RESEARCH NOTES

An Empirical Test of the Rational-Actor Theory of Litigation

Donald R. Songer
University of South Carolina
Charles M. Cameron
Columbia University
Jeffrey A. Segal
State University of New York at Stony Brook

This article examines the decisions of litigants in criminal cases to appeal decisions from the U.S. Courts of Appeals to the U.S. Supreme Court. Using a random sample of search and seizure cases from 1962 through 1990 and a measure of the likelihood that the appeals court decision will be reversed if cert is granted, we demonstrate that litigants behave as if they rationally consider costs and benefits in their decisions to appeal. Given the extraordinary number of cases decided by lower federal courts vis-à-vis the number of cases the Supreme Court can decide, we argue that such behavior is necessary if the Supreme Court is to retain control over the federal judiciary.

INTRODUCTION

Political scientists, economists, and sociologists have studied many aspects of decision making in courts, including the decision to initiate litigation. The decision to continue litigation through appeals, however, has all but been ignored. Such decisions are crucial to questions of hierarchy and control in the administration of justice because higher courts cannot exercise control over lower courts unless litigants appeal lower-court decisions that are divergent from upper-court preferences. In the absence of rational behavior by litigants, lower courts will have little reason to fear being overturned by a Supreme Court that receives nearly 5,000 cert petitions per term (Segal and Spaeth 1993). Scholars may assume that litigants are rational, but assuming they are and demonstrating they are are separate questions. No empirical work to date has demonstrated such a claim.

An earlier version of this article was presented at the 1993 annual meeting of the Law and Society Association, Chicago. We gratefully acknowledge the support of NSF grant SES-9112755 and thank Ashlyn Kuersten and David Slovensky for their research assistance.

© 1995 by the University of Texas Press, P.O. Box 7819, Austin, TX 78713–7819
We provide a first attempt at filling this gap in the sociolegal literature by analyzing the decisions of litigants to appeal adverse criminal decisions. We test the hypotheses on a random sample (n = 752) of decisions whether or not to appeal U.S. Circuit Court rulings to the U.S. Supreme Court in search and seizure cases from 1962 through 1990.

THEORETICAL FOUNDATIONS

Previous Research

Although the decision to appeal cases is not well studied, there are obvious similarities between the decision to appeal a ruling and the decision to plea bargain in criminal cases, and the decisions to bring and settle civil suits. In this section, we briefly review some important findings from the large literature on suit, settlement, and trial, highlighting points that cast light on appeals.

The locus classicus for the analytic study of criminal trials is Landes’s 1971 article “An Economic Analysis of the Courts.” Landes models a two-stage game of complete information between a prosecutor and a criminal defendant (we use contemporary game theoretic terminology to describe Landes’s model). In the first stage, the two actors plea bargain, possibly reaching a negotiated settlement. In the second stage, the two actors simultaneously allocate litigation effort. If the case proceeds to trial, the probability of conviction depends on the litigation efforts expended by both, as the “court” is represented by a smooth deterministic function. The sentence in the event of a conviction is common knowledge. The prosecutor attempts to maximize the expected number of sentence-years subject to a budget constraint. The defendant attempts to maximize utility, a decreasing function of litigation effort and sentence, subject to an effort constraint.

Landes’s model identified some of the key elements in any model of rational litigant behavior, and we expect these same elements to play an important role in appeals decisions as well. These elements include “the probability of conviction by trial, the severity of the crime, the availability of resources to each side, the relative costs of a trial versus settlement, and attitudes regarding risk” (Elder 1989, 193). Empirical studies of settlement tend to confirm the importance of these factors in trial decisions, although there is some ambiguity about the effect of the severity of penalties and little work has been conducted on the effect of prosecutorial costs (Elder 1989; Perloff and Rubinfeld 1988; Danzon and Lillard 1983; Rhodes 1976).

Not only did the Landes model point to elements such as probability of conviction and the cost of litigation, it also uncovered one of the fundamental principles of trial decisions: if the two actors share a common perception of the probability of conviction, then court costs drive risk-neutral litigants to reach a negotiated settlement. One of the central puzzles in the literature thus emerges: why are there trials—why don’t prosecutors and defendants always settle out of court? Or, restating the

1Landes (1971) assumes the prosecutor must allocate a budget of resources over his caseload, while the defendant values money spent on litigation.
matter, under what circumstances will prosecutors and defendants have different perceptions of the probability of conviction? Obviously, the same puzzle applies to appeals, for if both sides share a common perception of the probability of successful appeal they will incorporate this perception in their earlier decision to settle.

The work that immediately followed Landes’s analysis used ad hoc assumptions to sidestep the puzzle of asymmetric perceptions. More recent work uses incomplete information models from game theory to address the question directly. In some of these models only the defendant knows for sure whether he or she is guilty, so that settlement offers allow prosecutors to screen out guilty defendants (Grossman and Katz 1983). In others, the prosecutor has private information about the quality of the case, so that settlement offers signal to defendants whether they are likely to be convicted (Reinganum 1988).

These incomplete information models are extremely elegant and logically appealing, but from an empirical standpoint an obvious question is, do the predictions from such models differ substantially from those derived from the earlier models with ad hoc assumptions about asymmetric perceptions? Reinganum’s 1988 model (which represents the contemporary state-of-the-art) suggests strongly that the factors identified by Landes retain their importance. For example, her model predicts a positive relationship between the strength of the case and the probability of going to trial. The model also predicts that increases in the prosecutor’s cost of going to trial decrease the likelihood of trial. Interestingly, in light of the empirical evidence, the model suggests that the effect of the likely sentence given conviction and the defendant’s cost of trial are indeterminate. The latter prediction may be surprising but hinges on two conflicting effects. As likely sentence and defendant costs increase, the defendant is more likely to accept a given settlement offer. But those changes also lead the prosecutor to offer tougher sentences, which the defendant is less likely to accept. Hence the net effect depends on the relative magnitudes of the two effects, an empirical question.

**Hypotheses**

The lessons from the theoretical and empirical analyses of settlement seem quite clear. Rational litigants considering appeals to the Supreme Court will surely consider the probability of winning, the severity of the crime, and the availability of resources. We consider these in turn.

The probability of winning differs markedly for the defendant facing trial from the defendant seeking appeal to the Supreme Court. Whereas the trial-court defendant considering a guilty plea (with or without a negotiated settlement) has the absolute right to trial should he or she choose, the upper-court defendant deciding whether to forego appeal is not guaranteed his or her day in Court. The first step in winning for the advanced appellate defendant is probably the most difficult: getting the Supreme Court to agree to hear the case. Only then will the case be heard on the merits. Those factors that will make the Supreme Court (a) more likely to hear the case and (b) more likely to rule in favor of the defendant if it hears the case, should increase the probability of appeal.
We believe most if not all defendants in our sample face almost assured conviction if the evidence under question is legally admissible. The greater the severity of the crime, then, the greater the cost of being convicted and, presumably, the greater the likelihood that the defendant should appeal. Finally, poor defendants, i.e., those with fewer resources, should have less ability to appeal than those who are not financially challenged.\textsuperscript{2}

\textbf{DATA AND METHODS}

We test our predictions on decisions made by criminal defendants to appeal adverse search and seizure judgments from a random sample of such cases decided by the United States Courts of Appeals with opinions (including per curiams) published in the \textit{Federal Reporter} from calendar year 1961 through 1990.\textsuperscript{3} The unit of analysis is the search. In those few opinions that discussed the validity of several unrelated searches, each search was coded separately.

To evaluate litigant decisions to seek review of Circuit Court decisions, we need a well-specified model of \textit{Supreme Court} decisions. If litigants attempt to gauge, among other variables, their probability of success if granted review, they will need to assess the strength of their legal arguments as those arguments are likely to be evaluated through the filter of the attitudinal predispositions of the current Supreme Court majority. Such an assessment requires careful attention to the facts of their particular case, an understanding of the importance attached to each of those facts by the Supreme Court, and knowledge of the attitudinal perspectives of members of the Court. To evaluate whether litigants base their decisions to seek review on such an analysis, we need a model of Supreme Court decision making that takes into account both the most important case facts and the changing attitudes on the Court.

To satisfy that requirement, we choose the search and seizure cases and the fact-pattern models developed there by Segal (1984; Segal and Spaeth 1993). To our

\textsuperscript{2}In Cameron, Segal, and Songer (1993), we provide a simple game-theoretic model of appeals decisions without considering incomplete information in any detail. This model supports the above hypotheses for defendants. There is greater complexity for the government's decision to appeal, however. While the costs of appeal, which are higher for the states than for the national government, lowers the probability of appeal, and the importance of the questioned evidence increases the probability of appeal, other seemingly intuitive variables—for example, the probability of cert or even the relative likelihood of success rather than failure from the appeal—are actually ambiguous in sign. Their sign depends on the magnitudes of effects that tug in different directions. These variables cannot be used to test the model with respect to the government. Other than noting that consistent with our model, the national government, for which appealing entails substantially lower costs, appeals much more often than the states, we focus our attention on the decisions by criminal defendants to appeal.

\textsuperscript{3}We first determined the population of appeals court search-and-seizure cases by searching Westlaw for all cases with the topic "searches and seizures," all Fourth Amendment cases, criminal law topics 219, 226, 364, 365, 394, and 207, plus several relevant combinations of key words. The list of cases generated by these searches were put in a file, from which we took a stratified random sample of 40 cases per year. Any case from our sample that turned out not to be a search and seizure case was replaced with the next listed case. For years in which fewer than 40 search-and-seizure cases were published, all published cases were included in the sample.
knowledge, no fact-pattern analyses have performed as well as the search and seizure models. Segal’s model combines an examination of the place of the intrusion (e.g., home, business, car), the extent of the intrusion (full search versus lesser intrusion), the prior justification (warrant and probable cause), and various exceptions to the warrant requirement (e.g., searches incident to arrest) with a measure of the attitudinal preferences of the Court majority. Using data that add all search and seizure cases decided by the Supreme Court through the end of its 1990 term to the data analyzed in Segal’s earlier (1984) work, a logit model of the Court’s decision making categorized 78% of the cases correctly with a reduction in error of 41%.

Any assessment of Supreme Court preferences over time must consider whether those preferences have changed, and how they have done so. Most systematic attempts to measure change on the Supreme Court or among individual justices have measured the percent of cases decided in a liberal or conservative direction over time (e.g., Brenner and Arrington 1983; Ulmer 1973, 1979). Such designs have much to tell scholars, but they attribute all change to the justices and none to the changing nature of the cases (see Baum 1988 for a notable exception). Fortunately, we already can control for case characteristics. To measure change explicitly we tested a variety of models of how the Court’s decisions have changed in search and seizure after controlling for the facts of the case. We concluded that the model suggesting the Court has become increasingly conservative with each passing term since the advent of the Burger Court is superior to plausible alternatives.4 The parameter estimate for the term variable, .0919, suggests a search that had a 50% chance of being upheld in the 1968 term would have an 89% chance of being upheld in the 1990 term. Our model therefore includes a measure of changing Supreme Court policy orientation that takes the value of 68 during the Warren Court years and increases by one for each successive year beginning with the advent of the Burger Court.

The first step in our analysis was to determine, for each case in our sample of appeals court cases, the probability that the search at issue in the court of appeals would be upheld if the appeals court decision were reviewed by the Supreme Court. The coding rules employed by Segal (1984) were adopted for the coding of each of the case facts in the model described earlier.5 Like Segal, we coded our dependent variable as one if the court either found the challenged search to be

---

4Like Segal (1985), we find that models involving changing constants are superior to models involving changing parameter values of the independent variables. Of the models with changing constants, the one hypothesizing increasing conservatism with each term outperformed models hypothesizing (a) different constants for the Warren, Burger, and Rehnquist Courts, and (b) models suggesting increased conservatism for each replacement of a Warren Court justice with a Nixon, Ford, Reagan, or Bush appointee. The chi-square for the term model was appropriately lower (177.71 for the term model versus 179.81 for the appointment model and 178.63 for the chief justice model), the percent predicted correctly was higher (77.95 versus 76.41 and 76.92), and the significance level of the change variable was lower (.0017 versus .0040 and .0029).

5It should be noted that like Segal we accepted the decision of the lower court as to whether or not subjectively determined facts (e.g., whether or not there was probable cause) were present. That is, we coded case facts from the perspective of their status prior to the decision of the appeals courts.
reasonable or allowed the evidence obtained from the search to be used; if not, the dependent variable was coded zero.

For each appeals court case, the probability that the search would be upheld by the Supreme Court was computed using the parameter values from the Supreme Court model. The log of the odds ratio of the probability that the search will be upheld ($P_i$) can be expressed by an equation of the form:

$$\log \left( \frac{P_i}{1 - P_i} \right) = \alpha + \sum \beta_i X_i + \epsilon$$

where each “$X$” is the case fact and attitudinal variables from the Supreme Court search-and-seizure model, and the betas are the logit coefficients from that model. Substituting the actual values from the Supreme Court model, the following equation was used to generate the log of the odds ratio of the probability that each appeals court search would be upheld if reviewed by the Supreme Court:

$$\log \left( \frac{P_i}{1 - P_i} \right) = -6.019 + 3.256 \text{ incident} + 1.049 \text{ afterlaw}$$

$$+ -0.06 \text{ unlawful} + -0.234 \text{ probcaus} + 1.928 \text{ warrant} + -3.25 \text{ home}$$

$$+ -2.054 \text{ person} + -2.733 \text{ business} + -2.243 \text{ car} + 1.411 \text{ except}$$

$$+ -1.766 \text{ extent} + 0.878 \text{ US} + 0.121 \text{ term}$$

where the first three variables indicate whether the search was incident to or after a lawful or unlawful arrest; the next two variables indicate whether the trial court determined that there was either probable cause for the search or that the search was conducted pursuant to a warrant; the next four variables indicate the location of the search (a home, person, business, or car compared with the reference category of a location without a recognized expectation of privacy); the next variable (extent) indicates whether it was a full or limited search; the next variable indicates whether the United States was the government defending the validity of the search; and the last variable (term) is an indicator of the changing liberalism of the Supreme Court. Solving the equation for the value of $P_i$ (i.e., $P_i = \text{antilog} P_i / 1 + \text{antilog} P_i$) yields an estimate of the probability that the search at issue in the court of appeals would be upheld if reviewed by the Supreme Court. This estimate of the search being upheld ($EST \ UPHELD$) was then used in our empirical model.

Next, we tested variables affecting the likelihood that cert will be granted. The leading explanations of aggregate cert decisions involve two broad categories: conflict (Ulmer 1984; Caldeira and Wright 1988) and cues (e.g., Tanenhaus et al., 1963; Songer 1979; Armstrong and Johnson 1982; Caldeira and Wright 1988). The role of conflict stems directly from the Supreme Court's rule 17, which specifically lists conflict between lower appellate courts or between the lower appellate court and the Supreme Court as grounds for granting cert (Stern, Gressman, and Shapiro 1986, 194). Fortunately, our previously defined $EST \ UPHELD$ variable already measures conflict between the lower-court decision and contemporary Supreme Court preferences. We do not, though, have data on whether lower-court
cases might conflict with other lower-court cases. Nor do we know how, for our sample of cases, such data could reliably and validly be measured.\(^6\)

Of the cues tested by various scholars, the most important has been whether the United States favors review. As our data set consists of cases where criminal defendants lost at the relevant court of appeals, there are no cases in which the United States favors review. Another cue, or perhaps signal, demonstrated to be of importance is the existence of amicus briefs favoring or opposing review (Caldeira and Wright 1988). The decision of groups to support or oppose review typically comes after the appeal is filed and thus cannot be a factor in the decision of litigants to seek review.\(^7\) Two relevant cues from the Tanenhaus study are whether there was dissent in the appeals court case (DISSENT) and whether the Circuit Court overturned the trial court decision (OVERTURN) (see Tanenhaus et al. 1963 and Caldeira and Wright 1988). These factors that make the Court more likely to hear the case should thus make litigants more likely to appeal.

Measuring the seriousness of the crime is not a straightforward task. Some of our petitioners have been convicted and sentenced, while others have not yet faced a trial. We proceed in what we consider to be a reasonable fashion under the circumstances by adding a variable that measures the seriousness of the crime (CRIME): 3 = murder or other crimes of violence; 2 = organized crime, drugs, or bank robbery; 1 = other, including theft, tax evasion, white collar, conspiracy, perjury, gambling, immigration, and firearms.

Finally, we measure litigant resources as a dummy variable coded as one if the litigant is poor and coded as zero otherwise (POOR). To the extent that poor litigants file without legal assistance, they are also extraordinarily more likely not to have their petitions granted. Since our dependent variable is dichotomous (1 = litigant sought review, 0 = litigant did not seek review) we used logit to estimate our model. EST UPHELD and POOR should be negatively associated with the decision to appeal, while DISSENT, OVERTURN, and CRIME should be positively associated with the decision to appeal.

**RESULTS**

Our data consist of 752 search-and-seizure decisions rendered against criminal defendants in the U.S. Courts of Appeals. Of those 752 decisions, defendants appealed 312 (41.5%), incurring the costs of appeal against the joint probability of the Supreme Court granting cert and reversing the ruling.

\(^6\)We could measure allegations of circuit court conflict from petitioners' briefs, but as Ulmer (1984) demonstrates, such claims have little to do with actual circuit court conflict.

\(^7\)McGuire (1993, 121–25) finds that seeking amici at the cert stage is not a frequent activity of the Supreme Court bar, even among knowledgeable insiders. And though he is not specific on this point, the relevant section in his book seems to indicate that the amici-seeking activity that does exist follows the decision to appeal. Moreover, to the extent that groups seek out cases to file briefs on, this occurs after cert is granted (125–26).
TABLE 1

LOGIT ESTIMATES OF DEFENDANT APPEALS

<table>
<thead>
<tr>
<th>Variable</th>
<th>M.L.E.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.46</td>
<td>.42</td>
</tr>
<tr>
<td>EST UPHELD</td>
<td>-1.04**</td>
<td>.42</td>
</tr>
<tr>
<td>DISSENT</td>
<td>.76**</td>
<td>.29</td>
</tr>
<tr>
<td>REVERSE</td>
<td>-.36</td>
<td>.32</td>
</tr>
<tr>
<td>POOR</td>
<td>-.32*</td>
<td>.20</td>
</tr>
<tr>
<td>CRIME</td>
<td>.06</td>
<td>.13</td>
</tr>
</tbody>
</table>

\( n = 752 \)

\( *p < .10; **p < .01. \)

\( \chi^2 = 16.05; \ p = .0067. \)

\( -2 \times \text{LLR} = 1,004.55. \)

Mean of dependent variable = .415.

Reduction in error = 8%.

The coefficients in table 1 show the change in the log of the odds ratio for a decision by the losing litigant to seek Supreme Court review. The results demonstrate that litigants in these cases do respond, to a certain extent at least, to the variables derived from our model. Most important is the variable that measures the estimated probability that the Supreme Court will uphold the search. This variable ranges in value from .10 to .9998. At the .01 significance level we can state that litigants (presumably with the advice of counsel) consider what the Supreme Court would do if it heard their case before filing appeals. The coefficient, \(-1.04\), means that a one standard deviation increase in the probability of the search being upheld decreases the probability of appeals by about .05 from a baseline of .50. A change from the search least likely to be upheld to the search most likely to be upheld decreases the probability of an appeal by .31.

A high conditional probability of having a decision overturned if cert were granted would mean little to a defendant if there were virtually no chance that cert would be granted. Thus, defendants should consider variables related to the granting of cert. First, we note that the variable measuring the likelihood that a granted case would be upheld (\(EST\ \text{UPHELD}\)) also influences the likelihood that cert will be granted (Caldeira and Wright 1988; Ulmer 1984), in that it measures conflict with contemporary Supreme Court preferences. Moreover, dissent on the Circuit Court, which signals the potential of a problematic case to the Supreme Court (Caldeira and Wright 1988; Perry 1991; Tanenhaus et al. 1963; Ulmer 1984), also increases the likelihood of appeal. The coefficient for the variable measuring dissent, \(.76\), means that a litigant undecided about appealing in a case without dissent (\( p = .50 \)) would have a .68 probability of appealing an exactly similar case that contained a dissent.

A second variable related to the increased likelihood of cert in the literature, reversal of a lower-court decision, is not significantly related to filing an appeal in
these cases. One possible explanation is that litigants do not perceive this to be relevant to the Supreme Court's cert decisions.

Also failing to produce positive results is our measure of the seriousness of the crime. Although the estimate is in the expected direction, the coefficient is approximately half the size of its standard error. Apparently, those facing shorter prison terms are no less likely to appeal than those facing life in prison.8

Finally, criminal defendants who have fewer resources are slightly less likely to appeal than those with greater resources. The coefficient, −.32, means that being poor decreases the probability of appealing by a modest .08 from a prior baseline of .50. In some ways, poor litigants might be considered more likely to appeal, as they can appeal in forma pauperis. But as those appeals are almost universally denied (Segal and Spaeth 1993, chap. 4), that option is virtually worthless. The unwillingness of most poor litigants to avail themselves of that option demonstrates this.

Overall, our model is significant at $p < .01$. Nevertheless, it makes but a modest 8% reduction in error over a null model in which defendants never appeal to the Supreme Court. Thus, we could hardly claim that we have uncovered all, or even a substantial proportion, of the factors that influence appeals by criminal defendants. What we do show, though, is that whatever else is involved, rational behavior is also in evidence. Given that there is no other work in this area, either formal or empirical, we believe this is a worthwhile start.

**DISCUSSION**

This article demonstrates that criminal defendants engage in seemingly rational behavior in their decision whether to appeal adverse Circuit Court decisions to the Supreme Court. In some sense, this finding is not terribly surprising: many analysts of courts assume that the actors in the process are instrumentally rational. Yet as Green and Shapiro (1994) note, rational-choice models need to be tested.

Of course, our results are limited in that we only examine one issue area: search and seizure cases. Certainly, had we been able to find similar results across the gamut of cases heard in federal courts our results would have greater scope. But given the need to be able to predict expected Supreme Court outcomes, choosing a specific subject area was absolutely essential. A global model of appeals would require a global model of Supreme Court decision making that included fact patterns from all the different types of cases the Court hears. This cannot be done, and thus researchers must fill in the gaps in a piecemeal fashion.

Whether search-and-seizure decisions are the best place to start may also be questioned. We chose these cases because in our opinion the Supreme Court models developed there have more explanatory power than the models developed in other areas. But that is not to say that search-and-seizure cases are unique in being

---

8Recognizing the limits of our measure, we tried a series of alternative specifications. None worked any better than what we report here.
explainable by fact patterns. Research in capital punishment (George and Epstein 1992), obscenity (Hagle 1992; McGuire 1990), sex discrimination (Segal and Reedy 1988; Wolpert 1991), and the establishment clause cases (Ignagni 1990) all demonstrate the robustness of this approach. Of course we cannot claim rational behavior by litigants in other areas of the law based on our research, but one positive claim is a substantial improvement on no positive claims.9

Our research also has important implications for decision making at the Courts of Appeals and at the Supreme Court. Circuit Court responsiveness to the Supreme Court is always questionable in a world where the Supreme Court can only hear a small fraction of the cases appealed to it. Previous research has demonstrated that rational behavior by litigants, insofar as they appeal lower-court rulings not in line with upper-court preferences, is a necessary condition for hierarchical control in the judiciary (Songer, Segal, and Cameron 1994). We see here for the first time evidence of such behavior.

REFERENCES


9Future research might extend beyond additional areas of inquiry to additional modes of inquiry. Interviews with litigants and attorneys might further flesh out some of the rationales for taking, or not taking, cases to the Supreme Court.
Rational Actor Theory of Litigation


Donald R. Songer is professor of government and international relations, University of South Carolina, Columbia, SC 29208.

Charles M. Cameron is associate professor of political science, Columbia University, New York, NY 10027.

Jeffrey A. Segal is professor of political science, State University of New York at Stony Brook, Stony Brook, NY 11794.