no one will leave the compromise, anyone who goes to the compromise from another rule is guaranteed a reputational benefit of *u*. Yet when someone is faced with the compromise as a precedent, no such benefit is available. Meanwhile, the potential preference satisfaction is the same in both situations, since both choices are between the preferred rule and the compromise. Thus, anyone who will stay on the compromise (rather than go to her preferred rule) will certainly depart to the compromise (rather than go to her preferred rule).

[21] Satisfaction of this condition guarantees the satisfaction of any other conditions for the equilibrium in question to be possible.

these values stand in an inverse relationship to each other, since a rule that 1-preferrers like more is probably a rule the 2-preferrers like less, and vice versa. Let $\bar{y}_1''$ and $\bar{y}_2''$ be defined in the usual fashion. Then condition (29) becomes

$$\gamma > \bar{y}_2'' \quad \text{and} \quad (1 - \gamma) > \bar{y}_1''. \tag{32}$$

The implications of this condition differ only slightly from those stated earlier. In general, the farther apart are $\bar{y}_1''$ and $\bar{y}_2''$—that is, the more lopsided is the compromise rule—the more lopsided must be the support for the rules if the compromise is to work. For example, if 1-preferrers suffer greater preference falsification from the compromise rule[22] (larger $\bar{y}_1''$ than $\bar{y}_2''$), there need to be enough 2-preferrers $(1 - \gamma)$ to deter the 1-preferrers from leaving the compromise.

This might seem to contradict the earlier conclusion that greater division of opinion assists the emergence of a compromise, but that is not quite true. The question is, how large is the space of potential compromise rules? Since any potential compromise rule is characterized by the two values $\bar{y}_1''$ and $\bar{y}_2''$, the space of potential compromise rules can be represented as a two-dimensional area, as in Figure 5. In this figure, $\bar{y}_i''$ is measured along the left-hand axis and $\bar{y}_2''$ is measured along the right-hand axis. The conditions of (32) demarcate the viable subset of the space of potential compromise rules. When $\gamma = 1/2$, the set of viable compromise rules is given by the shaded square. If $\gamma$ changed to something else, such as $\gamma'$ in the figure, some potential compromises would be ruled out while others would become viable. Specifically, the area labeled $L$ would be lost, and the area labeled $G$ would be gained. Note that the area $L$ is greater than the area $G$. This is a general feature of any shift away from even division of opinion: the total area of potential compromises shrinks. Conversely, a movement toward greater division of opinion will increase the total area of potential compromises.[23] Of course, the effect this has in a particular area of law depends on where the compromise rules that are actually conceivable lie in the area of all potential compromises. For example, if for some reason there were no conceivable compromise rule in the southeast quadrant of Figure 5, a movement in the direction of a smaller $\gamma$ could increase the likelihood of finding a viable compromise.

In conjunction with the results of the two-rule model in Section I, these

[22] Recall that $v_i''$ represents the utility difference between the preferred rule and the compromise rule. Announcing the compromise rather than one's preferred rule therefore yields a loss in utility (preference falsification) of $v_i''$.

[23] The total area of potential compromises is equal to $\gamma(1 - \gamma)$, which reaches a maximum at $\gamma = 1/2$.

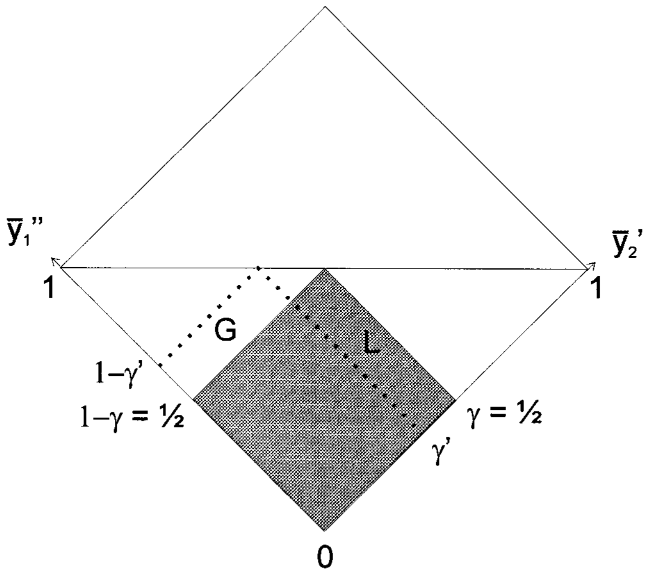


FIGURE 5.—Area of viable compromises. Shaded area is area of viable compromises when $\gamma = 1/2$. $L$ is the area lost when $\gamma$ shifts to $\gamma'$. $G$ is the area gained from the same shift.

conclusions have a significant implication: a viable compromise rule is most likely to be found in exactly those situations in which convergence on rule 1 or rule 2 is least likely to occur! When division of opinion is low, meaning that $\gamma$ is close to zero or one, convergence on one of the two original rules is possible and, when division of opinion is lower still, guaranteed—and this is just when a compromise is least likely to be reached. On the other hand, when division of opinion is high, meaning that $\gamma$ is close to one-half, convergence on one of the two original rules is impossible—and that is also when a compromise is most likely to be viable. In a sense, the option of compromise provides a means (albeit not an infallible one) of obviating the problem of oscillation that afflicts the two-rule world, by providing a third alternative in situations wherein judges' opinions are too evenly divided for the legal system to settle on one of two competing rules.

## III. COMMENTARY

### *A. Related Literature*

Much of the existing literature on the evolution of the common law can be classified into one of two approaches, which I will call ''demand side'' and ''supply side.'' The demand-side models explain the evolution of legal rules primarily in terms of the behavior of potential litigants, whose actions are driven in part by the efficiency and other properties of the legal rules that affect them. The behavior of judges is generally taken as random or exogenous in these models. Supply-side models, on the other hand, explain the evolution of legal rules primarily in terms of the preferences and behavior of the makers of law, judges.

The model employed in this paper falls into the supply-side camp. In treating judges as individuals who desire to implement their own legal preferences but who are constrained by the need to preserve their reputations, I have followed the lead of several other authors, including William Landes and Richard Posner, Georg von Wangenheim, and Miceli and Cosgel,[24] whose approach I have adapted. But the most popular models of legal evolution have come from the demand-side camp, whose canonical contributions include those by Paul Rubin, Priest, John Goodman, and a separate paper by Landes and Posner.[25] These authors all address their analysis to the question of whether the common law evolves toward more efficient (that is, wealth-maximizing) rules over time. The natural question is how, if at all, the present model could incorporate the insights of these authors.

The answer is tricky, for it depends crucially upon how those authors are interpreted. At least three of these models (Rubin's, Priest's, and Landes and Posner's) make predictions about the proportion of areas of law that will have efficient precedents, not about whether any particular area of law will have an efficient precedent. The present model, on the other hand, deals with a single area of law, making it difficult to integrate their approaches with my own. Fortunately, Cooter and Kornhauser[26] have outlined a useful framework for evaluating these models, which I will adapt for my purposes. For simplicity, I will limit myself to an analysis of the two-rule world.

The statement in Section I that a $(p^*, q^*)$ equilibrium would result in rule 1 spending $p^*/(p^* + q^*)$ of the time, and rule 2 $q^*/(p^* + q^*)$ of the time, as precedent was based on the implicit assumption that new cases arrive at a constant rate. Cooter and Kornhauser allow for the possibility that different rules will have different likelihoods of being challenged like so: Let $r_1$ equal the probability that a precedent of rule 1 will be challenged in a given period, and let $r_2$ equal the probability that a precedent of rule 2 will be challenged in a given period. The probability that a given precedent

[24] William M. Landes & Richard A. Posner, Legal Precedent: A Theoretical and Empirical Analysis, 19 J. Law & Econ. 249 (1976); Georg von Wangenheim, The Evolution of Judge-Made Law, 13 Int'l Rev. L. & Econ. 381 (1993); Miceli & Cosgel, *supra* note 5.

[25] Rubin, *supra* note 3; Priest, *supra* note 2; Goodman, *supra* note 3; Landes & Posner, *supra* note 3.

[26] Cooter & Kornhauser, *supra* note 12.

will be overturned in 1 period is equal to the probability that it will be challenged, multiplied by the chance that the challenged precedent will be overturned. Thus, if rule 1 is the precedent, the chance of it being replaced by rule 2 within 1 period is $r_1q^*$, and if rule 2 is the precedent, the chance of it being replaced by rule 1 within 1 period is $r_2p^*$. These probabilities replace $q^*$ and $p^*$ in determining how much time each rule spends as precedent; thus, rule 1 will spend $r_2p^*/(r_2p^* + r_1q^*)$ of the time as precedent, while rule 2 will spend $r_1q^*/(r_2p^* + r_1q^*)$ of the time as precedent.

This conclusion is useful because three of the canonical models (those of Rubin, Priest, and Landes and Posner) rely on the assumption that inefficient rules will generate either more or less litigation than efficient rules—in other words, that $r_1$ and $r_2$ will differ. Let us suppose that rule 1 is more efficient than rule 2. Rubin essentially argues that potential litigants will choose to settle suits when the precedent is efficient but go to court when the precedent is inefficient, so that $r_1 = 0$ while $r_2 > 0$.[27] The result is that rule 1 would, in the long run, spend 100 percent of the time as precedent. Priest argues that inefficient rules generate greater stakes than efficient rules and that (other things equal) greater stakes cause more disputants to go to court rather than settling; thus, $r_1 < r_2$. While this would not cause the system to converge on the efficient rule, it would cause the efficient rule to spend more time as precedent than it would if the rules were litigated at the same rate, because $r_2p^*/(r_2p^* + r_1q^*) > p^*/(p^* + q^*)$ when $r_1 < r_2$. Finally, Landes and Posner argue, against Priest, that inefficient rules might get litigated at a lower rate than efficient rules, because in many areas of law it is possible for potential litigants to contract around an inefficient rule, while they will avoid contracting costs by going to court under an efficient rule. Thus, $r_1 > r_2$, an assumption that yields the conclusion that an inefficient rule would spend more time as precedent than it would under identical litigation rates.[28]

But all three models, at least as interpreted here, founder on a problem foreshadowed in this paper's introduction: If the system oscillates among two or more rules, only myopic agents will assume that the standing precedent will be applied. Rational agents will instead base their behavior on the expectation that each rule will be applied with a certain probability. This

[27] Cooter and Kornhauser argue that this is an implausible assumption, because it relies on the ''group rationality'' assumption that disputants will always choose to settle if doing so minimizes their joint costs.

[28] Cooter and Kornhauser's interpretation of Landes and Posner (Cooter & Kornhauser, *supra* note 12; Landes & Posner, *supra* note 3) does not capture all the subtleties of that model. Much of Landes and Posner's analysis relies on treating precedent as the stock of all previous decisions, rather than just the last decision. Incorporating this insight in the present model would require a much more extensive revision than I will attempt here.

argument implies that agents will base their behavior—before a dispute arises as well as when choosing whether or not to settle—on the percentage of time that each rule spends as precedent. It is therefore implausible to assume that $r_1$ and $r_2$ will differ. Instead, a single probability $r = r(p^*, q^*)$ will actually determine whether a dispute arises in a given period. In consequence, rule 1 will spend $rp^*/(rp^* + rq^*) = p^*/(p^* + q^*)$ of the time as precedent (and similarly for rule 2). That is, *the actions of potential litigants will exert no pressure on precedent to move toward one rule or the other*. They may, however, affect the speed at which oscillation takes place, because when $r$ is larger, transitions from one rule to the other will take place more often.[29]

Goodman does not rely on differential rates of litigation to reach the conclusion that the legal system will lean toward efficiency. Instead, he argues that judges are most likely to rule in favor of the party to a dispute who has invested the most in the litigation process. Since an inefficient rule by definition generates greater losses for some parties than gains for others, those who benefit from having an inefficient rule overturned will invest more than those who benefit from keeping it in place.[30] Hence, judges will be more likely to overturn an inefficient rule than an efficient rule. In terms of the present model, Goodman's argument implies that if rule 1 is the efficient rule, $p^* > q^*$ (the inefficient rule is more likely to be overturned than the efficient rule). While the model does not explicitly allow for differential investment in litigation, it could possibly be incorporated into a broader interpretation of the term $\gamma$. While $\gamma$ has been treated as the proportion of judges who always favor rule 1 over rule 2, it could also be interpreted as the likelihood that a random judge will consider rule 1 more appropriate than rule 2 *in the dispute at hand*. If it is indeed the case that those who gain from overturning an inefficient precedent will spend more on litigation, then $\gamma$ should be larger than it would be if differential expenditures were ruled out, since more judges will perceive rule 1 to be ‘‘right’’ in a random dispute.

[29] This analysis depends on potential litigants knowing the percentage of time each rule spends as precedent, but not knowing what the current precedent is. If they know the current precedent, they will employ transition probabilities instead. If, for example, the precedent is rule 1, they will base their actions on the belief that rule 1 will be applied with probability $(1 - q^*)$ and rule 2 with probability $q^*$. This is implausible, however, because potential litigants often choose their behavior long before a dispute occurs and the case goes to court, and in the meantime the precedent could change. The further in the future dispute and trial are likely to occur, the more agents will rely on the percentage of time each rule spends as precedent instead of transition probabilities.

[30] One problem with this analysis is that an inefficient rule could create dispersed costs for some and concentrated benefits for others. So even if the costs are greater than the benefits in total, collective action problems may prevent those who benefit from changing the rule from investing enough in litigation relative to those who benefit from keeping the rule in place.

Whether or not this affects the equilibrium values of $p$ and $q$ depends crucially on the initial $\gamma$ (unmodified by differential investment) and the magnitude of the investment effect. If the investment effect were small, $\gamma$ might not change enough to alter the equilibrium in any substantial way. On the other hand, if the investment effect were large, or if the initial $\gamma$ were close to the threshold between one type of equilibrium and another, then a significant shift could take place, in which case the efficient rule would be the precedent for a larger percentage of the time than otherwise. If the investment effect pushed $\gamma$ past one of the thresholds identified in this paper, it could make convergence possible where it was not before or guaranteed where it was only possible before.

### *B. Illustrations*

The evolutionary picture suggested by this article's model seems to comport well with the actual development of certain areas of law. While some areas of law tend to change little over time, others display an ongoing struggle between doctrines or approaches. One example of the latter is the well-known tension between strict liability and negligence in the law of tort. As Mario Rizzo[31] has argued, that tension seems to have been resolved, in part, by the emergence of doctrines like ''assumption of risk'' and ''negligence per se'' that represent the importation of strict-liability notions into a negligence-based structure. The combined doctrine constitutes a compromise of sorts between the two approaches.

Similarly, the law of nuisance, in cases where the plaintiff voluntarily settles nearby an already existing nuisance, has been torn between two alternative doctrines: the coming-to-the-nuisance doctrine (which says the plaintiff should lose in these cases) and the balancing doctrine (which decides such cases by weighing a variety of economic costs and benefits of allowing the nuisance). As I have argued elsewhere,[32] the case law in this area has historically exhibited an oscillation between the two approaches, followed by the emergence of de facto court-enforced zoning as a compromise between them. In the law of both tort and nuisance, one can observe the kind of oscillation and compromise predicted by the model presented here. Whether other areas of law exhibit a similar evolution remains a subject for further research.

[31] Mario J. Rizzo, Rules versus Cost-Benefit Analysis in the Common Law, 4 Cato J. 865 (1985).

[32] Douglas G. Whitman, Economic Efficiency of the Coming to the Nuisance Doctrine: A Reappraisal (unpublished manuscript, New York Univ. 1997).

### *C. Concluding Remarks*

The modeling strategy employed here is, of course, abstract, and a number of objections might be raised against it. First, the model does not account for the hierarchical nature of most court systems, in which higher courts may review the decisions of lower courts. Second, the model does not account for the existence of cases that do not clearly fall within one area of the law or another; such cases may muddy the waters, since it might be unclear whether a previous decision is the ruling precedent in a current case or not. Third, the model does not allow for there to be more than three rules. If more than one potential compromise rule began to compete for the attention of judges, it is conceivable that a compromise rule that would otherwise be viable might no longer be able to hold its dominant position. All of these objections are valid, and incorporating these factors into the model would lead to a more complete (and much more complex) analysis of the issue.

Nonetheless, the model addresses, if in rudimentary fashion, a significant question that haunts the common law. In any given area of the common law, one can often find more than one rule competing for the attention of judges. Even when one rule is nominally the standing precedent, another rule is often waiting in the wings to take its place when a judge sees fit to announce it. This presents a problem: the legal system may flip-flop from one rule to another indefinitely. But is this actually a serious problem, and if so, when? The conclusion of this paper is that oscillation among legal rules is in fact possible, but it is not as serious a problem as it might at first appear. In a number of situations, the legal system will instead produce convergence on a single rule upon which agents can rely when choosing their plans and behavior.

When there are only two rules competing for hegemony, convergence on one rule occurs when division of opinion among judges is low, relative to the strength of judges' activist impulses. If there are enough judges who support one rule, even activist judges who oppose that rule will nonetheless follow it as a precedent rather than risk having their decisions repudiated by subsequent judges. On the other hand, if the judge pool is more evenly divided in support of the two rules, oscillation between the two rules becomes a serious possibility and (for sufficiently divided opinion) a certainty.

When a third ''compromise'' rule is introduced to the situation, the legal system is most likely to converge on that compromise when opinion is divided—in other words, precisely when oscillation is most common in a world of only two rules. Of course, in any situation of disagreement, from bargaining over goods to political negotiations, it is not surprising to find that compromises get struck from time to time. What is intriguing is the manner in which a compromise might emerge in the context of the evolution of law. The judges in the system need not agree, in any explicit sense, to announce only the compromise rule; nor is any external enforcement mechanism required. Instead, the compromise could conceivably be introduced by a single judge in a single case, and other judges would follow suit based on their self-interested calculation of reputational effects, weighed against their desire to implement their personal preferences over legal rules. The compromise emerges out of a decentralized process of judge-by-judge decision making.

The fact that multiple equilibria are possible under some circumstances emphasizes that the parameters of a legal situation, such as the number of supporters of a given rule, the degree of activism among judges, the aversion of judges to being overturned, and so on, do not always uniquely determine the outcome produced by the system. The history of the system and, more important, the expectations judges have about each other can substantially affect the behavior of the system; in fact, these factors can even decide whether the system does or does not converge on a single rule.

Finally, this paper's model emphasizes the role of judicial opinion in shaping the evolution of the system. That judges' opinions and beliefs affect the development of law might seem obvious, but in light of models of the evolution of law that emphasize the capacity of law to develop independently of or even in spite of judges' opinions, it is important to recognize that such ''demand-side'' approaches can only explain so much. The present model confirms our intuition that trends in judicial thinking do indeed strongly influence the direction of legal change, though not so strongly that current legal doctrine can be explained exclusively in terms of the opinions of the present pool of judges. History, expectations, and judicial preferences all interact to determine the course of legal change.